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A different perspective on the Carolingian economy: Material culture and the role of rural communities in exchange systems of the eighth and ninth centuries

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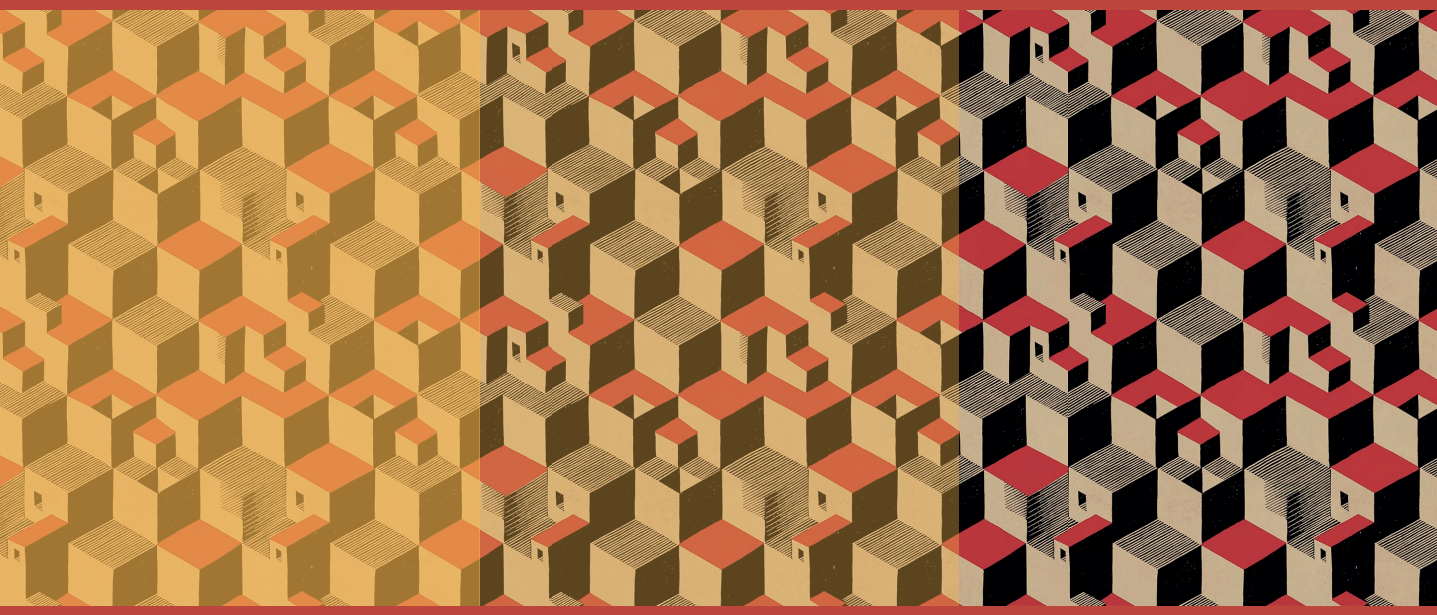
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A different perspective on the Carolingian economy

A. W. A Kemme

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Material culture and the role of rural communities in exchange systems of the eighth and ninth centuries

A. W. A. Kemme



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Material culture and the role of rural communities in exchange systems of the eighth and ninth centuries

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Introduction

Introduction

What was the role of peasants in the economy of the Carolingian period?[1] A question that has rarely been asked explicitly and less often still answered satisfactorily. This was, in essence, the premise of the Charlemagne's Backyard project of which the present study represents one part. The project was initiated in order to better understand rural inhabitants' role in shaping economic systems of the eighth and ninth century, through the study of archaeological evidence. The main issues the project is intended to address are how rural production was organised, to what extent the Carolingian period can truly be considered a period of economic growth, and how exchange and the manorial system developed in the course of the eighth and ninth centuries. This study focusses on the role of rural communities in the development of exchange systems during the Carolingian period. To what extent did the consumptive preferences of rural communities influence the flow of goods at a regional and interregional level?

There have been many attempts at characterising the nature of exchange in the Carolingian period. The study of the rural economy of the Carolingian period has up till now predominantly been conducted by historians. Archaeologists interested in economic issues regarding this part of the Early Middle Ages have tended to concentrate their efforts on the kind of exchange relations that existed in long-distance transactions. Exchange relations in a rural context have seldom been examined based on archaeological data.

The current consensus is that there was an upturn in economic fortunes in northwestern Europe in the eighth and ninth centuries. These centuries are thought to have witnessed an explosion in cultural expression, building activity, jurisprudence and liturgical reform. The causes for this upturn are mostly explained by direct or indirect involvement of elites in society, the king, the church, large landholders. Their consumptive needs led to increased demand for luxury items and this in turn led to the development of regional and supra-regional exchange networks where such goods circulated. These same networks allowed the transport and exchange of more mundane items in bulk over large distances. Rural communities of the Early Middle Ages are deemed not yet a sufficiently potent group to sustain long-distance trade in bulk goods and to generate demand sizeable enough to instigate economic growth. Therefore, the vast majority of the population is not seriously considered as an actor in existing models and are certainly not thought to have been a constitutive element in the development of exchange systems.

Research aims

The present research is not only an attempt to highlight an otherwise understudied aspect of eighth and ninth century society, but to challenge the idea that rural communities were effectively marginal in large scale developments. The study of material culture will make it possible to reconstruct rural inhabitants' ability to acquire objects and thereby get a glimpse of the networks they were part of.

Cultivators require certain items in order to be able to make their holding work, such as ploughs, pots, clothing. In addition objects used in ceremonies may be necessary. Furthermore, the requirement of some monastic institutions for payment of dues in coin will have necessitated the sale of goods, one way or another. Most of such items could have been produced within the household.

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1 What is understood by 'Carolingian period' in the present study will be explained later in this introduction.

However, it is clear from the archaeological record of the Carolingian period that in most areas of the Netherlands a number of goods were acquired from outside the household, but not the same range and not in equal amounts in every region.

An important question is what caused the distribution patterns of goods on rural sites that can be observed in the archaeological record? This will depend, at least in part, on dwellers overall relationship with the outside world. A tenant may acquire items through other networks than an independent cultivator. Were objects used in rural households usually bought and sold at local markets, imported goods being brought to these markets through some form of middleman? Or did rural dwellers visit larger regional markets and exchange hubs, such as have been discovered along the Rhine in order to trade directly with merchants coming from the source of manufacture?

Chris Wickham has claimed that the distributed volume of bulk goods such as pottery can be used to measure the complexity of economies.[2] The complexity of the exchange system in early medieval northwestern Europe was dependent on the wealth of the aristocracy and the demand they created, because they were the most reliable buyers.[3] Was it then the non-producing elite that created a demand for pots, millstones, ploughs and other implements required for cultivation? For some items and in some situations this may have been the case, for instance if it was felt the items would enable higher productive output and thus lead to a larger surplus and greater rent extraction from holdings. However, for other objects, such as pots, this seems unlikely.[4] Does the assertion that ceramics can be used as a proxy for the complexity of exchange systems stand up under scrutiny when the full assemblages of rural sites are taken into account?

A more general question is whether attempting to define the level of complexity of exchange systems is an appropriate means for understanding such a system? In fact, what does it mean to label an economy more or less complex than another? Instead of trying to assess the relative complexity of exchange systems this study aims at understanding what the role of various agents, institutions and environmental factors may have been in shaping such systems, in other words, in what way they were complex. For example, to what extent did the landscape create opportunities or impose boundaries on the flow of goods? Or, if Carolingian institutions and aristocrats were largely responsible for the distribution of objects then why do find assemblages on sites in some regions annexed by the Carolingians not become more similar to those already under Frankish rule? What role did merchants have in creating the kind of variability we see in material culture profiles between different parts of the research area? To what extent can developments that took place in the production and distribution of items be discerned through changes in the composition of find assemblages on sites? And how did rural communities' consumptive preferences influence the production and distribution of goods? In examining all of these issues, and others, it will be the extent to which they had an influence on, and were affected by rural communities consumptive preferences that forms the main focus of study.

Finally, this will be the first major overview of Carolingian material culture in the Netherlands since the introduction of Malta-archaeology. Aside from a few exceptions at the regional level, synthesis of pre- and post-Malta excavations of Carolingian find-assemblages has not been undertaken yet. This is the first of its kind at a national level. In particular, the analysis of eighth and ninth century ceramics represents the first comprehensive investigation of its kind for the Netherlands as a whole.

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2 Wickham 2005, 700.

3 Wickham 2010, 222.

4 To an extent Wickham agrees that peasants demand had a role to play but only at a regional level, it was not sufficient to enable bulk exchange (Wickham 2005, 699-700).

Spatial and temporal boundaries

The research area consists of the current borders of the Netherlands (fig. 1). The choice for this specific research area is to a large extent based on the availability of a sizeable dataset of rural settlements. The introduction of contract archaeology in the Netherlands has meant a substantial growth in the amount of Carolingian findspots. The nature of the commercial model that has been developed in the Netherlands means that, for better or worse, research has been carried out relatively indiscriminately across the country, although the predictive models used to evaluate the potential of a development plot can sometimes be questioned. The upside is that our knowledge has grown significantly in areas where before little was known, even if some regions remain comparatively under-examined. This spate of new research, added to an already rich tradition of large scale settlement research pre-dating Malta-archaeology has led to a substantial potential source of data, waiting to be tapped.

The research area is also of interest in relation to the debate on exchange in the Carolingian period because it allows us to examine the interaction between different scales of exchange systems. Several important exchange routes pass through the area, making it possible to infer how more local and regional exchange networks were connected to long-distance exchange. Furthermore, the research area contains substantial regional variability in terms of landscape, historical developments, cultural spheres and institutional influence, providing further parameters for understanding variability in material culture profiles.

Besides spatial differences in the distribution of finds another important aspect is changes in distributions over time. For that reason the research will not be limited entirely to the eighth and ninth centuries but also take into account the later seventh and early tenth century where relevant. From the outset of the research it was clear that important changes took place in the composition of find assemblages at the end of the Merovingian period and beginning of the Carolingian period in several regions in the Netherlands. In other regions the transition does not seem to have been so dramatic. Examining these temporal and spatial aspects can help understand what was specific for the Carolingian period, though it is also necessary to identify developments within the period as clearly as possible in order to interpret the distributions of artefacts in their relevant context.

Comparisons between regions in terms of material culture profile lie at the heart of much of the analysis in this study. In order to make these comparisons it was first necessary to define regions. The exact manner in which this was done is set out in chapter 2. However, it is important to stress here that the regions are not intended to represent political, cultural or ethnic units. In fact, any such identifications have largely been avoided throughout the research because they may hinder rather than help the interpretation of inter-regional variability in material culture. Political or ethnic labels often come with sets of expectations that can implicitly rule out certain interpretations.

Equally, assigning developments to either a ‘Merovingian’ or a ‘Carolingian’ period has been avoided. In the present research the terms are occasionally used as shorthand for the sixth and seventh, and eighth and ninth centuries respectively. Making broad distinctions between Merovingian and Carolingian period (material) cultural traits is sometimes justified. For instance, for ceramics two traditions can be distinguished, with clear differences in the appearance of vessels and in the range of functions represented in the corpus. Broadly speaking, these can be assigned either to the sixth and seventh centuries or the eighth and ninth centuries. However, when using period labels it is important to keep in mind that there is a risk of ignoring the poorly understood transition between the two traditions. The labels have a tendency to mask the exact mechanisms and processes through which the transition between the two periods took place, and the existence

of developments within them as well. The labels become a substitute for dates, without the dates actually having been established in sufficient detail. Moreover, the transition turns out to have occurred over different timescales, and taken different forms depending on the area and material under investigation.

Thesis structure

This thesis has been divided into three parts. The first deals with the general background of the study, namely an overview of the debate on the Carolingian economy as it now stands, the methodology of data collection and issues related to formation processes. In the second part the collected data is analysed per find category, namely the ceramics, metals and stone artefacts. Other find categories, although inventoried, have not been studied in detail because for various reasons their distributions were not comparable throughout the research area.[5] In the final part of this investigation the analysis of the finds is placed in a wider context and then interpreted in order to better understand the functioning of exchange systems in the eighth and ninth century.

Data collection consisted of two phases. The first was to assemble a general database of findspots intended to inventory sites which contained information relevant to the research. A large amount of these findspots have not been published in great detail; rarely completely, sometimes piecemeal but often there is little more than a brief overview. Nonetheless, a sufficient body of evidence has been compiled with which the aims of the research can be achieved. The second phase of data collection entailed quantifying, as much as possible, the amount of finds per findspot, per context and per find category. At the most basic level the amount of finds per findspot, per find category was collated, which in itself was not always possible based on published data. Where possible, finds were recorded at the level of structures. For the purposes of this research, the most important aspects of finds are their provenance and function, and the manner of their recording reflects this. The methodology related to data collection is described in detail in chapter 2.

The importance of examining the distribution of finds at site level stems in part from the need to factor in the effects of formation processes at the regional and national level. For example, a number of sites along the mouth of the Oude Rijn were situated near natural gullies which often prove to be very rich in finds, whereas sites on the coversands of the east and south of the research area do not have such find-rich features. It is important to factor in these differences when comparing sites and regions. Therefore, before concentrating on reconstructing exchange networks the effects of formation processes on the archaeological record will be examined. The number of finds per find category can be compared per site and per region in order to determine whether particular categories are more likely to be present on sites in certain regions or soil types and what influence the nature of a context-type has on the variety of objects that are found in them. The effects of formation processes on the interpretation of the data is discussed in chapter 3.

In practice only a small number of find categories are suitable for reconstructing distribution patterns. These are ceramic, metal and stone artefacts each of which is examined in a separate chapter in the second part of the research. Ceramics form the bulk of the finds from sites in our inventory. Much of the ceramics found on rural sites in the research area can be provenanced reasonably accurately, but the dating of the introduction and abandonment of specific vessel types and wares from particular manufacturing sites is more problematic. It is crucial to understand

5 The reasons are set out in chapter 3.

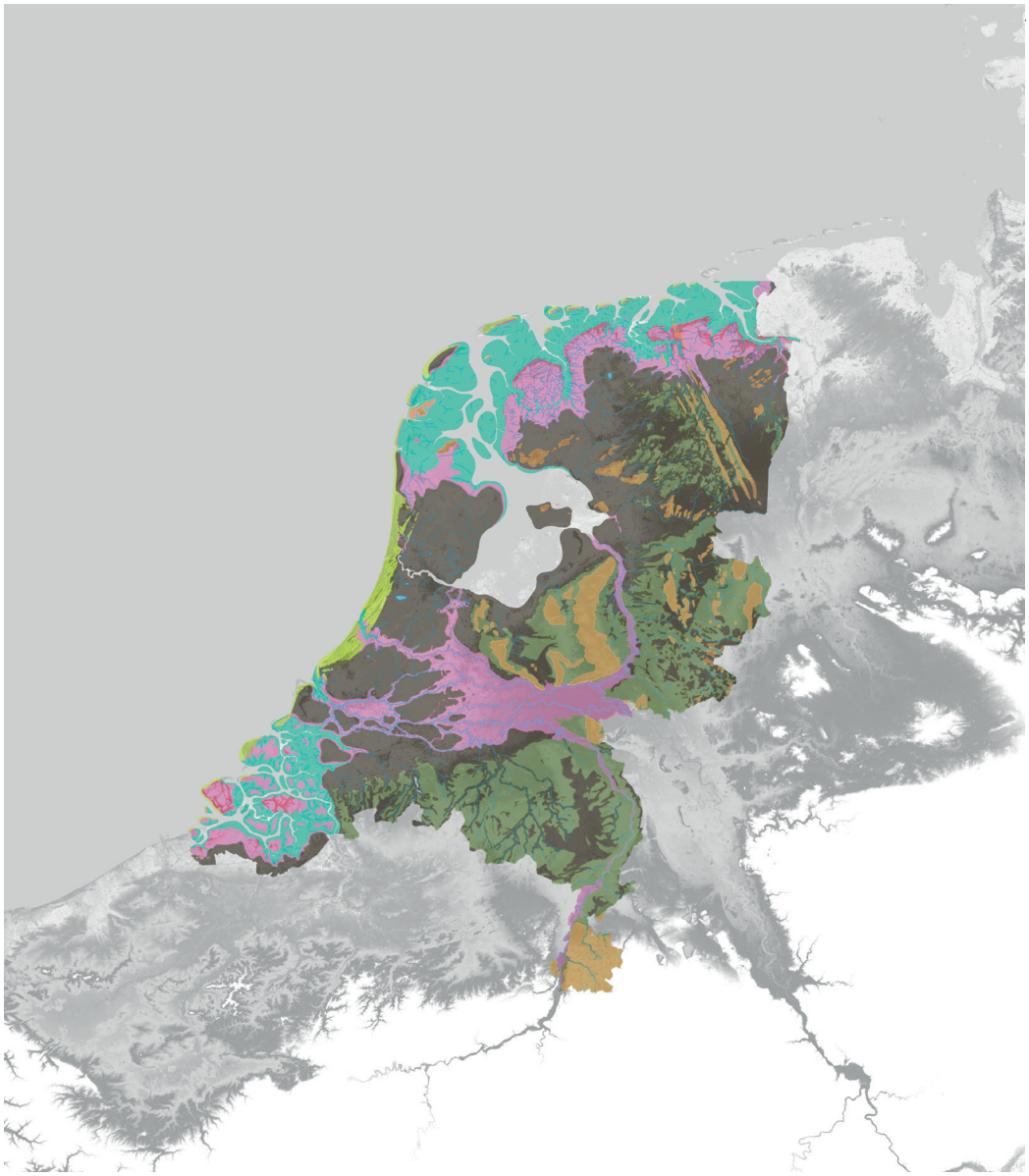


Fig. 1 Research area indicated in colour. For a description of what each colour represents see fig. 2.2.

reconstructing them as far as the available literature and evidence from our sites allow. The second main focus of the chapter lies in examining what the data collected for this study reveals about inter- and intra-regional variability in the consumption of ceramics sourced from the various known production centres of our period. Variations in the composition of ceramic assemblages are analysed in terms of the presence of vessel types and more broadly function groups.

Metal artefacts form a variegated set, in terms of the actual metals used, but also with regard to the function of the artefacts that were manufactured in each specific metal. Iron is one of the few goods that could have been produced beyond local needs on rural sites in the research area. For this reason the evidence for iron production and working is discussed in some detail. Among

the artefacts themselves copper-alloy brooches provide an excellent means of identifying regionally specific preferences and how these may have developed. Coinage, an artefact category always closely associated with exchange, is analysed in connection with developments in rural communities access to (or interest in) it.

Millstones form the most important group among the stone artefacts. They are particularly important because their distribution can be contrasted with ceramics produced in Mayen, where the vast majority of millstones discovered on our sites also originated.

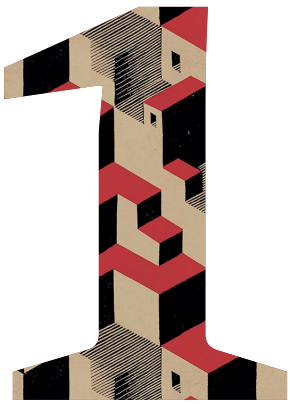
Part III sets out to contextualise and interpret the patterns identified in the data presented in part II. In order to fully understand those patterns it is necessary to take developments in areas surrounding the research area into consideration. Chapter 7 reveals that (developments in) ceramic assemblages on sites in some of our regions are markedly different from what was happening in for example Belgium or northern France. At the same time, other developments can be seen to have been quite similar throughout northwestern Europe. For ceramics, contextualising also means considering in more detail what the impact of changes in the appearance of vessels and the relationship between producers and consumers may have implied for rural inhabitants.

From the analysis and contextualisation of finds it will become apparent that the available evidence is not suitable for the establishment of a single, all-encompassing model of how exchange functioned in the eighth and ninth centuries. There are simply too many unknown or partially known variables to allow for the construction of such a model. Therefore, the approach taken in the final chapter is to examine several scenarios that may have influenced how rural dwellers were able to access goods and determine to what extent they are compatible with the available evidence.

One final point should be made here about peasant communities that is of importance for the remainder of the research. As discussed in the following chapter, historians' conceptions of peasants are rooted in descriptions contained in specific kinds of documents. Peasants are mostly defined on the basis of their juridical and tenurial status and separated into several groups including free peasants and peasants under various forms of subjugation. These groups are practically impossible to connect with the sources at archaeologist's disposal. Settlements, certainly at a regional level, often differ little in terms of size of building and yards and their associated artefacts, showing few signs of social or legal differentiation between past inhabitants. Therefore, in the remainder of my research I will follow Theuws in making the distinction between 'textual peasants' and 'archaeological dwellers'.[6]

6 Theuws in press a.

PART I



The debate

Introduction

This chapter aims to highlight the aspects of the current debate on the Carolingian economy among historians and archaeologists which are relevant for an investigation of the nature of exchange.

The debate on the nature of the early medieval economy has long concentrated on the relative importance of agrarian production on the one hand and exchange, particularly long-distance exchange, on the other. The origins of the current debate can be traced back to the works of Pirenne and Dopsch at the beginning of the nineteenth century.[1] Since then the arguments put forward by these two scholars have been contested and refined. New elements have been added such as the importance of craft production, gift-exchange and ritual for a better understanding of the development of the early medieval economy.

At present there sometimes seem to be two separate debates which are not always well articulated. One is mostly concerned with the agrarian elements of the economy and ultimately focuses on explaining the economic growth which is presumed to have taken place during the Carolingian period. The other discussion is primarily interested in identifying the characteristics of exchange in the Early Middle Ages, often ostensibly in order to explain the rise of towns from the late ninth and tenth century onward.[2] Where one of these themes is stressed, developments in the other are often presented as a consequence rather than an active constituent.

Despite the many current differences of opinion about the more detailed functioning of the Carolingian economy in comparison with preceding centuries, economic growth is almost unanimously and unquestioningly believed to be a defining characteristic of the Carolingian period. Moreover, only few historians bother to examine what this presumed economic growth actually entailed. Was there an increase in the absolute volume of agricultural output, was there growth in gross domestic product (GDP), or a rise in income per capita? These are all different measures of the state of an economy and each has a different meaning for our understanding of the effects that any growth may have had for groups in society. We shall see that a small minority of historians and archaeologists are less convinced that the Carolingian economy experienced overall growth.

A perhaps even more unanimously held position is that elites played a crucial role in the direction taken by the entire economy, be it positive or negative. The general trend is to see elite demand, which often is believed to include royal and ecclesiastical dues, as a positive driving force for increased agricultural production and exchange. Again, a small number of scholars has a different view but only in as far as elite intervention is considered to have had negative consequences for agricultural output, craft production and the development of trade. The actual importance of elites in this respect is rarely contested.

Tied up with these broader themes are more detailed aspects such as the importance of the gift-economy and the role of prestige goods, monetisation, manorialisation, the level of state intervention in the economic sphere and the degree to which exchange was embedded in social practise. There are aspects for which archaeology cannot conceivably offer new insights, for instance the effects that the juridical status of various groups in society had on their ability to participate actively in the economy. Establishing whether the inhabitants of an excavated settlement were free or unfree, tenant or independent proprietor or a mix of these categories realistically lies beyond the scope of archaeological inference.[3] This implies that some themes, which may well be important for a full understanding of the Carolingian economy, will be discussed in less detail than others and some

1 Pirenne 1937; Dopsch 1921-2.
2 Verhulst 2002, 132-135; Hodges 2012, 136-138.
3 Theuws in press a.

elements will simply not be highlighted, such as the origins of manorialisation or the extent of the slave trade.

Finally, as it is the aim of this chapter to present the debate on the Carolingian economy as it relates to the research at hand, namely networks of exchange in the context of rural communities, and not to produce a complete historiographical overview of the debate, it is limited to what are considered currently to be the most influential or important viewpoints. We will first examine trends in the debate among historians and archaeologists separately and then look at how the role of peasants in the economy is conceived by scholars in both disciplines.

1.1 Historians' models of the Carolingian economy

One of the key questions in the historical debate on the early medieval economy is how to explain the so-called Carolingian Renaissance. How were the means to build palaces like Aachen and Ingelheim and the many great monastery churches procured? As mentioned above, the fact that the period was characterised by economic growth is generally accepted, yet there is a problem explaining this phenomenon. Several factors have been suggested, for example the development of the bipartite manor, the presence of relatively stable state structures, population growth and new technologies and agricultural practises.

Adriaan Verhulst saw the development of the classical bipartite estate as the major innovation of the Carolingian period, an innovation probably stimulated by Carolingian rulers.[4] According to Verhulst the prime motivation for creating manors was to increase production by optimising efficiency, in order to increase deliveries to church, court and army.[5] However, in what respect the bipartite estate system was more efficient remains somewhat obscure. In Verhulst's analysis this can certainly not be found in an increase in yield ratios. Instead increased output is supposed to have been achieved through reclamations, the creation of large uninterrupted blocks of land and the introduction of the three-course crop rotation system, in other words using more land more intensively.

Since Philip Grierson and George Duby it has become increasingly common in historical and archaeological research on the Early Middle Ages to view the economy of this period as grounded in different principles than those of the modern era.[6] Economic relations have come to be seen as embedded in social relationships. This has led some to suggest that redistributive systems of gift exchange or patronage networks among the elite were the ultimate driving force behind the growth of the Carolingian economy.[7] In this view, propagated among others by Matthew Innes, the king played an important role in generating the networks of patronage which came to dominate the Carolingian economy. Royal patronage had already been a key aspect of aristocratic status in the seventh and eighth centuries when gifts were primarily redistributed from plunder and war booty. Items such as high quality weaponry and brooches were not commodities because their value lay more in the relationships they helped build and maintain.[8] When these forms of income began to dry up at the end of the eighth century the resources necessary to keep patronage networks afloat started

4 Verhulst 2002, 33-60.
5 Verhulst 2002, 59.
6 Grierson 1959; Duby 1973, 60-69; Devroey 2003, 175-178.
7 Innes 2009, 46-48. According to Innes non-elites could also profit from these networks, but they were not responsible for their instigation or maintenance.
8 Innes 2009, 47-48.

to be extracted from agricultural production. The upkeep of relationships within the aristocracy is considered to have given direction to a substantial portion of manorial estate management. Again, the king was the main initiator, introducing the manorial system which was soon embraced by large ecclesiastical institutions, which at any rate were structurally linked to the royal house.[9] These institutions were required to produce surpluses in order to meet royal demands, in particular in view of supplying the army.[10] Aristocrats, wishing to play a part in the patronage networks of kings and ecclesiastical institutions similarly set out to produce surpluses which could be transformed into objects suitable as gifts. Although the 'state', in the form of the king and ecclesiastical institutions, are deemed to have been the initiators of patronage networks, this model does not imply that their actions should be interpreted as intentional economic policy. On the contrary, the exchange mechanisms which were the result of patronage networks were mostly an unintended by-product.

For Chris Wickham as well, economic growth in the Early Middle Ages is intimately tied up with elite demand. In his view the Early Middle Ages are characterised by increasing aristocratic domination over peasants. In many parts of Europe the aristocracy is considered to have been relatively weak after the collapse of the Roman Empire, up to the seventh century.[11] Although Wickham believes northern Gaul was an exception to the rule, even there tenants are thought to have been subjected to less intensive exploitation than they had been under Roman rule.[12] From the seventh century onwards aristocrats began to gain increasing control over the peasantry in most areas, especially in the heartlands of the Frankish empire.[13] By the Carolingian period aristocratic dominance was more or less complete. The bipartite estate was the result of the aristocracies wish to increase production in order to take advantage of increased possibilities for exchange.[14] In fact the aristocracy was the only group in society that was wealthy enough to ensure that consistent demand for bulk exchange within regions became viable. This consistency also made craft specialisation possible.[15]

The positive appraisal of economic developments in the Carolingian period has not always been shared by all. In his 1973 work *Guerriers et paysans,* VII^{e}-XII^{e} *siècles : premier essor de l'économie européenne*, George Duby presented a view of early medieval north-western Europe as a bleak, harsh, backward world where innovation was almost non-existent and people used primitive and ineffective tools made mostly of wood. Despite the rather negative overall assessment of the early medieval economy, Duby did see growth in production during the early and late phase of Carolingian rule intersected by a period of decline in the first half of the ninth century.[16]

Like Wickham, Duby did not view aristocratic dominance as a wholly positive development, as they only achieved growth through exploitation of the peasantry, forcing them to work harder in order to deliver higher rents. Neither, in Duby's model, is the development of the bipartite estate an unambiguous success story. The bipartite manor, instigated by kings and monasteries, is considered to represent the most advanced form of agricultural organisation at the time. However, the level of labour services on these estates is interpreted as an indication that ploughs were rather ineffective,

9 Verhulst specifies that this development started on royal estates in the area between the Seine, Meuse and Rhine (Verhulst 2002, 34).
10 Devroey 2006b, 570-579.
11 Wickham 2005, 178-180, also 180-184 for Wickham's reasons for arguing for a relatively uninterrupted aristocratic presence in northern Gaul.
12 Wickham 2005, 534.
13 Wickham 2005, 570.
14 Wickham 2005, 290.
15 Wickham 2005, 706-707.
16 Duby 1973, 96-97.

and yield estimates for various crops based on the polyptych of the royal manor at Annapes, very low.[17] The advantages of the bipartite estate are supposed to have been a lowering of staff costs and generating enthusiasm among tenants, which in turn led to higher productivity and ensuring replacement of tenancies through hereditary rights. However, as with aristocratic domination this is thought to have put extra pressure on an already undernourished peasantry, without this leading to the development of new techniques or the expansion of arable land. With a supposed population growth occurring from the late seventh century onward requiring more mouths to be fed the cumulative effect was an agricultural crisis by the early ninth century. Peasant resistance of their exploitation is read by Duby as an indication that the manorial system described in polyptychs was disintegrating by the second half of the ninth century; in fact, the polyptychs themselves are understood as attempts to stave off any further decay of the system.[18] Supposedly, this worked during the first half of the ninth century after which population pressure became so great that technological innovation and reclamations were initiated.

In these scholarly discussions Jean Pierre Devroey stands out by questioning the nature of economic growth rather than treating it as something merely to be explained. He mainly criticises the current debate, first of all on the grounds that the modern concept of economic growth as a complex, long term process was anachronistic for the Early Middle Ages and long after as well.[19] Optimal economic action entailed maintaining the existing state of affairs. Second, growth can mean different things to different groups at different times, for example tenants may experience growth in net income with the lightening of dues. Also, forms of cooperation between tenant and lord may lead to a lightening of workload and more prosperous conditions for both. Third, it should be made explicit what is meant by growth, for example whether it implies an increase in GDP, income per capita or increased total (agricultural) output.

Although Devroey questions what we should understand by growth and what different kinds of growth could mean for specific groups in society, he does believe the period from the seventh to the eleventh century saw steady economic improvement.[20] In other words, Devroey does not truly question the basic premise that growth occurred, just which form it took in addition to how it can be explained.

For most historians exchange in the Carolingian period was ultimately a consequence of surpluses created on royal, ecclesiastical or secular aristocratic estates.[21] Surplus production was not the primary aim of these manors, which was to provide the goods necessary within the households of landowners. Although past notions of royal and ecclesiastical estates having been mostly geared towards self-sufficiency are now largely obsolete, the idea of them working with an explicit profit motif is also generally rejected.[22]

For many scholars, exchange in the Carolingian period is considered mainly a means of translating surpluses into goods not produced on lords' own estates. This could involve foodstuffs or tools, but also items exchanged within networks of patronage. Duby framed exchange in the Early Middle Ages, up until the ninth century, almost entirely in terms of gift exchange, which also include the dues owed to lords.[23] These were exchanges within reciprocal relationships and trade

17 In fact these estimates are today no longer deemed realistic (Devroey 2003, 115-119).
18 Duby 1973, 111.
19 Devroey 2006b, 359-363.
20 Devroey 2006b, 373-375; Devroey 1998, 70-73.
21 Duby 1973,112-113; Verhulst 2002, 87; Devroey 2006b, 556-558; Costambeys *et al.* 2011, 328-329.
22 For example Costambeys *et al.* 2011, 335; Verhulst 2002, 128-129.
23 Duby 1973, 62-63.

was essentially marginal within early medieval Europe. Perhaps the other extreme is represented by Michael McCormick who strongly rejects a view of an inward turned Carolingian empire with relatively little commercial exchange and manors geared primarily toward self-sufficiency.[24] In fact McCormick treats the bipartite manor as clear evidence for economic dynamism in the Carolingian period. In his view, the internal redistributive systems of manors encouraged the development of local and more centralised markets where surpluses could be sold for profit. Others, such as Devroey are positioned somewhere in between: they argue that it was primarily patronage networks, together with the internal redistributive systems of royal, ecclesiastical and aristocratic domains which encouraged the development of regional and long-distance exchange in the Carolingian period.[25] The vast geographical distribution of royal, monastic and some aristocratic estates meant that produce needed to be transported in one way or another from outlying properties to the residences of their proprietors. Partly, this may have happened through the obligations of transport and labour services owed by dependents of bipartite estates. Dues from monastic estates were in some cases to be brought to regional collection centres by tenants as part of their services from where goods were transported further to the abbey.[26] This created a system of regional and interregional transport; according to Innes there may have been room for trade on the back of these redistributive mechanisms.[27] Peasants charged with transport duties could have sold some of their own produce at markets around the main centres of exchange or royal palaces.[28] Verhulst and Devroey believe a considerable portion of transportation and exchange was undertaken by dependents of estates or at least by individuals who were tied to estates for set periods.[29] Meanwhile McCormick places more emphasis on the role of professional merchants, who lived solely off of commercial exchange.[30] These were active across Carolingian Europe, some working within regional or interregional networks, others over longer distances, perhaps spanning the entire Mediterranean and further.[31]

Stephane Lebecq is another historian who argues for an important role for agents of ecclesiastical institutions and the lay aristocracy, but also stresses the importance of the activities of the peoples inhabiting the regions surrounding the North Sea.[32] From the early seventh century onward inhabitants of these parts engaged in exchange amongst each other. In the eighth century these networks came to the attention of inland elites who were starting to produce an increasing volume of agricultural goods. According to Lebecq, these two developments stimulated each other, which in turn encouraged the inhabitants of the North Sea region to venture further inland in order to trade, and landed elites (including ecclesiastical institutions), to actively engage in sale of surpluses beyond their own direct needs.[33]

Wickham holds a similar view. Whereas he also attributes the flourishing of exchange in the Carolingian period to increased surplus extraction on aristocratic manors, he believes this was intentionally pursued by landlords who wished to convert surpluses into other agricultural and artisanal goods.[34] Surpluses were, in other words expressly created for sale at markets. To put it

24 McCormick 2001, 6-10.
25 Devroey 2006b, 581; Costambeys *et al.* 2011, 337, 346-347.
26 Devroey 1979, 547-548.
27 Innes 2009, 49.
28 Verhulst 2002, 89.
29 Verhulst 2002, 113; Devroey 2003, 154-155.
30 McCormick 2001, 644-647.
31 McCormick 2001, 639-695.
32 Lebecq 2000; Lebecq 2005, 658-659.
33 Lebecq 2000, 147.
34 Wickham 2005, 289.

succinctly, according to Wickham the expansion of the manorial system was caused by an increased incentive to produce surplus meant for exchange, not the other way round as we saw above.[35] This does not necessarily imply a pure profit motive, for increasing production, ultimately for use in exchange may still have been pursued to satisfy the demands of an elite lifestyle. Gift exchange and local exchange were not large scale enough to characterise the entire economic system and while redistribution systems within a manorial setting may have been quite voluminous, for Wickham trade in bulk goods such as ceramics and glass is the principle marker of the scale and complexity of any economic system.[36] Wickham suggests the buying power of great landowners and the scale of movement of goods between their lands was perhaps even enough to substitute for a tax system such as existed under the Roman Empire.[37]

It is relevant to note that ceramics are considered by Wickham to be the best way to examine patterns of large-scale exchange because they are most common on archaeological excavations and can be reasonably well provenanced.[38] McCormick presents a similar argument but lays more emphasis on the relationship between political developments and pottery distributions. He sees a correlation between the spread of Rhineland ceramics and the annexation of new territories under the Carolingians as well as the expansion of monastic property.[39]

The role of towns within the early medieval economy is, in general, a marginal topic within historical discourse. *Emporia* such as Dorestad or Quentovic are often viewed as one of a series of places where surpluses not needed within the estate structure may have been sold off.[40] There is some discussion over the extent to which *emporia* such as Dorestad were creations of Carolingian rulers. Duby saw monarchs as actively involved in controlling markets and long-distance trade.[41] Others such as Verhulst believe that, though kings clearly showed an interest in regulating exchange, this cannot be taken to imply they explicitly wished to encourage or control it.[42] In his view the evidence is simply too ambiguous. On the one hand rulers presented themselves as protectors of merchants and trade for which they claimed income from tolls in return. They also attempted to curb the proliferation of tolls. On the other hand the burden of tolls extracted by kings, especially at the borders of the empire can be considered a negative influence. Others, such as McCormick and Bruand believe the evidence for extraction of tolls is actually a witness to the vitality of trade for it suggests that the volume of exchange was sufficient to overcome the burden of toll- and tax collection.[43]

Verhulst, following Lebecq, believes *emporia* originated in the context of a North Sea trade network which was developed mainly by Frisians and started in the middle of the eighth century, although Lebecq himself traces its origins further back to the beginning of the seventh century.[44] In Lebecq's view the earliest ports were spontaneous creations and preceded by geographically diffuse exchange along the coasts of the North Sea, such as at beach markets.[45] However, early on the rulers on all sides of the channel recognised the potential of these sites and sought on the one hand to

35 Wickham 2005, 802. However, the extent of the spread of the bipartite system under the secular aristocracy in Carolingian northwestern Europe is not at all clear from historical sources.
36 Wickham 2005, 700.
37 Wickham 2005, 804.
38 Wickham 2005, 702-703. The validity of this claim will be examined in the final part of the research.
39 McCormick 2001, 659-669.
40 See for example Verhulst 2002, 112.
41 Duby 1973, 97.
42 Verhulst 2002, 129-130; Costembeys *et al.* 2011, 344.
43 McCormick 2001, 641; Bruand 2002, 118.
44 Verhulst 2002, 109. Lebecq includes the Anglo-Saxons as important instigators as well (Lebecq 2005, 645).
45 Lebecq 2005, 644.

facilitate exchange by providing security, but on the other, they were also interested in profiting from exchange by the collection of tolls and taxes, and the sale of goods.[46]

Historical sources for the early period of development of exchange networks are scant, but during the eighth and ninth centuries the historical evidence for merchants, markets and artisans increases, which for some suggests the existence of complex patterns of internal and external exchange.[47] For Duby in the 1970's the historical evidence for an apparent increase in trade in the Carolingian period had been a mere reflection of the source material, not of actual growth.[48] McCormick is almost diametrically opposed to this idea, arguing forcefully that the evidence points to exchange increasing in range, volume and variety between 700 and 875.[49] In addition to the *emporia* he points to the importance that temporary fairs organised around saints days or general assemblies may have had for commerce.[50]

According to the most recent survey of Carolingian history by historians of a younger generation, namely Marios Costambeys, Matthew Innes and Simon MacLean, the success of the *emporia* and their demand for tradable goods as well as items for consumption on site, stimulated the development of secondary centres further inland by the rural elite, leading to a denser network of local and regional exchange in lower-value, high quantity goods.[51] These local and regional markets eventually made the *emporia* obsolete. Devroey is more inclined to identify the impetus for the development of markets and towns in the estate system which encouraged the development of exchange networks that were primarily regional in character with little interaction between regions.[52] Moreover, most of the internal redistributive systems of estates would have been rather linear, from outlying properties to the central manor with little need for intermediary stages. Therefore, Devroey considers trade to have been marginal to the Carolingian economy.

Verhulst also sees an important role for abbeys and royal estates in the development of towns operating at a regional level from the second half of the ninth century, but in a more direct way than Devroey envisages. Based on analysis of the development of towns in the middle Meuse valley and in the west of Flanders Verhulst believes market places were initially created adjacent to large abbeys and royal manors, for example at Gent, Arras and Valenciennes.[53] These towns, inherently linked to estates, were developed first and foremost in order to meet the needs of the abbey itself or the royal household. However, according to Verhulst, in several cases they provided the impetus for the establishment of markets geared explicitly toward exchange for profit at a location nearby the estate town. International trade only started to play a role in the development of towns in the eleventh century.[54]

In sum, long-distance exchange via *emporia* is thought by most historians to have been of lesser importance for the economy as a whole compared to the mechanisms of local, regional and interregional elite led (redistributive) exchange. Similarly to long-distance exchange, the artisans' role in the economy is believed to have been rather marginal. At best craft production is considered a marker for the complexity of an economic system, indicating that elites had become sufficiently

46 Lebecq 2005, 646, 654.
47 For example Lebecq, see above. Also McCormick 2001, 6-12; Wickham 2005, 801-805.
48 Duby 1973, 121.
49 McCormick 2001, 695.
50 McCormick 2001, 647-653, 663-668.
51 Costambeys *et al.* 2011, 350-351.
52 Devroey 1998, 55.
53 Verhulst 1999, 56.
54 Verhulst 1999, 69.

reliable buyers to allow for craft specialisation.[55] Craft production is perceived mostly to have taken place within the confines of manorial organisation as part of labour services. Even where artisans were not directly incorporated in an estate structure they may still have been dependent on it. In other words, it is thought unlikely that they were working solely or primarily for their own benefit.[56]

1.2 Archaeologists' conceptions of the Carolingian economy

Whereas historians tend to concentrate on the landed elite and mechanisms of redistribution among manors to explain trends in the early medieval economy of Europe, archaeologists focus more on exchange and the communities involved in exchange. The nature of archaeological evidence and the development of the discipline has led to research primarily being focussed on what historians would consider the regional or even sub-regional level. Consequently, few archaeologists have explicitly engaged with the broader issues concerning the development and nature of the early medieval economy.

For some time, the main archaeological contribution to the debate on the early medieval economy was Richard Hodges' 'Dark Age Economics'.[57] It revealed a world hardly visible in historical sources before the ninth century, that of the North Sea exchange network. In essence it describes a transition from a socially embedded economy in the late seventh century toward a more formal economy near the end of the Carolingian period. Elites played a critical role in this development as they monopolised the exchange of prestige goods. In order to maintain their position within networks of peer-polity interaction they were obliged to sustain a non-producing class, in turn requiring agrarian intensification and specialisation. Crucially, the model puts emphasis on control of distribution rather than production as the main factor in the creation of rural economic stratification. Disinterested commodity exchange was only thought to have occurred from the late ninth and tenth centuries onward. Before this, exchange was mostly limited to reciprocal gift-exchange of luxury items among elites.

Hodges' concept of the early medieval economy was formulated at a time when the number of well-published early medieval sites in northwestern Europe was minimal. New excavations conducted since its first publication have led several archaeologists to challenge the model, not least among which Hodges himself in a relatively recent 'new audit'.[58] Still, to this day it guides much of the discourse on the nature of the early medieval economy among archaeologists.

Criticisms of interest in the context of this research are the central role of elite in the control of trade and trading towns and the degree to which exchange was embedded in social relations.

Before discussing these points we will first look at archaeologists' views on the question of growth. If archaeologists of the early medieval West participate in broader debates on the economy at all, generally speaking they do not engage explicitly with this topic. Their focus is mostly on towns and trade and much less on whether developments necessarily constituted overall economic growth. For example, Chris Loveluck challenges the idea of elites being the only catalysts for the development of

55 Wickham 2005, 259.
56 Verhulst 2002, 72.
57 Hodges 1982.
58 Hodges 2012.

towns, trade and rural reorganisation.[59] To an extent, he plays down the importance of the bipartite estate and emphasises research showing that the most numerous type of property in the eighth to tenth centuries in the early medieval west was the free peasant allod.[60] For Loveluck there is no doubt that the introduction of the bipartite estate led to a redefinition of elite identity and the ways in which the latter was expressed, yet at the same time he points out that this expression is not always visible in the morphology of excavated settlements. Engagement with the question of economic growth is limited to examining how exchange and towns developed, without necessarily taking into account the economy as a whole, including the rural economy.

In his new appraisal of early medieval economics, Hodges proposes reasonably steady economic growth from the sixth century onward with periods of stagnation. First came a period in the sixth and seventh century in which manors were developed by the secular aristocracy, incentivised by the revival of exchange networks in which both aristocrats and peasants could participate.[61] From the late seventh to the third quarter of the eighth century exchange in trading towns became more important and the yields of exchange networks were now confined to inhabitants of these towns and landed elites. Because peasants were largely excluded from this system, rural economic growth is deemed to have stagnated. For reasons unknown trade is seen to have declined during the last quarter of the eighth century after which monasteries and Carolingian legislation are considered the instigators of a revival of exchange. According to Hodges the economy during the first half of the ninth century was primarily based on exchanges of tribute and conspicuous consumption among the elite and above all monastic investment in monumentality. The construction of churches and monasteries, inspired by the palaces of the Carolingian kings, required large scale investment, which then fuelled trade at *emporia*. This long distance trade is considered to have been part of Carolingian royal strategy. Circumstances changed again around the middle of the ninth century when internal demand, this time including peasant demand, became more important than demand for internationally traded goods. The breakdown of previously existing ranked spheres of exchange, led to agricultural growth created by motivated peasants, though still under aristocratic guidance. Only from the late ninth century onwards does the rural landscape become the engine of the European economy.

According to Joachim Henning, the bipartite manor was designed to maximise surpluses to be collected as tribute, not to increase agricultural productivity in general. In his view there is no evidence for technological improvements on Carolingian manors, if anything he sees a decline in the quality of tools available.[62] The bipartite manor had a negative effect on production as a whole because tenants were forced to divide their time over both their own land and that of the lord while using the same technical know-how and implements. Furthermore, because the work on the land of the lord was not to their benefit peasants will have showed less initiative and therefore worked less efficiently. With an increase of control on labour, the Carolingian period saw a decrease in economic growth. In this model the elite remains the instigator of economic change, albeit now in a negative sense.

Frans Theuws likewise questions whether the Carolingian period saw economic growth. However, Theuws also believes elites are not necessarily required to explain economic developments and were

59 Loveluck 2013, 5.
60 Loveluck 2013, 10. Several of the studies Loveluck references deal with the (late) ninth century and later (Davies 1988; Bonnassie 1991a) and are situated in areas which can hardly be considered typical for the Carolingian world (Catalunia, Normandy).
61 Hodges 2012, 121-136.
62 Henning 2007, 23-26.

certainly not needed to stimulate large scale exchange in the Early Middle Ages. He argues that the Merovingian period saw significant transfers of goods over long distances, evidenced by the vast amount of objects found in rural cemeteries.[63] Merovingian cemeteries show that rural dwellers, at least at this time, had access to large networks and the amount of objects found in graves indicate that production must have been substantial too. The relatively affluent Merovingian countryside encouraged the aristocracy to introduce the manorial estate system in order to skim off surpluses. What appears to be economic growth in the historical sources of the eighth and ninth century may be a reflection of aristocrats' increasing success at exploiting the rural population rather than actual growth in output. Because burial customs involving burial goods died out around 700 AD it is much more difficult to establish whether such exchange networks as existed in the Merovingian period remained in place during the Carolingian period.

Given the fact that the models of archaeologists emphasise the development of exchange and towns, the role of *emporia* plays a central part in the debate. Were these towns where only finished or semi-finished commodities were traded or was craft production conducted there also? Was trade limited to long-distance luxury goods controlled by aristocrats and royal officials, as Hodges suggested, or was Dorestad a hub for interregional exchange of bulk goods? Were *emporia* part of an evolution from beach landing sites to fully fledged towns or did they exist simultaneously with other types of settlement with a trading component? And what was the role of older Roman towns which had remained active in the Late Roman and Merovingian period?

Henning believes craft production made up a significant part of the activities conducted at Dorestad and other continental *emporia*.[64] *Emporia* and other trading sites along the North Sea coast are interpreted as attempts to escape the manorial system. The role of craftsmen and traders in the development of the early medieval economy is paramount according to Henning. Based on an inventory of archaeological finds relating to agricultural and craft production and the slave trade, he concludes that the Carolingian period was an interlude between two periods where peasants, craftsmen and traders could operate with little or no royal or aristocratic control, leading to higher overall efficiency.[65] Collectives of craftsmen and traders grouped together at specific places and generated trade at first without any form of overlordship. Kings and aristocrats only became interested in these sites at a later stage and even then mainly offered protection in return for the right to levy taxes, just as Verhulst has suggested. Kings did not interfere in the running of these places. As discussed above, the control over rural production had a negative effect on rural productivity and this extended to urban development. Henning's view of the aristocracy as having a negative impact on the early medieval economy is clearly opposed to the generally accepted views among historians presented above.

Chris Loveluck and Dries Tys also agree that royal interests lay in collecting taxes and not in controlling the distribution of luxury goods. However, rather than primarily as sites of craft production they see a role for *emporia* and *wics* as places where the exchange of bulk goods could be taxed by rulers.[66] Apart from the *emporia* they suggest there were several other kinds of trading sites along the coasts on both sides of the North Sea. Regional settlement hierarchies existed in the maritime landscape without a great deal of royal or aristocratic influence, with communities having extensive access to what are generally deemed luxury items by archaeologists. Here Loveluck

63 Theuws 2012, 34; Theuws 2014, 5.
64 Henning 2007, 4-5.
65 Henning 2007, 31; Henning 2008, 50-53.
66 Loveluck/Tys 2006, 146.

and Tys recognise a distinct maritime identity in which items that were seen as luxuries by inland communities were rather more common for coastal dwellers.[67] Loveluck believes that by the seventh century merchants and artisans in marginal areas had developed a predisposition towards commerce and were familiar with profit oriented exchange.[68] Loveluck suggests that when land-based elites started playing a part in this exchange system their embedded rural economy was transformed by the experience. This is a challenge to Hodges' model proposing a transformation from embedded elite-led exchange to alienable commercial exchange. The North Sea exchange system had always been predominantly commercial, it was the elite-led rural exchange system that was transformed.

Theuws questions both the importance of craft production for the development of towns and trade and the distinction made between socially embedded and commercial exchange systems.[69] Archaeological investigations at Dorestad and other town sites of the eighth to tenth century in the Netherlands have revealed hardly any indications of craft production on a scale sufficient to explain the 'urban development'. This does not seem to have been the most important aspect in their development. For Theuws, characterising the economic system of early medieval Francia as based on either commodity or gift-exchange is tantamount to presenting a false dichotomy.[70] Early medieval exchange in any form was always embedded in a wider concept of the cosmological order. Theuws suggests conceiving of the early medieval economy as an eclectic economy consisting of components from a range of different kinds of economies and exchange systems.[71] Instead of attempting to determine whether long-distance, regional or local exchange was more important for the economy, Theuws advocates analysing how these different spheres were articulated.

1.3 Views on the peasantry in historical and archaeological models

Peasants are severely underrepresented in historical sources, which makes it difficult to define what their position was in the early medieval economy. Often they are largely ignored in historians' models because they can be so poorly identified. Traditionally, whenever they are discussed it is usually in relation to their juridical or tenurial status, particularly with regard to the question whether they were free or unfree and to what extent these categories were important within society.[72] The degree to which peasants could organise themselves and their access to public law courts have also often been debated.

Several more recent authors rightly point out that it is difficult to make the connection between legal status and economic activity.[73] The actual economic autonomy unfree peasants might have had was more important than their legal status. Theuws also questions the importance of the free-unfree divide as a status indicator, as other factors may have played just as important a role. From an archaeological perspective it is practically impossible to distinguish between and identify holdings of free dwellers, dependent tenants and unfree peasants. Excavated houseplans, farmyards and material culture of the Early Middle Ages rarely show any form of distinction within settlements or between settlements, certainly at a regional level.[74]

67 Loveluck/Tys 2006, 161-162.
68 Loveluck 2013, 206.
69 Theuws 2012, 30.
70 Theuws 2004.
71 Theuws 2012, 44. Also see following section for more detail.
72 For example Verhulst 2002, 46-47; Costambeys et al. 2011, 263-268.
73 Wickham 2005, 260; Devroey/Nissen Jaubert 2012, 32.
74 Theuws in press a.

Some believe the period between the Late Roman period and the seventh century was a relatively good time to be a peasant.[75] Aristocracies were weaker than before and held less land, which meant there was literally more room for peasants and also more scope for peasant autonomy. However, this did not necessarily lead to better access to goods, which in turn could improve their quality of living. Although in terms of autonomy these early centuries were a golden age for peasants, Wickham believes that did not manifest itself in material terms and their role in economic developments.

Both Wickham and Devroey have devoted considerable attention to the peasantry. The latter's analysis focuses almost exclusively on peasants that were in some way in a dependant relationship to a lord.[76] In the early medieval west, the composition of the peasant household, a stem family where up to two generations lived on a holding, and its productive characteristics, namely small-scale and based on a mixture of agriculture, animal husbandry and use of the forest, are thought to have developed independent of seigneurial influence.[77] Nonetheless, these elements became more or less fixated, as this type of household became the basic unit of administration in the context of landlord's management of estates. Rents were demanded at the level of the household, in the form of goods, services or money. Before c. 700 rural households are believed to have been largely self-sufficient.[78] The influence of landlords on peasant households is thought to have increased after 700. One of the consequences was that peasants became involved in networks where goods circulated over wider areas. In some parts, especially where goods were produced that involved specialist knowledge such as textiles and wine, surplus could have been marketed.However, these networks ultimately developed through and served the needs of elite groups. At the level of the village, in areas where land was predominantly in the hands of large landholders, communities of tenants were characterised by reciprocal relations between themselves and the landlord, but also communal arrangements and ceremonies among tenants, such as sharing of obligations, rights to commons and the use of the local church and cemetery.[79] There was a considerable degree of stratification within these communities, often related to the size of their lands, and holding certain positions within the estate system. There were also intermediaries who formed the link between the landholder and the tenants, ensuring the collection of dues in exchange for part of the revenue.

Wickham sees a fundamental distinction between several 'modes of production', namely the slave, feudal, capitalist and peasant modes of production. The main distinguishing characteristic of this last mode is that peasants are not obliged to provide rents to a landlord or state on a systematic basis.[80] Due to the sparse historical sources at his disposal much of the analysis is based on models of peasant society developed in fields such as anthropology, sociology and philosophy. Usually the peasant mode functions at the household level, the workload is shared among all members of the household, and goods are exchanged between households in reciprocal relationships through gift exchange or barter. Peasant societies before industrialisation were basically subsistence producers. Besides the requirements for basic subsistence, agricultural production and internal exchange were stimulated by the need for meeting social requirements. This implies there was little incentive for peasants to produce more than they needed, making markets for external exchange marginal to their livelihood. Wickham suggests indicators of such a peasant mode of production would be a relative

75 Wickham 2005, 534; Devroey/Nissen Jaubert 2012, 14; Theuws 2014.
76 Devroey/Nissen Jaubert 2012.
77 Devroey/Nissen Jaubert 2012, 19-20.
78 Devroey/Nissen Jaubert 2012, 25-26.
79 Devroey/Nissen Jaubert 2012, 31.
80 Wickham 2005, 537.

lack of economic differentiation and limited artisanal scale and complexity, restricted population levels and simple agrarian technologies.[81]

As mentioned in the previous section Henning regards peasants, craftsmen and traders to have been the instigators of economic growth and the development of towns. When left to their own devises, without control from above, they could work more efficiently. Henning argues that craft production started much earlier in the west than is usually assumed and many of the technologies attributed to the Carolingian period were already in use in the Late Roman and certainly Merovingian periods. Although Carolingian controls on trade stifled earlier progress, there were still pockets of entrepreneurial activity. The portion of production that was not intended for tribute to lords could be exchanged by craftsmen and merchants for their own profit. Differently to Wickham, Hodges claims that in the sixth and seventh centuries peasants could take part in the same exchange networks as the aristocracy. Theuws goes further by proposing that it was the peasantry that sustained large scale exchange networks during the Merovingian period and perhaps also during the Carolingian period.[82]

Loveluck's view of the peasantry depends largely on where they lived. Inland status was dependent on the control of landed resources, the possession of certain kinds of artefacts, and forms of consumption whereas in coastal areas land was much less important and artefact assemblages are less easily equated with social status. On the one hand Loveluck criticises the often simplistic equation of imported luxuries with elite status. Once renders and rents had been paid free and tied peasants operated on their own behalf. On the other hand he does believe that by and large this equation is correct, except when it comes to coastal communities. The excavated hamlets and single farms which were supposedly inhabited by (free) peasants in rural areas contain no traces of conspicuous consumption, crafted items were for household use and most importantly there are no indications for a 'gravitational pull' on resources.[83] Because of the presumed limited possibilities for agriculture in coastal areas the inhabitants are assumed to have been more predisposed to alienable exchange and thereby had access to goods that further inland were limited to elite groups. In rural areas there was a hierarchical ranking related distribution of luxury items, but in coastal zones this was much less the case.[84] In Lovelucks opinion, craft specialist and merchant communities had better access to a wider range of imported goods than farming communities.

Theuws agrees that peasants did play a role in exchange networks including long-distance exchange. But whereas Loveluck believes this to be a unique characteristic of coastal dwellers, Theuws holds the same to be true for individuals living inland.[85] As we have seen, this view is based on cemetery evidence, but also on the fact that preservation conditions create a bias in the recovery of certain types of artefact between the coastal area and sites inland, primarily due to differing soil conditions, groundwater tables and the destruction of the top layers of features which usually hold the majority of finds.[86] In particular, peasants living along major rivers may have been economically active in different roles simultaneously, such as that of farmer, trader, fisherman and artisan, but

81 Wickham 2005, 539.
82 Theuws 2014.
83 Loveluck 2013, 42.
84 Loveluck 2013, 208.
85 Theuws in press a.
86 The potential effects of these and other factors on the nature of the data collected for this research will be discussed in chapter 3.

peasants in more rural areas could have practiced a similarly broad array of economic activities.[87] In some of these capacities they may have participated in large exchange networks.

There is some historical evidence that the rural communities which seem rather homogenous and modest in material terms may in reality have been more socially diverse and enterprising than the archaeological record and certain anthropological models suggest. Pierre Bonnassie has used documentary evidence to show that peasant communities in ninth and tenth century Catalonia instigated the building of churches and defensive works as well as undertaking reclamations on their own initiative, partly through construction of hydraulic systems, including watermills.[88] Bonnassie believes this shows that rural communities could be innovative, economically pro-active and in particular indicates that they planned ahead, saving in order to invest.

According to most historians, peasants became increasingly dominated and exploited by the aristocracy during the Carolingian period, thanks in no small part to the introduction of the bipartite manor. The fact that this observation may be in some way correlated with the increase in documentation during the same period, particularly of documents pertaining to dependant tenants of monasteries and royal estates, is acknowledged by some but rarely taken into account in their models.[89]

In Wickham's feudal mode, which in his view is characteristic of most areas within the Carolingian empire, peasants were obliged to pay some form of rent to landlords. However, in general landlords in the feudal mode do not interfere in the actual production process giving peasants autonomy in how they manage the land, their primary focus being sustaining their own household.[90] One of the key differences between the peasant mode and feudal mode is that in the former, aristocracies had not yet become powerful or dominant enough to influence economic choices of all peasants. Once landlords gained the upper hand they dominated the main lines of economic exchange because they themselves were the main consumers, buying other agricultural and artisanal products. In this model, wealth is directed at the political and social needs of the elite rather than material and social consumption of peasant communities. Wickham firmly believes that peasants in Francia were dominated by the aristocracy by physical force, and that peasants had not internalised the values of the elite or entirely accepted their dominance.[91] In contrast to the general model of the feudal mode, the existence of the bipartite manor system is considered an indication that in the Carolingian period landlords did interfere directly in the production process, the reason for this being the incentive provided by increased opportunities for exchange, as we saw above.

This image of a perpetually antagonistic relationship between landlords and peasants is challenged by several scholars. Innes, Devroey and Theuws all believe it possible that either party could have mutually benefitted from their relationship. For peasants the advantages of entering a manorial estate as a tenant would have been relative stability in passing on land to heirs and rights to the use of common land and forests.[92] Peasants may also have identified with the fortunes of their lord leading to commonly held values and a shared identity related both to the physical and social

87 Theuws in press a.
88 Bonnassie 1991b, 243-249.
89 For example, Verhulst assumes agriculture was partly practised by free, independent peasants but because they are difficult to grasp in the sources he concentrates on large landowners (Verhulst 2002, 31). Devroey highlights some of the issues relating to the use of polyptychs in order to draw general conclusions about rural communities (Devroey 2003, 50-55; Devroey 2006b, 426-432).
90 Wickham 2005, 536.
91 Wickham 2005, 440-442.
92 Devroey 2006b, 524; Innes 2003, 108-110; Theuws 2010.

landscape.[93] Bonnassie's research revealed reciprocal relationships between communities and counts laid down in franchises which guaranteed the autonomy of villages on several issues in return for rents and military service.[94] Only in the eleventh century, when aristocratic and monastic holdings started to encroach on property associated with autonomous villages, often aggressively, and the power of counts was contested did these relationships start to break down.

1.4 Conclusion

In this overview of the debate on the economy of early medieval north-western Europe we have seen that in many respects historians and archaeologists seem to be engaged in different discussions. Perhaps this should not surprise us, given the nature of the sources available to either discipline. The sources of historians consist mainly of royal charters, estate inventories and lists of property transactions involving monasteries. The vast majority of these documents relates to landed property and its management. This presumably explains why historians have developed models that emphasise the role of the landed elite, royal legislation and manorial management of the land. It also accounts for the preeminent role ascribed to regional and local as opposed to long-distance exchange, the redistributive nature of exchange and the marginal role attributed to craft production.

Archaeologists' sources, on the other hand, consist of the remains of settlements and of the objects used by people. Interpreting traces of buildings and yards in a wider economic context can be difficult, which may be why archaeologists of the Early Middle Ages have tended to concentrate on artefacts and exchange systems. Certain objects can be provenanced to a greater or lesser degree and therefore it is possible to trace their movement from production to consumption sites, allowing exchange networks to be deduced from their distribution. This has led to a focus on trading sites and the development of towns, craft production and perhaps a greater appreciation of the role of commercial exchanges in the early medieval economy. In contrast, conceptions of the rural world are less clearly formulated.

These differences between historians and archaeologists are carried through to notions of the part peasants played in the economy of the Early Middle Ages. In written sources peasants rarely occur and if they do, in many cases it is because of their dependency toward a landlord. Archaeologists on the other hand have ample evidence for peasant regimes but the particular focus on artefacts and exchange often leads to interpretations centred on elite consumption, the lifestyle of town dwellers and craft production. Historians, but also several archaeologists, perceive non-elite rural communities as passive receivers of goods, either within a manorial setting, or through goods trickling down from elite exchange.

93 Theuws 2010, 49-50.
94 Bonnassie 1991b, 249-251.



Laying the groundwork

Introduction

This chapter sets out the methodological choices made and problems encountered during the collection of data and analysis. The focus is mainly on issues relating to the collecting of data and to a lesser extent the analytical phase of the research. The first section concerns the practicalities of data collection, that is, how data was collected and which aspects of artefacts were recorded. The second section deals with the choices made and problems encountered during the collection and interpretation of data. Finally, the method of defining regions is described, as well as their basic characteristics, for these regions form a crucial part of the analytical and interpretative framework.

2.1 Data collection for inventory of sites and inventory of finds

The introduction of contract archaeology in the Netherlands resulted in a considerable growth in the number of Carolingian sites. For better or worse, from an academic point of view, research has been carried out relatively indiscriminately across the country. Added to an already rich tradition of large-scale settlement research pre-dating contract archaeology, the research area houses considerable potential for the study of rural communities of the Early Middle Ages. The first objective was to create an inventory of sites by collecting as much information as possible on excavated Carolingian sites. The task of collecting data for this general database was undertaken by all three PhD-candidates within the Charlemagne's Backyard project. Subsequently, information relevant for the current research was gathered from the excavation reports on the inventoried sites in a separate database.

The collection of data for both the inventory of sites and the inventory of finds was governed by two basic principles. First, the vast majority of information should come from publications. There was simply too little time to re-evaluate large quantities of raw excavation data. Secondly, our definition of a site is that it must consist of at least one feature indicating a settlement. The aim was not to construct a habitation history of the Carolingian Netherlands. We believe that focusing on settlements and context rich find assemblages is necessary to produce a convincing interpretation of the rural economy. The identification of settlements based on surface finds or finds discovered during coring campaigns, can be haphazard. An exception will be made in this thesis for stray metal finds because their distribution may be of interest for understanding exchange mechanisms regardless of their specific context. A feature can be anything from a posthole to a well, but also evidence for habitation in the form of an occupation-layer. Particular types of sites have not been included, such as a number of Zeeland's ringforts or ecclesiastical sites because these findspots have either not yielded convincing signs of habitation, or were sites where agriculture was not the primary activity of their inhabitants or the foremost function of the site.[1] On the other hand, locations where revetments or remains of bridges over streams have been discovered were included because they are evidence for the arrangement and use of the rural landscape.

2.1.1. Inventory of sites: data collection

The inventory of sites was created by examining sources such as reports pertaining to excavations, archaeological chronicles, monographs, the yearly reports of the state archaeological service and

1 Such sites, particularly when they concern ecclesiastical institutions, may of course have played an important role in the organisation of agricultural production and the management of land.

ARCHIS II to name the most important. Again, the guiding principle in determining whether a site belongs in our inventory was the presence of at least one feature dating to the Carolingian period. A brief description of each site is contained in appendix VI. In the remainder of this study sites mentioned in text that have been included in the inventory will be followed by the site number in brackets.

Perhaps the most important repository available to us is the online archiving system of the Data Archiving and Networked Services[2] (DANS-EASY). Many archaeological reports produced by commercial companies in the past 20 years are now available here, though certainly not all. A number of companies and institutions not only upload the reports but also the raw excavation data, which proved useful during the collection of data for the inventory of finds. The database on the website was searched using several (combinations of) search terms in order to minimise the chance of overlooking Carolingian sites. Aside from uploading the end report and raw data, each deposited excavation is summarised in a form. The information on excavations in this form is contributed by companies themselves, which leads to varying degrees of completeness. As search results to a large extent are retrieved from the information in the form some reports are more readily retrieved than others. For example, in some cases where we knew excavations to contain Carolingian features there were no key words in the description form identifying the archaeological periods represented on the site. Another issue was not being able to see the forest for the trees, in that the database contains large amounts of desk-studies and coring campaigns, which return search results for practically every period related search term. These types of research are often incapable of pinpointing the date range of presumed sites within a research area and therefore a broad array of periods is added to the form. A final, not unimportant issue is that not all companies and institutes are forthcoming with uploading their excavation reports and data.

Up until circa 2000 most archaeological research was conducted by the state archaeological service (formally Rijksdienst voor het Oudheidkundig Bodemonderzoek (ROB), currently Rijksdienst voor het Cultureel Erfgoed (RCE)), universities, municipal archaeological services, the national museum of antiquities and to no small degree by archaeological volunteers, sometimes aided by a representative of the ROB. Much of this research has not been published extensively, in fact the vast majority is mentioned in accounts amounting to a few lines in the journal of the state archaeological service or provincial archaeological chronicles. The *Jaarverslagen van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* (JROB) and provincial chronicles were scanned for reports of Carolingian sites. These were then followed up by checking ARCHIS II[3] for additional information, as the reports were usually produced shortly after excavations had taken place and were intended to give an initial impression of a site. Also, many find reports were based on very limited observations which did not always provide conclusive evidence for the dating and nature of a site. ARCHIS sometimes offered additional information based on subsequent examinations of finds and features. A check was also conducted whether further excavations had taken place in or around a site at a later date, which could shed more light on the validity of its attribution to the Carolingian period and whether it could be considered a site according to our criteria.

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2 https://easy.dans.knaw.nl/ui/home

3 ARCHIS II was a national database maintained by the RCE containing the location and nature of sites, past and present, discovered in the Netherlands. During the course of the research period the system was replaced by ARCHIS III which performs the same functions. The transition took place after the inventory of sites was completed and therefore only ARCHIS II was used. All archaeological research carried out since the advent of contract archaeology in the Netherlands is recorded in ARCHIS, irrespective of the presence or absence of archaeological sites. This provides one way of determining whether an area was relatively sparsely inhabited during the Carolingian period or simply underrepresented due to other factors such as a lack of research in the area.

Aside from using ARCHIS as an additional reference for piecemeal excavation reports, the dataset was itself a source for identifying Carolingian sites. In order to distinguish sites among the vast number of observations ('*waarnemingen*' in Dutch) recorded in the database[4] a selection was made.[5] The remaining records were categorised per province using a measure of the quality of the context in which data was recorded (using the database-field recording the context in which finds were discovered) and the presence or absence of features as criteria. This resulted in eight categories, namely:

1. Context unclear/unknown (for example stray finds discovered in the nineteenth century forwhich even a rough estimate of the find location can't be given)
2. Carolingian finds recovered during dredging works
3. Carolingian surface stray finds
4. Carolingian finds discovered during a coring campaign
5. Carolingian stray finds discovered during both archaeological and non-archaeologicaldigging activities
6. Carolingian finds discovered in a layer (for example a possible habitation layer or asedimentation layer)
7. Carolingian features present but the nature of the site is unclear.
8. Clear remains of a settlement

The categorisation is based on our need for as context rich data as possible, meaning sites that contain at least some features. The lower the category the observation is assigned to, the less interesting it is for our purposes. Two additional categories were defined, 9 for stray finds of special interest such as metal artefacts or objects made of organic materials, and 10 for Carolingian sites not included in our research, for example churches, purely defensive works or cemeteries. For all sites in categories 6 to 8 the observations were individually checked in ARCHIS itself to see if they met our basic criteria for a site, all other categories were scanned for the presence of features and structures in the attribute table and if present checked individually in ARCHIS. Observations belonging to category 5 that were obtained during archaeological supervisions, trial trench campaigns and full scale excavations were also checked. In this way it was possible to identify sites for our inventory and at the same time retain information on stray finds recorded in Archis. The method is imperfect, partly due to the variable degree of accuracy and comprehensiveness of the information available on observations and partly because somewhat arbitrary decisions had to be made concerning the categorisation of particular find contexts. However, in the trade-off between ignoring the data present in ARCHIS entirely and missing out on sites, or examining the merits of each possibly

4 The shapefile of *waarnemingen* used to carry out the survey contained 335387 records. This was already a selection, see note 5 below.

5 This was achieved by using period identifier 'VMEB' (early medieval, 525-725 AD) as a start date and 'VMED' (early medieval, 900-1050 AD) as an end date and applying the restricted ('*beperkt*') search option within ARCHIS. This means that any observation dated to VMEB or later and every observation dated up to and including VMED was represented in the search result. This result was then downloaded as a shapefile (downloaded on 11-7-2013). Subsequently, all observations with a very general date (for example palaeolithic to early medieval) were excluded from the resulting records, and then the observations which were clearly Merovingian or Ottonian in date. It should be noted that the dating of finds in ARCHIS depends on the information available to the person filling in the form at the time. The quality of this information can be variable and therefore a proportion of the finds will have incorrectly been assigned to the Carolingian period.

Carolingian observation in ARCHIS and consequently becoming bogged down in mostly fruitless searches, the compromise seems acceptable.

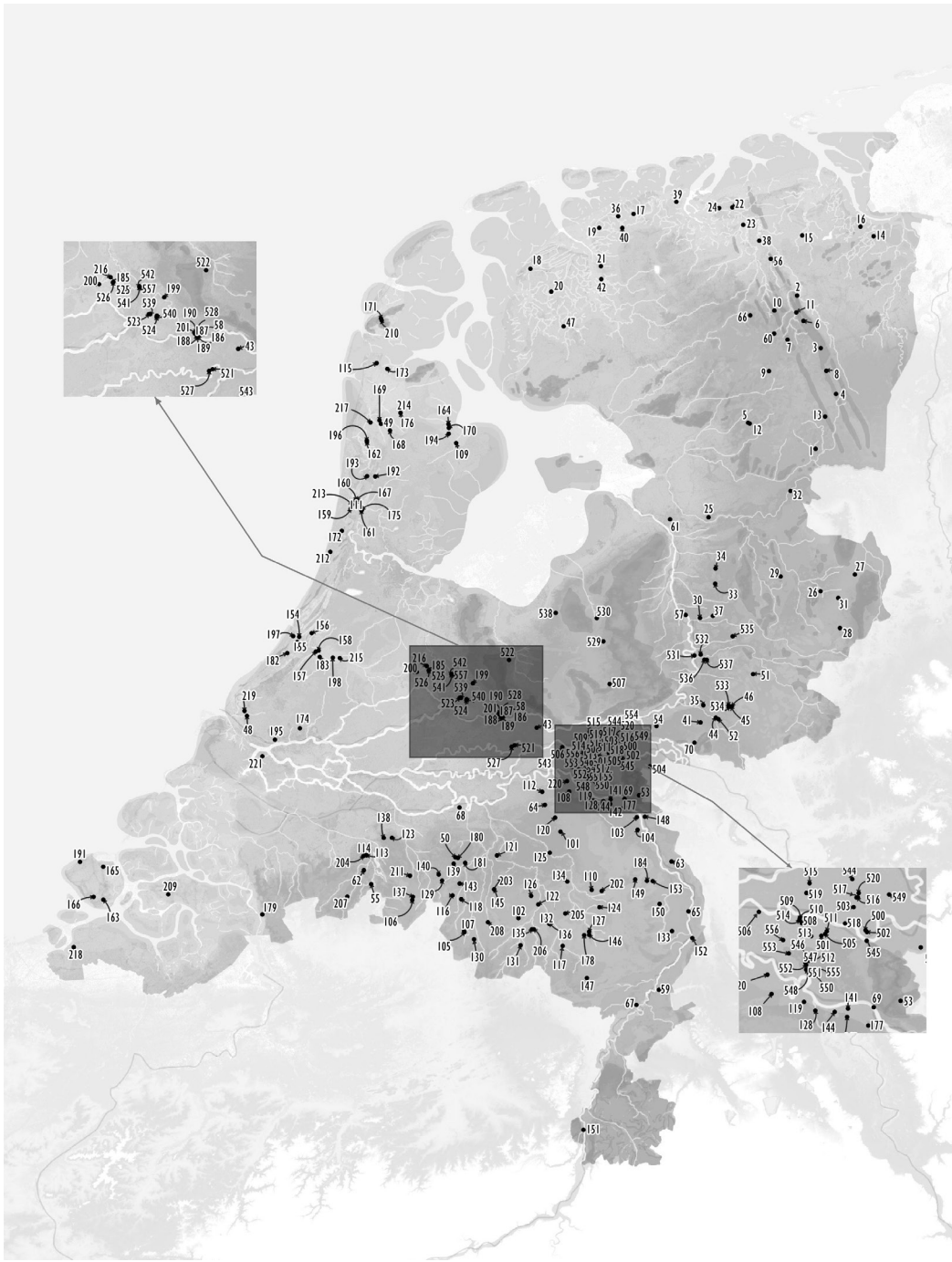


Fig. 2.1 Location of Carolingian sites in the research area.

2.1.2. Inventory of sites: the database form

The primary aim of the inventory of sites was to collate sites that could be used for further analysis within the three archaeological sub-projects (fig. 2.1). Certain aspects of sites were recorded for practical or analytical reasons, others we thought might give some initial insights into regional variability. The general characteristics that were recorded concern aspects of the location of the site, the date-range of the Carolingian settlement traces and the documentation related to the site. Most of these aspects are simply administrative in nature, though the square meters excavated can be useful when comparing sites, particularly in relation to the absolute amounts of structures and finds.

Sites were divided into five categories according to the extent to which they were excavated, namely 'completely excavated', 'partially excavated but the boundaries known', 'partially excavated', 'stray features' and 'unknown'. It soon became clear that many sites belong to the 'partially excavated' category, for which there are a number of explanations. First, some excavations and observations are simply too limited in scale to realistically expect them to have uncovered an entire settlement. Secondly, excavations carried out under contract archaeology conditions are legally bounded by the extent and limits of the civil works to be developed. This rarely coincides with the boundaries of archaeological sites. Excavations predating Malta-archaeology more often than not were also rescue excavations, also initiated by considerations other than the purely archaeological. However, at times the opportunity was available to excavate the non-threatened areas of sites as well. Thirdly, it is sometimes difficult to determine whether the boundaries of a site have been reached, often because large numbers of younger features are present in the same area where the Carolingian site lay. This can make it difficult to identify all Carolingian features and therefore determine whether the entire site has been excavated. Fourthly, Carolingian settlements in the Netherlands are rarely bounded by structures such as ditch systems, fences or palisades. Furthermore, some sites seem to consist of several single farmsteads spread out over a large surface area. Do they belong to a one site or should they each be considered sites in their own right?

The main soil type in which Carolingian features and finds were discovered was recorded because comparing soil conditions with the preservation of settlement features and the number and variability of finds is one way of identifying biases in the archaeological record. This is necessary in order to make meaningful comparisons between sites and regions possible.

The sub-form OMG-numbers[6] is administrative in nature, recording information on the different excavations that took place at the site. Many sites were excavated in several campaigns and not always by the same parties and may be spread over several decades.

The section of the form containing information on the archaeological remains present on a site consists of counts of the number of buildings, the presence of particular find categories and miscellaneous other aspects. The counts of buildings are based on figures provided in the excavation reports and were recorded relatively uncritically. The number of specific construction types dated to the Carolingian period was taken directly from excavation reports without independent examination of the features or the exact means of dating. This in itself was sometimes problematic due to the fact that within the same excavation report certain structures might be assigned to different periods at various points in the text or catalogue. The number of buildings per building type was sometimes difficult to ascertain from reports because either the exact numbers per building type were not made explicit or because of difficulties in distinguishing between for example main buildings and barns. As far as outbuildings are concerned, only sunken huts were counted separately. We felt sunken

6 Administrative numbers assigned to excavations carried out in the Netherlands. OMG stands for *Onderzoeksmelding*.

huts may be a rough indicator of regional variability, other types of outbuildings less so. A further recorded variable regarding buildings is the detail in which sections on features have been published. This can vary from no depiction of sections, through schematic overviews to digitised field-drawings.

Knowing which sites had a Merovingian predecessor or Ottonian successor can help single out excavations relevant for exploring developments in the spatial organisation of settlements. However, it was not always easy to determine whether continuity existed between periods, especially from the Carolingian to the Ottonian period. To a large extent this is due to dating issues, both of buildings and finds. We only recorded continuity when it was certain or highly likely. When relevant, younger features were described in the remarks section of the form since large amounts of post-Carolingian features intercutting Carolingian settlement traces will have influenced the degree to which structures were identifiable.

The presence or absence of a selection of find categories was recorded because they may highlight regional variability. These are wheel-turned pottery, tephrite, glass, Roman brick and loom weights, and in addition the number of silver or gold objects and coins and traces of craft production were recorded.

Finally, the 'remarks field' offered the opportunity to give a short description of the site and its research history, choices made in recording the data, remarks on the quality of publication and any other information that was relevant to understanding the site. The remarks field was particularly important considering the database was filled by all three PhD-candidates in the Charlemagne's Backyard-project and in some cases the research and/or publication history of a site was quite complicated to unravel.

2.1.3. Inventory of finds

In this section only the structure of the database created for the inventory is described.[7] Choices made in the collection of data will be discussed in section 2.2. In the finds database each structure (building, well, sunken-hut) discovered on a site recorded in the site-database is represented by one form. Some feature types that could not be assigned to a specific structure, such as postholes, pits and layers were aggregated across a site because recording finds for each individual feature would have been too time consuming. General information on the structure was recorded such as the site at which it was found, the structure or feature type and its dating. The structure numbers/codes were taken from the original publications as much as possible. When these were not defined in the report, structure numbers were assigned. Each find category is represented by a 'tab'. Per tab a number of variables of finds were recorded which were deemed relevant to the research. For example, for pottery the provenance and function of the original vessel is important to know, but the exact fabrics less so. If possible the number of sherds was counted and the start and end date for the pottery type was derived from the excavation reports in order to get an idea of the variability in dating of pottery. Vessel type was only recorded for diagnostic sherds as was function group.

The variables recorded for other find categories are mostly similar to those for ceramics. These include the specific material in question (such as gold, silver or copper-alloy for metal artefacts), the identification of the artefact and if possible the function group and specific type it belongs to and its provenance. Besides number, weight was also noted for some find categories. Finally, a check-box was added for all find categories except pottery, recording whether finds were indicative of craft

7 An overview of the variables that were recorded for each material culture group is provided in appendix V.

activity at a site, for example burnt loam from an oven wall, casting moulds or scrap metal and refuse from antler and bone working.

After the inventory was completed several additional variables were recorded during the analysis of the data in order to make the data more easily comparable. A separate field for feature type was added as well as an indication whether the site can be considered a rural settlement or a town, whether the record represents stray finds or not, whether it is an individual structure or an aggregate of several single features and whether the dating of the structure is based on dendrochronology.

2.2 Methodological issues

Creating an inventory of finds discovered at a large number of different excavations, carried out by a plethora of individuals, institutions and companies, and examined by more or less experienced specialists, gives rise to several methodological problems. In this section several of these problems will be highlighted, but at the outset it should be made clear that in a number of instances the issues are simply insurmountable within the limits set for this research. The limitations of the current set of publications was accepted as inherent to the research from the outset and in the course of collecting data it became clear that very few publications on sites contained all the information we would have liked to have collated on finds. A large proportion of excavation reports consist of short overviews, sometimes one or two pages, sometimes even less. The amount of information on finds in this kind of report is understandably low. Additionally, in quite a few cases lists of features and finds were not included in publications and also not available on DANS-EASY. Several provincial depots were contacted in order to obtain these lists, but in most cases it turned out they had not received the relevant data either. In short, not all findspots have been published in sufficient detail to allow a like for like comparison of sites. Unfortunately there was insufficient time within the project to re-examine a large number of sites. An attempt to mitigate the issues arising from variable excavation and publication standards is set out in chapter 3.

For quite a large number of sites the amount of finds per find category or specific groups within a find category could not be ascertained from the published data. In the case of ceramics the system developed for the finds from the Dorestad excavations formed the basis for recording vessel typology and fabric groups.[8] The system does not cover all ceramics of our period discovered in the research area, but it has been widely used to describe ceramics from Carolingian sites since the late 1960's and therefore provides a considerable degree of consistency. Not all the specific fabrics defined in the Dorestad system have been recorded in the database. Some of the fabrics have been reduced to aggregate groups because a higher level of detail is not deemed necessary for the present research.[9] The decision not to record more specific fabric identifications does not mean that fabrics are unimportant altogether for questions relating to the distribution and consumption of pottery. The colour of sherds may well have been an important factor in determining their use but because colour of sherds in particular often receives little attention in excavation reports and some fabrics in the Dorestad typology occur in several colour tones,[10] it would be almost impossible to achieve a sufficiently detailed level of description based on current publications.

8 Van Es/Verwers 1980.

9 For a detailed overview of the different kinds of pottery found on Carolingian sites in the Netherlands and the typologies used to describe them, see chapter 4. This chapter also contains a more detailed explanation of the recording of types and fabrics in this research.

10 Van Es/Verwers 1980, 56-59.

Despite the overall consistency the Dorestad system provides, an issue concerning provenance of pottery was that there remains variability in how the system is used by different pottery specialists. An example is the use of the term '*bolpot*' (globular pot mainly produced in the German Vorgebirge or Eifel). The term is on occasion implicitly utilised to denote a specific provenance without always specifying what that provenance is. It is sometimes used to exclusively indicate production form the Vorgebirge or the Eifel region, or even that the place of origin cannot be determined.

As mentioned in section 2.1.3, vessel type and function category were only recorded for diagnostic sherds such as rims and decorated sherds. This was done partly to have a clear baseline when comparing assemblages, but also in order to be reasonably certain that the ascription to a vessel type was made based on visual markers and not assumptions. For example, certain fabrics associated with production in the Vorgebirge are sometimes ascribed to specific vessel types, without diagnostic markers being present. Although there is a rough correlation between fabrics and vessel types, it is not consistent enough to justify assigning wall-sherds to a specific pot type.

During the inventory of finds some new fields were introduced to the pottery-form and new pottery categories and fabrics added to reference tables in order to be able to include the material from some sites. This was especially true for handmade pottery, as there is no generally excepted typology or description for this material. In the same publication a distinction might be made among handmade pottery between Hessens-Schortens, *Kugeltopf,* ' early medieval handmade' and 'Carolingian handmade'.[11] Each might then be distinguished further according to (combinations of) temper included in the fabric. This led to the recording of a large number of fabric groups making comparison very difficult. Therefore, once the inventory was complete the fabrics of handmade pottery were simplified in order to improve comparability. At the same time fields were added to categorise the ceramics in provenance and chronological groups. These two fields were added later because the process of inventorying itself was key in establishing relevant categories.

A final problem that arose during the inventory of ceramics was the decision whether to count the actual number of pottery sherds or the minimum or maximum number of vessels. The terms minimum and maximum number of vessels are problematic because the manner in which they are used is not always consistent and often not entirely clear. Orton, Tyers and Vince define recording of minimum number of vessels as assigning sherds to the same pot as much as possible whether they fit or not, and maximum number of vessels as, when in doubt assign sherds to different vessels.[12] They conclude that both sherd count and estimated number of pots (minimum or maximum) are biased whereas weight and particularly estimated vessel equivalent are more favourable. Unfortunately the weight of individual sherds is often not recorded and measurements needed to calculate vessel-equivalents are even less commonly noted. Therefore, in most cases, the actual number of published sherds has been counted. Where published data includes estimates for the number of vessels this has been recorded, but then only for rim-fragments. It was felt that this would provide the most comparable measure of vessel count between sites.

Excavation reports rarely contain even a majority of the desired information with regard to find categories other than pottery. Therefore a number of fields often remained open, especially the attribution to a specific type and the provenance of an object. This partly reflects limitations inherent to certain object types, particularly those made of stone, but also the current state of research and standards of publication. In the end, function groups were only assigned systematically

11 Another issue is that some handmade sherds cannot be dated more precisely than between 400/500 and 1000 AD, spanning both the Merovingian and Carolingian period. Where this is the case the sherds in question have been omitted from comparisons between the two periods.
12 Orton *et al.* 1993, 172.

to metal artefacts, mostly because there was no added value in creating categories for other groups of material culture. In the case of re-used building material such as Roman tiles their possible use rather than the original function was recorded where it could be ascertained.

The weight of artefacts usually cannot be derived from excavation reports. Knowing weight as opposed to number would be particularly useful for building material and stone objects such as millstones, or slag material. Furthermore, provenance and specific type are rarely noted which, again can largely be put down to inherent limitations of the objects themselves and state of research. It is impossible to be sure where a stone artefact such as a whetstone was made, although the source of the stone itself can sometimes be determined. For millstone fragments the issue is not so much where they came from, the area around Mayen in the Eifel is generally accepted as the source of tehprite millstones on Carolingian sites in our research area, but to what period they belong. There are some typo-chronologies for millstones but often the fragments excavated are too small to determine the exact type. This makes it impossible to ascertain whether millstone fragments found in Ottonian or later features were actually part of millstones used in the Carolingian period. Consequently, it was decided only to include millstone fragments found in structures and features dated to the Carolingian period. Therefore, it is possible that the amount of millstone fragments present on sites has been underestimated, particularly where many younger features are present within the same areas of an excavation as Carolingian features. Other stone objects are also often difficult to date and usually are assigned to the Carolingian period based on the context they were found in. Fragments of glass artefacts can similarly be difficult to date.

Metal artefacts may have stylistic markers which can help in their dating and establishing a source of origin, brooches and coins in particular. However, for some brooch types there is no single accepted typology meaning that it was necessary to synchronise the various typologies in order to make comparative analysis possible. To a lesser extent the same was necessary for other groups of artefacts. During the data collection phase, type nomenclature and codes were mostly recorded exactly as they were published, but after this phase had been completed the contents of the database were inspected and standardised where necessary.

A final, general point regarding the inventory of finds is that when finds were not discovered in (or published in relation to) an individual structure, they have been aggregated per feature type. If that was not possible, usually due to the quality of the publication, they were recorded as stray find under a single record for a site as a whole (usually under feature 9999). These latter finds can give a general indication of the kind of find material present on a site and can be useful at a regional level but without a clear relationship with a structure they have little value for site level analyses.

2.3 The definition of regions

The primary objective of the present research is to understand developments in the nature of exchange in our research area throughout the eighth and ninth centuries, chiefly in terms of the mechanisms through which objects were exchanged. The expectation is that investigating the collected data will highlight differences in material culture profiles between regions in the Netherlands, differences which will merit explanation. Regions form a key analytical tool within the research. From the projects outset it was clear that differences in the built environment and material culture existed between Carolingian settlements in the Netherlands and that these differences were to some extent regionally clustered. In order to make interregional comparisons it was necessary to

delineate regions concretely. The analytical nature of the regions defined below must be stressed. They should not be perceived as representations of early medieval territorial units in for example a political sense.

Regions were defined using a number of criteria, the two most important being soil conditions and archaeological evidence. The palaeographic reconstruction of circa 800 AD produced by De Vries and Vos formed the main source for distinguishing regions by soil conditions (fig. 2.2.).[13] The reconstruction offers a reasonably detailed overview of the main soil conditions in the Netherlands around 800 AD. Other than soil conditions, regions were defined using archaeological evidence, partly based on what was known at the outset of the project from existing regional studies and partly on results of the inventory of sites. The main archaeological characteristics employed were settlement structure and location choice.

Many parts of the Netherlands were covered by peat in the Carolingian period and it is presumed here that they formed natural boundaries between various regions. For example, an area of peat along the Meuse forms the majority of the border between regions 6 and 8. Extensive areas of peat were certainly not impermeable barriers between regions but they did represent largely uninhabited zones and would have known limited traffic and communication channels. Waterways also occasionally represent the boundary between our regions though in a number of cases the specific waterway was chosen somewhat arbitrarily. Parts of some boundaries are identical to current provincial borders, simply because they were convenient and there was no reason to situate the boundary elsewhere. But aside from defining boundaries it is also necessary to consider how regions formed coherent territorial areas. Below the choices made in delineating each region and its most important characteristics are discussed. The intent is not to give a complete overview of the landscape and soil conditions or the nature of habitation in the area. The outlines of regions as described below are not set in stone. On occasion it may be more productive to juxtapose groups of regions, or conversely to analyse sites within a sub-region. During the interpretative phase of the research several sub-regions were defined in order to highlight relatively consistent divergence between parts of regions that could be identified in the distribution of artefacts.

Region 1 represents the northern coast of the Netherlands which at the time was dominated by tidal marshes and tidal zones. Part of the current province of Noord-Holland has also been included in the region because it showed the same characteristics around 800 AD. The main difference between region 1 and the neighbouring regions 2 and 4 lies in the fact that the latter had no tidal marshes and considerable areas of coversand. The boundary between regions 1 and 5 is more ambiguous because both are coastal areas and historically are often considered to have been part of the same territorial unit, Frisia. Nonetheless, they were separated on the grounds that they differed in terms of soil conditions, the habitable areas of region 5 being formed by dunes along the coast and river banks adjacent the mouths of the rivers Rhine and Meuse. In addition, the material culture and settlement structure on sites in the two regions appeared to differ, based on observations made during our inventory of Carolingian sites.

Region 1 has been divided into four subregions, largely coinciding with the north of the province of Noord-Holland, the west of the province of Friesland, the east of the province of Friesland and finally the province of Groningen respectively. However, the precise delimitation of the subregions

13 De Vries/Vos 2013.

was not explicitly based on current provincial or historical boundaries, but on differences in the composition of find assemblages.

Region 2 corresponds largely with the current province of Drenthe. This region is characterised by a patchwork of coversand islands and a glacial landform known as the Hondsrug, both surrounded by extensive peat areas. These peat zones separate region 2 from surrounding regions. One site in Hardenberg near the border between the modern day provinces of Drenthe and Overijssel (site 32), which would fit better in region 3 in terms of soil conditions has been added to region 2 because the site inventory suggested that it had more in common with sites in this region than region 3.

Region 3 consist of the area to the east of the IJssel-river in the current provinces of Overijssel and Gelderland. Here cover sands form the main soil-type with much less peat zones than in region 2. To the west lies region 4 which is characterised more prominently by glacial landforms.[14] The southern boundary with region 6, which is clearly defined as an area dominated by rivers and river deposits, is constituted by the river Rhine. The cover sands in region 3 have a comparatively patchwork-like nature relative to regions 2 and 8, which also contain large amounts of cover sand islands. Region 3 was divided into two subregions. The current boarder between the provinces of Gelderland and Overijssel formed a convenient boundary between the two areas, though again, differences in material culture profiles formed the primary criterion.

Region 4 encapsulates the areas known today as the Veluwe and Utrechtse Heuvelrug. The northern border is constituted by the former Almere, the eastern border consists of the IJssel river, the southern corresponds with the current Nederrijn and Lek rivers, the western border with the Vecht river. Though the region contains few Carolingian settlements, the settlements that are present were much larger than most sites in other regions. Since excavations at Kootwijk and its surroundings were undertaken in the 1970's and 80's the importance of iron-production in the region is well documented. Along the southern and western border, and to a lesser extent along the eastern border the soil is characterised by glacial landforms. One practical reason for the limited number of sites in the region is the fact that large parts of it are covered by forest and heath-lands which form protected nature reserves. Furthermore, the wooded areas not part of a nature reserve are relatively sparsely populated. Therefore, it is difficult to determine whether the small number of sites is representative of the relative habitation density compared to other regions or if our view is obscured by a lack of excavations. The distribution of archaeological excavations as recorded in ARCHIS indeed shows that large parts of the region have witnessed virtually no research.

The western border of **region 5** roughly corresponds to an area where extensive peat coverage is indicated on the palaeographic reconstruction of c. 800 AD. The border between region 1 and 5 was chosen because of differences in soil conditions as mentioned above. However, the boundary was chosen rather arbitrarily by drawing a line between on the one hand an area where peat streams flow towards the Oer-IJ, and on the other hand one where they flow towards the former Almere. The boundary between regions 5 and 6 runs partly along waterways indicated on the palaeographical reconstruction, which to an extent correspond with some present day rivers and streams such as the Amstel and Meije. The boundary crosses the Oude Rijn at Bodegraven and then follows the frontier between peat and marshes on the palaeographical reconstruction until the Meuse near Aalburg. The habitable areas of region 5 appear to have been the dunes and beach ridges along the coast

14 They also occur in region 3, for example the Sallandse Heuvelrug.

as well as the mouth of the rivers Rhine and Meuse. The extent to which the peat area in the east of the region was settled and habitable is difficult to determine. Much of the peat in this area was reclaimed during the later Middle Ages and succeeding periods, meaning that even if there were Carolingian settlements on the peat they are now lost. Discoveries of traces of habitation on sand dunes and ridges have up till now been limited to the coastal area of the province of Noord-Holland,

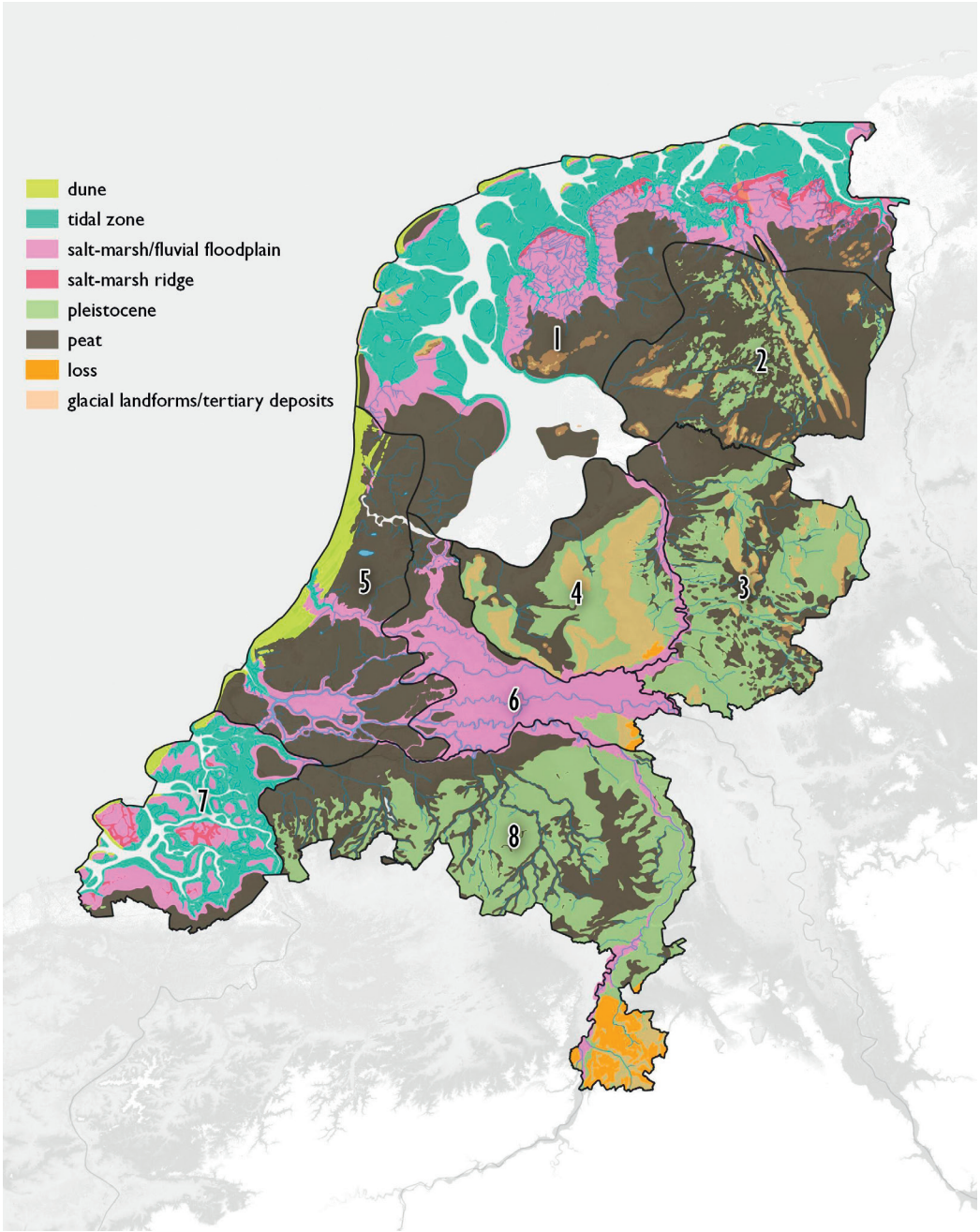


Fig. 2.2 Regions plotted on the palaeographical reconstruction of circa 800 AD (after De Vries /Vos 2013).

between Alkmaar in the north and Groot Olmen in the south. The latter is the only site to actually have been discovered under the dunes directly along the modern coastline. More sites may lie beneath these dunes which were largely formed after the Carolingian period.

The region was separated into two subregions, the Oude Rijn forming the boundary. The boundary between **region 6** and regions 3 and 4 is formed by the Rhine. To the north of the river the soil consists mostly of Pleistocene coversands and peat, in contrast with the marshes, rivers and natural levees predominant in region 6. The southern boundary with region 8 is similar to the current border between the provinces Noord-Brabant and Gelderland, which follows the river Meuse. It could be argued that the whole of the river Rhine up till Katwijk should have been included in region 6. The same goes for the area adjacent the river IJssel. One reason for not including the settlements around the mouth of the Rhine in region 6 is the presence of a stretch of river, running through an extensive peat area between Leidsche Rijn to the west of Utrecht and Alphen aan den Rijn, where no settlements or related structures dating to our period have been discovered. The peat zone may have formed a natural frontier between the two areas. The boundary between the regions has been drawn almost exactly half way along this stretch of river. The river IJssel formed a convenient boundary between regions 3 and 4 and it seemed rather convoluted to work region 6 in between. The areas around the rivers Waal beyond Druten (506), the Meuse beyond Heusden (68), and the Linge beyond Buren (527) have yielded no sites in our inventory. The first sites after these points are to be found around the mouth of the Meuse in region 5.

Region 6 was also divided into two subregions, an eastern and a western half. Sites in both subregions differ not only in the composition of find assemblages but also in the volume of finds per site.

The outline of **region 7** almost entirely coincides with the current province of Zeeland. Only the northern border lies slightly more to the north than the current border with Zuid-Holland in order to include all the tidal marshes and tidal zones present in this area in one region. Habitation seems only to have been possible on the dunes and parts of tidal marshes which were sufficiently silted up not to be flooded too frequently. According to the palaeographic reconstruction, this leaves Walcheren, the western end of Schouwen-Duivenland, a zone around Goes and some small, scattered patches. Until quite recently it even seemed that the tidal marshes were only inhabited seasonally, perhaps by sheep-herders. An excavation in 2007 revealed the first clear early medieval settlement traces on a silted up tidal marsh outside a ring fort. The region is well known for its ring forts which were probably all founded in the ninth century.

Region 8 is practically identical to the current provinces of Noord-Brabant and Limburg combined. The region is characterised by pleistocene sands in the central area of the current province of Noord-Brabant, peat areas along the northern border and another large peat area to the west of the river Meuse, known as De Peel. The habitable areas in the region more or less formed islands amid Pleistocene sands less suitable to habitation, watersaturated soils and stream valleys. This is similar to the situation in region 3, though the islands seem to have been larger in region 8 and there also appears to have been much less peat between them. The area lying between De Peel and the Meuse river was apparently relatively well suited to habitation and this area has yielded a number of sites. However, no sites have been discovered in the middle and southern part of modern day Limburg. Even for Maastricht the current evidence for actual traces of habitation in the eighth and ninth centuries are few and far between.

Region 8 has been split up into six subregions. The most south-easterly subregion is characterised by a relative paucity of sites as just mentioned. The other subregions each have their own characteristics in terms of material culture profile and to some extent also landscape and settlement structure.



The effects of formation processes and research methods

Introduction

Before objects used in the past become the archaeological artefacts that are at the heart of a study such as this, they go through various filtering processes. The filtering starts with the effect of past use practises of objects and value systems, in particular in relation to deposition, whether intentional or unintentional. The archaeological record always represents a selection of the material present at any particular location for the period during which that location was exploited. The distribution of material over a location may be random or related to meaningful intra-site use and meaningful depositions may have been made to look random by processes which occurred after deposition. Therefore, overly simplistic interpretations of object distributions, for example attributing a particular activity to a particular area within a site based on the presence of certain objects, can provide erroneous interpretations of the available data. Because this study focuses mostly on intra- and inter-regional variation, site-specific depositional practises are of lesser importance. However, post-depositional processes, the various factors which can distort initial depositional patterns, can be of considerable influence on distribution patterns of artefacts at a regional level.

Much research has been done, and continues, both theoretically and practically, on the implications of factors such as soil conditions, ploughing and other agricultural practises, water tables, animal activity and later human activity on the physical preservation of finds and features as well as cultural practises such as inheritance, veneration of ancient monuments in the past or collecting of older artefacts, on the representative value of what is discovered archaeologically.[1] In addition, the methods used during excavation, for instance the choice whether or not to sieve the soil from features or use a metal detector, can have a profound effect on the amount and variability of material culture unearthed. As the collated data was derived almost exclusively from published excavations, publication practices are another important factor to take into account. In some cases excavations carried out to a high standard have limited use for the present research because the results have been published in such a way that it was impossible to extract the relevant information. The aim here is not to provide a long list of possible factors that may have influenced the data compiled in our database, any one of which probably is applicable to one or more sites in our survey, but to identify which of them had an impact that has caused a significant bias regarding aspects relevant to the research goals. We need to determine what those biases entail at site, inter-site and inter-regional level.

3.1 Site, inter-site, inter-regional biases

First we will examine the biases at the site level, of which it should be noted that most also have a bearing on the inter-site and inter-regional levels. A prime example of this is excavation methods, which often differ between sites depending on the methodologies in vogue in a particular period or used by the excavating institution or company; then there are financial or time constraints, to name but a few factors. These can also be relevant at site level when this has been excavated in several stages by different institutions or private companies, sometimes decades apart. Because differences in excavation methods affect the comparability of any one site to any other site to a greater or lesser degree, it is impossible to give general estimates of the effect for the analyses carried out in chapters 4 to 6.

1 Some examples are Schiffer 1987; Roymans 1995; Fokkens 1998, 56-80; Bazelmans *et al.* 2002; Huisman 2009.

For pottery the implications will presumably be mitigated by its omnipresence and the relative ease with which it can be recognised during excavation. Many of the sites for which the methods of collection are obscure are also those which have been poorly published, and excavated in the period before the rise of commercial archaeology. This period saw a greater variability in the accuracy and detail of collecting of finds between institutions. Commercial archaeology often shows less exacting levels of recovery than the better executed excavations of the previous era, but the differences between excavating parties are smaller due to the introduction of minimum standards.[2] For pottery therefore, it seems reasonable to assume the representative value of sites in the analyses will be influenced primarily by the standard of publication and less by excavation methods.

Other, less common find categories, may be affected more by differing excavation methods. Metal objects are a case in point, as the use of metal detectors on excavations has only become common practise relatively recently in the Netherlands. Metal objects are much less likely to be deposited on sites than pottery because they were less common in daily life and broken objects could be recycled. For that reason alone they are less likely to be found. The same applies to glass artefacts and probably certain objects made of organic material such as combs. Most of these types of material are also more susceptible to decay than pottery. The use of metal detectors can therefore have a significant effect on the recovery rate of metal objects and the same applies to sieving, especially for glass. Unfortunately, sieving has rarely occurred in a consistent manner on any of the Carolingian sites in our dataset and consequently very little glass has been found at all. This means glass artefacts by default will be underrepresented, and play a minor role in our analyses.

Another issue particularly relevant at site level is that features from later phases of habitation will tend to contain more finds than the initial phase. If a Carolingian settlement consisted of for instance three consecutive phases without older habitation being present at the same location, the features of the first phase are less likely to contain find material due to the fact that refuse will not have had a chance to build up at the time the first features were dug.[3] This can lead to a false impression of the amount and variability of material present during the consecutive phases of habitation. The material culture of the first phase may be underrepresented. A related issue arises when older and or younger habitation is present at the same site as the Carolingian settlement. Older material may end up in Carolingian features which is particularly problematic for artefacts which cannot readily be dated to a specific period such as stone artefacts, some metal artefacts and a proportion of the hand-made pottery. Younger material may find its way into Carolingian features through human or animal activity perhaps making the features seem younger than they are. It may also lead to difficulties recognising Carolingian structures among the many, often larger, younger features.

Second, factors relevant to the inter-site and inter-regional levels of comparison are differing soil conditions and water tables, the nature of the features present on sites, the degree of disturbance of the original habitation level, whether or not there is a natural build-up of sediments at the site, later agricultural practises and significant changes in the landscape.

The effects of soil conditions on artefacts are well known and can be substantial. There are many differences in the composition of soils across the Netherlands, but the main soil types are essentially clay, sand and peat (*fig. 3.1*). Pottery, stone and glass artefacts are relatively well preserved in all these soils, though clay can have an adverse effect on softer fired ceramic wares, in our period

2 Whether these have actually been adhered to in all cases is another matter and minimum standards are often applied as maximum standards.
3 Verhoeven 2010, 269-276.

hand-made pottery in particular. However, metal and organic materials are much more reliant on favourable soil conditions and water table levels to remain preserved. Iron and copper-alloy artefacts are particularly susceptible to corrosion, especially in aerobic conditions, in comparatively dry, loose soils.[4] Both metal and organic material are preserved better in anaerobic conditions and relatively compact, wet soils. Therefore metal artefacts and objects made of organic materials are more likely to be found in clay soils of which the compact nature limits the availability of oxygen and retains moisture better. They survive much less well in sandy soils. Because soils play an important part in our definition of regions, and most regions therefore have relatively homogenous soil conditions, the main differences will be between sites from different regions. Region 5 perhaps shows the greatest internal differentiation in soil conditions with habitation on sand dunes, along rivers and in (former) peat areas. This makes it an interesting region to examine for the possible effects of soil conditions on the comparability of sites, although it might be the case that sites on different soils also had different habitation histories exactly because of their differing location.

A factor which may have had a significant effect on the comparability of sites and regions is the degree to which the original habitation level(s) were preserved. Some sites in our survey consist of nothing other than the remains of habitation levels and original surfaces deposited one on top of the other, whereas for many other sites these levels have been completely removed, either by ploughing, erosion or commercial exploitation. In the past most unintentional refuse depositions will have been incorporated into the soil just below the contemporary surface. This material found its way into the pits that were dug through habitation layers. Therefore, what is found in the vast majority of archaeological features is a limited selection of what was present in habitation layers. Sites that do contain habitation layers can be expected to yield considerably more finds than those that do not. The preservation of habitation layers is partly dependent on local, natural conditions. They are often discovered in areas that were flooded repeatedly in later centuries, to an extent protecting the layers from later human activity. Layers of deposited wind-blown sand have in some cases helped preserve habitation layers in the dune areas of region 5, but in contrast with sites which were later flooded, the settlements on sand-dunes often remained continually inhabited at least until the end of the Central Middle Ages. Unsurprisingly, many sites with intact habitation layers have been discovered along rivers and in zones which were flooded and covered in peat following Carolingian habitation. Settlements on terps in region 1 are by their very nature also characterised by the presence of habitation layers, though here they are a consequence of human action. Due to the fact that these sites were often continually inhabited before and after the Carolingian period, there is generally a degree of disturbance and intermingling of habitation layers.

On sandy soils where no sedimentation took place the post Carolingian use of the landscape led to a gradual destruction of the upper part of the topsoil mostly through ploughing. In the Late Middle Ages most Carolingian sites on sandy soils were progressively covered by layers of sand mixed with manure, intended to improve the fertility of the otherwise relatively poor soils. This eventually led to thick deposits of arable layers (plaggen soils) protecting the older dug in archaeological features. However, because each subsequent fertilisation required mixing with the soil already present, the early medieval habitation layers will have been completely incorporated into cultivation layers within the first few generations of the application of sod-fertilisation.[5] In addition, manure fertilisation, which does not necessarily lead to significant raising of the surface level, is likely to have taken place for several centuries after habitation ended. In the period before sod-fertilisation started existing habitation layers would already have been turned over considerably.

4 Carmiggelt/Schulten 2002, 71-72.
5 Theuws/Van der Heijden/Verspay 2011, 86-90.

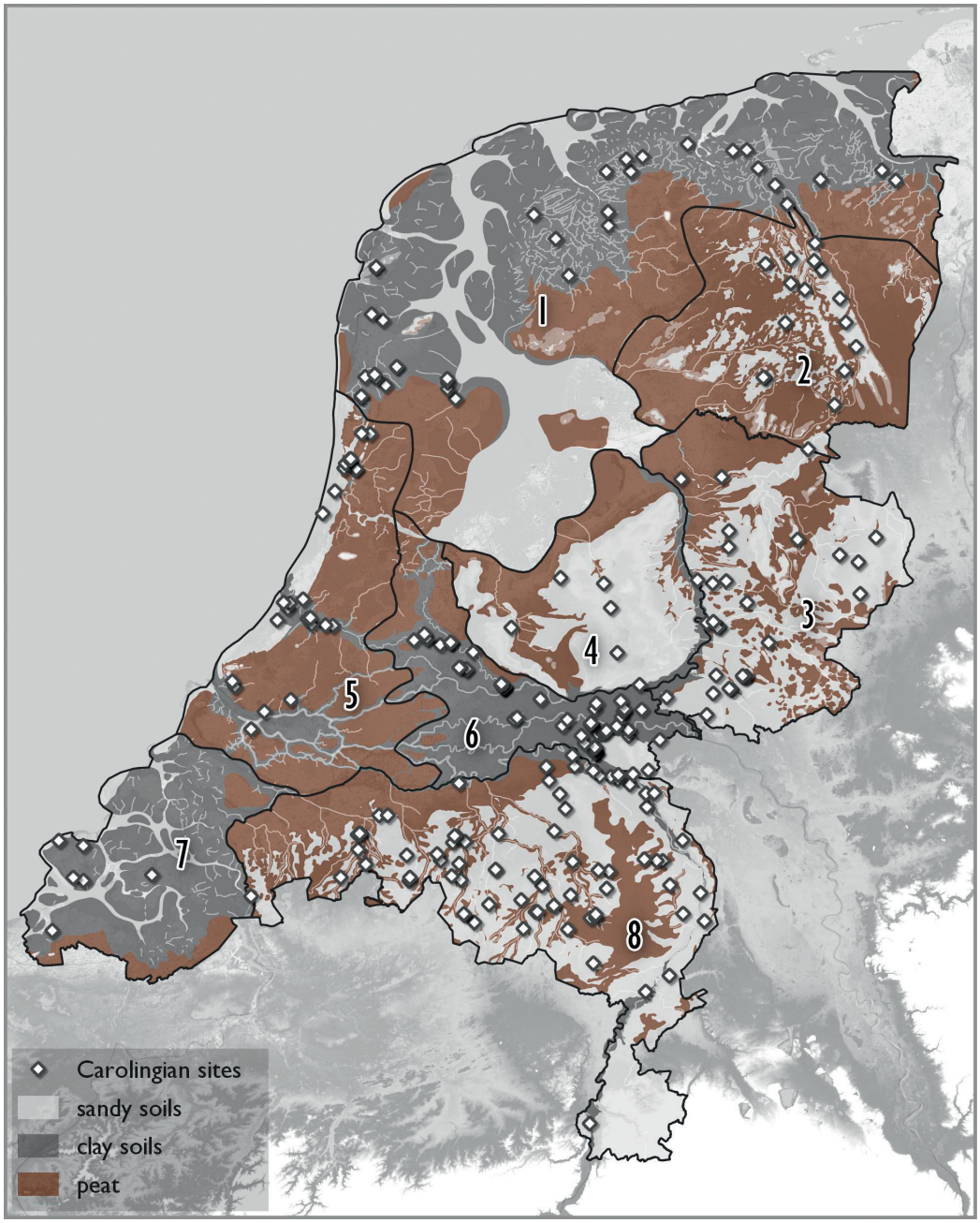


Fig. 3.1 Parts of the research area where either, sandy soils, clay soils or peat dominate (based on De Vries/Vos 2013). For the site numbers see figure 2.1.

Therefore, habitation layers are rarely found on sites in regions dominated by sandy soils.

Finally, the kind of features present on a site may have had an impact on the amount and variability of finds. Some types of features are more likely to yield a large amount of artefacts compared to others simply due to their relative size, but the use of features in the past can also be a cause. Wells are often among the largest single archaeological features on sites and because they lay open for their entire use-life there was always a possibility of material falling in, although in general they seem to have been kept clean as best as possible as long as they were in active use. As the purpose of wells was to obtain water they were dug to groundwater level, meaning that on many sites they are the only features to yield finds from waterlogged conditions, especially those on dry soils. Wells could be used as refuse pits after abandonment of their primary purpose, although it seems to be more common for them to be filled up swiftly after disuse. Even so, due to the sheer volume of the contents of the well shaft there is a greater chance of find material having been deposited in a well than in most other features. Therefore, sites containing many wells may yield more and more varied finds than those containing few or none.

Region	No ditch-systems	Ditch-systems
1	97.0%	3.0%
2	73.3%	26.7%
3	100.0%	0.0%
4	50.0%	50.0%
5	77.8%	22.2%
6	87.8%	12.2%
7	100.0%	0.0%
8	97.3%	2.7%
All regions	**91.0%**	**9.0%**

Table 3.1 Percentage of sites per region where either ditch systems were present or not.

Ditches, though often not preserved to a great depth on Carolingian sites, can also contain relatively large amounts of finds because they cover a considerable cumulative surface. The use of ditches was not common to each of our regions in the Carolingian period (table 3.1). This will have partly been due to the fact that water management was a necessary component of settlement organisation in wetter areas, but this does not account for all observed variability. Sites in regions 2 and 8 were characterised by comparatively similar soil conditions and water table levels, but where several settlements in the former region do show the use of ditches, almost none have been found on sites in region 8. Whereas wells are a common feature of settlements in almost all regions, ditches are not and may be responsible for significant differences in the amount of finds between regions.

Silted up watercourses which were still active in the Carolingian period are an even more regionally specific feature type. These only occur at sites in regions 1, 5 and 6, often where there were very dynamic river systems. In many cases these channels seem to have been used as dump sites for refuse from the neighbouring settlement. Another common practise was to build revetments along the stretch of channel which passed the settlement. These were then reinforced with settlement refuse. Silted up channels are understandably rich sources of find material and can cause significant biases in the amount and variability of find material, especially as they generally have excellent conditions for the preservation of metal and organic material.

Sunken huts are another type of feature unevenly distributed over regions and which, due to their relatively large size, can contain high amounts of artefacts. This could make it difficult to compare

sites with sunken huts to those where craft activities took place in above ground structures or in the open air.

Though dug-in post constructions are fairly common in most regions there are areas where buildings were constructed by other methods such as sod-walls or hammered in posts. As postholes contain a significant proportion of the finds from features on sites where they are present, their absence in particular regions will presumably have had an effect on the amount of finds potentially present. At the same time, areas where structures constructed of dug-in posts are common are generally also those where sod-fertilisation took place, causing the most find rich upper section of postholes to be disturbed.

In the next sections I will be examine how several of the discussed factors may have influenced the data on which the analyses in the following chapters is based. Firstly, the various factors that can be grouped under preservation conditions will be discussed. Secondly, effects of the presence of particular kinds of features on the amount and variability of finds is examined. Finally the impact of excavation methods and publication practises on the collected data will be discussed.

3.2 The effects of preservation conditions

A recent overview of brooches found in the low countries dating from the Iron Age to the Early Middle Ages examined what post-depositional factors likely had the greatest influence on observed distribution patterns.[6] Based on similarities in the distribution of brooches in the Netherlands with those of glass La Tène bracelets and Late Roman *terra sigillata* sherds it was concluded that soil conditions played a limited role as far as the spread (though not the volume) of items is concerned while the depth of deposits relative to the surface were deemed to be of primary importance. In areas with sandy soils the process of improving the soil, discussed in the previous section, has buried finds under thick deposits, while for example the clay soils in the central river area require little additional fertilisation. This means that ploughed land in areas where clay soils dominate will more readily bring archaeological objects close to the surface, where they can be found through surveying and metal detecting. The conclusions are mainly relevant for the area of the Netherlands along the major rivers and to the south of them because the reference material circulated mostly in those areas. However, the principles can be expected to be the same for the northern half of the Netherlands. In fact an analysis of the specific find conditions in the northern provinces, particularly in the province of Friesland led to similar conclusions. The interplay of past and present-day land-use, metal detecting practises, and archaeologists role in recording finds, could be shown to have had important consequences for the distribution of stray metal finds.[7]

The analyses in the following chapters are usually based on finds from excavated contexts, so the depth of deposits should not be a factor.[8] Despite soil conditions not appearing to be of great consequence for the overall distribution of stray finds, in this study the volume and variability of find assemblages is an important factor in interpreting the level of connectedness of sites and regions. Therefore the potential effects of soil conditions for the recovery of the different find categories needs to be examined. The number of finds of metal and organic material per region and per soil type reveals that objects made of bone or antler have been found mostly on sites situated on clay. The

6 Heeren/Van der Feijst 2017, 365-371.

7 Bazelmans/Gerrets/Pol 2002, 232-235.

8 However, in the chapter on metal artefacts use is made of the stray find evidence for Carolingian coinage. The difficulties in interpreting their distributions is discussed there.

same is true for artefacts made of wood. Where objects in bone, antler, leather or wood have been discovered on sites on sandy soils and recorded per feature they were recovered from wells. The consequence is that hardly any artefacts made of these materials has been found on sites in regions 2, 3, 4 and 8. For this reason and the fact that their recovery is so dependent on favourable preservation conditions, they have not been studied in great detail. With regard to metal artefacts the image is somewhat more diffuse. As expected, in general metals seem to be found more frequently at sites on clay than on sandy soils, though the difference is limited in absolute terms. Of each major group of metal in the database except iron, that is gold, silver, copper-alloys and lead, the majority was recovered from sites on clay (table 3.2). It is remarkable that in a number of instances the amount of copper-alloy artefacts is much higher than iron objects on the same soils in the same regions. This is probably partly a consequence of publication practises, copper-alloy artefacts being more likely to be mentioned in less comprehensive reports, and partly to the fact that copper-alloy objects can often be dated accurately on morphological grounds rather than just context.

Region	Soil	Silver	Gold	Copper-alloys	Iron	Lead	Tin	Total
1	**Clay**	39	-	42	9	2	3	95
2	**Sand**	2	-	4	6	-	-	12
3	**Clay**	-	-	-	2	-	-	2
	Sand	4	-	10	11	-	-	25
4	**Sand**	-	-	-	4	-	-	4
5	**Clay**	20	-	21	93	4	8	146
	Sand	80	-	43	70	3	-	196
6	**Clay**	48	-	56	4	4	1	113
	Sand	-	-	7	-	-	-	7
7	**Clay**	-	-	10	6	-	-	16
	Sand	2	-	20	2	2	4	30
8	**Sand**	12	2	17	36	2	-	69
Total		**207**	**2**	**232**	**243**	**17**	**16**	**717**

Table 3.2 Number of finds per metal, per region and per soil type.

If we compare the coastal and riverine regions 1, 5, 6 and 7 with the more inland regions 2, 3, 4 and 8 the former group contains 28 sites on clay and 14 on sand, where metal artefacts may be expected to have been recovered and recorded if they had been present, based on the excavation and publication scores (see section 3.4). In the inland regions two sites were situated on clay and 43 on sandy soils. These figures indicate that inland areas are at a slight disadvantage with regard to the likelihood of metal artefacts being discovered due to the lack of sites on clay soils. However, if we compare the average number of metal finds on sites on sandy soils between coastal and inland areas it is clear the average for the former is much greater (table 3.3). This suggests a difference in recovery of metal objects which cannot readily be explained by the factor soil conditions. One site in region 7 classed under sites on sandy soils, Domburg (191), contained a relatively large assemblage of metal finds. Here the numbers can at least partly be explained by the fact that the site was waterlogged and that the soil consisted of anthropogenic layers. However, it is not so easy to clarify the relatively high average quantity of metal artefacts at sites on sandy soils in region 5 (table 3.4). On closer inspection two sites on sandy soils in region 5 stand out due to their find conditions. Both at Bloemendaal-Groot Olmen (212) and Wijk aan Zee-Hoogovens (172) habitation layers were relatively well preserved which may explain the particularly large assemblages of iron artefacts which together account for roughly 70% of iron artefacts found on sandy soils in region

5. By contrast the amount of copper-alloy objects at both sites is fairly limited. But even when these two sites are omitted the amount of metal artefacts on sites with sandy soils in region 5 is still high compared to other regions.

Area	Soil	Artefacts	Sites	Avg N artefacts per site
coast	clay	370	28	13.2
	sand	233	14	16.6
inland	clay	2	2	1
	sand	110	43	2.6

Table 3.3 Average number of metal artefacts by area and soil type.

Region	Soil	N sites	Silver	Gold	Copper-alloy	Iron	Lead	Tin
1	clay	10	3.9	-	4.2	0.9	0.2	0.3
2	sand	3	0.7	-	1.3	2.0	-	-
3	clay	2	-	-	-	1.0	-	-
	sand	13	0.3	-	0.8	0.8	-	-
4	sand	2	-	-	-	2.0	-	-
5	clay	3	6.7	-	7.0	31.0	1.3	2.7
	sand	7	11.4	-	6.1	10.0	0.4	-
6	clay	13	3.7	-	4.3	0.3	0.3	0.1
	sand	6	-	-	1.2	-	-	-
7	clay	2	-	-	5.0	3.0	-	-
	sand	1	2.0	-	20.0	2.0	2.0	4.0
8	clay	1	-	-	-	-	-	-
	sand	25	0.5	0.1	0.7	1.4	0.1	-

Table 3.4 Average number of artefacts per metal and site, separated by region and soil type. The number of sites per soil type does not represent the total amount but rather the sites with an excavation score of 1 or 2 and a publication score of 1 to 4.

3.3 Aspects related to features

The manner in which data was collected and the nature of features themselves both create problems when attempting to compare the find density and variability between feature types. Ideally something like a figure for the average number of finds per cubic meter of fill should be calculated but that is not possible. For some feature types even an average number of finds per feature could not be derived. Due to time constraints, in this research the decision was taken to mostly group finds from postholes and pits together, either as part of a structure or as a class of features. It was simply far too time consuming to enter the finds per individual unit for these feature types. Therefore, in the case of most feature types a direct comparison of the amount and variability of finds between sites and regions is not possible. However, it is possible to examine how influential the presence of particular feature types has been on the nature of assemblages between select regions.

Table 3.5 shows the absolute number of ceramics from rural sites per structure type and per region. Ceramics were chosen because they are least affected by post-depositional processes. Table 3.6 is similar but shows the sum of sherds per feature type. In both tables stray finds (broadly defined as finds dated to our period and not attributable to a feature or structure) have been excluded. It is important to note that the remaining sherds represent roughly 30% of the total number of recorded fragments (table 3.7). The number of stray finds compared to those that could

be assigned to structures and features is first and foremost an indicator of the effects of publication practises. These are discussed in section 3.4. However, some of the differences between regions can probably be related to the presence of specific feature types.

Structure type	1	2	3	4	5	6	7	8	Total
barn	-	-	68	-	-	-	-	5	73
defensive works	-	-	-	-	7	-	-	-	7
ditch	137	50	259	16	1231	1340	-	137	3170
fence	-	-	-	-	2	-	-	-	2
grain store/ haystack	-	-	16	9	1	61	-	38	125
hearth/fireplace	22	7	-	10	-	-	-	-	39
layer	649	3	15	47	367	1287	121	43	2532
main building	5	7	471	152	967	90	34	1420	3146
natural waterway	4	-	-	-	8108	53	-	2	8167
outbuilding	-	-	26	-	876	8	-	158	1068
palisade	-	-	-	4	-	-	-	-	4
pit	178	1116	464	431	870	3096	4	421	6580
posthole	12	15	434	211	302	433	-	622	2029
sunken hut	26	40	15	761	-	38	-	17	897
well	283	207	877	181	658	227	-	879	3312
Total	**1316**	**1445**	**2645**	**1822**	**13389**	**6633**	**159**	**3742**	**31151**

Table 3.5 Total number of ceramic sherds per structure type and per region.

Feature type	1	2	3	4	5	6	7	8	Total
building ditch	-	-	7	-	-	-	-	-	7
ditch/moat	137	50	252	16	1238	1340	-	137	3170
layer	649	3	15	47	367	1287	121	43	2532
layer building	-	-	-	-	1809	-	-	-	1809
natural waterway	4	-	-	-	8108	53	-	2	8167
pit	178	1116	464	431	870	3096	4	421	6580
posthole	12	22	1015	376	339	592	-	2243	4599
sunken hut	26	40	15	761	-	38	-	17	897
well	283	207	877	181	658	227	-	879	3312
Total	**1289**	**1438**	**2645**	**1812**	**13389**	**6633**	**125**	**3742**	**31073**

Table 3.6 Total number of ceramic sherds per feature type and per region.

Region	Stray find
1	14388
2	7890
3	4011
4	8786
5	24035
6	8979
7	301
8	4914
Total	**73304**

Table 3.7 Total number of ceramic sherds recorded as stray finds.

It is worth briefly noting that the figures for metal artefacts are roughly similar to those for ceramics with 61% of the total amount of metal finds from sites in the research area, where finds could be attributed to individual structures, having been recorded as stray finds. However, there appears to be a considerable difference between artefacts made in silver and copper-alloys and those made of iron. Of the objects made in the first two metals 94% and 85% respectively have been recorded as stray finds while for iron artefacts the figure is 44%. An examination of the sites with the largest assemblages of silver and copper-alloy artefacts indicates that the high percentage of stray finds is not the result of less than ideal publication practises, but that the majority of artefacts indeed were discovered in topsoil. Part of the explanation for the difference between copper-alloys and iron objects probably lies in the already mentioned difficulty of dating many iron artefacts on morphological grounds. In contrast copper-alloy artefacts mainly consist of brooches, and silver items are usually coins. These can be dated far more accurately. The evidence suggests iron objects were more common on rural sites than they now appear.

The figures in tables 3.5 to 3.7 indicate that in general sites in regions 5 and 6 have the largest assemblages. The structures that yielded relatively large amounts of finds in these two regions compared to other regions are ditches, layers, natural waterways and pits. The amount of sherds discovered in features belonging to buildings is comparable for regions 5 and 8 but the evidence behind table 3.6 suggests that is for different reasons. One main building and one outbuilding from two sites in region 5 account for almost the complete assemblage of sherds from buildings in the region. In both cases remnants of habitation layers had survived. On the one hand this underlines the influence the presence of such layers can exert, on the other hand it suggests that buildings in region 5 yielded relatively few finds overall. Equally, in region 6 only one main building contained ceramics, at least as far as finds could be attributed to structures (table 3.8). The numbers for regions 1 and 2 are also limited. In contrast, buildings, and postholes more generally, are consistently among the more find-rich elements in regions 3, 4 and 8.

Structure type	1	2	3	4	5	6	7	8	Total
barn	-	-	5	-	-	-	-	2	7
defensive works	-	-	-	-	1	-	-	-	1
ditch	3	3	2	-	7	9	-	3	27
fence	-	-	-	-	1	-	-	-	1
grain store/ haystack	-	-	4	8	2	4	-	21	39
hearth/fireplace	-	1	-	-	-	-	2	-	3
layer	5	1	1	-	-	1	1	1	10
main building	3	5	14	37	15	1	6	102	183
natural waterway	2	-	-	-	3	4	-	1	10
outbuilding	1	-	5	-	1	1	-	40	48
palisade	-	-	-	1	-	-	-	-	1
pit	2	25	19	-	3	8	3	15	75
sunken hut	2	10	2	103	-	6	-	2	125
well	19	13	29	7	56	16	-	77	217
Total	**37**	**58**	**81**	**156**	**89**	**50**	**12**	**264**	**747**

Table 3.8 Count of the number of individual structures in the find database that contained ceramics. Only instances of finds from individually recorded structures were included and not those from aggregated groups of features such as postholes, layers and ditches. Therefore, the figures are somewhat deceptive for ditches, layers and pits.

An important question is whether the presence of certain features contributed meaningfully to the large differences in absolute number of finds between some regions? Once more, for most features this is impossible to say with confidence due to the manner in which the finds were recorded. The presence of silted up natural waterways running along a settlement clearly does lead to relatively high numbers of finds. The finds from two sites in region 5 where a silted up watercourse was present could be assigned to specific feature types, Leiderdorp-Hoogmadeseweg (158) and Valkenburg-De Woerd (155). Finds from the fill of the watercourses made up roughly 95% and 78% of the total assemblage respectively (excluding stray finds). For Leiderdorp this is not so unusual because the sections of the site included in the dataset mainly consisted of trial trenches over the watercourse. However, at Valkenburg the adjacent settlement was also excavated. The sherd count from the remaining features at Valkenburg is still sizeable compared to other sites in the research area, so the presence of a silted up natural watercourse may not account entirely for the higher absolute number of finds for sites around the mouth of the Rhine. Nonetheless, this feature type probably does account to a large degree for the relatively high absolute number of stray finds in region 5. For example, the finds from Koudekerk aan den Rijn-Lagewaard (198) could not be attributed to specific features, but the publication on the site indicates that two-thirds of the material dated to our period was recovered from a silted up natural watercourse.[9] This site alone accounts for almost 4000 ceramic stray finds.

With regard to ditches the picture is less clear without a more detailed analyses of the kind of ditch-systems present on sites in the various regions. Both inland and coastal regions have reasonably similar amounts of records in the find database representing ditches, meaning that a comparable number of sites at least contain some ditches. However, it says nothing about the number of ditches per site or the total volume of infill they represent. A closer examination of the sites where finds could be assigned to feature types reveals that it is mainly a small number of sites in regions 5 and 6 which contribute to the relatively high numbers of sherds from ditches in those areas. The site Uitgeest-de Dog (161) has one of the largest assemblages in the research area. Unfortunately, it was not possible to assign the finds to feature types in the context of this study due to the manner in which they were published. However, the find report does provide total numbers of sherds per feature type. Of the 2846 fragments assigned to features, almost 25% was recovered from ditches, followed at some distance by wells, pits and postholes.

Although the interpretation of the number of finds from layers suffers from the same problems as ditches, it seems clear that at least in region 1 the presence of layers on sites has had an influence on the amount of sherds recovered. Unfortunately, the nature of layers was not systematically recorded during data collection, partly because it was not always possible to determine from the published data. For sites in region 1 where finds could be attributed to feature types most contained at least some finds from layers and in most cases those finds accounted for at least 20% of the total assemblage. In particular several sites in the north of the province of Noord-Holland contained remnants of habitation layers. Even though the finds from Medemblik-Schuitenvoerderslaan (172) and Schagen-Waldervaart (169) could not be attributed to specific feature types the site descriptions make it clear much of the find material was recovered from layers that were covered by younger sediments. Therefore the presence of find rich layers on sites in region 1 appears to be one of the main reasons for the large amount of stray finds in that area. In region 5, the finds from the site Wijk aan Zee-Hoogovens (172) accounts for almost a third of the stray finds in the region. This site was meticulously excavated which almost certainly led to a relatively high artefact recovery rate.

9 Dijkstra/Van Grinsven 2007, 29.

However, the large amount of pottery fragments is undoubtedly also due to the preservation of habitation layers under a meters thick, undisturbed stratigraphical sequence.[10]

Sunken huts only occur regularly on sites in regions 1, 2 and 4, but have also been found on sites in parts of regions 3, 6 and 8. Figure 3.2 shows they are unevenly distributed across the research area and as they are a relatively large feature may cause overrepresentation of finds compared to areas where they do not occur. Unfortunately few sites where sunken huts have been discovered were published to the extent that finds could be attributed to individual structures or features.

Region	Site	Place	% of assemblage	N sherds
1	**21**	**Leeuwarden**	8.6%	26
3	**45**	**Zelhem**	15.3%	11
4	**507**	**Oud Reemsterzand**	7.5%	7
4	**530**	**Uddel**	49.1%	708
4	**538**	**Putten**	16.1%	46
6	**501**	**Wijchen**	49.4%	38
8	**67**	**Beegden**	36.6%	15

Table 3.9 The proportion of the total assemblage contained in sunken huts at sites where finds could be associated with structures and features.

Table 3.9 gives an overview of the percentage of the total ceramic assemblage that was recovered from sunken huts on rural sites where this could be determined. The table indicates that where they were present sunken huts may well have contributed considerably to the volume of finds. Given the small number of sites with sufficient evidence for the kind of finds recovered from sunken huts it is not possible to make any assertion regarding them containing above average quantities of material associated with artisanal activities.

The examples given above indicate that at least to some extent the differences in the absolute number of finds between regions is due to the presence of particular feature types. However, this does not necessarily imply the amount of ceramics present in settlements would on average be roughly equal for each region if we could correct for the influence of feature types. The Valkenburg site still shows relatively high absolute figures when the silted up watercourse is ignored and the absolute number of sherds from postholes and pits at Uitgeest-De Dog is relatively high compared to an average site in regions 3 or 8. Perhaps the best way to compare the volume of material on sites is by examining the finds from wells. Their characteristics are comparable throughout the research area and they usually represent a single feature. Therefore it is possible to calculate average numbers of sherds per well (table 3.10). The figures for the overall average number of sherds per well, per region indicate that the regions considered to be inland areas have higher values than riverine and coastal areas. When the sherds are split up into wheel-turned and hand-made groups it becomes clear that the high values for regions 2 to 4 are largely due to considerable amounts of hand-made ceramics. The differences in the average amounts of wheel-turned and hand-made pottery per well roughly reflect the relationship between both groups within and between regions, something that will be discussed further in chapter 4. The figures are probably also a reflection of a tendency for handmade ceramics of the period to be more prone to breakage, or to fragment more than wheel-turned pottery.

10 Bosman/Calkoen 1967, 224-231.

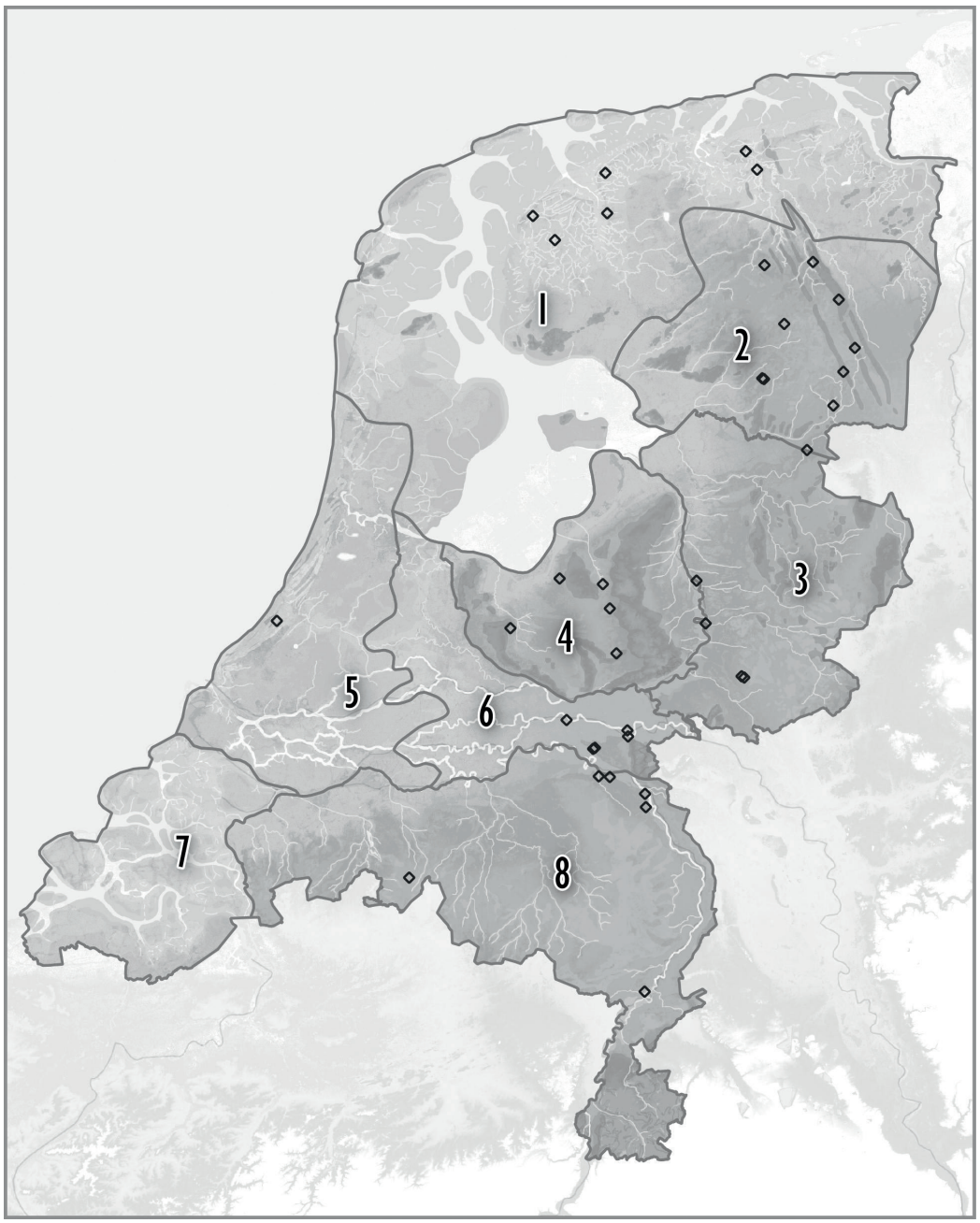


Fig. 3.2 Distribution of sites containing sunken huts.

When only the wheel-turned sherds are considered the differences between regions are generally limited, but region 5 has a lower average than the three inland regions for which we have figures. This seems to contradict the evidence from some individual sites in region 5 mentioned above. Table 3.10 also contains the average number of wells per 1000m² for each region. The numbers suggest the amount of wells on sites in regions 5 and 6 was on average considerably higher than in some

inland areas. This might explain why, even if the average amount of sherds is relatively low in for example region 5, the total amount of sherds from wells is still high.

Region	Wells[11]	Avg N of wells per 1000m2[12]	N Sherds	Avg N sherds per well	Avg N WT	Avg N HM
1	14	0.7	87	6.2	1.3	6.3
2	6	0.4	206	34.3	-	34.3
3	27	0.7	767	28.4	4.4	28.6
4	6	0.2	171	28.5	6.0	23.5
5	67	1.1	380	5.7	3.9	4.1
6	13	1	93	7.2	7.4	2.4
8	54	0.4	565	10.5	7.4	9.3

Table 3.10 Figures relating to the number of ceramic sherds recovered from wells in the research area.

In summary the evidence for differences in the size of artefact assemblages on sites between regions is ambiguous but indicates they are not as big as the total absolute numbers suggest. However, the question remains whether the variability of finds between regions might differ because of the size of the samples. The ceramic evidence presented in chapter 4 certainly suggests this played a role but perhaps not to such an extent that developments cannot be followed or comparisons between regions are made redundant. For artefacts produced in materials particularly susceptible to decay such as metals, bone and wood the question is difficult to answer because the regions with large assemblages are also the areas where preservation conditions are often more favourable to their survival. Table 3.11 shows on which proportion of sites in a region artefacts belonging to a particular find category occur. Region 5 has among the highest scores in each category but otherwise there is no clear distinction between inland and coastal areas. Presumably it is a combination of factors that makes region 5 stand out, making it complicated to determine whether the region ultimately had a richer material culture or not.

This can be illustrated further by once again examining the relationship between different metals and the contexts in which they were discovered. When this relationship is viewed by region it becomes apparent that in most coastal and riverine regions artefacts in silver, copper-alloys and iron have all mainly been discovered in topsoil. In inland areas silver and copper-alloys have also predominantly been found in topsoil but iron was discovered more often in features. This suggests that besides the morphological traits of artefacts, differences in land-use between the various regions, such as discussed in section 3.1 also played a role in the recovery rate of metal objects. Particularly the extensive occurrence of relatively acidic plaggen soils in the inland areas characterised by pleistocene sand may have caused a higher degree of decay of iron artefacts in topsoil compared to coastal and riverine areas.

The large assemblages in coastal and riverine regions are also, at least in part due to a lesser degree of disturbance of archaeological levels in later centuries. Aside from agricultural practises, subsequent disturbances could have been caused by continued habitation on sites after our period. Table 3.12 shows the percentage of sites per region that either provide evidence for continuity or not. It makes clear that continued occupation at the same site was considerably less common in region 5 than in other areas.

11 The numbers of wells that contained ceramics.
12 Based on the total number of wells dated to our period per site divided by the excavated surface area. Sites with a surface area below 1000m2 were excluded.

Region	Brick	Glass	Ceramics	Metal	Zoological	Wood	Stone
1	20.7	13.8	100.0	31.0	27.6	6.9	41.4
2	33.3	13.3	93.3	26.7	0.0	13.3	46.7
3	17.4	8.7	100.0	52.2	13.0	13.0	43.5
4	25.0	25.0	100.0	50.0	0.0	0.0	75.0
5	36.8	31.6	100.0	63.2	36.8	26.3	52.6
6	18.8	6.3	93.8	53.1	6.3	3.1	28.1
7	25.0	25.0	100.0	100.0	50.0	0.0	75.0
8	31.0	5.2	96.6	34.5	0.0	1.7	51.7

Table 3.11 Percentage of sites that contain the various find categories per region.

Region	No continuity	Continuity
1	66.7%	33.3%
2	53.3%	46.7%
3	53.8%	46.2%
4	0.0%	100.0%
5	81.5%	18.5%
6	42.9%	57.1%
7	50.0%	50.0%
8	59.5%	40.5%
All regions	**57.3%**	**42.7%**

Table 3.12 Percentage of sites in each region that either show continuity of occupation or not.

3.4 The effects of excavation methods and publication practises

In order to assess and to factor in the effect of excavation methods and publication practises each site was assigned an excavation and a publication score (table 3.13).[13] The scores do not necessarily equate to an assessment of the quality of excavation or publication in a general sense. They are first and foremost intended as an indication of the usefulness of the sites in the context of the current research. However, the evaluation of the excavation quality in particular is normative to an extent, based more on the overall impression of an excavation than on the use of specific methodologies. Any excavation with a score of 1 to 4 can be expected to have been carried out to a degree that finds were recorded per feature and each find category was recovered and recorded if they were encountered. Also they are expected to have been carried out fairly systematically. Sites with a score of 5 or 6 may have been excavated less thoroughly. Furthermore some find categories may not have been recorded systematically, either because they were not deemed of interest or because of time-constraints. The reason for making separate categories for small-scale excavations and trial trenches (scores 3 and 4) is that they may represent just a small proportion of a site and therefore provide only a limited overview of the variability of find material. In addition, few features are sectioned during trial trench campaigns meaning that for the most part only finds discovered during removal of topsoil will have been recovered.

13 Initially a post-excavation score was also applied because in some cases the post-excavation analysis of a find category had obviously been carried out to a high standard but the publication of the data was not sufficiently detailed for our purposes. However, it often proved difficult to assess the quality of post-excavation analysis exactly because it had to be derived from the publication. Furthermore, the quality of publication ultimately determined how useful the data from a site was for carrying out analyses.

The publication scores have been applied mainly based on how comprehensively the different find categories were published per structure or per feature. The first two scores stand for publications that provide the total amount of finds for each find category, either per structure and feature, or not. In addition the information about the various find categories is usually fairly comprehensive in these publications. The finds from sites with a publication score of 3 or 4 have only partially been published. For example, the total amount of ceramics per type and fabric may have been published, but stone and metal artefacts might only be mentioned as being present without giving exact numbers or descriptions. The finds from sites with a publication score of 5 are merely useful to give an impression of the distribution of find categories or, for example ceramics vessel types, but give no information on the volume of finds. For finds from sites with this score it is also often difficult to determine whether all recovered find categories have been stated or only a selection of finds deemed to be worthy of mention. To a lesser extent this can be the case for sites with a publication score of 3 or 4 as well.

The find category of which the recovery is probably most dependant on excavation methodology is glass. The collected data clearly shows that the discovery of glass artefacts is highly dependent on excavation methods, particularly the sieving of features. Of the six rural sites in the database where sieving took place only one did not yield glass objects dated to our period, although at the site in question (Geldrop-Genoenhuis (132)) fragments of sixth or seventh century glass artefacts were discovered. Of the 84 fragments of glass vessels found on rural sites, 56% were recovered at the sites where sieving took place. The underrepresentation of glass artefacts in the dataset due to a lack of sieving is counterbalanced somewhat by the likelihood that when glass artefacts have been discovered by other means they were published even when the overall publication of finds is poor.

The recovery of artefacts made of stone seems to suffer with low excavation scores. Only five stone artefacts have been recorded on sites with a score of 5 or 6. The same is true for production waste associated with metal working which is even rare on sites with a score of 4. The explanation is probably that seemingly indeterminate objects are more readily overlooked during less intensively and systematically conducted excavations.

Excavation score	meaning	Publication score	meaning
1	High quality, including sieving or at least sectioning by hand	**1**	Total counts for all find categories, per structure/feature
2	Normal quality, use of metal detector	**2**	Like 1 but not per structure/ feature
3	Like 2 but small excavation	**3**	Partial counts or total counts only for certain find categories, per structure/feature
4	Trial trenches	**4**	Like 3 but not per structure/ feature
5	Poor overall quality	**5**	Only presence/absence information for find categories
6	(Virtually) Non-archaeological fieldwork	**6**	(Virtually) no data on finds
0	Indeterminate	**0**	No finds

Table 3.13 Summary of the meaning denoted by excavation and publication scores.

Even more problematic for the current study are the consequences of publication practises on the availability and detail of data. Poorly excavated sites understandably often lead to reports of limited value, but well executed excavations can be rendered of similar worth by choices made in the publishing of the results. Thankfully the general trend is for good quality excavations to be published well more often than not (table 3.14). Nonetheless, only 18% of the available publications can be said to be optimal for our purposes (with an excavation score of 1 to 3 and publication score of 1) and for just over 50% of excavations with a score of 1 to 4 the finds could not be systematically assigned to structures and features. Table 3.15 indicates that this has likely had an effect on the frequency with which non-ceramic artefacts have been recorded. Obviously the recovery of the various find categories depends on several other factors, but for most the relative number of instances that they have been recorded drops steadily with successively lower publication scores.

Q pub Q exc	0	1	2	3	4	5	6	Total
0	22	2	-	-	3	1	21	49
1	-	5	4	1	-	-	-	10
2	-	23	16	6	18	4	-	67
3	-	14	14	6	15	9	2	60
4	-	9	8	4	4	5	4	34
5	-	1	1	-	3	5	3	13
6	-	-	1	1	3	5	3	13
Total	**22**	**54**	**44**	**18**	**46**	**29**	**33**	**246**

Table 3.14 The relationship between excavation scores and publication scores.

Q pub	Ceramics	Metal	Stone	Zoological	Wood	Brick	Glass
1	100.0	61.1	63.0	18.5	9.3	35.2	16.7
2	100.0	65.9	59.1	22.7	9.1	31.8	22.7
3	100.0	50.0	61.1	11.1	0.0	38.9	5.6
4	97.8	45.7	30.4	8.7	10.9	19.6	10.9
5	93.1	34.5	20.7	10.3	6.9	10.3	6.9
6	15.2	3.0	0.0	0.0	0.0	0.0	0.0

Table 3.15 The frequency with which find categories occur on sites relative to publication score.

Field	Description
Quality Excavation	Excavation score (see above)
Quality Publication	Publication score (see above)
Per structure	Whether finds could be recorded per structure. Either yes, no or partial
Per feature	Whether finds could be recorded per feature. Either yes, no or partial
Metal/Glass/Ceramics/Brick/Stone/Zoological/ Wood/ present	Whether the find category was found at the site. Either yes, no, indeterminate or likely
Metal/Glass/Ceramics/Brick/Stone/Zoological/ Wood/ totals usable	Whether the figures for each find category provided by the publication can be used for comparison with other sites

Field	Description
Sieving	Whether sieving took place
Metal detector	Whether metal detecting (likely) took place
Only Ceramics per structure	Whether only ceramics have been recorded per structure.
Only Ceramics per feature	Whether only ceramics have been recorded per feature.
Total ceramic types available	Whether the number of sherds per type represent the figure for the entire assemblage and is not just based on rims.
Total ceramic rims per types available	The number of sherds per type only represents rims, not body sherds
Total ceramic fabrics available	Whether the number of sherds per fabric represent the figure for the entire assemblage and is not just based on rims.
Total ceramic rims per fabric available	The number of sherds per fabric only represents rims, not body sherds
Percentages ceramics	Whether percentages can be calculated on the figures for ceramics even when the total assemblage has not been published in detail
Ceramic types available	Whether the types present among the assemblage are mentioned
Ceramic fabrics available	Whether the fabrics present among the assemblage are mentioned
Number per type usable	Allows making a distinction between sites where the total number of sherds assigned to types can be used for comparison, sites where that is not possible and sites where it is possible only for either wheel-turned or handmade ceramics
Number per fabric usable	Allows making a distinction between sites where the total number of sherds assigned to fabrics can be used for comparison, sites where that is not possible and sites where it is possible only for either wheel-turned or handmade ceramics

Table 3.16 Characteristics of the published datasets that have been recorded in order to make comparison between site assemblages easier.

3.5 Discussion

The examples provided above indicate that it is virtually impossible to correct systematically for the kind of biases present in the data that arise from preservation conditions, the nature of find contexts and excavation methods and publication practises. In several cases a combination of factors might be at play. The danger lies therein that every pattern observed in the data can be explained away as a result of one or more of the discussed factors instead of being an indication for activity in the past. This is not desirable and equally not necessary. It does mean that for each analysis carried out on the distribution of find and artefact categories it must be considered what the effects of the specific combination of post-depositional processes and archaeological methodologies may have been on the observed patterns. Whether that has been done adequately in the following chapters is ultimately at the reader's discretion.

In order to ensure that the data used in any given analysis is as comparable as possible each site has been scored on a range of characteristics (table 3.16). The excavation and publication scores have already been discussed, but others pertain to the find categories themselves. For each find category a judgement was made whether the number of artefacts present in the available publications represented the entire assemblage from that site or whether it was likely that finds had been omitted. This was necessary for publications with a score of 2, 4, 5 or 6. Quite a number of characteristics relate to ceramics because there were many variations on how they were published. For example, in some cases only the total amount of rims were available and not the total of the sherd assemblage. When only the rims were published this was sometimes done just for wheel-turned pottery or only per type and not per fabric. Another common variation was that the total assemblage was divided up by type and by fabric separately meaning the two could not be connected. These variations mean that assemblages can be suitable for some analyses but not for others. The recorded characteristics allowed assemblages not suitable to particular analyses to be filtered out and at least mitigate the influence of excavation and publication practises on the comparability of assemblages.

3.6 Conclusion

The aim of this chapter was to identify the various factors that may have caused the distribution patterns of artefacts (based on their initial deposition) to be distorted, and also to gain an idea of the extent to which each factor played a part. The evidence regarding post-depositional processes, in particular the effect of differing soil conditions was a first indication that sites in coastal and riverine areas were more likely to reveal find rich assemblages. Clay soils, which are better suited to the preservation of metals and organic materials are more common in regions 1, 5, 6 and 7 than in other regions. However, this did not explain the relatively large amount of metal finds from sites on sandy soils in region 5.

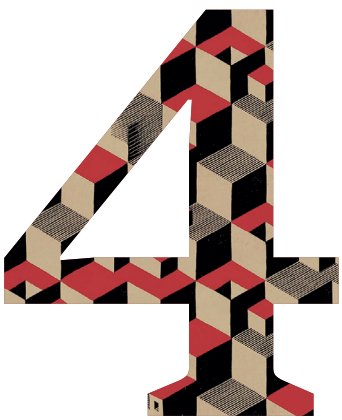
Examination of the possible influence of the presence of particular feature types on differences between sites and regions provided more indications that the relative abundance of finds in coastal and riverine regions may not be entirely representative of variation in the past in the research area as a whole. In region 5, near the mouth of the Rhine, several sites were located adjacent the remains of a silted up watercourse that had presumably been used as refuse dump in our period. These features are especially large, find rich and do not occur often in other regions. Furthermore, they generally have good preservation conditions for metals and organic materials. It also seems that

stratigraphical layers associated with sites were less prone to disturbance through later land-use than on more inland sites. This is indicated by the large number of finds from topsoil and habitation layers in regions 1, 5 and 6. The average number of sherds found in wells suggests the differences between regions were not as great as the total amount of finds indicates.

The number of stray finds compared to the quantity of artefacts recovered from features cannot be entirely explained by post-depositional processes. Unfortunately, the published data for the majority of sites in the dataset did not allow the finds to be attributed to individual structures or feature types. In terms of the ability to use site assemblage in a comparative manner, insufficiently detailed publications probably form the greatest obstacle. Limitations arising from excavation methods also play a role, particularly with regard to metal and glass artefacts.

The combined effects of the various distorting factors led to the decision not to analyse artefacts made of glass and organic materials in detail. Their distributions were too dependent on excavation methods and preservation conditions respectively. Another general conclusion is that inland and coastal areas will be difficult to compare. Archaeology often has to deal with data that is not entirely comparable and it is no different for this research, especially given the broad geographic scale that was chosen (at least in archaeological terms). A certain degree of simplification is unavoidable and this has several consequences. It will be necessary to work mainly with averages, ratios and percentages rather than with absolute amounts, and even then always with caution. Another consequence is that there are limits to the kind of questions that can be answered. In addition it means my research is not focussed on defining a single model of the Carolingian economy based on archaeological sources. There are too many unknown or partially known variables to convincingly combine all the available data in one unified model. What is possible is to investigate alternative options regarding key issues and determine which options are more likely in the wider context.

PART II



Ceramics

Introduction

Comprising roughly 80% of the recorded finds in the dataset ceramics play a key role in the analysis of exchange in this study. The main advantage of ceramics for the present study aside from their abundance is the fact that they often can be provenanced reasonably accurately. The volume of pottery means that conclusions can be drawn with more confidence than with some other find categories. Being able to provenance goods means being able to trace routes between production centre and consumers. This allows us to start to think about how goods were transported and exchanged, but also about how consumption may have played a role in the scale of production and dispersal of wares.

Unfortunately it is not all good news. The dating of ceramics often leaves something to be desired, particularly as we would ideally like to capture developments in the production, distribution and consumption of goods throughout our period. The chronology of the ceramics from most production sites in our period is the subject of debate in the areas where they were manufactured. At the same time, those debates have to an extent been stifled when it comes to the finds in our research area, the main reason being that the typo-chronology developed for the ceramics from the harbour excavation of Dorestad has been virtually the sole point of reference for pottery of the eighth and ninth century for the past 50 years.[1] In order to be able to say anything about developments in ceramic assemblages in our period it is necessary to question existing chronologies. It is of particular importance to narrow down the introduction of certain vessel types or wares as much as possible. Therefore the first sections (4.1-6) in this chapter consist of a survey of the existing literature. Admittedly, at times the nature of this survey will verge on being hyper-critical. This is necessary to understand the arguments and assumptions underlying the various chronologies and to examine whether they are still valid on the basis of new evidence. To all intents and purposes this is the first in depth examination of ceramics of the eighth and ninth centuries for the Netherlands as a whole, and aside from the main purpose of understanding exchange networks it will highlight the possibilities of and restrictions on inference inherent in the available dataset.

After reviewing the literature the next section (4.7.1) examines the evidence for dating ceramics from sites in our dataset. That evidence is by no means unequivocal and will equally require assumptions being made in order to say anything useful for the remainder of this research. However, it does provide some compelling new data for the interpretation of developments in the availability of goods in our research area. The remaining sections deal with the vessel types and fabrics of ceramics on our sites. These two aspects are then translated to function and provenance groups because these are the kind of attributes that are useful for understanding consumption at a regional level.

One final preliminary comment: in the following I will distinguish between ceramics in a Merovingian *tradition* and those in a Carolingian *tradition,* in order to convey the fluidity of these qualifications. Particular vessel types or fabrics are often simply labelled either Merovingian or Carolingian. The labels carry implicit assumptions about the dating of the pottery in question without having to be very specific. Hence, the eighth century, during which the transition between the two traditions occurred has become something of a black box. At the start there is still Merovingian pottery and at the end there are already Carolingian vessels, but how the transformation took form is obscured through the ambiguity in the dating of the two traditions.

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1 The first instance of the typology being used to describe the finds from Dorestad was in an article published in 1969. The ceramics of several sites were published using the typology before the definitive publication in 1980. An example is the report on the excavation of Medemblik-Schuitenvoerderslaan (170) in 1974.

4.1 The Dorestad typo-chronology

First, the Dorestad typo-chronology itself is examined to determine on what criteria it was based originally. This will be a rather lengthy discussion, but necessary because the Dorestad system has been the reference point for much of the ceramics from sites in our dataset. In addition it is the system which has been used to record most of the pottery in this research.

4.1.1 The fabrics

In the initial publication of the harbour area Hoogstraat I by (fig. 4.1, in the remainder of the chapter Hoogstraat will be abbreviated to HS) Wim van Es and Pim Verwers, 18 different wheel-turned fabrics were distinguished.[2] They are designated by a lower case 'w' followed by the fabric number. In the publication of harbour areas HS O and II-IV two fabrics were added which were associated with late-Merovingian/early Carolingian vessels.[3] In the publications on the Dorestad finds little attention is given to the actual methodology and process of defining fabric groups and therefore it is difficult to ascertain how the system was created in practice. Therefore it is not clear why particular choices were made. For example, it is unclear what happened to the fabrics 5 and 7.

The four main aspects by which fabrics were defined are temper, hardness, treatment of the surface and colour. Regarding the fabrics associated with the German Rhineland, the main characteristics were fineness of the temper and hardness. Colour and surface treatment were of much less importance for their identification. Fineness of tempering and hardness were both defined on three scales, respectively fine, rougher, and large and many grit particles, and soft, middle-hard and very hard. These nine fabrics in essence can be charted in a table with hardness on one axis and roughness on the other. Fabrics w11 and w13 to w17 were defined primarily on the basis of surface treatment and colour. Their description is geared towards the immediate identification of a specific fabric type, more so than that of the Rhineland wares. It could be argued that, although the same characteristics are used, two kinds of categorisation have been employed, one more formal (though not entirely so) for the Rhineland-fabrics and one less formal and more descriptive for the other fabric groups.

Of the early medieval fabrics, w1 is most common in the HS I assemblage making up almost 50% of the rim-sherds. Fabric w2 and w10 are considered variations of fabric w1, mainly differing in hardness. Fabrics w3, w4 and w8 are also considered to be related as are w6, w9 and w12.

Vessel types WI, II, I/II, IV and IX[4] mostly occur in the fabric group 1-2-10.[5] Type WIII is more strongly associated with the fabric group 6-9-12 although group 1-2-10 still comprises roughly a third of the rim-sherds of this vessel type. The fabric group 3-4-8 holds an intermediary position as far as type WIII is concerned, and is the second most prevalent group among types WI, II, I/II, IV and IX, although the frequencies are relatively low compared to group 1-2-10.

2 Van Es/Verwers 1980, 56-59.
3 Van Es/Verwers 2009, 148.
4 See below for description of vessel types.
5 Van Es/Verwers 1980, 139.

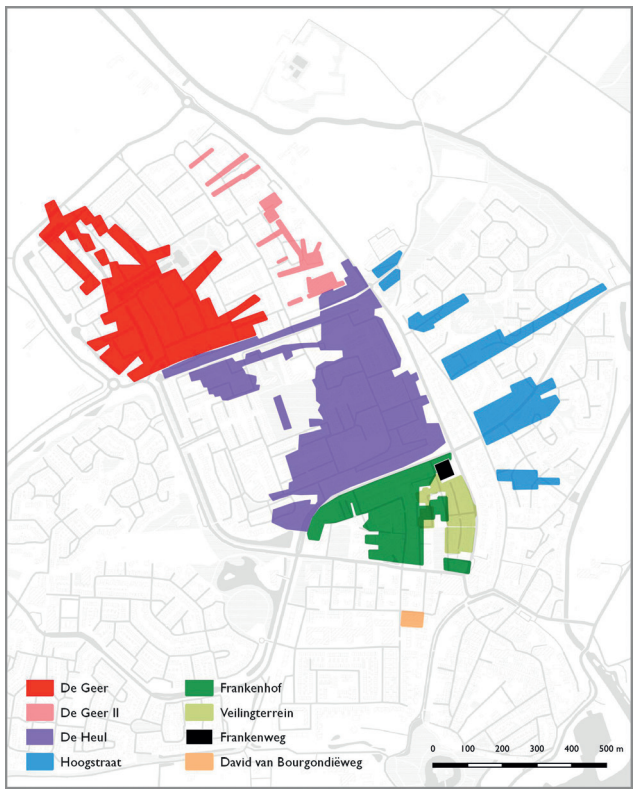


Fig. 4.1 Excavations in Wijk bij Duurstede that have yielded traces of activity in the seventh to ninth century.

The authors of the excavation report on HS I believe that chronological differences probably did not play an important role in the frequency of fabrics per vessel type.[6] Fabrics 1 and 2 are said to occur equally often among early types as they do among late types. Only fabrics 13 and 14 can be associated with early vessel types and may therefore also be earlier in date than most other fabrics. Fabric 1 is equated to 'Classic Badorf', a term explained later in this chapter, which was produced in the Vorgebirge, an area to the northwest of Bonn in Germany. Because vessel types WI and WII are both known to have been produced in the Vorgebirge region it was concluded that all types with a high percentage of fabrics 1-2-10, that is types WI, II, I/II, IV and IX, originated from that region. The same was assumed for fabric group 3-4-8 and these fabrics were seen as variations on group 1-2-10. At the time of the first Dorestad publication fabric group 6-9-12 was long thought to have had its origins in the Eifel region, but examination by the authors of pottery from kiln sites revealed the fabrics were also produced in the Vorgebirge, at least in Walberberg.[7] This led them to conclude at that time, that the majority of WIII vessels also originated from the Vorgebirge region. Type WXII is considered to have come from this region as well. Because some vessels of type WXII were produced in Vorgebirge fabrics as well as fabrics w13, w14, w16 and w17 it was suggested the latter fabrics may have been produced in the area around Cologne, although they had as yet not been identified in the region itself.

6 Van Es/Verwers 1980, 139.
7 Van Es/Verwers 1980, 143. We will return to this ascription further on.

4.1.2 Vessel types

The section of the Dorestad typology regarding early medieval wheel-turned ceramic vessels in the Hoogstraat I report begins with no introduction. The underlying criteria for distinguishing between vessel types must be gleaned from the descriptions of each type. In the original 1980 publication thirteen wheel-turned types were identified, indicated with a capital 'W' and Roman numerals. These were subdivided further mostly based on rim type, using a capital letter. Type XIII is not really a type but rather a residual group for diagnostic sherds that could not be assigned to any other type.

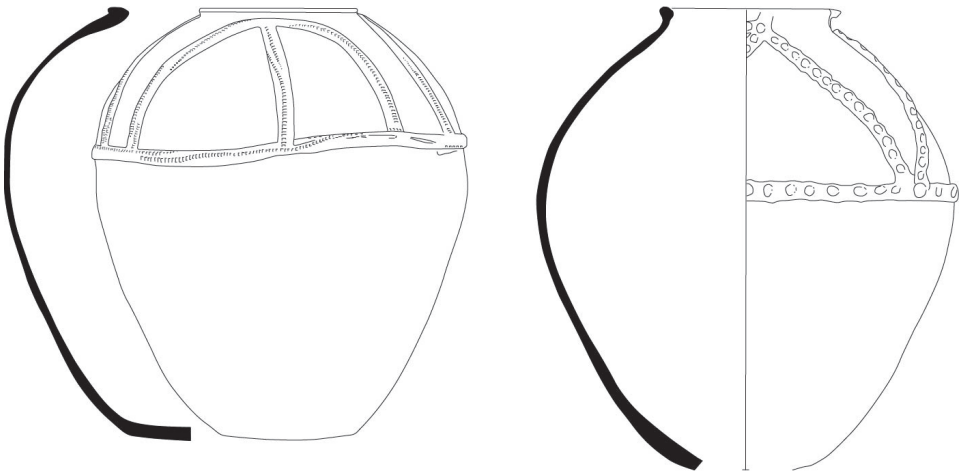


Fig. 4.2 Type WI, (Van Es/Verwers 1980, 61, fig. 23.1; 62, fig. 24), 1:8.



Fig. 4.3 The characteristic applied strips with stamped decoration on the upper part of reliefband amphora (Collection Rijksmuseum van Oudheden, Leiden).

Type WI (fig. 4.2/4.3) consists of large containers labeled amphoras, but they also roughly resemble Roman dolia. The main characteristics of this vessel type are its size, which is the largest among the corpus, the fact that it is relatively thick-walled compared to other Rhineland types, and its decoration. The decoration consists of applied clay strips on the upper part of the body, with roulette stamp decoration, individual stamps or finger-impressions on the bands. Four rim-types were distinguished and the type generally occurs in fabrics w1 and w2. The WI vessel type is thought to have developed from large globular or egg-shaped vessels. For a long time these earlier vessel types were best known from burials in a cemetery discovered in Walsum[8] and from contexts in neighbouring Duisburg. However, at the time of the 1980 publication no direct link could be made between the vessels found at Dorestad and those discovered in the cemetery in terms of their development. The supposed early examples were not yet decorated with applied strips and as such are not truly relief-band amphoras.

Vessels with applied strips were believed to have been introduced around 825 at the earliest.[9] However, because of similarities in fabric between types WI and WII, Van Es and Verwers assumed WI dated from the second half of the eighth century onward (see below).

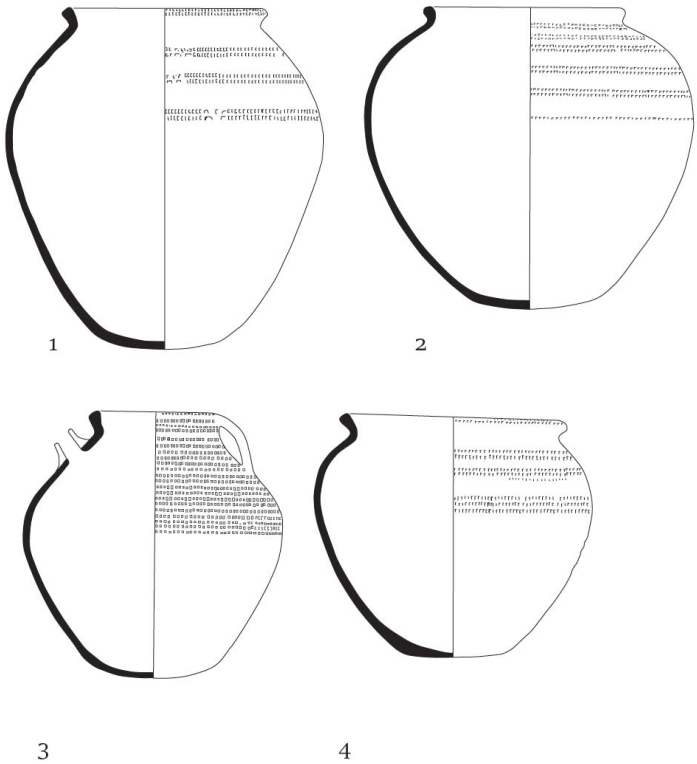


Fig. 4.4 Type WIIx (1/2, Van Es/Verwers 1980, 70, figs. 28.2, 28.6), WIIy (3, Van Es/Verwers 1980, 70, fig. 28.5), WIIz (4, Van Es/Verwers 1980, 70, fig. 28.1), 1:8.

8 The vessels from the Walsum cemetery will be discussed in more detail in a later section.
9 In this section, when discussing the evidence used to date vessel types in the Dorestad typology, I am mostly repeating the arguments provided by Van Es and Verwers. In later sections the validity of these dates is scrutinised in more depth.



Fig. 4.5 Left an example of type WIIx found at site 187 (De Koning 2012, 150, afb. 4.19). Right a spouted pot, type WIIy, discovered at site 160 (Open Data Provinciaal Depot voor Archeologie Noord-Holland, inventory-number 1094-01).

For the relief-band amphoras discovered at Dorestad, the end of their production was set around the middle of the tenth century based on finds from excavations at Haithabu. Van Es and Verwers noted that reliefband amphoras were produced until the second half of the eleventh century but that these varieties differed significantly in shape from those discovered at Dorestad.

Type WII (fig. 4.4/4.5) is collectively named 'Badorf Vessel'. The fact that the vessels presumably originate from Badorf or its immediate surroundings may be part of the reason why several vessel shapes were collated under one umbrella type. Common features are roulette-stamp decoration on the upper part of the body and the lenticular shape of the base. The type generally occurs in fabrics w1, w2, w3, w4, w6, w10 and w12. However, other than these common characteristics, the WII-type actually consists of three distinct vessel classes; medium to narrow mouthed jars, narrow-mouthed pitchers and wide-mouthed bowls. Because the five identified rim-types do not correspond exclusively to specific vessel classes the letters x, y and z were added to the rim type to indicate the vessel class, where this could be determined.[10]

Vessel class y, narrow-mouthed pitchers, only occurs together with rim-type C and vice versa. Because only one complete specimen was found among the Hoogstraat material it was difficult

10 Reading the description of types A, B and D one can sometimes question why some rims were added to one or the other type when they seem hardly distinguishable. Nowhere does it become clear what the main distinction between the types is because even the features mentioned as most characteristic for a type can occur as a variation in another as well. Why the variant was not included in the type it seems most clearly to belong to is not sufficiently explained, especially as both types A and B have many variants. Considering the small amount of rims that could be assigned to class z, and the similarities between rim- types A, B and D it seems conceivable that bowls with a type A rim may well have been made. In that case the distinction between types A, B and D is purely for classificatory purposes, the rims are classified because they can be, not because it ads to a better understanding of the use or dating of the sherds. Similar issues pertain to the rim-types of vessel types WIII and WIV.

to say anything definitive about the overall shape of this class. The presence of a spout is most characteristic as well as strap handles. The spout was typically attached to the outside of the body instead of fastening it to the inside. This occurred after the decoration was added.

Class x represents a medium to narrow mouthed jar and occurs together with rim-types A, B and D. In fact rim type A is exclusively associated with this class. Rim-types B and D can also be found on class z vessels, wide-mouthed bowls. In practice then only rim-types B and D can be found among more than one vessel class. Determining whether a rim sherd belongs to a class x or z vessel can be problematic as some class x vessels have an opening comparable in size to those of z class vessels. In order to tell the difference a larger section of the body needs to be present. Class z vessels have a more squat body than class x vessels; the measurement for their height is considerably less than that for the widest diameter of the body. Apparently Class z vessels are also generally smaller than those of class x and more or less equal in size to class y.

The origin of the WII type is sought in vessels manufactured in Duisburg fabric group II. This is one of the fabrics defined by Fritz Tischler when describing the early medieval ceramics discovered in and around Duisburg.[11] According to Van Es and Verwer's reading of Tischler's fabric descriptions, three fabrics were distinguished for the Duisburg material: Merovingian, 'Old Badorf' and 'Classic Badorf' of which the latter is equal to Dorestad fabric w1. Types in 'Classic Badorf' fabric supposedly developed from vessels produced in the 'Old Badorf' fabric which was dated by Tischler between 720 and 780 AD based mainly on the dating of Madelinus coins. However, because views on the dating of Madelinus coins had changed between Tischler's publication and the HS I publication, Van Es and Verwers suggested that the production of 'Old Badorf' ware may have started in the second half of the seventh century and 'Classic Badorf' may have been produced since the middle of the eighth century, though the reasoning behind the latter date is not made entirely clear. The Zelzate costral, a vessel in 'Badorf' fabric containing a coin hoard dated between 870-880 AD was taken as evidence that 'Badorf' pottery was being produced until at least the end of the ninth century.

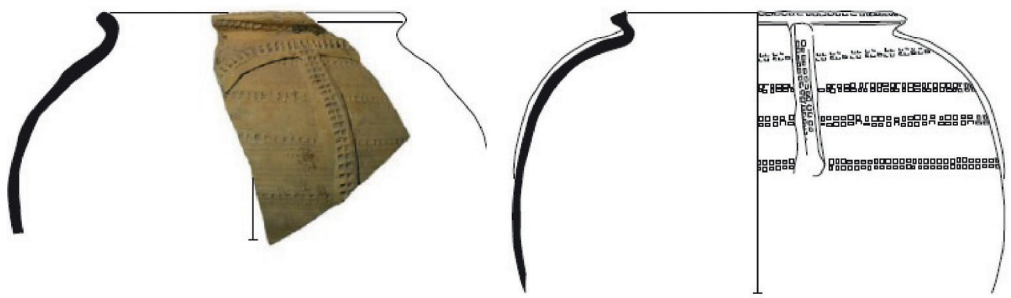


Fig. 4.6 Type WI/II (De Koning 2012, 155, afb. 4.27).

The hybrid **type WI/II** (fig. 4.6) consists of containers with WII type vessel shapes and rim-types and decorated clay strips normally found on WI vessels. There are differences between the relief bands on WI and WI/II vessels. Most notably the horizontal band marking the end of the decorated zone on WI vessels is absent on WI/II vessels. The type mainly occurs in fabrics w1, w2 and w3 and the rim-types are defined in the same manner as WII rim-types but with two additions, F and G.

11 Tischler 1952. See section 4.2 for discussion of Tischler and other arguments used in the dating of Badorf types.

However, no examples of WII types C and E were found among the hybrid vessels and G is almost the same in shape as rim-type A. Therefore, in fact only four types are known for vessel type WI/II and only one differs from rims found on WII vessels. The absence of type C rims is noteworthy as this probably means that class y vessels were not produced with hybrid decoration. In addition, although not explicitly mentioned, it seems class z vessels were also not produced in the hybrid form. Because, just as type WII, vessel type WI/II was mostly produced in fabric w1, it is assumed they can be dated similarly.

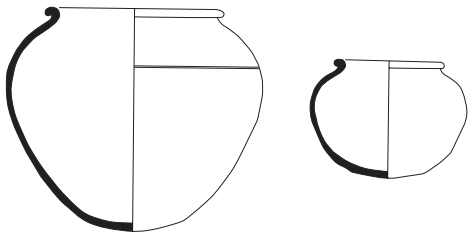


Fig. 4.7 Type WIIIA, (Van Es/Verwers 1980, 82, figs. 36.1, 36.6), 1:8 .



Fig. 4.8 Most frequently occurring rim types among WIII vessels, 1=A (Van Es/Verwers 1980, 82, figs. 36.35, 36.4), 2=B (Van Es/Verwers 1980, 85, figs. 37.4, 37.14), 3=C (Van Es/Verwers 1980, 85, figs. 38.2, 38.4), 4=D (Van Es/Verwers 1980, 85, figs. 39.2, 39.9), 1:4.



Fig. 4.9 Left an example of type WIII manufactured in Mayen. Right a specimen from the Vorgebirge (Open Data Provinciaal Depot voor Archeologie Noord-Holland, inventory-number 8420-02 (left) and 4121-01(right)).

Type WIII (fig. 4.7-4.9) is explicitly identified as a cooking pot. It is an almost globular or squat, medium sized pot with a lenticular base. It can occur in all fabrics from w1 to w12 but the examples discovered at Dorestad are most frequently manufactured in fabrics w1, w3, w6 and w12. Fabrics w2, w9 and w10 are also well represented. Two sherds were apparently produced in fabric w5, for which however there is no description in the publication and that otherwise is only associated with type WXII.

Type WIII is the most frequently occurring vessel type among the HS I material making up one third of the total number of rim-sherds. The rims have been seperated into six types of which type E only occurs in fabric w11. Vessels of type WIII produced in fabric w1 often seem to have had an egg-shaped body which differs from the usual globular shape. Vessels with an egg-shaped body were commonly found with rim-types C and D and it is suggested by the authors that they perhaps represent a separate vessel type. However, because too few complete examples survived to support this idea rim sherds of this type have been incorporated into type WIII.

The origins of the globular cooking pot are identified in a vessel found at the cemetery of Hohenfels in Germany to the west of Mayen. The pot in question was very similar to WIII cooking pots but with a flat base, and it was dated to the early eighth century. The Hohenfels pot was attributed to Mayen and it is suggested that manufacture of this kind of globular pot started there. At some later date the vessel type began to be produced in the Vorgebirge region. A cylindrical neck is considered to be an early feature and the ridge which marks the transition from shoulder to body is linked to the ridge found on many Merovingian biconical pots. The fact that three sherds attributed to rim type WIIIB were produced in fabric w16, which is otherwise strongly associated with vessel type WVII, a biconical pot, is seen as further evidence for a relationship between vessel type WIII and the Merovingian biconical pot. This leads the authors to suggest a start date of production around the middle of the eighth century at the latest for type WIII. The fact that biconical pots practically never can be connected to cooking and type WIII is explicitly identified as a cooking pot plays no part in the considerations. Sherds of rim types A to D discovered in a layer dated before 863 in the Xanten Dom led Van Es and Verwers to presume an end date for the vessel type just after the middle of the ninth century, though they were aware of the type being predominantly dated up till the end of the ninth century. Types C and D are seen as a possible intermediary between Merovingian *wölbwandtöpfe* and globular pots and are therefore dated between the end of the seventh and beginning of the eighth century.

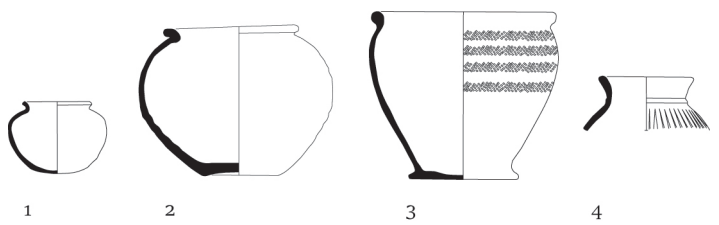


Fig. 4.10 Type WIV (1, Van Es/Verwers 1980, 88, fig. 42.1), WV (2, Van Es/Verwers 1980, 91, fig. 46.1), WVI (3, Van Es/Verwers 1980, 92, fig. 49.3), WVII (4, Van Es/Verwers 1980, 95, fig. 53.1), 1:8.

Types W I, WII and WIII make up the vast majority of the ceramics found at Dorestad. Other types represent less than 5% of the assemblage each.

Type WIV (fig. 4.10, 1) is similar to types WI and WII in terms of fabrics and rim types and is therefore dated more or less to the same period. It is a small jar of which the function is not entirely clear.

Vessel **types WV** (fig. 4.10, 2) and **WVI** (4.10, 3) both differ significantly from the previously described types in terms of shape and fabric, but are quite similar to each other. Type WV is exclusively associated with fabric w13 and WVI with fabric w14. Both fabrics are grey in colour but they differ in overall finish, the latter often exhibiting a metallic hue. The types are described as medium sized, flat-based pots. The provenance of WV and WVI vessels is not entirely clear but at the time of the HS I publication the distribution of pots produced in fabric w13 seemed to be limited to The Netherlands, Belgium, Denmark and Sweden. Therefore a production site in the Low Countries was presumed. The pots were dated between the late seventh century and the beginning of the eighth century on the grounds that their flat base, decoration, and the pinched spout on some examples show similarities with pots in a Merovingian tradition. The assigned dates are therefore ultimately predicated on the assumption that morphological aspects such as the transition from flat to lenticular bases occurred more or less simultaneously within roughly half a century across northwestern Europe.

The shape of **type WVII** (fig. 4.10, 4) seems to be a continuation of Merovingian biconical pots which are often found in burials of that period. However, there are differences, most notably in the decoration which on WVII vessels primarily consists of line patterns, although single stamps and roulette stamp decoration is also encountered. Most sherds of this type were assigned to fabric w16, a burnished ware, which in turn also occurs almost exclusively in association with type WVII. Because of the similarities with Merovingian biconical pots, this type was considered to represent a transitional shape between the biconical pot and the globular pot and therefore dated between the late seventh and early eighth century. Some sherds of this type were manufactured in fabric w1 and therefore it is thought production continued in to the second half of the eighth century.



Fig. 4.11 Type WVIII (Collection Rijksmuseum voor Oudheden, Leiden).

Tating jugs, **type WVIII** (fig 4.11) in the Dorestad typology, have long been considered luxury items, indicative of elite consumption. It is a tall jug with a rounded lower section, and more or less straight upper part, widening towards the rim. The vessel has a tubular spout, a band shaped handle positioned at a distance under the rim and the majority of bases is lenticular. Type WVIII is always produced in fabric w15 and is often decorated with tin-foil. The jugs are said to be of superb quality which presumably relates to the decoration, the relative consistency of production and the burnished surface, but what exactly makes these pots superb is not detailed. Another characteristic

aspect of the vessel is that the upper attachment of the handle is inserted through the wall of the vessel. The bottom part of the handle is attached to the outside of the wall. The type is supposed to have developed from so called *Röhren-Ausgusskannen* dated to the sixth and seventh centuries. The literature available at the time of the HS I publication supposedly showed unequivocally that Tating jugs date to the ninth century. The authors add that because sherds of Tating jugs were discovered during excavation in Paderborn in features covered by a layer dated to 778, they must at least also have been produced in the second half of the eighth century.

The definition of **type WIX** (fig. 4.12) steep-walled pots was hampered by several uncertainties, mainly caused by the limited number of complete examples present among the Dorestad finds. The type is presumed to have had a flat base, partly because one complete vessel did so and partly because of similarities between this type and Merovingian barrel shaped pots or *wölbwandtöpfe* (the term that will be used in the remainder of the chapter) which also generally have a flat base. In particular, the type resembles Merovingian *wölbwandtöpfe* from the Walsum and Wageningen cemeteries. However, in essence this type can already be found in roughly similar form in fifth and sixth century contexts and is present in burials of the seventh century, though the fabrics differ from those used for WIX vessels. The type was mainly produced in fabric w1, but also in w2, w3, w6 and w18, in other words in relatively soft fabrics. Decoration on this type is uncommon but when present consists of roulette stamps with multiple lines of rectangular impressions or wavy or straight lines made through incisions.

Because some examples of this type were probably produced in the 'Old Badorf' fabric, and due to their similarity with Merovingian wölbwandtöpfe, Van Es and Verwers dated WIX vessels between the late seventh and first half of the eighth century, perhaps even the second half of the eighth century. Based on a find assemblage from Medemblik where this type was not identified among ninth century material it is assumed type WIX was no longer produced in that century. The fact that these pots are steep-walled yet supposedly dated to the same period and perhaps even later than several types believed to be transitional (WIIIC/D, WVII) would seem to undermine the idea of vessels gradually morphing from steep-walled to rounded and finally globular in a linear process. Nonetheless exactly that argument is repeated at the end of the chronological discussion for type WIX to support its dating. The development may have indeed taken place, but considering the quite large overlap of the alleged period of production of these types it would seem inappropriate to use the development as a means of dating individual examples. Furthermore, the argument contains an element of circular reasoning.

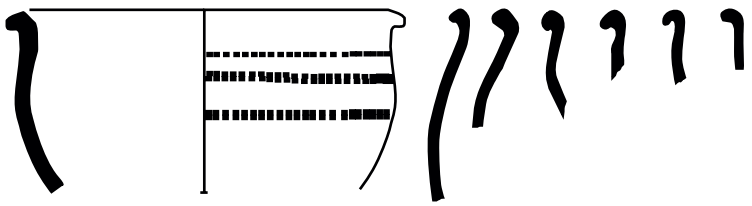


Fig. 4.12 Type WIX (Van Es/Verwers 1980, 100, fig. 55), 1:8.

Type WX (fig. 4.13/4.14) is a group of vessels consisting of various bowl shapes. For this type the addition of a capital letter does not indicate differences in rim-shape but in vessel shape. Types A, B and C have parallels in Merovingian cemetery finds of the seventh century. It is presumed these types of bowl were produced up until the early eighth century, though there are no clear indications

for when the bowls went out of use. Only the fact that half of the examples of these types were made in fabric w1 and w2 is provided as an indication for an eighth century date.

Type WXD is considered a derivative of the A-C types, due to its more globular body, which places it in the same development as discussed above, from steep- to rounded forms. This, combined with the predominance of fabric w1 is seen as evidence for an eighth century date.

Type WXE is linked to Late Roman and Merovingian mortars. Based on examination of the extant literature the bowls might be dated to the seventh century but because at Dorestad they often occurred in fabrics w13 and w14 the authors believe an eighth century date is equally possible. Once more, the manufacture of this type in fabrics w1 and w2 is also considered a reason for placing production in the eighth century.

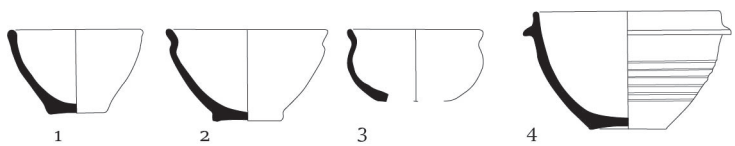


Fig. 4.13 Type WXA (1, Van Es/Verwers 1980, 102, fig. 57.1), WXB (2, Van Es/Verwers 1980, 102, fig. 57.2), WXD (3, Van Es/Verwers 1980, 102, fig. 57.7), WXE (4, Van Es/Verwers 1980, 102, fig. 57.13), 1:8.



Fig. 4.14 Left an example of type WXD (De Koning 2012, 182, afb. 4.56), right type WXB (source: Open Data Provinciaal Depot voor Archeologie Noord-Holland, inventory-number 4121-02).

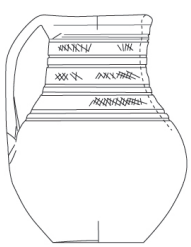


Fig. 4.15 Type WXI, (Van Es/Verwers 1980, 105, fig. 58.1), 1:8.

Type WXI (fig. 4.15) is a jug which even among the Dorestad material is quite rare. It may be decorated with grooves, cross-hatched rouletting and lines. The dating of the jugs was based on that of other vessels made in fabrics w14 and w15, that is the eighth and ninth century.

Finally **type WXII** does not represent a single vessel shape but contains all sherds in fabrics w1, w2, and w10 with painted decoration. The subtypes are all different vessel shapes and although more varieties were found during the Hoogstraat excavations, not all were discovered at HS I and therefore only a type of costrel and a jug are described in the publication. For the dating of the costrels similar examples from a cemetery in Mayen dated to the late seventh century were used as a starting point. However, these were produced in Mayen fabrics, those from Dorestad were manufactured in Badorf wares. Because the gap between the traditional start date of 'Classic Badorf' at the end of the eighth century and the costrels from Mayen is considered too great, the authors suppose that 'Classic Badorf' production may have started in the middle of the eighth century. The manufacture of costrels would have begun around that time as well. Apparently it is not considered an option that painted costrel production could simply have started later in the Vorgebirge than in Mayen. Because jug type WXIIB often has a comparable rim to type WIIIB a similar date is assumed. As specimens of painted jugs appear somewhat more westward in the harbour area of Dorestad, and it is thought that the harbour slowly moved from west to east, the jugs are presumed to have had a slightly earlier start date than the costrels, between c. 700 and 750 AD.

The dates assigned to types as described above were mainly based on the available literature at the time. These were then used to define two chronologically separate groups among the types. An early group contained types WV, WVI, WVII, WIX and WX and a later group consisted of the remaining types.[12] Because the jetties of the harbour at Dorestad were constructed from west to east over a long period of time it was expected that the distribution of pottery would reflect this process with early types mainly present at the west end and later types found further to the east. The harbour area was divided into three zones which constituted stages of development of the jetties. These comprise an early western section, an intermediary middle section and a later eastern section. The amount of sherds per type recovered from each excavation trench were converted into a comparable unit of measurement representing the frequency of types per area of the excavation. The resulting patterns were examined in order to identify evidence that could contribute to the dating of types derived from the literature.

A table of relative frequencies per zone was compiled for most types and other groups of diagnostic sherds.[13] The numbers in the table were produced by taking the amount of sherds per type and per zone, dividing the results by the total square meters for each zone, then adding up the three resulting numbers and finally using that total to calculate frequency percentages per zone. Van Es and Verwers saw no significant deviation from the expected pattern in the relative frequencies of types per zone. They believed that the data not only provided a rough guide for the relative chronology of the various types but could actually help refine chronologies based on the existing literature.[14] Using the figures in their table the types that were most frequent in the westerly zone could be split in to two groups. The late-early group consisted of types WIID, WIIIC and D and WV which were also recovered relatively frequently in the eastern zone. An early-early group contained types which were not, types WVI, WIX and WX. For the types most frequently discovered in the middle and eastern zones the proportional frequencies did not indicate major discrepancies with

12 Van Es/Verwers 1980, 151 and fig. 80.
13 Van Es/Verwers 1980, 157, table 21.
14 Van Es/Verwers 1980, 158.

the dates based on the literature. Type WI could be dated similarly to other known Badorf types such as WIIA-D. For pots of type WVII it was suggested they may have been in use slightly longer than expected.

One aspect which was not considered in the applied manner of calculation is the overall frequency of sherds for the entire excavated area. Varying intensity of research throughout the excavation was not considered to have been of influence on the observed distribution patterns even though not every trench (and even neighbouring trenches) was excavated in an equal number of levels.[15] Differences in the presence of find rich features and loss patterns related to the nature of activities during the early medieval occupation phase were deemed unknowable factors and therefore ignored. The distribution of the recovered sherds was solely attributed to chronological developments in the ceramic assemblage. Before examining the validity of this claim we shall first consider the evidence provided by the remainder of the Dorestad harbour excavations.

4.1.3 The Hoogstraat O and II-IV publication

Almost 30 years after the publication of the first part of the harbour excavations the remainder was made available in 2009. In terms of pottery little was changed in the definition of fabrics or vessel typology. One new type number was added, WXIV, which represents vessel types identified among the material classified under type WXIII in the original typology, the group of miscellaneous sherds. Similarly to the 1980 publication, it is necessary to read in between the lines and make deductions based on the published tables, because alterations in typology and fabrics are not discussed in the text. For example, when examining the tables containing numbers of rim sherds, a new rim type (WIIIG) appears to have been added, but it is not described in the text or depicted in a drawing. Some other vessel types also have additional rim types which, again, are not discussed in the text. Furthermore, no mention is made of vessel classes x, y and z for vessel type WII, either in the text or in a table. This means either that no distinction was made between jars and bowls for whatever reason, or that no identifiable fragments of bowls with a WIIB or D rim-type were present among the finds.

The subdivision of types into chronologically separate groups that was made in the 1980 publication was also employed in the 2009 publication but with a few small alterations. The later types were now also divided into an earlier and a later group (see below). Type WXIV was added to the early (early) group as was type WV, which also remained present in the second early group. Type WVII was added to the early (late) group as well as the first of the two later groups. Types WIIIA and B were given a start date of 750/775 instead of 725 and types WIIA and B were dated from 800 onward, where 750 was suggested as a possible start date in the 1980 publication. Because only start dates are given for the groups it is not possible to fully compare the dating of the types with those in the HS I publication. In addition, it is not explained exactly on what basis the new dates were assigned.

650/675	early (early)= WV, WVI, WIX, WX, WXIV; HIII
725	early (late)= WIID?, WIIIC/D, WV, WVII
750/775	late (early)= WI, WIIC, WIIIA/B, WIV; HI-1, HII
800	late (late)= WI, WIIA/B, WI/II, WIV, WVIII; HI-2

15 Van Es/Verwers 1980, 154. For the number of levels per trench see Van Es/Verwers 1980, 20, figure 4.

Type W XIV (fig. 4.16) was added to the typology in order to incorporate a diverse collection of ceramics originally grouped under miscellaneous.[16] The main shared feature is their presumed late Merovingian date. Only type WXIVG is thought to perhaps date somewhat later based on similarities with rim types WIIA and WIIB. Like type WXII the nine subtypes will have had varying functions and each represents a particular vessel shape. They represent storage vessels (WXIVA, WXIVC), jugs, pitchers and flasks (WXIVB, WXIVE, WXIVF), globular pots and jars which may have been used for storage or cooking (WXIVD, WXIVK), biconical pots (WXIVG) and bowls (WXIVH). Some subtypes resemble vessels discovered in the cemetery of Walsum.[17] Although part of the assemblage could be assigned to fabrics w1 and w3, other fabrics did not fit those defined for the ceramics of HS I. Therefore, two new fabrics were added, w20 and w21. The former is basically a beige to grey coloured, rough-walled fabric with coarse temper which resembles Merovingian rough-walled fabrics. It was equated to Böhner's D-ware which he introduced to designate rough-walled Merovingian ceramics.[18] Fabric w21 is smooth-walled and generally associated with biconical pots.

Most of the vessels which have been grouped under type WXIV have been dated on cemetery evidence from the Lower Rhine area. Frank Siegmund's typochronology of grave goods from Lower Rhine cemeteries plays a crucial role. The authors refer to a distinction Siegmund makes between Badorf ware of *Badorfer Machart* and *Niederrheinische Nachahmungen*, a division not dissimilar to that proposed by Tischler. *Badorfer Machart* was divided into two further fabric groups, which Van Es and Verwers believed were both identical to 'Old Badorf'. Late seventh century burials discovered along the Lower Rhine contained ceramics which Siegmund saw as Lower Rhine imitations (*Niederrheinische Nachahmungen)* of 'Badorf' ware. 'Badorf' ware had to be older than its imitations and therefore should at least date from around 670 (the beginning of *Niederrhein* phase 10, according to Siegmund. The exact reasons will be explained in section 4.2). In addition, the use of fabrics w20 and w21 among type WXIV vessels is considered evidence for a date in the late seventh or early eighth century due to the similarities in fabric with pottery in a Merovingian tradition.[19]

It would be understandable if by now the reader had slightly lost the plot regarding the terminology surrounding 'Badorf' fabrics.[20] In section 4.2 an attempt will be made to clarify the debate, at least as far as I have been able to disentangle it. A section of the 2009 publication is devoted to late medieval ceramics. In this context some wares are discussed which are part of pottery assemblages dating to the end of our period. Once more we are presented with a range of terms intended to distinguish between certain chronologically distinct products from the Vorgebirge region.

'Late Badorf' is described as slightly different in fabric than w1 and w2, namely harder, with somewhat different colours and marginally different rim shapes too. The main vessel types are roughly the same as earlier Badorf vessels, relief-band amphoras, WII jars and WIII globular pots. However, WIII was less commonly recovered, particularly in the harbour area. Late-Badorf ware has been identified among the youngest material at kiln sites in Eckdorf, Walberberg and Badorf and amongst the oldest material in Pingsdorf. There it has been found together with what is termed 'Early Pingsdorf' ware. 'Early Pingsdorf' ware is supposed to be harder still, stoneware-like even.

16 Van Es/Verwers 2009, 147-153.
17 Stampfuss 1939.
18 Van Es/Verwers 2009, 153. They actually follow Siegmund but he in turn used Böhner's classification of wares for the ceramics found in Lower Rhine cemeteries (Siegmund 1998, 119).
19 Van Es/Verwers 2009, 154-155.
20 In the Dorestad publications the situation is complicated even further by using several additional terms for 'Classic Badorf' interchangeably, such as young and genuine.



Fig. 4.16 Example of type WXIVA (left, De Koning 2015b, 284, afb. 9.35) and WXIVD (right) (De Koning 2012, 176, afb. 4.52).

The surface feels like fine sandpaper and colours vary from brown-yellow to olive-green to blue-grey. Production of vessels in 'Late Badorf' ware is supposed to have ended around the beginning of the tenth century, except for relief-band amphoras which remained in production into the eleventh century at least. At kiln sites in Pingsdorf 'Early Pingsdorf' ware has been recognised only among finds belonging to the earliest excavated phase of production implying it was no longer being produced after circa 875. In the presentation of the data of the Hoogstraat excavations both wares have been combined under fabric w10.[21] This makes it impossible to apply the distinction in the present research. Furthermore, unlike the majority of the Dorestad fabric system, 'Late Badorf' and 'Early Pingsdorf' have not become a standard part of the idiom for describing early medieval ceramics in our research area. As such this would not be a problem if we could assume that the ascription of sherds to fabric w10 always concerned this 'late-Carolingian' Vorgebirge production. However, there are several reasons, both methodological and relating to the material itself which means this is not always possible.

A final group discussed in the 2009 publication which belongs to the end of our period is so-called Hunneschans pottery. Its fabric is more akin to the late wares just described than it is to 'Classic Badorf' and its main distinguishing characteristic is the application of both roulette-stamp decoration and red paint.[22] Several of the vessels grouped under type WXII can be identified as Hunneschans vessels. Hunneschans was relatively uncommon in the Dorestad assemblage. However, in this respect it is hardly unique as Hunneschans never constitutes a major component of ceramic assemblages from settlements. Limited output, perhaps related to a short period of production is a likely explanation for the relatively small number of sherds. Overall, the Dorestad finds offer no new insights for the dating of these three late Vorgebirge products relative to what is known from other sites.

21 Van Es/Verwers 2009, 160 note 88.
22 Van Es/Verwers 2009, 166-169.

4.1.4 Dating the Dorestad assemblage

In comparison to the other investigated parts of the harbour area of Dorestad, HS O and HS I yielded relatively low average numbers of sherds per 1000 m² excavated. In the 2009 publication this is partly explained by a possibly lower intensity of investigation during the excavations of HS O and HS I.[23] It is also deemed likely that the position of the excavation trenches in relation to the harbour and riverbed will have played an important role in the observed differences in sherd densities. Although HS II, HS III and HS IV have high average densities of pottery per 1000 m² for the whole excavated area, this is especially true for harbour sections 1 and 2 (fig. 4.17). In the case of the HS I excavation, if only sections 1 and 2 were considered it would sit in between HS II and HS IV in terms of finds per 1000 m². This observation combined with variations in intensity of research in different parts of the harbour indicates that disregarding the overall frequency of finds almost certainly will have had implications for the interpretation of the relative frequencies of types as calculated in the 1980 publication. It is stated in the 2009 publication that: "A direct link between the density of finds and the intensity of the activities in the Dorestad period cannot, unfortunately, be made",[24] because it could not be determined which factors exactly influenced the observed densities of finds.

In the 2009 publication the analysis of the distribution of finds again centres on the comparison of the three zones in the harbour area. However, the means of calculating and representing the difference in find density between the zones was altered. Now the average number of sherds per 1000m² was calculated per zone. Based on these numbers the frequency of sherds per zone was divided into six classes. The classes were defined relative to the average number of sherds per 1000m² based on the total number of sherds found in the harbour area. So the average number of sherds per zone, per excavation area were compared to the total average number of sherds per 1000m². This provides a measure of the relative density of sherds per zone, per excavation area. Similar calculations were performed per pottery type and then compared to a control group which consisted of the relative frequency of all the ceramics in the assemblage per zone (fig. 4.17). The differences between the frequency scores of the various types and the control group were subsequently summarised in a table (table 42,[25] see fig. 4.18) which provides an indication of where certain types are more or less common than average. The optimum of early types usually lies in zone 1, whereas that is never the case for late types.[26] In zone 2 the later types largely conform to the control group (though rarely exceed it) whereas scores for earlier types generally fall below those of the control group. These differences were then translated into a percentage of the number of instances that a chronological group (early/middle/late)[27] was below, above or equal to the control group over the various zones.

23 Van Es/Verwers 2009, 293.
24 Van Es/Verwers 2009, 294.
25 Van Es/Verwers 2009, 310, table 42.
26 Van Es/Verwers 2009, 301.
27 In the comparison made in table 42 types were grouped slightly differently to the four early and late groups. Instead of four groups, three groups were defined, an early and a late group and a middle group which only consisted of types WIIIA and B because these were well represented in both zones 1 and 2.

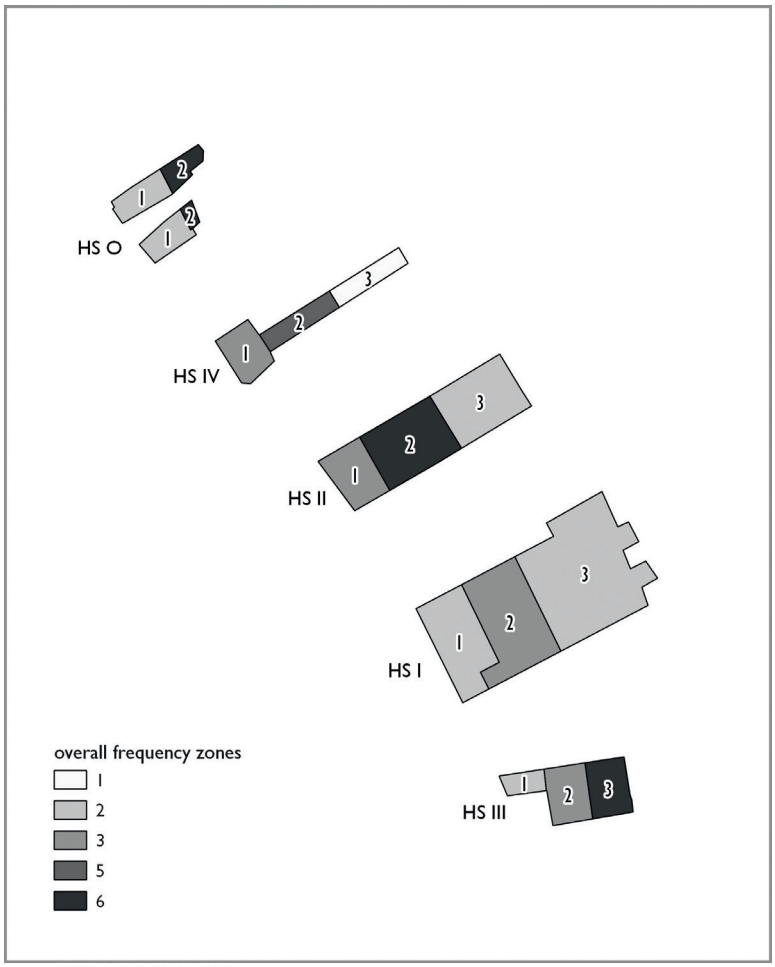


Fig. 4.17 The overall frequency of ceramics in the excavated parts of the harbour area of Dorestad. The numbers depicted in the excavated areas indicate the sections of the harbour.

Again the authors believe the observed patterns were primarily related to chronology rather than any other factors:

"We assume that time was the key factor in the distribution of the sherds, and that the composition of the pottery complexes therefore primarily provides information on the duration of use of the riverbed areas concerned (...) To be specific, the beginning of the Hoogstraat excavations was (about) the same everywhere, but in the central area between Hoogstraat I and II (southern part) the complex of finds was able to develop longer, which explains the differences in composition between the Hoogstraat I and II complexes, on the one hand, and those of Hoogstraat O and IV on the other; nothing can be said in this respect about Hoogstraat III."[28]

28 Van Es/Verwers 2009, 299.

In terms of the development of the harbour area this generally may well be the case. It is also implied by the carbon dates of posts from the riverbed and the distribution of coins. Each piece of evidence points to an extension of constructions from west to east into the riverbed over a considerable period of time. However, neither the carbon dates nor the coins can provide a sufficiently detailed chronological framework to apply to the ceramics.[29] In fact in the publication on HS I, it is explicitly stated that the carbon dates "cannot be used (...) to establish the accurate dates of the three constructional phases".[30] For us the important questions are whether the distribution of the sherds allows for the relatively detailed division of the various types into four periods and whether it can truly be employed as independent dating evidence?

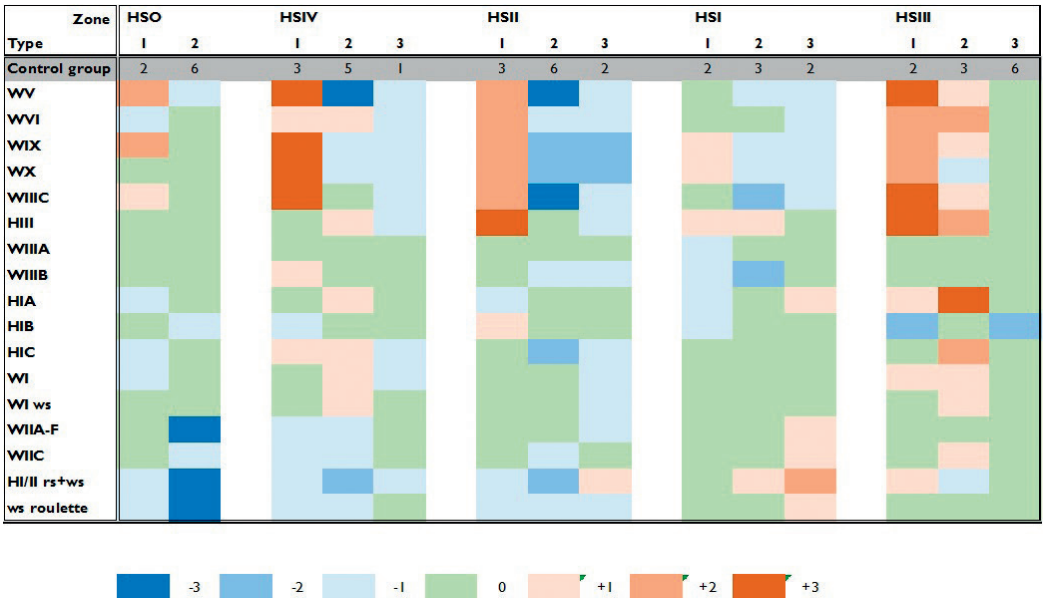


Fig. 4.18 The difference between the frequency scores of types and the control group (after Van Es/Verwers 2009, 310, table 42).

Closer examination of the table summarising the differences between the relative frequency of types and the control group raises several issues. As long as it is not clear which factors contributed to the observed ceramic distributions it cannot be assumed they are purely a reflection of developments in ceramics over time. For example, the high amount of 'late' types (WI, WII, WIII) observed in zone 2 may have been caused by a general peak in pottery usage when that zone saw its most intensive period of activity. In that case it would not be unusual that zone 2 sees the highest density of these types. At the same time this scenario does not rule out that the same types were also in use during the peak in intensity of activity in zone 1. Despite being most frequently recovered in zone 2, the frequencies of types WI, WII and WIII in zone 1 are still considerable compared to other types.[31] In

29 The interpretation of the carbon dates presented in the 2009 publication bolsters the conclusions reached in the HS I publication, but in my view the reading of the dates is highly optimistic. The samples do show a tendency to be younger the further they were taken to the east in the riverbed but there is considerable room for manoeuvre when it comes to the detail of when various stages of construction were undertaken.
30 Van Es/Verwers 1980, 301.
31 For example, compare the frequencies of WIIA-F and WIIIA represented in figures 240 and 244 with those of WV and WIX in figures 241 and 242 (Van Es/Verwers 2009, 304-308).

HS I, in terms of relative frequency, around one-fifth to a quarter of type WII was discovered in zone 1. It is in fact likely that very little can be said about the dating of vessel types WII and WIII based on the relative frequency distributions because they probably form the main constituents of the control group in every zone and therefore largely determine the reference score. This seems to be confirmed by the fact that subtype WIIIA only deviates from the reference score on one occasion. It makes up a quarter to a third of all rim-types in each section of the harbour, in most cases even constituting a higher percentage than any main type other than WIII (that is type WI, WII, WIV etc.).

What figure 4.18 does show is that a selection of types which are deemed to be early in date are evidently far more frequent than average in zone 1. The predominantly early character of these types cannot be denied. Whether the evidence from the harbour area allows for the kind of subdivision of early types suggested by Van Es and Verwers is less obvious. Just as the data can say little about 'late' groups in zone 1 it can also say little about early types potentially continuing well into the period of use of zone 2. As zone 2 has very high densities of sherds overall, due to the vast amount of 'late' types in this area, it could make the presence of early types seem less frequent relative to the control group than in zone 1. Several early types have equal if not higher frequency scores in zone 2 than in zone 1 and only rarely are the scores more than one point lower.[32] Some early types may have remained part of the ceramic corpus during the main period of activity in zone 2, in much lower numbers than later types, but not very different from the main period of activity in zone 1. A likely example is type WX that is of itself a variegated collection of bowl shapes of which some may be older, younger and have been in production for shorter or longer periods.

The examples discussed above are not primarily intended as an alternative interpretation of the available evidence regarding developments in the use of ceramics in the harbour area. The Hoogstraat excavations clearly indicate a shift in the kind of vessels available to the inhabitants of Dorestad throughout the period in which the harbour area was developed. The point is that the data provided by the Hoogstraat excavations is not such that the periods during which specific types were in use can be accurately pinpointed. Neither is it possible to deduce how quickly one set of types was replaced by another. The excavations in the harbour area of Dorestad do not provide an independent source for dating the periods in which specific vessel-types were in circulation.

However the site can be used for refining or confirming the dates of some types. Type WVI, which is assigned only to the early (early) group actually stands out with higher than average scores in zone 2, suggesting it at least should be added to the early (late) group if not to a younger group as well. The same is true for handmade type HIII. On the other hand, the early ascription of type WIIIC is actually more prominent in the remaining harbour excavations than it was in HS I, seemingly confirming its relatively early appearance. Something else the data certainly does show is how dominant 'late' types were in Dorestad ceramic history. The figures imply an (enormous) increase in supply for a period, but do not demonstrate exactly how long that period lasted.

As far as dating and provenancing ceramics of our period is concerned the Dorestad typo-chronology provides parameters for the dating of the presence of types on sites in our research area. It offers a relative chronology for vessel types which have been given absolute dates based on the extant literature. The description of fabrics has been the main reference point for macroscopically identifying characteristic aspects of ceramics from various production centers that are encountered in the research area. However, it does not provide independent dating evidence for the production period of specific vessel types. Neither does it provide clear absolute dates for the introduction of

32 See Van Es/Verwers 2009, 310, table 41.

specific vessel types into the research area. Because of this it is necessary to examine the literature on which the dates for the Dorestad types are founded.

4.2 Vorgebirge ceramics

The Vorgebirge is an area situated roughly between Bonn and Cologne with a rich tradition of ceramic production. During our period manufacture took place at several locations within the modern towns of Badorf, Eckdorf and Walberberg, and perhaps in Pingsdorf as well (fig. 4.23). Broadly speaking the literature on Vorgebirge ceramics can be divided into two phases. In the first phase research was mostly focused on the fabrics of the pottery in order to determine provenance and date various wares. Only more recently have concerted efforts been made to examine the finds from the Vorgebirge with the aim of creating typo-chronologies. In the following we will first examine the research on fabrics because this is the kind of analysis that much of the literature used for dating the Dorestad ceramics was based on. Subsequently we will look at the typological approach. The terminology surrounding fabrics is closely tied up with the place names of sites where production is thought to have occurred. In order to make a clear distinction between when fabric labels or actual production sites are being referred to, in the remainder of this chapter fabric labels will be set between apostrophes.

4.2.1 Research based on fabrics

Kurt Böhner's work was until recently fundamental to the dating of Vorgebirge pottery and remains influential. His basic premise was that, based on the material available to him at the time, ceramics could be dated better by studying fabrics than vessel morphology. This meant that for a long time typological examination of Vorgebirge products was put on the back-burner.

According to an article written by Böhner in 1955/56 the first pottery production in the Vorgebirge region took place near the end of the sixth century or beginning of the seventh century.[33] This date was not based on finds in the region itself but mineralogical research on finds from Merovingian cemeteries, which identified a group of pottery that was very similar to later 'Badorf' and 'Pingsdorf' wares, making an origin in the Vorgebirge most likely. Based on finds from Waldorf in the Vorgebirge, Böhner supposed that Vorgebirge production initially imitated Mayen vessels.[34] Böhner dated the bulk of this Waldorf material, which he called 'Vorgebirge' ware in the seventh and eighth century. In the eighth century '*ältere* Badorf'[35] ware existed alongside 'Vorgebirge' ware for a time and was subsequently replaced by 'Pingsdorf ware' at the end of the ninth century. This last assumption was based on the dating of the Zelzate costral which Böhner had seen and determined to be Pingsdorf ware.

33 Böhner 1955/56, 372.

34 The connection of 'Vorgebirge' ware with the finds from Waldorf has been questioned by Müssemeier. Böhner's definition of 'Vorgebirge' ware was initially based on finds from the churches of Breberen and Doveren (see below) and only later equated with finds of production waste from Waldorf. The Waldorf material is apparently more similar to the coarser, so-called imitations of 'Vorgebirge' ware defined by Tischler (Müssemeier 2012, 244).

35 Böhner 1955/56, 373. The term '*ältere* Badorf' is problematic because it suggests there may also have been a younger 'Badorf' ware. However, there is no further indication in Böhner's work that I can find to suggest he believed two chronologically distinct 'Badorf' wares existed. Also see the discussion on Tischler's work below and note 47.

Böhner's dating of fabric groups in his 1955/56 article in the Bonner Jahrbücher was founded on several of his own earlier studies and the work of Fritz Tischler on ceramics from the Walsum cemetery and Duisburg area. A 1950 article described the sherds discovered during rescue excavations in two churches, one at Breberen and the other at Doveren, two towns lying between the Rhine and Meuse in Nordrhein-Westfalen. The sherds from Breberen were not believed to originate in the Vorgebirge and based on the mineral inclusions Böhner[36] suggested they might come from the area to the west of the Rhine between Düsseldorf and the lower Meuse valley. The '*Niederrheinische*' products were said to be influenced by the production in the Vorgebirge. Böhner defined three '*Niederrheinischer Ton*' groups. The first (NR-Ton I) was very similar to 'Vorgebirge' ware. The second (NR-Ton II) was represented by one rim-sherd which resembled a vessel found at the Walsum cemetery. It was not compared to a Vorgebirge fabric. The third ware (NR-Ton III) bore a close resemblance to 'Badorf' fabrics and the final group (NR-IV) was comparable to 'Pingsdorf' ware. The first group was dated similar to 'Vorgebirge' ware, the next two received the same date as 'Badorf' ware and the last group was equated to the dating of 'Pingsdorf' ware. None of these groups was represented by more than a handful of sherds. The pottery of Doveren consisted of the 'true' 'Vorgebirge', 'Badorf' and 'Pingsdorf' wares and a few later fabrics. Just as at Breberen the number of sherds per ware were quite low at Doveren. In the article on the finds from Breberen and Doveren some dates were assigned to the various wares. Production of vessels in 'Badorf' ware was generally assumed to have started around the turn of the eighth to ninth century. The finds from an unpublished settlement at Gladbach were said to date up to and including the eighth century and contained no 'Badorf' ware sherds just as the cemetery of Walsum which was dated to the first half of the eighth century if not later.[37] The end of 'Badorf' ware production was put around the time when 'Pingsdorf' ware started to be manufactured, although Böhner suggested the two fabrics may have been used side by side for a little past the middle of the ninth century.

Another source of evidence for dating the finds from the two churches came from an excavation carried out in the Bonner Münster. The site was published by Böhner in a 1951 article and it briefly described the pottery found in a large pit.[38] The pit mainly contained pottery of 'Badorf' ware, but also some 'Mayen' and 'Vorgebirge' ware and a 'Pingsdorf' sherd. It also contained a coin of Louis the Pious providing something of a terminus post quem, because it was assumed the pit was dug for sand-winning and presumably was filled up quickly after being dug. Böhner again used the pottery from the unpublished settlement of Gladbach as a reference point for the Bonn sherds. 'Mayen' wares were apparently also found at Gladbach though not the rim types discovered in Bonn (all of two examples). In addition, Gladbach yielded no examples of 'Vorgebirge' or 'Badorf' wares and hardly any rounded bodies which did occur in the Bonn assemblage. Böhner employed the Gladbach finds to propose the pottery assemblage from Bonn dated to the end of the eighth century at the earliest, because of the dating of the Gladbach site in combination with the dissimilarities in ceramic assemblages. The presence of the coin of Louis the Pious is taken to mean that 'Vorgebirge'

36 Based on analysis carried out by J. Frechen.

37 An initial find report was published in 1938 (Wagner/Hussong/Mylius 1938). The finds and settlement features were studied during the 1950's and '60 but the results were never published. In 2013 a brief overview of the excavation was provided by Grunwald and Schreg, offering new insights into the dating of the settlement (Grunwald/Shreg 2013). In their view the settlement was inhabited from the 6th to the 10th century, rather than just the 7th and 8th centuries as suggested by Böhner. However, the newly acquired dates were mainly based on ceramic evidence using the typochronology of Vorgebirge ceramics developed by Keller. As discussed in the following section, the absolute dates assigned to the chronological groups in Keller's chronology are somewhat problematic.

38 Böhner 1951, 118-121.

ware could have been produced in to the ninth century, but again, in his later 1955 article Böhner mentions a date between the seventh and eighth century.[39]

Around the same time, Tischler had thin-sections analysed of vessels discovered in an early medieval cemetery excavated in the town of Walsum, just to the north of Duisburg in Germany.[40] In addition examples found at various locations in the city of Duisburg itself were analysed. The samples allowed three fabrics to be distinguished. These were compared with Böhner's first two Vorgebirge fabrics, 'Vorgebirge' and 'Badorf' ware, and with 'Mayen' fabrics. The identified fabrics were considered to be imitations of these, produced somewhere in the Lower Rhine area.[41] In addition to these three fabrics, 'true' examples of Vorgebirge wares were also recognised among the finds. The Vorgebirge wares were given Arabic numerals and the imitations Roman numerals (fig.4.19-4.21). To be clear, the numbering of Lower Rhine fabric groups of Böhner and Tischler do not correspond except for group I (see table 4.1).

The pots recovered from closed contexts in his research area apparently showed that vessels in 'Vorgebirge' ware and its Lower Rhine imitations occurred in features dated to the late seventh and early eighth century, while vessels in 'Badorf' ware and its imitations only occurred in early- to mid-eight century contexts.[42] Incidentally the location and nature of the contexts was not specified,

B Original[43]	B Nr[44]	T Original[45]	T Nr[46]	Van Es and Verwers interpretation of Tischler	Dorestad fabric
Vorgebirge (Waldorf)	I	1	I	I	-
Badorf	III	2	II	2 ('Classic Badorf')	w1/2
Pingsdorf	IV	-	-	-	-
-	II	-	-	-	-
Mayen	V	3	III	-	w6/9/12
-	-	-	-	II ('Old Badorf')	-

Table 4.1. Overview of the various systems for classifying early medieval Rhineland ceramics and the relationships between them, as suggested by Böhner, Tischler and Van Es and Verwers. B Original/T original= the labels for the production sites which were considered by Böhner or Tischler to be the originals on which the Lower Rhine imitations (B Nr/T Nr) were based. The column with Van Es and Verwers interpretation shows what they believed Tischler meant in terms of the relationships between fabric groups I, II and 2.

but it may be that it concerned the Walsum cemetery. In the final part of his article Tischler claimed fabric group I and II form two distinct chronological horizons within the Walsum cemetery.[47] Importantly, the fabrics were not only chronologically distinct but were also limited to specific vessel shapes. Groups 1 and I occurred with narrow mouthed *wölbwandtöpfe*, plump amphora and

39 Böhner does say *primarily* seventh to eighth century, so perhaps he still does not rule out a fading out of Vorgebirge ware in the early ninth century. Böhner 1955/56, 373.
40 Tischler 1952, 194-200.
41 Tischler 1952, 196.
42 Tischler 1952, 196.
43 Böhner 1950, 214-216.
44 Böhner 1950, 209-212.
45 Tischler 1952, 195.
46 Tischler 1952, 196.
47 Tischler 1952, 200.

some carinated dishes. Group 2 and II vessels were limited to bottles and jugs with a single handle and also sleek, egg-shaped amphora and some wide-mouthed *wölbwandtöpfe*.

Contrary to what Böhner believed, Tischler claimed the Walsum cemetery included vessels which belong to group 2, 'Badorf' ware. Because a burial containing a Madelinus coin, which at the time was dated between 689 and 716 also included a vessel belonging to fabric group I, the vessels of groups 2 and II were deemed to be of later date and assigned a *terminus post quem* of around 720 AD. Tischler then introduced a crucial distinction between old and younger 'Badorf' ceramics, but did not elaborate on what he understood these terms to mean exactly. They do not appear in the article until the very last paragraph and have no prior mention in Böhner's work.[48] Group 2 is supposedly 'Old Badorf' and in accordance with the arguments just described dates after 720 (and by extension its Lower Rhine imitations, group II, as well). Its production period is said to have lasted from roughly 720 to 780 purely on the basis that it would have covered about two generations. Younger 'Badorf' was dated between 780 and 860 when it was replaced by 'Pingsdorf'.

In all honesty it is difficult to reconstruct Tischler's reasoning coherently. 'Old Badorf' ware must be the same as what Böhner understood to be 'Badorf' because Tischler quotes Böhner's description of the ware. It is unclear whether there is a difference between Tischler's younger 'Badorf' ware and Böhners 'Badorf' ware, though considering the dates applied to the respective fabrics it would appear not. An explanation for the distinction between old and younger 'Badorf' ware may lie in Tischler's equation of fabrics with specific vessel shapes. The vessels assigned to group 2 or II do not conform to the kind of Badorf vessels he was familiar with from Dorestad and other sites.[49] Vessels of Dorestad type WI and WII were probably what Tischler understood when he spoke of younger 'Badorf'. It is not at all clear Tischler implied that what he describes as younger 'Badorf' differed in terms of fabric from its predecessor.

This reading of Tischler's thoughts on Vorgebirge wares has implications for the arguments presented by Van Es and Verwers for the dating of several of the types identified at Dorestad. They believed Tischler in fact did distinguish between an 'Old Badorf' and a 'Classic Badorf' fabric.[50] The latter fabric was equated with their w1 fabric. However, reading Böhner and Tischler it seems likely so-called 'Old Badorf', Dorestad fabric w1 and younger or 'Classic Badorf' are one and the same. At any rate, in my view Van Es and Verwers misinterpreted Tischler's groupings by suggesting that he meant that group II was 'Old Badorf' and group 2 was younger 'Classic Badorf' (see table 4.1).[51] This misunderstanding is for the most part only a problem as far as the dating of fabrics is concerned, not necessarily for the chronology of vessel types. Although in the Dorestad system types WI and WII are dated on the basis of the supposed chronology of their fabrics, at the same time these are likely to have been the kind of vessels Tischler meant by younger 'Badorf'. So, in a way, his proposed dates for these types could still be relevant.

48 Böhner does mention older 'Badorf' ware in his 1955/56 article and refers to Tischler. However, he says it was replaced by 'Pingsdorf' ware at the end of the ninth century and makes no reference to a younger or classic 'Badorf' ware (Böhner 1955/56, 373).
49 Tischler 1952, 197. Here Tischler points to the differences between the kind of vessels found in the Walsum cemetery and the "younger examples of Badorf type" ("*den jüngeren Vertretern des Badorfer Typus*").
50 Van Es/Verwers 1980, 77.
51 Van Es/Verwers 2009, 154-155.

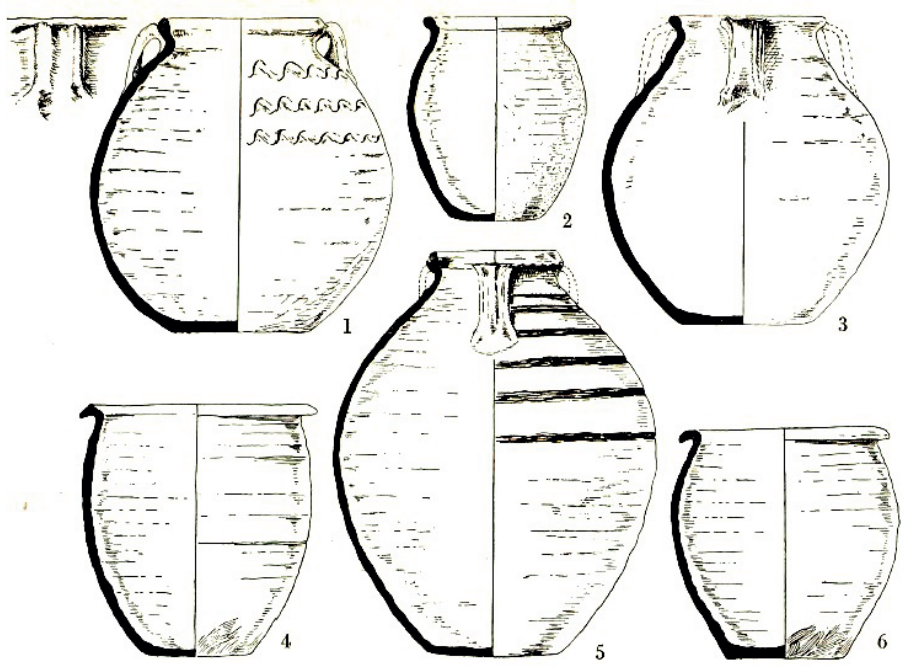


Fig. 4.19 Examples of Tischler's group I (Tischler 1952, 199, abb. 2).

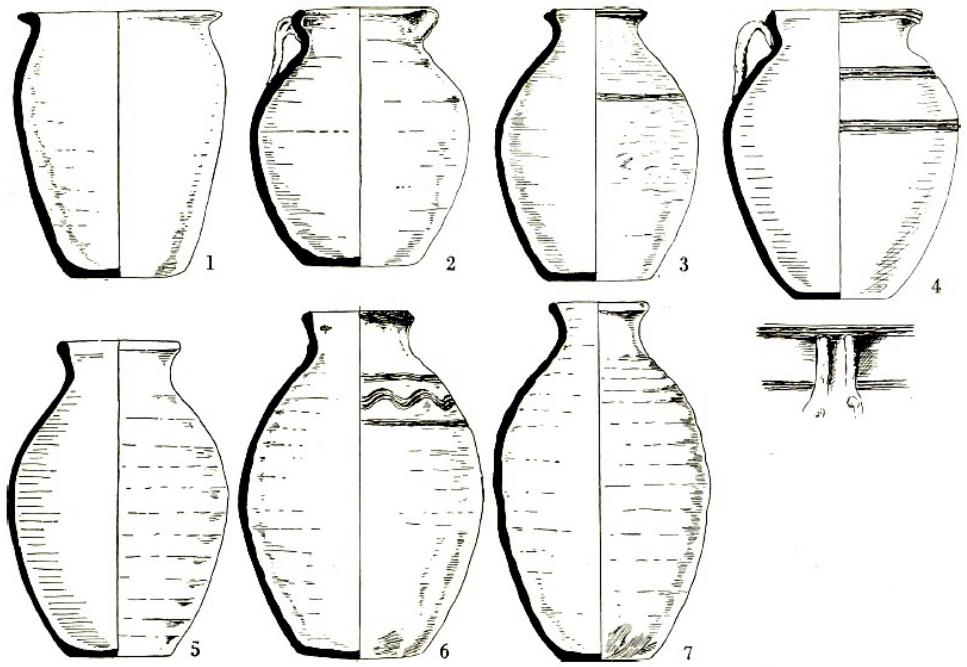


Fig. 4.20 Examples of Tischler's group II (Tischler 1952, 199, abb. 3).

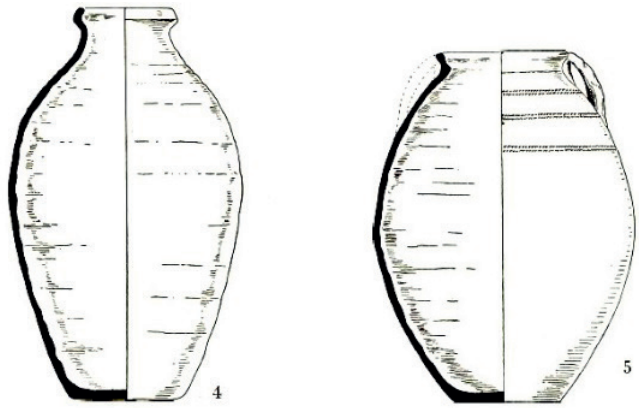


Fig. 4.21 Examples of Tischler's group 2 (Tischler 1952, 198, abb. 1).

Van Es and Verwers shifted Tischler's dates for 'Old Badorf' to the second half of the seventh century based on new insights on the dating of Madelinus coins.[52] For that reason, presumably following Tischler's suggestion for the duration of production of 'Old Badorf', the dates for 'Classic Badorf' could be shifted to the middle of the eighth century.[53] However, as we just saw, the period of circa 60 years which Tischler thought 'Old Badorf' may have been in use was not based on any specific evidence. Van Es and Verwers originally offered no further arguments for dating fabric w1 except that it must have existed by the third quarter of the eighth century according to the evidence provided by a hoard discovered during ploughing at Krinkberg in 1880. The hoard has a terminus post quem of 781 and was supposedly deposited in a vessel of type WII. However, the association of the coins with the vessel has since been questioned.[54] Consequently, in terms of the literature quoted for the dating of the Dorestad material, only Frank Siegmund's work on Lower Rhine cemeteries remains as a source of evidence for the dating of old and younger 'Badorf'.[55]

Siegmund's (re-)examination of the fabrics of pottery from Duisburg and the cemeteries of Stockum and Walsum allowed him to distinguish two groups of ceramics, which he labelled ceramics of '*Badorfer Machart*'. The two groups were defined based on their hardness, and the combination of fineness and density of temper. It is important to emphasise first that the groups were identified as 'Badorf'-*like* production, and second that they were defined in relation to Tischler's groups of wares. With regard to the first point, this means that in reference to Tischler's fabrics, the groups can contain both 'Badorf' (2) and imitation of 'Badorf' (II) fabrics. It was not Siegmund's intent to definitively define the 'Badorf' fabric because he believed the available evidence from the production sites was not sufficient to do so. The second point entails that the chosen criteria of hardness, and density and size of temper allowed Tischler's group I, and groups II and 2 combined, to be identified as more or less separate clusters when plotted in a chart.[56] The two groups of '*Badorfer Machart*' defined by Siegmund are in fact a subdivision of Tischler's groups II/2.

52 Van Es/Verwers 1980, 77; Van Es/Verwers 2009, 155.
53 Van Es/Verwers 1980, 78.
54 Keller 1998, 302.
55 Van Es/Verwers 2009, 155.
56 Bridger/Siegmund 1987, 554-555 and figure 6.

According to Siegmund, a soft fired, fine and densely tempered fabric (*Badorfer Machart* D-BM1) is found first in burials of phase 10 of his Lower Rhine chronology and a slightly finer and more densely tempered fabric (*Badorfer Machart* D-BM2) appears around the transition from phase 10 to 11.[57] Therefore, these fabrics are believed to form a chronologically relevant variable. According to Siegmund, both fabric types D-BM1 and D-BM2 occur among vessels types which were assigned by Tischler to either 'Badorf' ware (2), Lower-Rhine imitations of 'Badorf' ware (II) or 'Vorgebirge' ware (I). As the fabrics of several pots, assigned by Tischler to the group of imitations of 'Badorf' vessels, showed the characteristics of D-BM1, this led to the conclusion that 'Badorf'-like ceramics were being produced in phase 10 of the Lower Rhine chronology which starts around 670. Because most of the vessels in the Walsum cemetery are supposed to be Lower Rhine imitations of 'Badorf' ware, real 'Badorf' ware had to be slightly older, and have started to be produced by 670 at the latest. The production of wares in the second fabric, D-BM2, would then begin roughly at the transition from phase 10 to 11, so around 700.

A major issue with this train of thought lies in the ascription of fabrics D-BM1 and 2 to the Vorgebirge. Siegmund defined his two fabric groups based on the same vessels from the Duisburg region that Tischler studied, and in reference to Tischler's fabric groups. Therefore, in effect, the only indication that the fabrics Siegmund defined were in fact 'Badorf'-like was Tischler's identification of them as such.[58] Van Es and Verwers believed both D-BM1 and D-BM2 were essentially 'Old Badorf' and according to Siegmund's dating of phases 10 and 11 this would place it between 670 and 740, more or less what they had already suggested. The problem is that Siegmund was not referring to 'Old Badorf', but simply 'Badorf'-like material. It is not clear what the exact relationship is between ceramics of '*Badorfer Machart*' and Dorestad fabrics.[59]

Furthermore, for several reasons the dates derived from Siegmund's work for the initial phase of 'Badorf' production and the transition from WXIV vessel types to those that are usually associated with Badorf (WI and WII) are problematic.

First, there are issues with the absolute dates assigned to Siegmund's phases. Theuws has argued that regarding the final phases of the Lower Rhine chronology (8 to 11), the dating of the transition from phase 9 (640-670) to 10 (670-705) has its problems.[60] It is partly based on the transition from gold to silver coinage which, according to Siegmund occurred between circa 650 and 680. Because burials of phase 10 sometimes contain gold coins Siegmund maintains they should date some time before 680, that is 670. However, the fact that the striking of gold coins ceased at some point at the end of the seventh century does not mean gold coins went out of circulation. If gold coins did circulate several decades longer than Siegmund assumes, artefacts assigned to phase 9 may have

57 Siegmund 1998, 227-228.

58 A further problem is that vessels from the Duisburg area were attributed by Tischler to either 'Badorf' or its imitations on their fabrics, not their morphology. If Siegmund is correct in saying that examples of vessels attributed to group I by Tischler were made in either D-BM1 or 2, this would contradict Tischler's assertion that combinations of wares and vessel types formed distinct groups. Although that does not seem unrealistic, it does lead to a significant problem. If fabrics are not directly linked with vessel types then the bottom falls out of the claim that vessels of a certain type can unequivocally be attributed to the Vorgebirge or the Lower Rhine. That makes it more difficult to suggest fabrics of '*Badorfer Machart*' (which may or may not be from the Vorgebirge) can be linked to 'Badorf' vessels as defined by Tischler.

59 Siegmund does mention that in his view a later 'Badorf' fabric is represented by acoustic jars found in the Xanten Dom (Siegmund 1998, 228). The main difference with D-BM1/2 is that the Xanten finds were fired harder. However, these are globular pots which were generally fired harder than WI and WII vessels and hardness by itself is rarely a chronologically significant characteristic of ceramics (see for example Keller 2004, 125).

60 Theuws 2001, 197.

continued to be deposited into the last quarter of the seventh century and those of phase 10 into the eighth century. Moreover, the end date of phase 8 and the start date of phase 9 (640) seems to be based on the dating of Madelinus coins from circa 640 onwards.[61] If Madelinus coins were struck later, as argued by Theuws, the whole dating of the phases has to be revised.[62]

No absolute dates were available for dating the transition from phase 10 to 11 (705-740). The only indications come in the form of sceattas discovered in burials assigned to phase 11. According to Siegmund, these sceattas were struck in the first half of the eighth century and therefore phase 10 should date before that. However, the so-called continental runic type sceattas that occur in graves were already being manufactured at the end of the seventh century.[63]

In order to better understand what signified the end of phase 11 a final phase 12 (740-) was defined which contained burials that no longer have characteristics of phase 11.[64] The evidence is mostly based on cemeteries related to churches. In addition, the main characteristic of phase 12 burials is a lack of grave goods. For the end of phase 11 sceattas also play an important role because in a few cases such coins were discovered in association with trapezoidal coffins which belong to phase 12 according to Siegmund. Therefore phase 12 must have started some time before the second half of the eighth century, by which time the sceattas in question are supposed to have gone out of production (again, it is apparently impossible that coins were used for longer than they were struck). This leads to an end date for phase 11 around 740. The transition from phase 10 to 11 is placed at 705, exactly half way between the end date of phases 9 and 11.[65]

It is impossible to determine on Rhineland cemetery evidence whether the kind of artefacts present in phase 11 burials did not continue to be produced (long) after the practise of furnished burial had ended. The date provided for the end of phase 11 is based largely on evidence from church cemeteries where developments may have been different from those in rural cemeteries. In addition, because the main arguments for dating the end of phase 11 have nothing to do with artefacts, it only provides a rough indication for the abandonment of furnished burials in the Rhineland. There is no guarantee the practise did not cease before or after the supposed end date of phase 11. Overall, the very precise dates that have been assigned to the *Niederrhein* phases, and by extension the artefacts that belong to these phases, do not appear entirely justified. This creates a problem for Van Es and Verwers' dating of the transition from 'Old' to 'Classic' Badorf.

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61 Siegmund 1998, 201.
62 Theuws 2003, notes 30 and 50.
63 Op den Velde/Metcalf 2003 [2007].
64 Siegmund 1998, 199.
65 It may not even be possible to make the kind of hard distinction between phases 10 and 11 artefacts that the Lower Rhine chronology suggests. The chronology in its final form, based on Siegmund's work on lower Rhine cemeteries and the Franken AG's investigation of cemeteries in the so called Kölner Bucht region, contains few find types in the later phases which can solely be dated to one specific phase (Nieveler/Siegmund 1999). The only artefacts that are dated so precisely occur together as specific sets, predominantly at Walsum. It is my belief the evidential value of this combination of objects for the creation of narrow chronological phases is limited. It is quite possible that there was a development from objects typical for phase 10 to 11, but it also seems likely they were used side by side for some time making it impossible to draw a line where one type stopped and the other began. Even if it were possible to pinpoint when a type was most prevalent it would still only indicate the period that type was used most in the burial ritual and would not make it possible to date an individual burial or object to exactly one phase.

Second, the initial date for 'Badorf' production is based on the idea that Tischler's interpretation of a group of vessels as imitations of 'Badorf' ware was a correct assessment.[66] There is some doubt over whether they were indeed imitations and not simply a slightly different fabric produced in the Vorgebirge.[67] Bardet studied samples from some of the same vessels Tischler also examined using Neutron Activation Analysis and found that most adhered to the chemical characteristics of other Vorgebirge ceramics.[68] One sample belonged to Dorestad fabric w1 and could be attributed to production in Eckdorf. A further two fitted the chemical characteristics of Walberberg while one sample probably originated from the Vorgebirge, though it did not coincide entirely with any of the known production sites. Finally, one sample did show similarities with known Lower Rhine products. Two other vessels from other Duisburg findspots were also sampled. The first had been identified as Badorf imitation by Tischler and was macroscopically similar to fabric w1. The other was initially seen as imitation of Vorgebirge ware. Chemically they could not be assigned to a specific production centre. Bardet believed the first sample could have been made from tertiary clay found in the area between the Rhine and the Meuse while the second is probably a product of the Lower Rhine area. The results of Bardet's research indicate that it is very difficult to determine where vessels with characteristics of Vorgebirge production discovered in the Duisburg area were actually produced without the use of chemical analysis. But even if a large portion of the vessels from the Walsum and Stockum cemeteries were manufactured in the Lower Rhine region there is no way to tell whether their production started earlier or later than that in the Vorgebirge. The only reason to assume 'Badorf' wares are the originals seems to be that they were the first to be archaeologically identified.

Bardet's research revealed a number of other interesting aspects of Vorgebirge pottery. The samples consisted of 71 sherds from the Hoogstraat sites with several samples of each fabric between w1 and w17.[69] In addition roughly 100 sherds from production sites in the Vorgebirge and Mayen were analysed. The Vorgebirge samples were chemically quite similar and could be identified as a group, those from Badorf and Pingsdorf being particularly alike. At the same time, the sherds from Badorf/Pingsdorf and Eckdorf could be clearly separated from one another while Walberberg sherds showed a mixture of characteristics of the other two locations. Even within a single findspot the Walberberg finds varied considerably. This might be explained by mixing of clays and perhaps the addition of a flux in some cases in order to achieve the desired qualities for the end product. Whereas the wares from the various Vorgebirge sites could be reasonably well separated from one another, some of the Dorestad fabrics showed substantial variability. Examples of fabrics w1 and w3 in particular were found to have several clay sources. A large group in fabric w1 could be equated with Eckdorf material but other samples did not conform to the chemical signature of Vorgebirge ceramics at all.[70] On the other hand w2 and w10 fabrics were much more homogenous and similar to each other, as well as wasters found in Pingsdorf. Fabrics w4 and w8 both adhered to what might be expected for Vorgebirge ceramics although they did not fit any specific clay source well. The Walberberg sites are deemed a likely source of these fabrics given the evidence for mixing at these sites, creating a heterogeneous signature.

66 This premise is also questioned by Van Es and Verwers but just a few sentences later they follow Siegmund's reasoning regarding imitations of 'Badorf' being preceded by real 'Badorf' (Van Es/Verwers 2009, 155). In all honesty the paragraph in question is generally quite confusing, because a few sentences later again a start date for genuine 'Badorf' around the middle of the eighth century is suggested, which is supposed to fit Siegmund's reasoning but obviously does not.

67 If not simply a fabric in a Merovingian tradition (Heege 1995, 80).

68 Bardet 1995, 236-237.

69 Bardet 1995, 189.

70 Bardet 1995, 227.

With regard to the relationship between fabrics and vessel types, samples from WII vessels showed characteristics of Pingsdorf, Eckdorf and Walberberg wasters, while the WIX examples conformed mostly with the first two sites.[71] Interestingly the WIX vessels made from an Eckdorf clay had macroscopically been described as Walsum-like. Several WIIIA and WIXA samples in w3 fabric showed most affinity with the Walberberg signature, examples of WIIIA and D and WIX in w2 fabric all conformed to that of Badorf/Pingsdorf. The chemical analysis indicates that fabrics which were considered by Tischler to be imitations of 'Badorf' were at least in part produced in the Vorgebirge. Not only that, but they could also be considered examples of fabric w1. On the other hand, a portion of the samples of w1 fabric from Dorestad likely originated from sites outside the Vorgebirge. This raises the question what the probative value of fabrics is for making a distinction between various stages in the development of Vorgebirge pottery production?

Excavations carried out in the south of the town of Walberberg have provided further evidence that fabrics may not be the best characteristic on which to date Vorgebirge ceramics.[72] The site yielded features covering the entire Early Middle Ages. Among the earliest dated finds was pottery with a fabric similar to that of Waldorf and Walberberg. Contexts in which this material was discovered gave an overall impression of dating to the sixth century, but no kilns in the Vorgebirge are known for this period. Among the features were six pottery kilns which contained ceramics that were typologically assigned to either Keller's phase A or B (see below) of Vorgebirge ceramics. The fabrics of the sherds belonging to the first phase were comparable to Waldorf finds and also likened to Böhners D-ware. Ceramics associated with phase B came in two fabrics, both less abundantly tempered than phase A pottery. One group was (slightly) rough to touch, the other had a smooth surface. This last group is to all intents and purposes the same as what would be called w1 fabric in the Dorestad system.[73] One kiln, which contained examples of phase B types, was carbon dated to either the last third of the seventh or first two thirds of the eighth century.[74] Keller also believes ceramics in a 'Badorf' fabric were being produced by the seventh century at the latest, both in Walberberg and Eckdorf.[75]

Dating vessel types based on the fabrics they were produced in has been shown to be problematic. Few of the arguments used to date the vessel types in the Dorestad typology have a solid empirical base. There is much confusion in the existing literature concerning the naming and identification of certain fabrics, sometimes leading to the erroneous application of others work. Bardet's study, as well as more recent research on production sites in the Vorgebirge, shows how problematic it can be to use macroscopic observations on fabrics as the basis for dating the production and consumption periods of vessel types. That is not to say that fabrics have no value for dating ceramics, but at least in our period only in relation to one another, not as a proxy for the dating of vessel types. The finds from Walberberg and the research conducted by Bardet show that ceramics exemplified by the vessels found in the Walsum cemetery were produced partly in what is generally understood to be a 'Badorf' fabric. The finds from Walsum and Walberberg indicate that most of the vessels

71 Bardet 1995, 233-234.
72 Müssemeier/Schneider 2012, 191-207.
73 The fabrics are not specifically linked to existing definitions of wares in the article referenced here. However, images of sherds in the various fabrics point in the direction of what is widely described as 'Badorf ware'. In addition the identification of the finds from the Walberberg excavation as 'Badorf' ware was confirmed to me by M. Schneider during a visit to the archaeological depot of the LVR-LandesMuseum Bonn in June 2016.
74 The excavators prefer to use the younger of two possible date ranges provided by the calibrated carbon date because it better fits the dates assigned to phase B by Keller.
75 Keller 2012, 212. Unfortunately neither context has been published.

brought together under type WXIV date to the late seventh and the first half of the eighth century, if not later. The next section will look at what else can be said about the chronology of Vorgebirge ceramics by taking a typological approach.

4.2.2 Research based on typology

As noted at the beginning of this section, typological investigation of early medieval Vorgebirge ceramics was taken up only quite recently. After Böhner's distinction of Vorgebirge fabrics, the sherds discovered at the production sites in the Vorgebirge remained only summarily published for quite some time. The finds from Dorestad were the first to be published with a large section devoted to the morphology of early medieval Rhineland ceramics. Some years later Janssen did something similar for the wheel-turned ceramics from Haithabu, but in less detail. However, neither of these studies attempted the dating of types primarily on the basis of their morphology. In a dissertation, later developed in several articles, Christoph Keller first sought to create a typo-chronology of early medieval Vorgebirge pottery based on excavated material found at production sites. Additionally, Markus Sanke published the material recovered from production contexts in Pingsdorf. The finds mainly date to the time after our period ended but his first two phases represent the latter stages of production in a Carolingian tradition.

Keller distinguished five phases in the development of Vorgebirge ceramics of which two were divided into subphases (fig. 4.22).[76] Phase A pottery is characterised by steep-walled, wide-mouthed pots and small ovoid pots with rims with an interior groove.[77] Large jugs with multiple handles, which are known from cemetery finds, are also assigned to this phase, but these were not actually found at the production sites. Most pots still had flat bases though some lenticular bases do occur and decoration consisted of wavy lines. The occurrence of some of the types of phase A in Merovingian burials leads Keller to the assumption that they date to Siegmund's Lower Rhine phases 10 and 11.[78] However, the transition to phase B may have taken place slightly later than 740. In a more recent article it has been suggested the phase should perhaps be divided further into two subphases, partly on the basis of cemetery research. The main developments during the second subphase were apparently the introduction of the lenticular base and jugs with multiple handles.[79]

Vessels belonging to phase B are still believed to be rooted in the Merovingian pottery tradition. The main differences with the previous period are that pots tended toward a more closed opening and smaller pots became more globular. The first relief-band amphoras appear in phase B, but the strips were not yet arranged in geometric patterns. The phase also contains a wide array of bowl types. Both flat and lenticular bases were in use and besides wavy lines, stamp decoration occured.

In phase C the shoulder of vessels became more globular in shape and overhanging rims were more common. Relief-band amphoras became larger with shorter rims and with more decoration on the applied strips. All forms except bowls now had lenticular bases and only roulette-stamp decoration and incised lines appear occasionally.

During phase D roulette-stamp decoration was applied to large vessels with rounded or triangular rims. The impression is that there was a gradual development from rounded to triangular

76 Keller 2004; Keller 2012.
77 Keller 2004, 126-129.
78 Keller 2012, 215 and note 44.
79 Keller 2012, 217.

rims. The strips of clay on relief-band amphoras were now always decorated with roulette-stamp. This phase has also been divided into two subphases, D1 and D2. The first more or less comprises the material assigned to phase D found at the kiln sites while the second phase was created to accommodate vessel- and rim shapes which have not been recognised among the wasters but are found on settlement sites.[80] These include spouted pots which do not occur at all in phase D1.

Phase E is characterised by the introduction of red slip decoration in combination with roulette-stamp decoration. Globular pots occurred with triangular, round or square rims. Spouted pitchers are also among the vessel types as well as small beakers. Phase E fits in a relatively narrow time-period. It was not among the finds in a destruction layer in Deventer associated with a Viking attack in 882, but was present in younger features at other excavations in the town. Examples were used as acoustic jars in a phase of the church of Meschede dated around 897/905.[81]

Other than the dates for the first and last phase there are very little absolute dates available to anchor the relative chronology. Phase C is believed to predate the construction of the earthworks at Haithabu, implying they went out of use before 810 to 830. Phase D types are thought to have been in use before 863 because they occur in a building phase of the Xanten Dom which was supposedly destroyed by Vikings at that time. The transition from phase B to C has been set at the end of the eighth century simply because this is roughly halfway between the estimated end of phases A and C.

A few observations are of importance for the present research. First, on the published evidence the differences between vessels belonging to phase A and B seem to be quite subtle. This poses a problem for our research area because here generally only a distinction between early and 'classic' Badorf vessels is made (WXIV and IX vs WI, WII and WIV). The early vessels have not been systematically subdivided according to Keller's typology. A second point is that the typology implies that globular pots similar to those produced in Mayen were not manufactured before the end of the eighth century in the Vorgebirge. Third, Keller is the first to admit there are no contexts available for the eighth and first half of the ninth century which can provide absolute dates.[82] The proposed chronology is difficult to marry with some of the settlement evidence in our research area as it stands, not least that of Dorestad.

A typological study of ceramics produced in the town of Pingsdorf by Sanke is of interest here, not so much for dating purposes but more for insights into developments in the vessel corpus. Sanke used more or less the same evidence for dating the first two phases of Pingsdorf production as Keller.[83] Among the Pingsdorf finds were two kiln contexts that effectively belong to Keller's phases D and E respectively. The first contained almost exclusively globular pots, without the characteristic red paint decoration of later Pingsdorf vessels. In the second context globular pots made up a far smaller proportion of the assemblage, spouted pots being the most common vessel type. As such these two contexts alone are of limited value because their contents may not be fully representative of the range of vessels being produced at the time. However, contexts dated after circa 900 are more numerous making it possible to draw conclusions about the composition of the output of the production centre. The figures show that pouring vessels remained the largest group proportionately but that the importance of tableware increased with time. Vessels associated with cooking did not exceed 20% before the twelfth century.[84] As a whole the late ninth and tenth century kiln sites of

80 Keller 2012, 219.
81 Keller 2012, 220.
82 Keller 2012, 220.
83 Sanke 2002, 179-183.
84 Sanke 2002, 207-209.

Pingsdorf indicate a steep decrease in the production of cooking vessels and a simultaneous increase in the manufacture of pouring and storage vessels.

The range of vessel types and composition of the output produced during the early medieval phases of Vorgebirge production cannot be determined with great accuracy. The number of contexts for the first three phases of Keller's typochronology is too limited and for later phases has not been published fully. However, the impression the published data gives is that for the first three phases vessels intended for cooking probably made up a substantial proportion of output, but that types specifically intended for storage were also part of the standard range. A proportion of the cooking vessels may in fact have been intended for storage purposes but their morphology does not allow us to make a distinction. Throughout the later phases jars and pitchers were developed into forms clearly separated from globular pots, a type usually associated with cooking. Perhaps more than had been the case for pottery in a Merovingian tradition the producers influenced the functions vessels had at this time. Conversely, the storage of goods may have become important to the point that a separate class of vessels was deemed necessary. Relief-band amphoras were a feature of the Vorgebirge corpus from a relatively early stage but it saw considerable transformations throughout its development. That may have implications for how we should interpret their use at various times. These considerations will be elaborated on in chapter 8.

The typo-chronology of vessels discovered at the production sites in the Vorgebirge is partly comparable to the chronology suggested for the Dorestad finds. However, the Vorgebirge finds allow a more detailed reconstruction of developments. They show that there were more stages in the transition from vessels still anchored in a Merovingian tradition to the jars and pitchers so dominant in the Dorestad assemblage. On several points the dating of the phases of production do not conform with the Dorestad chronology. Vessels in a Merovingian tradition would have been produced well into the second half of the eighth century and globular pots only appeared at the end of the century. The kind of vessels considered typical for the Carolingian period are said to have appeared towards the middle of the ninth century. A substantial proportion of the ceramics found during the Dorestad excavation seems to belong to phase D, if not D2. That would imply a start date around 830, even later for spouted pots. The consequence is that either the bulk of the ceramics at Dorestad were imported in a very short period of time, or that they were imported substantially later than is now generally assumed. Admittedly there is nothing in the data from the harbour excavations which can categorically refute either of these scenarios. It is necessary to look at other sources of evidence from our research area to test the suggested chronology.

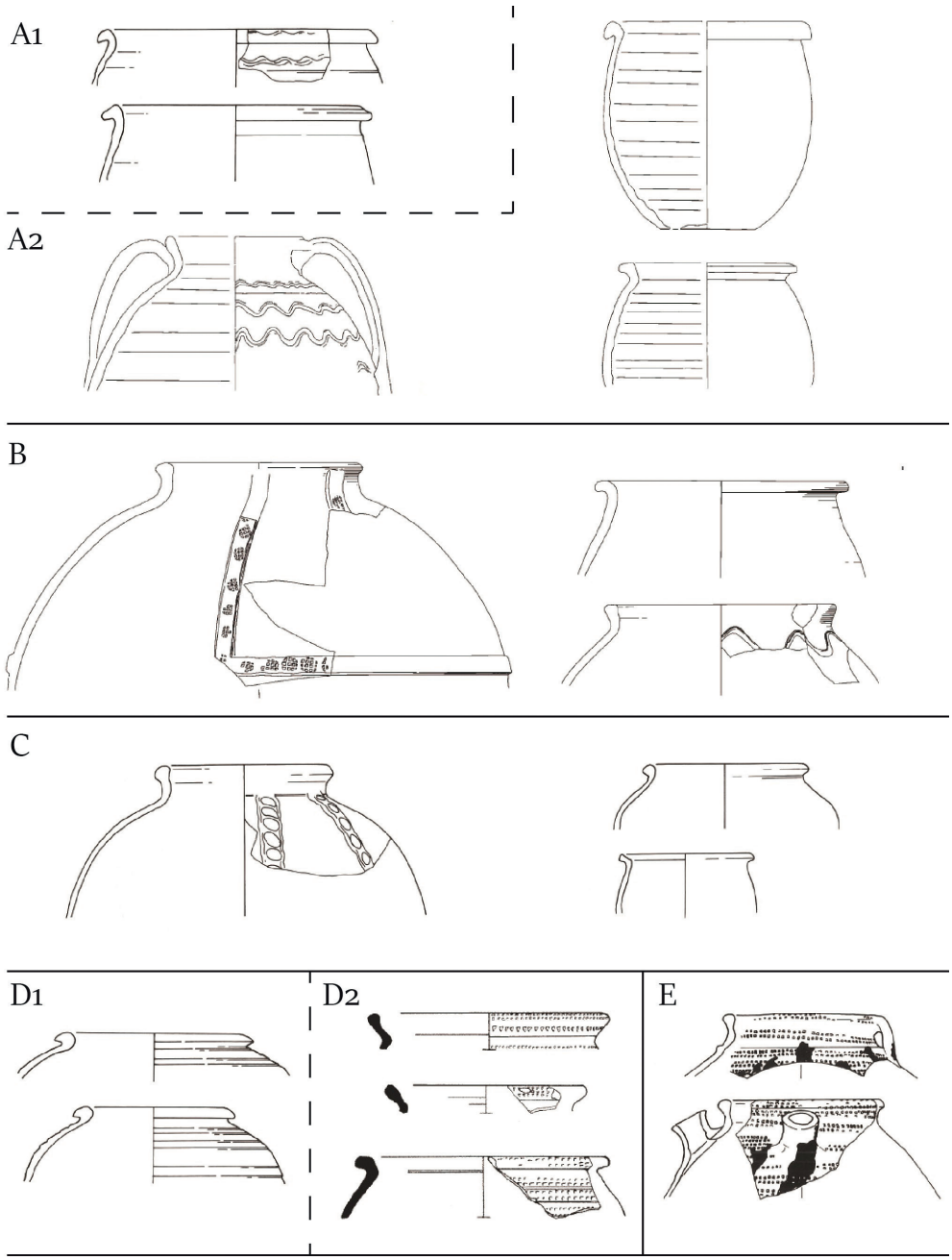


Fig. 4.22 Overview of Keller's typology.

4.3 Mayen ceramics

Compared to Vorgebirge ceramics the picture for Mayen pottery in our period is much clearer. This has several reasons. Variability is more limited among Mayen products and they show little development during the eighth and ninth centuries. In addition, fabrics can be relatively easily identified macroscopically due to augite inclusions, although it can be difficult to distinguish individual sherds from some Walberberg products superficially.[85] Mayen pottery was produced in the town of Mayen in the Eifel region of Germany (fig. 4.23). The pottery production centre in Mayen was active between roughly the second and the fourteenth century AD, although the quantity of output and range of exports differed per period.[86] For example post tenth century exports are rarely found in the Netherlands, though this may be partly due to difficulties in recognising the later products. Wheel-thrown pottery was produced at several locations in the Eifel from the second century BC up till the fifth century, but Mayen is as yet the only town to have yielded remains of Merovingian and Carolingian period ceramic production in the region.

In the middle of the fifth century production in the town shifted some distance from the left of the Nette river to the area between what is now the Siegriedstrasse and the Genovevaburg . Pottery in Late Roman tradition seems to have been manufactured at this new location until the beginning of the sixth century after which production appears to have declined somewhat.

Mark Redknap undertook the classification of a considerable amount of the ceramics found in production contexts in Mayen.[87] A range of wares and vessel types were defined that were often distinctive for particular periods. The dating of fabrics was based on the internal relative chronology of kiln-fills and external securely dated contexts which contained the fabrics.[88] In essence the naming of fabrics follows Böhner's categories developed for vessels found in Merovingian grave contexts. The main fabrics dated to our period are MD ware, which is described as a rough walled fabric and ME ware which is very hard fired. MD ware is supposed to have mainly been in use between the late fifth and early eighth century although a particular variant remained in production until the ninth century. ME ware is dated between the late seventh and late ninth century. Types produced in a further two fabrics have also been dated between the late seventh and ninth century. MB/C ware is a smooth-walled fabric and was fired in either an oxidising or reducing atmosphere. MFP ware consists of vessels with red paint decoration.

Fabrics are not necessarily exclusive to types. For example, the vessels of main interest here, globular pots with a lenticular base, can occur in both fabric MD and ME. Although a portion of the globular pot types were produced in MD ware, the fabric differs from the variant of MD ware (A1) employed in vessels in a Merovingian tradition. The description of variant A4 of MD ware, used in the manufacture of globular pots seems rather similar to Dorestad fabric w6, while ME ware fits with fabrics w9 and w12. Mayen fabric MB/C is comparable to fabrics w15 and w16. Bardet indeed found that Dorestad fabrics w6, w9, w12, w16 and w17 had a similar chemical composition to wasters from Mayen.[89] However w15, or Tating ware, differed to an extent that it was deemed unlikely to originate from the same source.

85 Van Es/Verwers 1980, 143; Redknap 1999, 101.
86 Grunwald 2012, 143.
87 Redknap 1999.
88 Redknap 1999, 25.
89 Bardet 1995, 238.

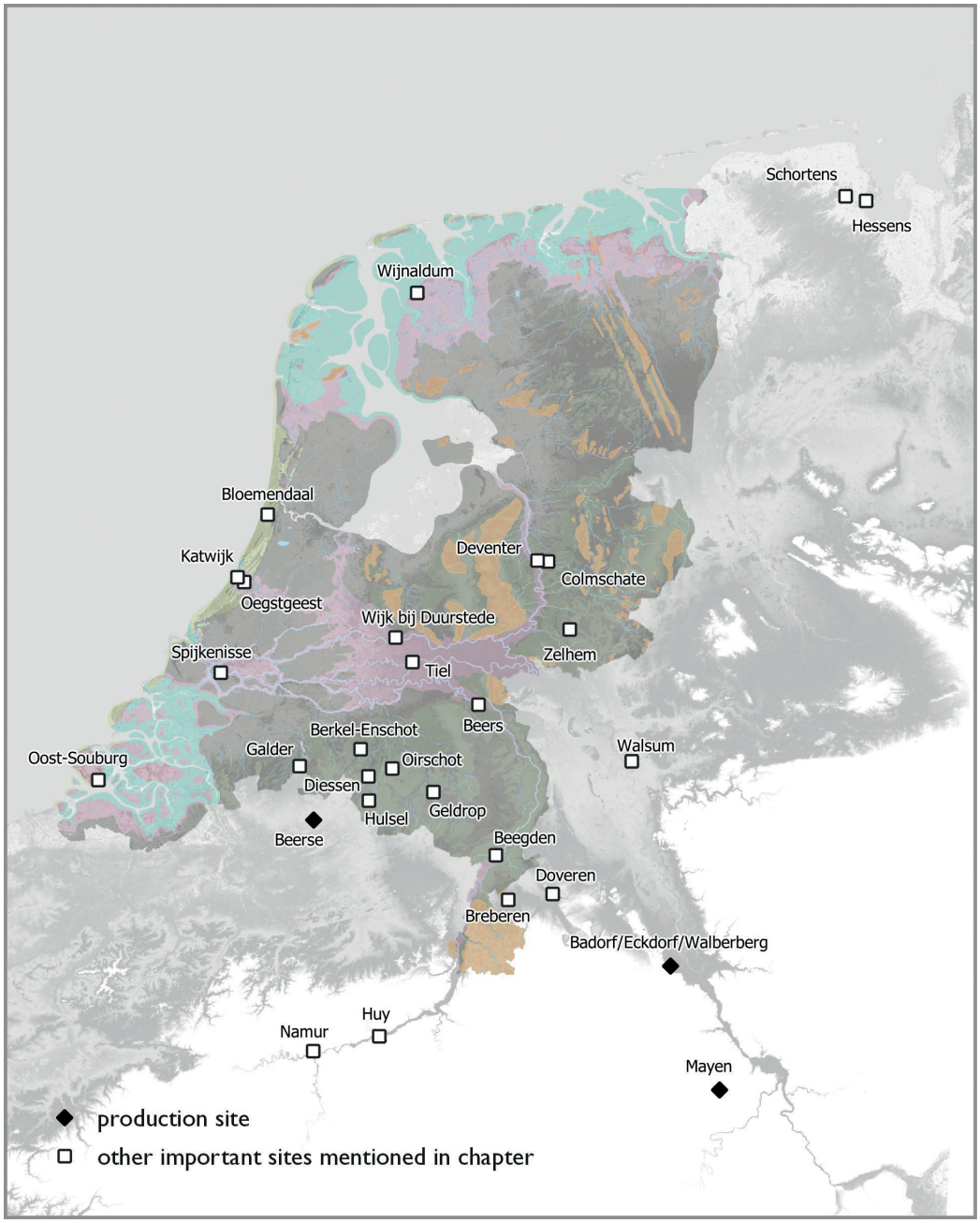


Fig. 4.23 Sites mentioned in this chapter that are important with regard to the provenance and dating of ceramics.

Redknap believed Tating jugs were manufactured at Mayen mainly because of similarities in rim-shape of certain vessel types in MB/C ware.[90] The lack of tin-foil decoration, typical for Tating jugs, on Mayen wasters can be explained by the fact that it would have been applied to the vessels after firing. However, overall the case for production of Tating jugs in Mayen is not particularly strong. The vast majority of sherds illustrated in Redknap's publication (which was intended to be comprehensive with regard to depicting the variability of Mayen production) in MB/C ware have decoration in the form of stamps, grooves or geometric patterns comprised of polished lines (*eingeglättete Linien*). On Tating jugs tin foil was applied to otherwise undecorated surfaces. In addition the depicted vessels do not show evidence for a hole where the handle would have been applied. The application of the upper side of the handle by inserting it through the body of the vessel is a technical characteristic of Tating jugs.[91] The type of spouts found on the jugs from Dorestad also do not appear to be amongst the wasters. On the other hand these kind of technical details may have differed for each centre producing the jugs. Finally, a study of Tating jugs using Neutron Activation Analysis found that of the 44 samples taken from various sites just one sherd showed chemical characteristics of Mayen production, while 41 belonged to a single homogeneous group that could not be provenanced.[92]

If the number of sherds per vessel type in Redknap's study are aggregated according to their presumed period of production[93] it is possible to get an impression of developments in the scale of production (table 4.2). There is overlap between the first three periods but in general there is a clear increase in the volume of wasters from vessels in a Merovingian tradition to those in a Carolingian tradition. In the period between 900 and 1050 the number of fragments returns to the level encountered before circa 700. The vast majority (14292 out of 15935, or 90%) of ceramics dated between 675 and 900 belong to globular pots. It is possible that some of the differences between periods may be related to an overrepresentation of excavations in areas where ceramics were manufactured predominantly in the eighth and ninth centuries. However, the excavated features apparently also point to intensification of production from the late eighth century onward. The area where pottery was produced was expanded and periodically levelled and then re-used.[94]

Period	Sum of sherds
400-725	2661
675-750	3319
675-900	12616
900-1050	2072
1050-	272
Total	**20944**

Table 4.2 Number of sherds in production contexts from Mayen per period. Based on types produced in MB/C, MD and ME wares and the dates assigned to types by Redknap.

The chronology of Mayen ceramics is relatively straightforward for our period because of the limited variability in vessel types. One aspect of particular importance is the introduction of the globular pot with lenticular base. Redknap dated the earliest examples to the last quarter of the seventh century,

90 Redknap 1999, 85-88.
91 Van Es/Verwers 1980, 98.
92 Stilke/Hein/Mommsen 1999, 415-417. The sherd that could be ascribed to Mayen was also macroscopically anomalous compared to the bulk of the samples and not a typical example of Tating ware.
93 According to Redknap 1999.
94 Grunwald 2012, 146.

mainly on cemetery evidence. Cemeteries in a wide area around Mayen, among which Rübenach, Pommerhof, Miesenheim, Iversheim and Hohenfels, contained examples of globular pots in the later stages of their development. Ament considered them a characteristic of his *Jüngere Merowingerzeit* III (JM III) dated after 680.[95] However, this early date has recently been questioned. The burial contexts Ament pointed to were either disturbed or not well documented.[96] Other cemeteries in the surrounding area of Mayen contain artefacts considered to be typical for the late seventh and the first half of the eighth century, accompanied by vessel types in a Merovingian tradition and lacking globular pots.[97] The vessels in the cemeteries do show a development towards a more rounded body and are hard fired, but still relatively thick walled. This led Lutz Grunwald to suggest that globular pots from Mayen followed roughly the same chronological developments as in the Vorgebirge, beginning at the end of the eighth century. With the start of production being set about a century later than Redknap suggested, the contrast between Carolingian and preceding or succeeding production as shown in table 4.2 would become even more pronounced.

4.4 Meuse-valley ceramics

Our knowledge of ceramic production in the Meuse valley during the eighth and ninth century is rather sketchy. One of the reasons is the relative lack of excavated remains of ceramic production for this period, especially compared to the abundance of evidence for the preceding and following periods. Therefore research has focussed on Merovingian pottery production in towns such as Namur, Huy and Maastricht and the high medieval production of wares mainly known from Andenne but also produced in several other towns along the Meuse.[98] In stark contrast, no kilns of the eighth and ninth century have been unearthed with certainty thus far. However, it is believed that pottery was manufactured in the region during these centuries based on settlement finds. The best evidence for what eighth and ninth century regional production from the Meuse valley looks like has come from Huy and Namur. At the site Grognon situated at the confluence of the Meuse and Sambre in Namur well stratified contexts provide a framework for reconstructing developments in Meuse valley ceramics. Four phases have been distinguished that were dated based on their stratigraphic relations combined with absolute dates that were assigned to several features.[99]

During the eighth century no major changes occurred in the ceramic assemblages compared to the seventh century except that rough-walled wares were now mainly fired in a reducing atmosphere. Three rough-walled products can be distinguished, an oxidised and a reduced fired group and a grey ware that was smoke-fired. The ceramics of the latter group are otherwise white or light-grey in colour on their interior and in section. These black or grey wares were also common in the first half of the ninth century but from the start of that century the first vessels in light tones and with painted decoration start to appear. However, there are problems with the dating of the first two phases because activity at the site slowed down between the early eighth and middle of the ninth century.[100] It is possible that there were gaps in the deposition of material. Therefore, although stratigraphical relations between features containing ceramics of this period might allow

95 Ament 1976.
96 Grunwald 2012, 150.
97 Saal 2012, 179-190.
98 De Longueville 2006, 55.
99 Colette et al. 2006, 111-117.
100 Colette et al. 2006, 108.

distinct phases to be defined, the absolute chronological relationship between the two phases is not certain. This means that there is room for manoeuvre regarding the start and end dates of wares represented in the first two phases.

Light coloured wares seem to have become increasingly popular in phase 3, dated between the second half of the ninth century and the first half of the tenth. This period also saw the introduction of a regionally produced hard fired and rough walled ware, usually in white, pinkish or grey tints.[101] At the same time the earlier greywares were almost entirely pushed out. Furthermore the period witnessed the introduction of the lenticular base which gradually took over from flat bases. This is considerably later than in the Rhineland and appears to fit better with developments in northern France.[102] Finally, in phase 4 light coloured wares came to dominate, a proportion of them painted, while at the same time glazed wares were introduced. Rough-walled wares only represented a small proportion of the assemblage during this period.

Ceramics from a stratified deposits at the Ruelle de Coucous site in Huy largely confirm the sequence revealed at the Grognon site.[103] Important in the context of the present research is that the researcher, Wolfram Giertz, saw a link between three fabrics found in the Huy material and the w13, w14 and w15 fabrics in the Dorestad system.[104] The description of fabrics w13 and w14 is certainly very similar to the appearance of the black and grey wares found at the Grognon and Ruelle de Coucous sites. The similarities have also been noted by De Koning in reference to finds from Beegden (67) and the abbey of Susteren.[105] With regard to the question whether Tating ware (fabric w15) was produced in the middle Meuse valley, it can certainly not be ruled out. As mentioned above in the section on Mayen ceramics several researches have shown that Tating ware was likely produced at multiple sites.

Bardet's analysis of the chemical composition of w13, w14 and w15 sherds indicated that whereas w14 was clearly not made from the same clay as fabric w13, the latter did show similarities with fabric w15.[106] Fabric w14 seems to equate to the black or grey smoked wares found mostly in phase 1 and 2 at the Grognon site. Fabric w13 could be the same as the reduced fired wares also mainly present in phases 1 and 2. Bardet found that when the grey fabric w13 was re-fired it became reddish in the oxidising conditions of the kiln used for the experiments. This fits the conclusion that fabric w13 and w14 were manufactured from different clays. As yet no production sites of ceramics in these fabrics has been discovered and it is possible that both were produced concurrently at one or several sites in the middle Meuse valley, using different clays, or even that each originated from completely different regions.

Turning to the dating of fabrics w13 and w14 the evidence from Namur implies that they would have been produced throughout the eighth century and perhaps into the early ninth century, though the issues with dating the contexts of this period at the Grognon site discussed above need to be taken into account. Fabric w13 may have also been in use in the seventh century considering its similarities with the kind of wares produced in the Merovingian period. For fabric w14 an earlier date for the start of production cannot be ruled out either given the current state of research. The characteristics of the vessels that were produced in both fabrics are still in the Merovingian tradition and apparently remained so for the entire eighth century.[107] Again, lenticular bases only started

101 De Longueville 2006, 57.
102 These developments are discussed in more detail in chapter 7.
103 Giertz 1996.
104 Giertz 1996, 41.
105 De Koning 2015a, 51.
106 Bardet 1995, 231-232.
107 De Longueville 2006, 56.

to appear in the second half of the ninth century. For Meuse valley ceramics then, developments in overall pot shape differed from the Rhineland and the similarity with vessels in a Merovingian tradition does not appear to be reliable grounds for dating in this case.

4.5 Other wheel-turned ceramics

At the time the initial publication of the Dorestad harbour finds was published several fabrics could not be provenanced with any certainty. Fabrics w13 to w17 have already been discussed. The remaining fabric w11 was associated with one particular rim type among the globular pots. In Bardet's study the fabric clearly differed from any other she had analysed and a likely provenance could not be ascertained.[108] It has been suggested the vessels made in fabric w11 may have been manufactured somewhere in England and is perhaps Thetford or Ipswich ware.[109]

Besides the ceramics contained in the Dorestad system, sites in the south of the research area have yielded evidence for regional wheel-turned pottery production. Among the finds in Dommelen, Arno Verhoeven identified three fabrics associated with pots that show characteristics of vessels in a Merovingian pottery tradition but that were often associated with Carolingian Rhineland ceramics in find contexts.[110] They comprise two rough-walled wares of an oxidising and reducing variety and a fine ware. Verhoeven assumed that they must have been manufactured somewhere in the southern Netherlands because examples had only been discovered on sites in this area. In addition the fabrics appear similar to those of later medieval wares known to have been made in the region. In subsequent decades the wares have been identified at several other sites in region 8. Due to the find associations at Dommelen the wares were dated to the seventh and eighth centuries.

A more recent discovery confirms wheel-turned ceramics were produced immediately to the south of our research area in the eighth or ninth century. An excavation in Beerse in modern Belgium uncovered the remains of a pottery kiln which contained what can clearly be recognised as imitations of Vorgebirge vessels.[111] The range of vessel types is mostly limited to globular pots similar to type WIII and spouted pots akin to type WIIC. The sherds are mostly reddish-orange, sometimes with a grey core and generally fired quite soft to middle-hard. Two carbon dates of charcoal taken from the kiln fill provided dates between 643 and 710 and 673-779 AD. In light of the previous discussion of the chronology of Vorgebirge production and the evidence from sites in the research area presented below these dates appear to be on the early side, if not too early for the kind of vessels found in the kiln. But perhaps more important for the purposes of the present research is what the contents might tell us about consumptive preferences in the region. If the contents of the kiln are a fair reflection of the range of wares produced on the site it would seem that demand was focussed on cooking and pouring vessels. A small number of fragments of relief-band amphora and perhaps a few bowls were also discovered. The assemblage implies that by the time the pots were being produced the template for what wheel-turned ceramic vessels should look like was determined by Vorgebirge production, at least in these parts. For the moment it is impossible to ascertain the area in which the products of Beerse were distributed. It is conceivable that sites in our research area contain sherds from vessels manufactured at the Beerse kiln which have now been ascribed to the Vorgebirge. Although the fabric of the pots cannot easily be mistaken for Vorgebirge wares, one or two anomalous rim-sherds or

108 Bardet 1995, 232.
109 De Koning 2012, 127-128.
110 Verhoeven 1993, 68-70.
111 Arts/Siemons in prep.

fragments with roulette stamp could have been seen as unusual variations of 'Badorf'. At the same time, undecorated body-sherds might easily be incorrectly identified as Merovingian style pottery common in the region. Despite the possibility that some sherds that originated in Beerse have been mistaken for Vorgebirge or perhaps even Mayen production it seems unlikely this is the case for large portions of Carolingian assemblages. As mentioned, the fabrics can hardly be mistaken for one another and if a substantial portion of the ceramic corpus at sites had been in the Beerse fabric, it is likely they would at least have been identified as a separate group. Those who examined the assemblage from the kiln put forward the suggestion that the wares were perhaps among the finds at Oost-Souburg. There, a group of ceramics was singled out with a reddish coloured, relatively coarse fabric belonging to WIIC-like vessels.[112] Whether the vessels were actually manufactured in Beerse is less important than the fact that a group of sherds was singled out based on its anomalous fabric despite morphological similarities with Vorgebirge products. It will be interesting to see whether future research can determine the range of dissemination of the Beerse production site's wares.

4.6 Handmade pottery

Handmade pottery represents 60% of the total amount of sherds and estimated number of vessels based on rim-sherds collated for this study. In several regions handmade ceramics are the most common kind of pottery on sites. For the purpose of this research the fact that handmade pottery was usually produced locally whereas wheel-tuned pottery almost invariably originated from outside the research area provides an important element of contrast in the analysis of distribution patterns. However, because handmade pottery of the period was manufactured in long-lived types and in some cases fabrics, it has proved of limited use for dating purposes on sites. In addition, due to the local character of its production the ceramics are not ideally suited to the creation of overarching typo-chronologies. These factors in particular have contributed on the one hand to little research on handmade ceramics at a supra-regional level and on the other hand many site or regionally specific typologies. A consequence is that for a number of sites the local or regional typologies had to be converted to a single standard in order to make comparison possible. Any such conversion inevitably involves data-loss and manipulation.

The typology used in this study is that which was devised for the Dorestad excavations by Van Es and Verwers (fig. 4.24).[113] The most common vessel type is the globular pot (fig. 4.25), which is identified as *Kugeltopf* in this research in order to avoid confusion with the wheel-turned globular pot type WIII. Less common among the Dorestad finds are frying pans, egg-shaped pots also known as Hessens-Schortens vessels (fig. 4.26), bowls and finally crucibles which are not discussed in this chapter. The *Kugeltöpfe* were divided further according to their rim morphology into three types, HIA, HIB and HIC. In addition, three handmade wares were defined, h1 which was mainly characterised by its grit-temper, h2 with shell-temper and h3 which has a mix of sand, mica, stone and/or shell.[114] Before and since the publication of the material from the Hoogstraat I excavation several other attempts at creating typologies for handmade vessels have been undertaken. To name a few examples, Van Es himself analysed the finds of Odoorn (2) and Roorda examined the ceramics of Gasselte (4) in a thesis, and the numerous finds from Kerk-Avezaath-Stenen Kamer (521) were employed to create a typology which has been used at several other sites. More recently there have

112 Van Heeringen 1995, 154; Arts/Siemons in prep.
113 Van Es/Verwers 1980, 112-124.
114 Van Es/ Verwers 1980, 59.

been several masters theses on the handmade ceramics from sites in the northern Netherlands.[115] However the only study relevant to our research area that has taken a broad view of medieval handmade ceramics both in time and space was conducted by Arno Verhoeven.[116] Although some amendments have been suggested for specific areas it represents the most complete overview of developments in handmade ceramics during the Middle Ages in our research area and is used as the main source for the brief description given below.[117]

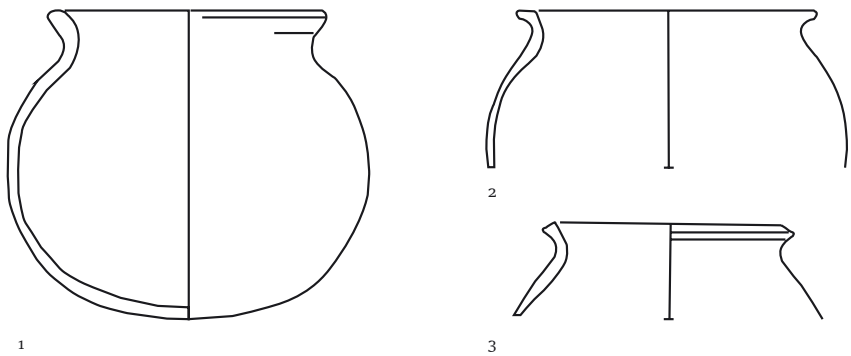


Fig. 4.24 Examples of types HIA (1), HIB (2) and HIC (3), (Van Es/Verwers 1980, 114, fig 61.1; 116, fig. 65.3; 118, fig. 66.2), 1:4.



Fig. 4.25 Examples of Kugeltöpfe (source: Open Data Provinciaal Depot voor Archeologie Noord-Holland, inventory number 9532-01 (left), 10071-01 (right))

115 Boon 2011; Samson 2011; Wennink 2010.
116 Verhoeven 1998.
117 For example Schotten 2012, 132-139.



Fig. 4.26 Examples of Hessens-Schortens type vessels (source: Open Data Provinciaal Depot voor Archeologie Noord-Holland, inventory number 9979-01 (left), 10068-03 (right)).

Verhoeven divided the area in which *Kugeltöpfe* were part of ceramic assemblages in to eleven different regions of which five partly lie in our research area (fig. 4.27). The first, covering most of the coast of the Netherlands, northwest Germany and western Denmark, has traditionally been considered the area where the *Kugeltopf* originated. In our research area this comprises region 1, region 5, region 6 and most of region 7. Verhoeven's region III more or less covers our regions 2, 3 and 4, but also a large area in Germany. What is region 8 in this study is part of Verhoeven's region X, which continues into the northern part of Belgium. A small, but not unimportant section of region 6 falls within Verhoeven's region XI which encompasses a limited zone on both sides of the Rhine, roughly down to Koblenz. Finally the southernmost part of region 7, known as Zeeuws-Vlaanderen is part of region IX. As we have no sites in this area it is not directly of interest here.

With regard to his region I Verhoeven argues that it was not as uniform an area during the Early Middle Ages as has sometimes been thought. For example, while shell-tempered ware is one constituent of the ceramic assemblage at many sites in the region, at sites in Niedersaksen shell-temper is present in practically all the handmade ceramics. This variability within the region appears to carry through to the dating of the introduction of *Kugeltöpfe*. Based on the evidence from Dorestad, Uitgeest (161) and The Hague, Verhoeven contends that the earliest *Kugeltöpfe* in the Dutch coastal zone may well date to the first half of the eighth century.[118] They replaced vessels known as Hessens-Schortens-type, named after two cemeteries in Ost-Friesland, the finds from which formed the basis for the definition of the type. The transition from Hessens-Schortens to *Kugeltopf* appears generally to have been relatively swift in this region. Evidence from sites in northern Germany however points to a later introduction of the *Kugeltopf* and a longer period in which Hessens-Schortens and *Kugeltopf* vessels co-existed.

As for region III, there are clear differences in the composition of assemblages between it and region I. First there are more Hessens-Schortens vessels and bowls in region III which in parts of the region remained in use well into the ninth century.[119] The contemporaneous occurrence of vessels with a lenticular or flat base and globular shaped pots into the ninth century has been observed at several sites in the area of the Netherlands to the east of the IJssel-river in the past decades.[120]

118 Verhoeven 1998, 32-34.
119 Verhoeven 1998, 39.
120 For example at Warnsveld (532).

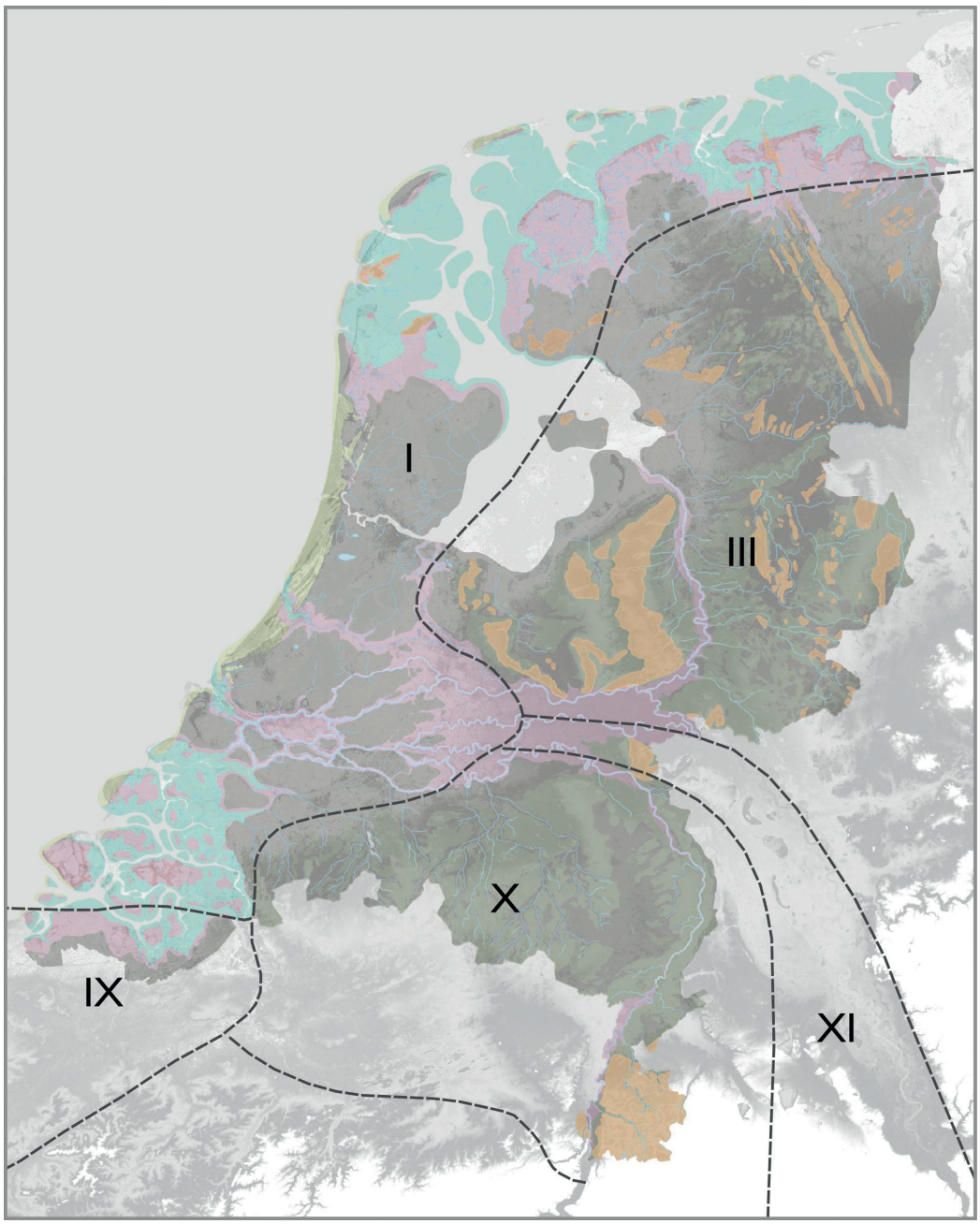


Fig. 4.27 Kugeltopf regions defined by Verhoeven relevant to the research area (after Verhoeven 1998, 30, afb. 4).

For the purposes of this research it is important to stress a few key similarities and differences between regions in the developments regarding handmade pottery. First, although the character, timing and longevity of developments in Verhoeven's regions I and III differed, the technological development of the ceramics was broadly similar. They were certainly more similar to each other than the handmade

121 Verhoeven 1993, 72-76; Verhoeven 1998, 47-48.
122 Schotten 2012; De Koning 2009.

products in use in region X. Secondly, the difference in the pace of change from handmade ceramics with lenticular and flat bases to those with a fully globular body between regions I and III is marked. In the parts of region I which fall within our research area the transition appears to have taken place relatively quickly while in region III the two co-existed for quite some time.[123] On the other hand, region X and XI do not appear to have had a significant tradition of handmade ceramics before the ninth or even tenth century and are not considered to be part of the core area of the development of the *Kugeltopf*. Thirdly, handmade ceramics in our period were for the most part a local product with a limited distribution, produced at the household level. A portion of the shell-tempered ware may form an exception as might the handmade ceramics in parts of region X.[124] Specific decorations on some *Kugeltöpfe* found at different sites also suggest a degree of regional distribution.[125] As a final remark it must be emphasised that although handmade wares have been presented here rather unproblematically, certainly compared to wheel-thrown wares, this is more a reflection of the role they will play in the following analyses than the actual complexity of developments in medieval handmade wares. Verhoeven points out that the frequent use of the Dorestad typology probably obscures the fact that there was much more regional variation then it now seems.

4.7 Analysis of the finds

Ceramics form the largest groups of finds recovered from sites in the research area. In total 104455 sherds from rural sites were recorded, 101452 that actually date to our period.[126] Table 4.3 shows that in some regions the number of sherds and in particular rim-sherds is limited. Therefore region 2 cannot realistically be compared to other regions when it comes to wheel-turned pottery. The finds from region 7 are so limited it cannot be easily compared on any count with other areas. At the opposite end of the scale sites in regions 5 and 6 contain far more sherds than other regions. Some of the reasons for the differences in volume of sherds between regions can be explained by the effects of formation processes and research methods that were discussed in chapter 3. As will become apparent, in some cases this makes it difficult to interpret variation between regions.

Region	Handmade sherds	Handmade rims	Wheel-turned sherds	Wheel-turned rims
1	12629	1308	2915	561
2	9314	1274	17	1
3	5953	531	507	29
4	8243	903	2333	59
5	20558	2220	15569	2261
6	3076	417	12360	907
7	122	10	301	38
8	2456	165	5099	303
Total	**62351**	**6828**	**39101**	**4159**

Table 4.3 Total number of sherds and rim-sherds per region.

123 Verhoeven sees a general trend moving from west to east whereby *Kugeltöpfe* are progressively introduced later and co-exists with a wider selection of handmade vessel types, Verhoeven 1998, 251.
124 Verhoeven 1998, 17-20, 30-31, 259-261.
125 Verhoeven 2008, 313.
126 The remainder are sherds of other periods that were found in structures dated to the Carolingian period.

The evidence for dating and provenancing ceramics of our period gleaned from existing literature does not always permit drawing definitive conclusions. Although the provenance of most of the wares in the dataset can be traced with reasonable confidence the same cannot be said for their chronology. Key questions are in what period and how quickly ceramics in a Merovingian tradition were replaced by those in a Carolingian tradition. As the ceramics of the middle Meuse valley illustrate, some of the characteristic developments in this transition such as the replacement of flat bases by lenticular bases could in fact occur well into the ninth century in certain regions, much later than in the Rhineland. Another important question is when the 'classic' Badorf vessels WI, WIIx and WIIy were first introduced on sites in the research area? Therefore, before moving on to the analysis of vessel types and fabrics at a regional level, it will be examined what can be learned from the collected data about the chronology of ceramics of our period. In the following section fabrics have been summarised and abbreviated according to Table 4.4.

Abbreviation Category	(Dorestad) fabric	Provenance
BAD (Badorf)	w1,w2	Vorgebirge
RBA (reliefband amphora)	mainly w1, w2	Vorgebirge
MAY (Mayen)	w6, w9, w12	Mayen
WALB (Walberberg)	w3, w4, w8	Vorgebirge
W13	w13	Meuse-valley?
W14	w14	Meuse-valley
LBAD (late-Badorf)	w10, Badorf/Pingsdorf	Vorgebirge
KUG (Kugeltopf)	h1, h2, h3, other	Local/regional/supra-regional
HS (Hessens-Schortens)	h1, h2, h3, other	Local
CR (Carolingian regional)	Carolingian regional wheel-turned	Regional
W11	w11	?
TAT (Tating)	w15	?
CSM (Carolingian smoothwalled)	w16	Mayen
W17	w17	Mayen
WALR (Walsum rough-walled)	w20	?
WALG (Walsum smooth-walled)	w21	?
CW (Carolingian wheel-turned)	Carolingian wheel-turned, not specified further	?
RHI (Rhineland)	Rhineland ceramics, not specified further	Rhineland
EMH (early medieval handmade)	Early medieval handmade ceramics, not specified further	Local

Table 4.4 Dorestad fabrics as they have been summarised under fabric categories.

4.7.1 Dating evidence from sites

There are several methods available that can help refine the chronologies derived from production sites and cemeteries that were discussed in the previous section. One method is to look at the aggregate assemblage of structures that can be dated before or after a certain time. In addition, there are some specific assemblages that, although they cannot be dated accurately do seem to span a limited period of time and therefore provide information on the kind of vessels and wares that were in use simultaneously. Another possibility is to examine the assemblages of individual

structures that have been dated within a narrow timeframe on the basis of absolute dates or which can convincingly be assigned a *terminus ante quem* or *terminus post quem*. More or less the same can be done with the entire assemblage of select sites.

The quality of the data does not allow a fine grained analysis of dated structures in narrow timeslots. Therefore only the relative proportion of wheel-turned fabrics and types for the total of structures dated either before or after 800 have been compared (table 4.5). Categories which are not very informative such as RHI or CW were excluded from the comparison. The main conclusion regarding fabrics are that the period after 800 contains a higher proportion of Badorf than before and that the proportions of supposedly early wares W13, W14 and WALB drop noticeably. The percentage of MAY also falls somewhat.

If the same comparison is made for wheel-turned vessel types and they are reduced to their basic shapes without specific rim types there are some fairly dramatic changes before and after 800 (table 4.6). Types WI and WIIx and WIIy are the only three to show strong increases while types WIII, WV, WIX, WX and WXIV all witness considerable decline. However, globular pots remain among the most common vessel types. For other types increases or decreases are not so prominent. The structures (buildings, wells etc.) themselves will have been dated partially on the grounds of the ceramic evidence so it is to be expected that general ideas about the chronology of wares and types are confirmed. At the same time, dating methods such as building typochronologies and dendrochronological dates will also have played a role. Therefore, if the dating of vessels differed considerably from that of the dates assigned to structures based on building typology or scientific dating methods, it would presumably have led to less clear figures. Nonetheless, this method is not suitable for providing more refined dates for the introduction of vessel types on rural sites in our research area. In the following we will examine some of the other options in relation to specific sites.

Category	<800	>800
BAD	31.4%	43.4%
KGL	1.2%	-
LBAD	7.3%	11.9%
MAY	19.5%	13.8%
RBA	4.7%	16.3%
TAT	0.3%	3.3%
W13	18.3%	5.3%
W14	6.4%	2.1%
WALB	9.6%	4.0%
WALG	0.3%	-
WALR	1.2%	-
Total	**100.0%**	**100.0%**

Table 4.5 Proportion of each fabric in features and structures dated up to 800 compared to those dated after 800.

Type	<800	>800
WI	4.1%	16.3%
WI/II	-	1.0%
WIII	39.5%	25.7%
WIIx	1.8%	28.3%
WIIy	6.5%	12.5%
WIIz	-	0.2%
WIV	2.3%	1.6%
WIX	6.5%	1.4%
WV	16.5%	5.3%
WVI	4.4%	2.0%
WVII	1.0%	0.3%
WVIII	0.3%	3.1%
WX	4.9%	1.0%
WXI	0.8%	0.1%
WXII	-	0.4%
WXIVa	8.0%	0.5%
WXIVb	0.3%	-
WXIVbi	0.3%	-
WXIVglob	1.8%	0.3%
WXIVj	0.5%	0.1%
WXIVx	0.5%	-
Total	**100.0%**	**100.0%**

Table 4.6 Proportion of each type in features and structures dated up to 800 compared to those dated after 800.

Evidence from specific sites

The following paragraphs examine a number of sites in the research area which can provide clues for developments in the kinds of vessels that would have been available on rural settlements throughout our period. Individually these sites can only offer a tentative indication for these developments, but it is hoped that by combining the evidence a reasonably coherent picture can be provided. Most of the sites discussed below either ceased to exist or were founded during the period under investigation. This should give some indications of the kind of pottery available up to, but certainly not after a certain point and vice versa. It may also show which vessels and fabrics were (partially) contemporary and which were certainly not. Ideally it would also be possible to gain a sense of the pace at which wares or types succeeded each other, but this will prove to be difficult.

In theory contexts such as dendrochronologically dated wells would seem to be ideal for answering questions regarding the chronology of ceramics. However, there are several issues that often make it impossible to draw firm conclusions from the contents of such features. Dendrochronology in the best case scenario provides an accurate date for the felling of the tree in question. For elements such as hollowed out tree trunks used in the construction of wells the assumption is that generally there will not have been a great deal of time between felling and final use. However, cases are known where such trunks have been re-used in other wells.[127] Furthermore, sherds discovered in the fill of the well shaft will (partly) have accumulated throughout the period of the well's primary function. In addition, the shaft may contain settlement refuse which entered the well when it was abandoned. In the latter case the sherds might even pre-date the construction of the well, or represent the site assemblage for a time after being abandoned if it was used as refuse dump. The only archaeological

127 Constructions in which barrels were incorporated pose an additional set of problems that will be discussed below.

element of dendrochronologically dated wells which can provide a reasonably reliable *terminus ante quem* is the fill of the pit dug for the construction of the well. Any finds contained in it must have been present at the site before the well was constructed. The problem is that the fill of construction pits is rarely find-rich. For these reasons finds from individual dendrochronologically dated structures play a limited role in the following section. However, in some cases they can be useful in relation to the total assemblage of sites.

Period	Total	Rim	Body	Base	MNI	%Rim	%Total
ROM	33	3	25	5	2	0	0.1
Late ROM	1	1	0	0	1	0	0
450-600	1	1	0	0	1	0	0
625-675	78	18	52	8	16	1	0.2
650/75-750	475	107	342	26	66	2	1.5
725-900	26258	2411	22469	1379	2233	85	80.7
850-950	1304	133	1160	11	84	3	4
900-1050	1924	175	1674	75	117	4	6
1050-1250	1971	196	1676	98	130	5	6.1
1250-1500	4	2	1	1	1	0	0
1500-	469	38	416	15	12	0	1.4
Total	**32518**	**3085**	**27815**	**1618**	**2663**	**100**	**100**

Table 4.7 Number of sherds per period and proportion of sherds as percentage of total. MNI indicates the minimum number of individuals per period. %Rim shows the percentage of rims per period. After De Koning 2012, 118.

In 2007 and 2008 one of the remaining unexcavated parts of Dorestad was investigated.[128] The site **Wijk bij Duurstede-Veilingterrein** (187) produced 36641 ceramic sherds, the vast majority of which was dated to the Carolingian period (table 4.7).[129] The period 725-900 is represented by wheel-turned types WI, WI/II, WII, WIIIA/B, WIV and WVIII. The earlier period 675-750 comprises types WIIIC/D, WV, WVI, WVII, WIX, WX and WXIV.

During the examination of the pottery finds an attempt was made to test existing ideas on the dating of types and wares in the Dorestad chronology by studying the assemblages of closed contexts. One of the conclusions was that type WV occurred more consistently with other early types than WVI.[130] This was interpreted to imply that WV and WVI may have been introduced more or less at the same time, but while the former was no longer manufactured by the middle of the eighth century, the latter remained in production for some time after. A similar comparison for types WVII and WVIII showed they were correlated more strongly with younger than with older types.[131] The find associations of type WIX did not provide a clear link with other older types, in fact the type most commonly found alongside it was WII. In addition the evidence did not allow for a chronological distinction to be made between types WXIVD and WIX. The first is supposed to be the predecessor of the second type.[132] Other vessel types that fall under WXIV and type WX did not show a clear tendency toward an earlier or later group of types either. This is probably in part due to the intensity of occupation on the site, exemplified by the high density of features.[133]

128 Dijkstra 2012.
129 De Koning 2012, 117-235.
130 De Koning 2012, 167-168.
131 De Koning 2012, 171-173.
132 Van Es/Verwers 2009, 151.
133 De Koning 2012, 179.

The frequency of types per habitation phase and per yard was also employed as a means to determine whether they tended to be earlier or later.[134] Supposedly early types were almost exclusively associated with the first three phases of occupation dated between 650 and 850. In addition the percentage that did not contain younger types declined strongly between phases 1 and 2. These analyses provide further evidence for tendencies in the development of ceramics from the late seventh to late ninth century, but they are not very detailed. In addition, the dating of phases and yards was largely dependent on ceramics so it is not unusual that the dating of types should broadly agree, a point conceded by the author.

Category	-750	% -750	750-800	% 750-800	800-850	% 800-850
BAD	21	44%	18	29%	9	69%
KP	4	8%	3	5%	3	23%
LBAD	1	2%	-	-	-	-
MAY	4	8%	18	29%	-	-
TAT	1	2%	-	-	-	-
W13	7	15%	9	14%	-	-
W14	4	8%	6	10%	-	-
WALB	5	10%	4	6%	-	-
WALG	1	2%	-	-	-	-
RBA	-	-	4	6%	1	8%
CW	-	-	1	2%	-	-
Total	**48**	**100%**	**63**	**100**	**13**	**100%**

Table 4.8 Number and percentage of sherds per ware in wells dendrochronologically dated up to 750, 800 and 850 at Wijk bij Duurstede-Veilingterrein and De Heul.

The Veilingterrein and **Wijk bij Duurstede-De Heul** (528) excavations uncovered a large number of dendrochronologically dated wells. Most did not contain very many sherds (table 4.8), but it is not just the limited amount of pottery that makes the use of finds from the dendrochronologically dated wells problematic. The wells at Wijk bij Duurstede were mostly constructed of dug in barrels and it has been shown that the dates of individual staves from a single barrel can vary considerably.[135] This is at least in part related to the fact that each stave only represents a selection of the tree rings present in the tree from which it was manufactured. If no sapwood is present on samples from a barrel it is impossible to determine how much time elapsed between the growth of the section of tree from which the youngest dated stave was cut and the actual felling of the tree. Although for both sites a large amount of staves per barrel was dated, this still left a considerable number of wells with a small sample. But even when a large sample is available, without sapwood the dates only provide a rough *terminus post quem*, including for the finds from the construction pit fill. A further complicating factor is that barrels may have been in use as a container for some time before ending up as part of the construction of a well.

134 De Koning 2012, 218-224.
135 Jansma/Van Lanen 2015, 110.

TPQ date	Category	Type	TPQ date	Category	Type
685	BAD	W IIB	756	WALB	W IIIA
	BAD	W IIIA	758	MAY	W IIIA
691	W13	W VB	759	BAD	-
702	W14	W VI		KD	-
	WALB	W IIID		MAY	-
	WALB	W XIVC		MAY	W IIIA
715	BAD	W IIIC		RBA	-
718	BAD	-		W13	-
	W13	-		W13	W VA
	WALB	W XIVB		W14	-
724	W13	W VA		W14	W XI
726	BAD	W IID	763	BAD	-
729	MAY	W IIIB		BAD	W XIVA
	WALB	W IIIA		MAY	-
730	MAY	W IIIA		W14	-
731	BAD	-		WALB	-
737	BAD	W IVB	768	BAD	W IIIC
	W13	W VA	776	BAD	-
741	BAD	-		BAD	W IIIA
	LBAD	W IIID		RBA	-
742	BAD	W IIB		W13	-
	BAD	W IID	794	BAD	W IIIA
	BAD	W IIID		RBA	W I A
	BAD	W IVC		WALB	W XIVC
	BAD	W IXA	799	BAD	W IID
	MAY	W IIIA		MAY	W IIIA
	WALB	W XIVB		W14	W VI
	WALG	W XIVG	818	RBA	W I A
749	BAD	-	837	BAD	W I/II A
	BAD	W IIB		BAD	W I/II
	BAD	W IIC		BAD	W IIB
	MAY	W IIIB		BAD	W XIVB
	TAT	W VIII			
	W13	-			
	W14	-			

Table 4.9 Wheel-turned wares and types found in dendrochronologically dated wells from De Heul and Veilingterrein excavations.

A further issue is that the nature of the publication of the De Heul site is such that we do not know from which layers within the wells the finds were recovered. Apparently most were discovered in the fill of the shaft rather than in the construction pit fill, but that could still mean the finds were recovered from a secondary fill which formed some time after the initial abandonment of the well.[136] These two factors make it problematic to use the dated wells of Wijk bij Duurstede for pinning down dates for specific fabrics or vessel types. The earliest dated well from the De Heul site provided a dendrochronologically derived *terminus post quem* date of 685 AD and contained rim sherds of a WIIB and a WIIIA vessel. Everything discussed in previous sections and the following suggests this

136 Verwers/Botman 1999, 244-250.

is far too early a date for these rim types, particularly for the WIIB rim-sherd. A similar case was encountered during the Veilingterrein excavation where a well was dated after 687 AD but contained a sherd conventionally dated to the last quarter of the ninth century. If we are to reject these two examples for refining the dating of ceramics, we must also do so for the other wells with a barrel construction. The evidence from the wells can however be compared with existing chronologies in order to establish to what extent they comply with each other.

Table 4.9 demonstrates that globular pots in the earliest dated wells almost always either are of type WIIIA and B in MAY and WALB fabric or type WIIIC and D in BAD fabric. The first BAD example of WIIIA was discovered in a well dated after 794. The finds suggest globular pots in all these wares were likely present on the site by the middle of the eighth century. Unfortunately it cannot be ruled out that the types were introduced later in the last quarter of the eighth century as Keller and Grunwald believe was the case. The fact that globular pots in BAD fabric first seem to be manufactured with rim types C and D does agree with Van Es and Verwers observations. However, instead of being precursors of rim types A and B they appear to have been contemporary. The evidence from wells also suggests types WIIB, C and D might have been present during the eighth century. This also challenges the typo-chronology based on the production sites, but cannot be considered definitive proof.

The site **Oegstgeest-Rijnfront** in region 5 has been excavated in several stages, the main sections of which have not yet been published fully. What is interesting about this site is that the dendrochronological dates obtained up till now all indicate habitation ceased before the start of the eighth century.[137] Comparison of a selection of the pottery from the excavations carried out by the University Leiden with material from production sites in the Vorgebirge suggests that part of the Oegstgeest material could have originated from the same sites as Waldorf and Walberberg finds. This would confirm that Vorgebirge products were being used on sites near the mouth of the Rhine in the seventh century. More detailed analysis is necessary to determine whether the initial introduction of these products in this area can be narrowed down further and what proportion of the total assemblage they comprise.

At another site near the mouth of the Rhine, **Katwijk-Zanderij** (197) (fig. 4.23 and 4.28), the youngest settlement traces have been dated up to the first quarter of the ninth century at the latest but the peak in habitation lay between the second half of the sixth and the end of the seventh century.[138] This is reflected in the pottery, of which between 79 and 88 % is dated to the Merovingian period and 6-16% considered Carolingian.[139] Habitation was spread out over a wide area and uncovered during several excavations spanning more than a decade. The finds of several sceats, coins of Pippin the Short and Charlemagne, an isolated wooden post, dated 761 +-10 AD and in particular a wooden plank from a ship which was reused in a well and dated 798 +-8 AD all imply that habitation was present in some of the excavated areas in the eighth and possibly even early ninth century. It may also be significant that despite the relatively large number of coins recovered during the excavations (77 in total) no coins of Louis the Pious, struck between 814 and 840, were identified, even though this is generally the most commonly found Carolingian issue in our research area. A similar picture emerges from the brooches (for the coin and brooch evidence see chapter 5).

137 Doeve 2015, 80-81.
138 Dijkstra 2011b, 145-147; Van der Velde 2011b, 51.
139 Dijkstra 2011a, 60. The percentage range is related to different campaigns in 2005 and 2008.

The first excavations to be studied in some detail were conducted in 1996/1997 and produced almost exclusively pottery in a Merovingian tradition.[140] Three sherds of MAY and WALB made up the Carolingian component of the assemblage among which were a rim sherd of a globular pot type WIIIA and a jar type WIXA. Aside from these sherds the ceramics pointed to two phases of activity at the site, one in the late fifth and sixth century and the other in the sixth and seventh centuries.

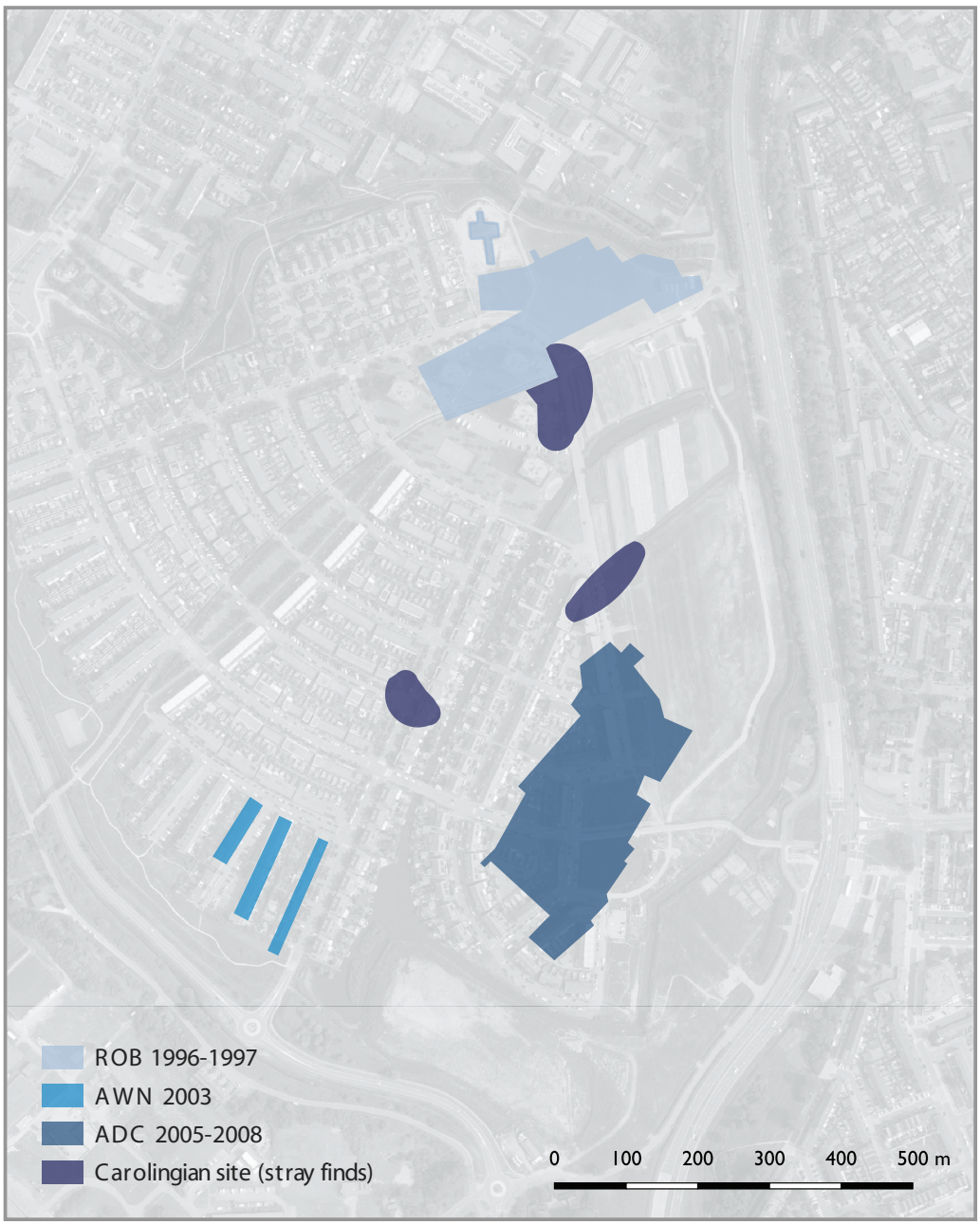


Fig. 4.28 Overview of sites Katwijk-Zanderij (after Dijkstra 2011b, 146, fig. 4.19).

140 Dijkstra/Van der Velde 2008, 277.

Excavation in 2005 yielded a few rim sherds belonging to a large jug with two or three handles which can be compared with amphora types Kru-2.1, 2.21 and 2.22 from Siegmund's Lower Rhine cemetery typology. Apparently the fabric was neither BAD nor MAY. The sherds produced in a BAD, MAY or WALB fabric only comprised one rim fragment belonging to a WXD type bowl in a BAD fabric.

Amongst the 2008 material most of the rim sherds belong to type WIII and 'early' types, WV, WVI, WIX and WX. Although the number of rim sherds was limited there was a distinct lack of WII[141] vessels. The WIIIA and B types were made in MAY fabric, an example of WIIID was produced in a BAD fabric. Handmade pottery was rare in the total assemblage with only a handful of sherds having been discovered, both in Merovingian and Carolingian tradition. Two rim fragments were ascribed to type HIA, one to type HIC.

Finally findspot 4-11 was not excavated but comprises a location that was discovered during sand-winning in the 1930's. The collected sherds consist of a mixture of rims in a Merovingian and Carolingian tradition of which the latter group was slightly more prevalent (41% and 59% respectively). The majority of sherds in a Carolingian tradition belonged to types WIII and WIX (65%), but WI, WI/II, WIIx, WIIy, WIV, WV, WVI and WX were also present. Unfortunately nothing else is known about the context of the finds.

The dating of the site excavated in 2008, well into the eighth century and perhaps the beginning of the ninth, appears to fit Keller's chronology better than the Dorestad chronology. This is apparent from the almost complete lack of WII type rim sherds. Even at findspot 4-11 the types WI, WI/II, WII and WIV encompassed just 14% of the total number of sherds attributable to the Dorestad typology, 8% of the total assemblage. The absolute dates, coins, brooches and abundance of Merovingian vessel types suggest the area was not inhabited far into the ninth century. On the one hand this indicates WI, WII and WIV vessels were not yet the dominant types in the eighth century, if they were present at all. On the other hand the site's overall chronology implies that these types were present not long after the start of the ninth century at the latest. Another observation is the fact that at several locations types WIII and WIX were discovered amongst assemblages that were otherwise dominated by ceramics in a Merovingian tradition. There appears to have been some overlap between the two traditions where these types are concerned.

The **Bloemendaal-Groot Olmen** site (212) (fig. 4.29) in the north of region 5 is actually an outstretched area in the dunes along the Dutch coast where several sites from various periods in the Early Middle Ages were discovered. The sites often manifested themselves first as surface finds which had been blown free.[142] Sometimes habitation layers were also visible at surface level. Excavations at a number of these sites showed that older layers were occasionally present below the surface level, providing stratigraphically separated habitation layers. Probably from the tenth century onward traces of occupation were covered by the formation of the younger dunes along the Dutch coast. The combination of these aspects meant that a series of relatively undisturbed contexts with slightly different periods of habitation could be investigated. However at several sites it was deemed likely that younger occupation had been eroded in the past.

Site 1 consisted of finds from features as well as surface finds, the latter consisting mainly of sherds which could be situated in the sixth to late seventh and early eighth centuries.[143] The pottery belonging to the youngest phase was recorded using Keller's typochronology and an unpublished study of the finds of Wijnaldum (18). Though some of the rims resembled examples belonging to Keller's Phase B, it was deemed unlikely that the assemblage actually dated to the end of the eighth

141 One example of WIIB was present.
142 De Koning 2015b.
143 De Koning 2015b, 245-248.

century. The overall composition pointed more to the late seventh and first half of the eighth century, particularly because 'classic' Carolingian Vorgebirge and Mayen vessels were completely absent. The Rhenish fabrics present were either WALB or MAY, in other words no BAD. Among the rim types were examples of WIX and WIIIC of the Dorestad typology.

Site 2, 3, 6 and 7 contained a comparable assemblage, though here a few BAD sherds were also recovered as well as WIIIA and WX rim types. At site 3 an assemblage discovered in a cultivation layer consisted of handmade HS pots and WIX type wheel-turned vessels. Sites 4 and 5 yielded small amounts of pottery in a Carolingian tradition, and even less in a Merovingian tradition as surface finds.

Site 8 consisted entirely of material attributable to a Carolingian tradition. Here handmade pottery made up a much higher percentage of the total than on the previously discussed sites. The wheel-turned rim types mainly comprised globular pots with rim types A and B, but WII jars, WIIC pitchers and WIV pots were also present. Fabrics BAD, MAY and WALB were all among the finds but the first fabric was clearly most prevalent.

Sites 9 and 10 yielded sherds in both a Merovingian and Carolingian tradition. The Carolingian component consisted of WIII type vessels and *Kugeltöpfe* of types HIA and HIC. For that reason the sites were dated between the late seventh and ninth century, but one could question whether, with the lack of WII and WIV vessels in particular, the end date may not be earlier.

Finally site 14 provided another intriguing set of material from features and as surface finds. Here a small amount of sherds in a clearly Merovingian tradition were recovered but the bulk consisted of early types in the Dorestad typology and material belonging to a Carolingian tradition. However, although BAD fabrics were present, none of the 'classic' Badorf types such as WI and WII were discovered even after surveying the surrounding area after the excavation. The rim types that were discovered belonged to vessels which are known from the Walsum and Stockum cemeteries in the Lower Rhine area. Besides these 'early- Badorf' types the site also yielded sherds in W14 fabric and WVI type, WIII globular pots and fragments of type WIV. The globular pots were mainly produced with rim types B and C (though A was also present), and in fabrics BAD, WALB and MAY which all occurred in roughly equal measure. Among the handmade pottery *Kugeltöpfe* dominated, rim sherds were of types HIA and HIC.

levels of intensity of research at the various sites. In addition, the coast is a dynamic landscape and consecutive habitation phases may be separated stratigraphically, meaning younger phases of sites may have been eroded and older phases not excavated due to them lying below the groundwater table. However, the distinct nature of the assemblages at sites 1, 8 and 14, which all provided finds from features as well as surface finds, gives the impression that their composition does to a large degree represent chronologically separate horizons. Site 1 contains no finds attributable to a BAD fabric and the rim types are limited to WIX and WIIIC. Site 14 produced BAD fabrics but only in types WIX, WIV and WXIVB. All WIII vessels were manufactured either in WALB or MAY fabrics, just as at site 1. In addition *Kugeltopf* types HIA and HIC were present. At site 8 WALB made up only a small proportion of the total, BAD was dominant and WII types were present, while WIX and WXIV rims were not. Besides HIA and HIC, HIB was also represented at site 8. Furthermore, it is noteworthy that at each of the three sites the amount of sherds in a Merovingian tradition successively decreased, from the largest group at site 1, to a rather obscure group at site 14 and eventually complete absence at site 8.

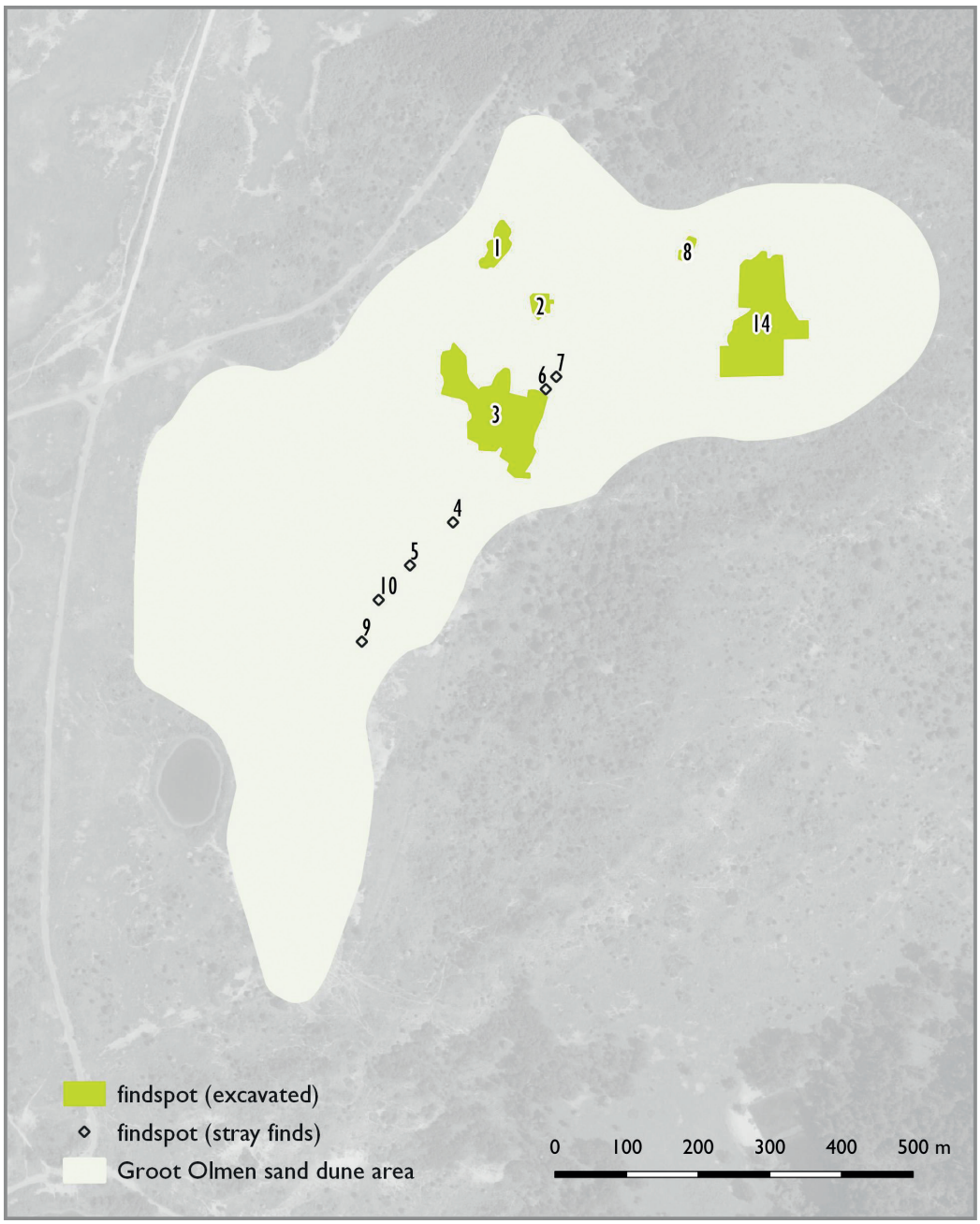


Fig. 4.29 Overview sites Bloemendaal-Groot Olmen (after De Koning 2015b, 22, afb. 2.4 and 26, afb. 2.6).

How can the differences between the groups of sites discussed above be explained? In theory the sites may have had different functions and therefore different assemblages. The author of the report also points to factors such as the different circumstances at the various sites, some consisting only of surface finds while others contained closed contexts.[144] The author also points to different Again,

144 De Koning 2015b, 289.

assuming these differences have chronological significance rather than being fully caused by other factors, the following developments can be sketched. Initially WALB and MAY fabrics and WIX and WIII(C) types were introduced and existed for a time alongside material in a Merovingian tradition. Later, while WIX and WIII vessels in WALB and MAY fabrics were still in circulation similar vessels in BAD fabrics were introduced and the use of handmade pottery increased while Merovingian fabrics declined. Ceramics in fabric W14 were also added to the corpus. Subsequently, WIX vessels were completely abandoned, while those in WALB fabrics declined. Vessels in BAD fabrics became more common and WII types were introduced. Handmade pottery also became more important while vessels in a Merovingian tradition were no longer part of assemblages and the use of pottery in W14 fabric had already ceased. From what we now know of the production of BAD fabrics based on excavations in Walberberg[145] it seems unlikely that the transition from an assemblage such as site 1 to site 14 would have taken very long. BAD fabrics were being produced in the late seventh or first half of the eighth century. As vessels in BAD fabrics were being manufactured in roughly the same area as WALB it seems reasonable to assume that once production started it would not take long for the products to be exchanged within the same networks. If this was the case the transition from a Merovingian tradition to a Carolingian (fabric) tradition could have taken place within a few decades in the first half of the eighth century.[146] However there is nothing on the sites to negate the possibility that the transition took place more towards the middle of the eighth century rather than the beginning. The period of time between the assemblages of site 14 and 8 is almost impossible to judge based on the archaeology of the sites alone. Site 14 provided evidence for successive rebuilding of houses on the same spot suggesting the site was not short lived. These buildings were dated roughly to a 50 year period somewhere between 725 and 800 AD, but a shorter period cannot be ruled out. Furthermore, the discovery of several buildings which typologically can be dated in the ninth century, but were poorly preserved may be an indication that a ninth century settlement was largely eroded.

Although the different sites of Groot Olmen provide compelling insights into the composition of pottery assemblages throughout the Early Middle Ages, the lack of independent dating methods means that they can only act as a guide. Sites 2, 3, 6 and 7 give an idea of developments towards the end of the Merovingian tradition. Site 9 and 10 provide a link between this tradition and Carolingian style pottery and site 8 shows what a site completely devoid of sherds in a Merovingian tradition may look like. However, with a lack of independent dating methods it is not possible to pinpoint when, or better over what period of time the transition took place.

An association between ceramics in a Merovingian tradition and globular pots from the Rhineland has been observed at several other sites. At **Beegden-Eerdweg 4** (67), a site along the Meuse in region 8, a small settlement (or successive phases of a single yard) with three main buildings and seven sunken huts was dated between the sixth century and first half of the eighth century.[147] The pottery consisted of fragments of vessels in a Merovingian tradition, globular pots of type WIIIA in BAD fabric and an example of type WVIA in W14 fabric.[148] In several cases sherds in a Merovingian and Carolingian tradition were discovered in the same features. The overall impression of the site and the ceramic assemblage suggests it is unlikely it was occupied for the entire eighth century. Roughly 60-70% of the total pottery assemblage (also including Iron Age,

145 Müssemeier/Schneider 2012.
146 The late seventh century is less likely in light of finds elsewhere, for example Oegstgeest (see above).
147 Dijkstra 2015a.
148 De Koning 2015a, 48-52.

Roman and Late Roman sherds) belonged to the sixth or seventh century and only about 10% could be assigned to Carolingian production. The amount of structures dated to the Early Middle Ages does not suggest a very long period of occupation and no evidence for continuation of habitation after the eighth century was discovered.

At a second site along the Meuse in region 8, **Beers-De Riet** (142), among other things a range of dendrochronologically dated wells was excavated. The site seems to have been inhabited continuously from the Merovingian period to the Central Middle Ages.[149] At least part of the settlement area was used both in the Merovingian and Carolingian period. Even so, the contents of wells show hardly any mixing of Merovingian and Carolingian sherds. Considering the relatively long habitation period more mixing might have been expected, but this only seems to occur in wells dated after 900. At the same time few wells contained more than a handful of sherds.

The site provides a reasonably accurate date for a relief-band amphora of which the clay strips were decorated with fingertip impressions. Two sherds which do not fit but are very similar and seem to have come from the same vessels were found several meters from each other in two wells. They had identical clay strips, were both relatively thin walled for a relief-band amphora and showed the same fabric characteristics. Both the wells in which they were discovered were dendrochronologically dated. The first sherd came from the core fill of a well dated 749 AD while the second sherd came from the fill of the construction pit of a well date after 798 AD. This makes it likely that the vessel involved was used somewhere in the second half of the eighth century. A rim sherd of WIIIA type in a BAD fabric was found in the construction pit of the same well dated 749 AD. Finally, a settlement area was discovered in a part of the site clearly removed from the main bulk of habitation. All but one sherd found here was manufactured in a Merovingian tradition. The single exception was a fragment in Mayen ME ware, most likely belonging to a WIII vessel.

A few sites in regions 3 and 8 offer dendrochronological dates that provide an opportunity to estimate the period in which the transition from ceramics in a Merovingian to those in a Carolingian tradition took place. First a site in the west of region 8, **Galder-Bollemeer** (55) contained a well that was dated to 757/758.[150] Unfortunately the description of ceramics in the report is quite poor but it is at least clear that no Merovingian material was present. This would imply that by the middle of the eighth century the transition from one tradition to another had been completed.

Slightly further east the earliest dendrochronological date for a well at the site **Berkel-Enschot-Enschotsebaan** (139) was 720/721 AD.[151] The site yielded six Merovingian sherds compared to 63 fragments of BAD, MAY and RBA. Only two rim fragments, belonging to examples of globular pots in MAY fabric, were recovered. Among the BAD sherds a few had roulette-stamp decoration. The site was probably continually inhabited from the eighth to the thirteenth century so it is impossible to say when vessels like WII may have been introduced. However, the finds could at least be interpreted to imply that by the second quarter of the eighth century ceramics in a Merovingian tradition were on their way out in the area.

Another site not far to the south of Berkel-Enschot provides evidence that this was almost certainly the case before the middle of the eighth century. Excavations at **Diessen-Vroonacker** (118) yielded five yards dated to the Early Middle Ages.[152] Three wells were associated with the early medieval occupation, two of which were dendrochronologically dated to 738 and 740 respectively. The ceramic assemblage contained no sherds in a Merovingian traditions. Two rim fragments of

149 Brouwer in prep.
150 Koopmanschap 2014.
151 Brouwer/Van Mousch 2015.
152 Van Benthem 2012.

type WIII were discovered in MAY fabric and two wall sherds in BAD fabric were decorated with roulette-stamp. One sherd belonging to a relief-band amphora was also among the finds as well as fragments believed to be regionally produced wheel-turned grey-ware.

Further to the east again **Oirschot-Gasthuisstraat** (203) contained two dendrochronologically dated wells, one dated 730 AD and the other between 773 and 802.[153] Once more, Merovingian ceramics were absent, but MAY and BAD were present. Among the rims, two belonged to WII jars in BAD fabric and three to globular pots in MAY fabric. In addition one fragment of relief-band amphora was recovered. BAD must have been present between 730 and 802 because a sherd in this fabric was discovered in the construction pit of the youngest well, which cut the older well.

Merovingian sites in this part of region 8 certainly do contain wheel-turned pottery, rather than being completely a-ceramic for a time. At **Hulsel-Kerkekkers** (107) the only extant well was dated dendrochronologically to 698 AD.[154] The pottery was mainly manufactured in a Merovingian tradition but a few BAD/WALB sherds were also recovered. One of these had a flat base.

At **Geldrop-Genoenhuis** (132) in the eastern half of region 8 a series of wells were dendrochronologically dated, the oldest to 606 ±6 and the youngest between 734 and 741AD. The tree used in the last of the wells dated to the seventh century was felled in 687 AD. The construction pit contained only sherds in a Merovingian tradition.[155] The fill of the shaft equally mainly consisted of Merovingian style ceramics but also contained two sherds which probably originated in the Vorgebirge. The wood from the next dated well (though not necessarily the next well to be dug) was felled between 734 and 741. The construction pit contained a fragment of BAD as did the shaft fill. The finds suggest Vorgebirge ceramics were introduced somewhere either at the end of the seventh or in the first third of the eighth century.

In region 3 the site **Zelhem-Soerlant III** (533) contained three wells that were all dendrochronologically dated. The oldest was dated between 767 and 783, the second between 789 and 801. The third well provided two dates, between 793 and 805 and between 801 and 813. The site yielded no sherds of wheel-turned vessels in a Merovingian tradition, but a findspot in the vicinity did, indicating Merovingian wheel-turned ceramics were available in the region.[156] Therefore the site assemblage suggests such ceramics had gone out of use by the second half of the eighth century.

The site **Colmschate-Het Sworminck** (30) consisted of a single yard with a main building and one well of which the wood was dated to 750/751 AD. Unfortunately the finds from the site have not been published in detail but the only ceramics mentioned are HS and BAD. Wheel-turned Merovingian style ceramics were available in this area because an excavation close by yielded just that.[157]

None of these sites can inform us about the introduction of types belonging to Keller's phase D, WII type jars and pitchers. The number of diagnostic sherds on rural sites is usually limited, so the absence of a type probably has more to do with chance than the composition of past ceramic assemblages. Furthermore wall sherds without decoration, that have to be dated more broadly on fabric would quickly muddy the waters. But if we accept that these sites with dendrochronologically dated wells were not a-ceramic it seems highly likely WIII type globular pots were present on sites in region 8 before the middle of the eighth century. The transition from a Merovingian to a Carolingian pottery tradition may have taken place in the first few decades of the eighth century considering

153 Kooi 2012.
154 De Leeuwe 2008.
155 Unpublished research by author.
156 Kenemans/Van der Velde 2002, 69-73.
157 Groenewoudt 1987.

the restricted number of instances of mixing of the two in wells, and the finds from dated wells at Beers, Berkel-Enschot, Diessen, Hulsel and Geldrop. The finds in region 3 demonstrate that the transition had taken place there by at least the second half of the eighth century, but it could have happened earlier. An association of Merovingian pottery and WIII globular pots has been identified at several sites, not only in region 8 but also on sites in region 5.

The ceramics of **Wijnaldum** (18) in region 1 have not been published fully and the characteristics of the ceramic assemblage have to be gleaned from brief remarks and percentages. Nonetheless, these are quite informative as the material was divided into phases based on a detailed analysis of the ceramics and the stratigraphy of the site. Among the main developments between 550 and 900 AD are the steep decline in the percentage of wheel-thrown ceramics in favour of handmade pottery from the period 550-650 to 650-750.[158] The wheel-thrown percentage drops from 63.7% to just 1.2%.[159] When this happened exactly is difficult to pin down, but it was certainly before the middle of the eighth century, perhaps before the start of the century. Two other important developments occurred during this time, namely the introduction of WIX vessels in BAD fabric and what are considered rough-walled predecessors of type WIII. It also witnessed the transition from HS to KUG which is set more towards the beginning than the middle of the eighth century.[160]

The period 750-850 saw the introduction of globular pots in a clearly Carolingian tradition and WII vessels in BAD fabric. Their appearance is actually dated more precisely between 750 and 775 on the grounds that they were introduced after sceattas went out of use but before the adoption of shell-tempered handmade *Kugeltöpfe*.[161] Although the percentage of wheel-thrown pottery increased slightly in the period 750-850 it was still much lower than in the second half of the sixth and first half of the seventh century. Finally the most notable development in the second half of the ninth century was the introduction of Pingsdorf and Hunneschans pottery.

Excavations within the ringfort of **Oost-Souburg** (163) revealed traces of settlement which in theory could have started at any time in the ninth century, but a late ninth century origin seems most likely.[162] The ceramic assemblage certainly differs from other sites of our period. Apart from examples of relief-band amphoras that have 'late' characteristics, hardly any pottery in BAD fabric was discovered. The rims of vessels produced in BAD fabric found at Oost-Souburg are not present among the Dorestad types or in Keller's typology. The combination of roulette-stamp decoration and applied clay strips is reminiscent of type WI/II but that is where the similarities end. Some Hunneschans pottery was present but Pingsdorf type pottery clearly formed the bulk of the wheel-turned ceramics. Oost-Souburg gives an impression of what assemblages looked like at the very end of our period, devoid of MAY and with the exception of type WI, WXII and HI no vessels that fit the Dorestad typology.

Another site where habitation started at the end of the ninth century is **Spijkenisse-Hartel West** (221). The combined carbon dates of posts belonging to the first building on the site produced a date of 870 AD.[163] The ceramics associated with the location of the oldest building mainly consisted of Pingsdorf and post-Carolingian *Kugeltöpfe*, but BAD and MAY as well as grit- and shell-tempered *Kugeltöpfe* were also present. The remainder of the site yielded single sherds of

158 Gerrets/De Koning 1999, 97-98.
159 The percentage wheel-thrown in the period 550-650 may actually have been higher (Gerrets/De Koning 1999, 97).
160 Gerrets/De Koning 1999, 97 and note 17.
161 Gerrets/De Koning 1999, 121, note 19.
162 Van Heeringen 1995, 36-39.
163 Bult 2009, 92.

both WALB and W14, as well as Hunneschans. In terms of types, globular pots were present in both BAD and MAY fabrics as well as WII jars and pitchers and a WIV type pot. The presence of Duisburg pottery, considered characteristic for the tenth century, implies that the location of building 1 was inhabited into the tenth century. This makes it impossible to accurately determine what the relative proportions of wares was in the late ninth century. Overall the Carolingian wares comprise only a small proportion of the ceramic assemblage on the site. BAD, WALB and MAY amount to 75 sherds in total while the number of Pingsdorf fragments was 4508 and even Duisburg was far better represented with 264 fragments.

Finds from **Deventer** (57), often considered a successor to Dorestad with a similar focus on exchange, were already mentioned in relation to the dating of Keller's phase E. Excavations at Smedenstraat 38-44 revealed remains of the ninth century moat and rampart that enclosed the medieval town as well as evidence for the Viking attack on Deventer in 882 AD.[164] Features belonging to the settlement prior to the attack were also discovered. These consisted of ditches, postholes and pits. A few features, such as a possible sunken hut must have been in use at the time of the attack as they were filled with earth dense with ash, and they were covered by the subsequently erected rampart. The rampart was also found at several other locations among which Noordenbergschild and Molenstraat 55. The first of these two excavations yielded features lying beneath a layer of sand containing traces of a fire with the rampart erected above it. Hunneschans pottery was not present in traces pre-dating the destruction layer or the layer itself at the Smedenstraat, though apparently a sherd with a combination of roulette-stamp and paint decoration was discovered at Noordenbergschild.[165] It was believed to be a predecessor of real Hunneschans pottery. What makes the interpretation regarding Hunneschans slightly problematic is that Hunneschans sherds are never particularly abundant in assemblages. Nonetheless, their complete absence at several locations containing the destruction layer in Deventer, and in similar contexts in Zutphen is noteworthy. In the features lying beneath the destruction layer KUG was most common while Vorgebirge wares dominated the wheel-turned assemblage.[166] These were assigned to Walberberg production and can partially be equated to Dorestad fabric w10. Softer fired BAD fabric w1 was apparently absent and MAY made up only a small proportion of the sherds. Globular pots were still present in Vorgebirge and Mayen wares while Pingsdorf pottery was not yet among the finds. The picture is roughly similar for the pottery discovered in the destruction layer.[167]

Another town comparable to Wijk bij Duurstede in terms of its function is **Tiel**. Its development was somewhat similar to Deventer, the initial phase dated to the second half of the ninth century.[168] However, the oldest excavated habitation appears to have had a rural character. Traces that can be connected with an exchange function date to the late ninth century at the earliest. Sherds in BAD fabric have been discovered at all locations in Tiel containing traces of early medieval habitation, but they were mainly fragments of relief-band amphoras.[169] Pingsdorf pottery was most common on the various sites while MAY and WALB were virtually absent.[170] Although some fragments of globular pots of type WIII have been discovered at most locations, they never constituted more than a handful of sherds. Another aspect of the Tiel finds is that BAD fragments were relatively hard fired. The excavation Tiel-Koornmarkt contained a large proportion of ceramics in BAD fabric but

164 Bartels 2006, 208-210.
165 Sanke 1999, 256,262.
166 Bartels 2006, 43-45.
167 Bartels 2006, 49.
168 Oudhof/Verhoeven/Schuring 2013, 125.
169 Verhoeven 2013, 116-120.
170 For example at Tiel-Koornmarkt.

again the majority belonged to relief-band amphoras. The other vessels in BAD fabric consisted of type WI/II, and pitchers (more or less) of type WIIC.[171] Several dendrochronological dates associated with younger stratigraphical horizons than those containing the bulk of the BAD vessels (excluding RBA) provided a *terminus ante quem* of around 950 AD. Pingsdorf ceramics were among the finds in the oldest habitation levels, which could not be dated exactly.

Period	Fabric	Type
E	BAD	WIX
Type+ fabric	MAY	WXIVa
	WALB	WXIVb
		WXIVj
		WXIVglob
	W13	WV
	W14	WV
		WVI
		WX
		WXI
	WALG	WXIVbi
	WALR	WIII
	HS (region 1,2,5,6,8)	HIII
fabrics	CR	
	W13	
	W14	
	WALR	
	HS (region 1,2,5,6,8)	
EM	BAD	WIV
Type+ fabric	WALB	WX
		WIIICD
	MAY	WIIICD
		WX
	CSM	WIII
		WVII
	HS (region 3,4)	HIII
fabrics	CSM	
	CR	
	WALB	
	HS (region 3/4)	
M	BAD	WIIIAB
Type+ fabric	MAY	WIIIAB
	W11	WIIIE
fabrics	BAD	
	MAY	
	W11	
ML	BAD	WIIx
Type+ fabric		WIIy
	RBA	WI
	TAT	WVIII
	KP (region 1,4,5,6,7)	HI
fabrics	RBA	
	TAT	
	KP (region 1,4,5,6,7)	
L	LBAD	WIII
Type+ fabric		WIIy
	KP (region 2,3,8)	HI
fabrics	BP	
	HU	
	LBAD	
	KP (region 2,3,8)	

Table 4.10 The wares and types as they were assigned to periods. E= up to 800; EM=emphasis before 800; M=equally before and after 800; ML=emphasis after 800; L=after 800. Combinations of type and fabric, and fabrics alone are shown separately. In combination with types, fabrics can occur in more than one period. However, fabrics alone (recorded as such when sherds could not be assigned to a type) have been assigned to just one period.

171 Dijkstra 1998, 28-32.

Conclusion

The overview of sites presented above provides evidence for the period in which the transformation from wheel-turned ceramics in a Merovingian tradition to those in a Carolingian style took place. A series of dendrochronological dates from sites in region 8 make it highly likely the transition had taken place by 730, but not before 700. Two other sites in region 8 indicate that globular pots were in use alongside Merovingian style pottery for a time. The same can be said for sites in region 5. We might assume the transition between the two traditions took place around the same time in region 5 as in region 8. Region 5 appears to have had strong contacts with the German Rhineland in the sixth and seventh centuries given the presence of barrels made from southern German timber at Oegstgeest. The site also yielded ceramics similar to types assigned to Vorgebirge phase A. It is not to be expected that inhabitants of the area around the Rhine mouth, well connected to the German Rhineland, adopted new ceramic vessel types from the German production centres much later than those on sites in the middle of region 8. In fact, it seems more likely they adopted them first. The assemblages of Katwijk-Zanderij and Bloemendaal-Groot Olmen strongly indicate that for a time during the eighth century the two most common vessel types on sites were WIII and WIX vessels. They were manufactured in BAD, MAY and WALB fabrics.

What neither site, or any other for that matter, can clarify is when types WIIx and WIIy were first introduced. Early examples of WI vessels were probably in use by the second half of the eighth century which is attested by finds from Beers-De Riet and the Vorgebirge kiln-sites themselves. Despite the problems associated with the dendrochronologically dated barrel-wells of Wijk bij Duurstede, several contexts would have to be shifted over a century later to conform with Keller's chronology. In addition, the enormous amount of rim-sherds that belong to Keller's phase D discovered at Dorestad make it difficult to reconcile the start date of around 830 assigned to this phase with, for example the coin data for Dorestad. The composition of the Katwijk assemblages suggest type WII was introduced rather late in the development of the site. Again, given its location it might be expected to have been at the vanguard of new developments in ceramic products from the Rhineland. Therefore, had type WII been available when habitation at Katwijk was at its peak in the eighth century, more examples would be expected. Unfortunately we do not know how long the petering out of occupation took at this site, just that it lasted into the early ninth century at least.

In effect, no position on the dating of type WII is indisputable when it comes to assigning detailed start- and end-dates to manufacture and consumption. To a lesser degree, the dating of other vessel types found on sites in the research area is also up in the air. Furthermore, Keller's typology of Vorgebirge pottery cannot be applied to the collected data because it cannot be fully synchronised with the Dorestad typology. In chapter 8, when an attempt is made to reconstruct the development of exchange networks, the more detailed dates for ceramics outlined in the previous sections can be employed to good effect. There, several scenarios will be examined based on different views on how specific types should be dated. However, a more pragmatic approach has been adopted for the dating of types and wares when it comes to the following sections. Most (combinations of) wares and types have either been assigned to the period before or after 800 AD (table 4.10). Type WIII can occur equally in both periods. Other types such as WIV and WX can also occur in both periods but are believed to lean more towards being early than late, while the reverse is assumed for types WI and WII. As will become apparent, dividing the vessels and fabrics into these groups offers the possibility of identifying chronologically relevant trends in the dataset. It also provides some flexibility in analysing those trends.

4.7.2 Handmade vs wheel-turned ceramics

Comparison of the relative proportions of handmade and wheel-turned pottery between and within regions is a first guide to understanding networks through which goods were exchanged. In our period wheel-turned pottery almost invariably originated from outside the research area. Handmade pottery is generally believed to have had a limited area of distribution, restricted to a single settlement or perhaps a relatively confined local area. A simple comparison of the proportions of both types of pottery per region already shows large differences (fig. 4.30). Clearly, a distinction can be made between the north and south of the research area.

Whereas in most regions handmade pottery was already a part of ceramic assemblages before 700 AD, in the southern Netherlands it hardly occurred before that time. It was probably introduced at some point during the ninth century. Before the first half of the ninth century all sites in region 8 would have almost exclusively used wheel-turned pottery. The overview per region in figure 4.30 gives the impression that handmade pottery was quite common on sites in region 8. This can be nuanced somewhat by looking at the proportions per site and factoring in the relative volume of sherds per site (fig. 4.31).[172] This shows that handmade ceramics are particularly strongly represented on sites in the eastern part of the region while in the western part wheel-turned pottery is much more prevalent. This may indicate handmade pottery was introduced earlier in the east of the region then in the western half. It is possible that in the latter area handmade wares only became part of household assemblages towards the end of the 9th century. In this light it is noteworthy that sites in the west of region 8 where habitation continued after the Carolingian habitation phase, contain higher proportions of handmade pottery than those where habitation ceased.[173] However, it cannot be determined how quickly handmade vessels were introduced in the region as a whole based on the available data.

That handmade pottery was already used in other regions prior to the start of our period does not mean there were no important changes throughout our period in the proportion of handmade and wheel-turned pottery. The dataset is not ideally suited to highlight these developments, as it would have required an inventory of seventh century finds as well. Nonetheless, the evidence from several sites can be used to show general developments at a regional level. For the northern part of region 1 the excavation at Wijnaldum (18) in particular has yielded important insights. The stratigraphical analysis of find contexts suggests that the transition from an assemblage dominated by wheel-turned wares to handmade pottery occurred somewhere in the middle of the seventh century, in other words before our period, and before the introduction of *Kugeltöpfe*.[174]

Region 4 also witnessed a dramatic change in the proportion of wheel-turned to handmade pottery, but this seems to have happened slightly later, though it is difficult to be sure without the same kind of contexts as at Wijnaldum. The evidence from Kootwijk (529) indicates that whereas the Merovingian period saw almost exclusive use of wheel-turned pottery, similar to region 8, by the ninth century handmade pottery made up almost three quarters of the assemblage.[175] At the two other sites in the region for which we have data the percentage of handmade pottery is even higher than at Kootwijk, towards 90 percent.

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172 Relative to the total assemblage from rural sites in the database.
173 In subsequent centuries handmade pottery would become an important feature of ceramic assemblages in subregions 8.1 and 8.2 as shown for example at Tilburg-Havep (140) and Berkel-Enschot-Enschotsebaan (139). However, at neither of these sites handmade ceramics could be associated with structures dated to the Carolingian period.
174 Gerrets/De Koning 1999, 97.
175 Verhoeven 1998, 211-219.

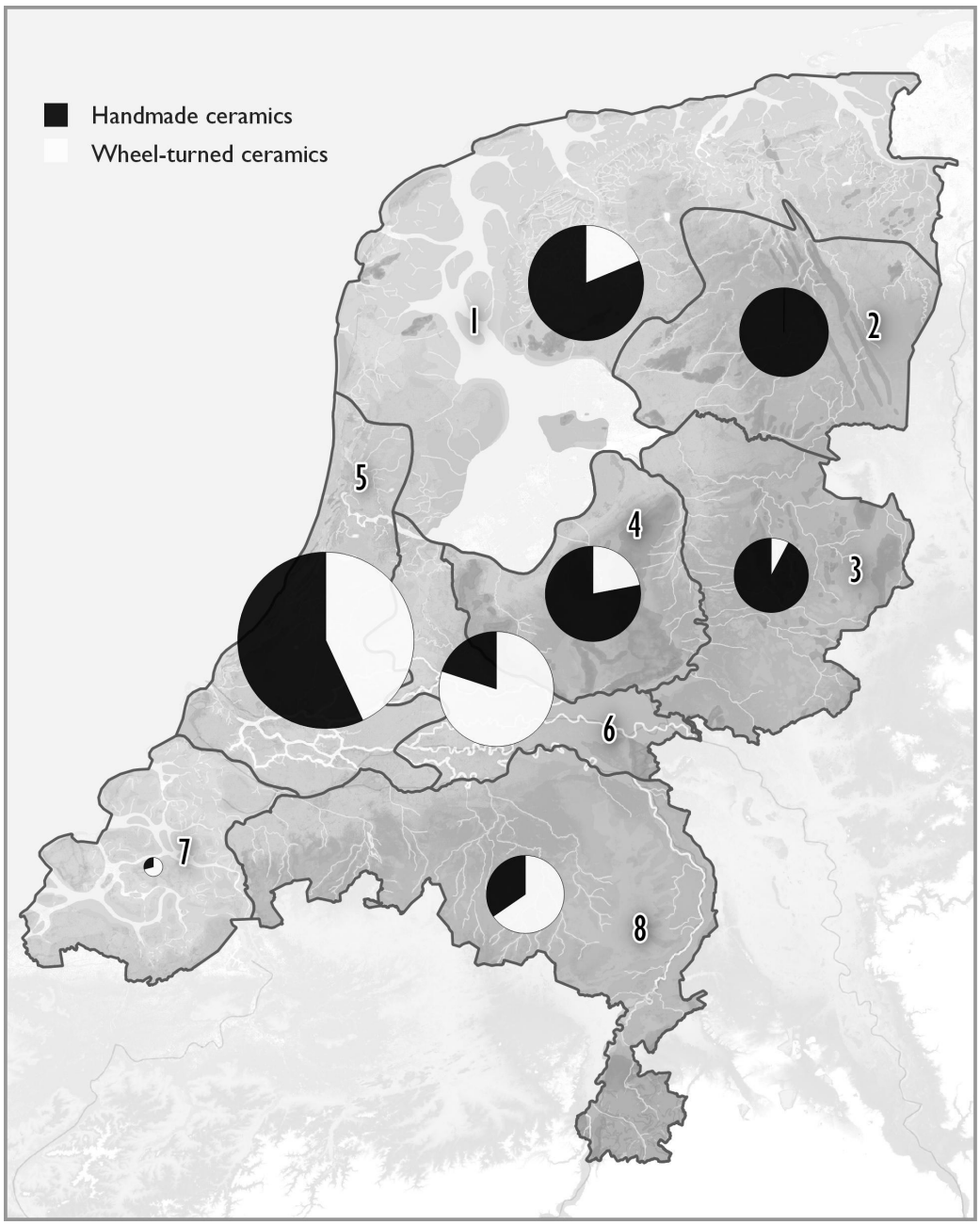


Fig. 4.30 Proportion handmade to wheel-turned pottery per region. Size of charts is relative to the total amount of pottery in the inventory.

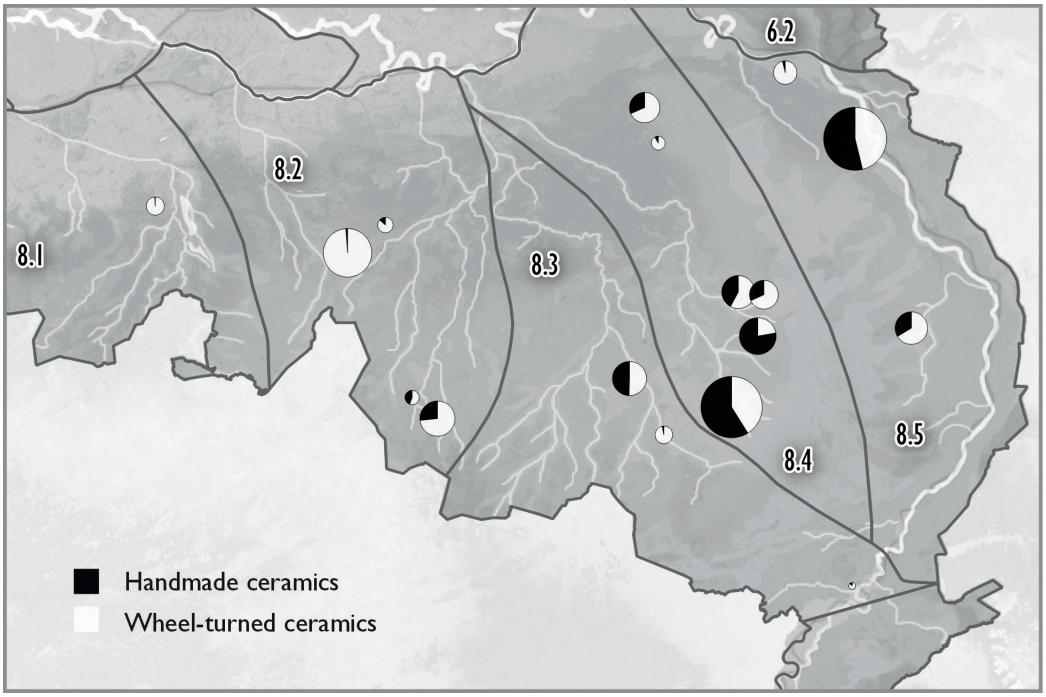


Fig. 4.31 Proportion handmade to wheel-turned pottery per site in region 8. The size of the charts is relative to total assemblage for all sites in the region. Only the finds discovered in Carolingian structures have been incorporated in the figure in order to reduce the possibility of younger handmade sherds affecting the results.

Sites in region 5 along the Rhine and the areas to the south of the river (subr. 5.2) mostly have a higher percentage of wheel-turned pottery while to the north of the Rhine the situation is reversed (subr. 5.1) (fig. 4.32). In the north of region 5 the Groot-Olmen site (212) shows a development from a high proportion of wheel-turned to gradually increasing proportions of hand-made ceramics. The transition appears to have taken place in the course of the eighth century. However, compared to region 4, the percentage of wheel-turned pottery per site is usually higher and the absolute amount of wheel-turned ceramics is also much greater. In the south of region 5, between the Rhine and Meuse, sites almost invariably have a higher proportion of wheel-turned pottery than handmade. Nonetheless, handmade pottery does comprise a considerable proportion of assemblages on most sites, and here too the impression is that the proportion of handmade ceramics gradually increased between the late seventh and ninth century.[176]

In region 2 hardly any early medieval wheel-turned ceramics have been discovered, not only on sites but also as stray finds recorded in Archis. The east of region 1 and north of region 3 are comparable in that respect.

In areas where wheel-turned ceramics made up an important part of assemblages in the seventh century there is consistently a shift toward the use of handmade pottery in the course of the eighth and ninth century. It did not take place at the same time or at the same rate in each region and even within regions there appear to have been differences. In areas where handmade ceramics made up the bulk of assemblages before the eighth century little changed. For example areas in the south of region 3 (subr. 3.2) often contain a modest amount of wheel-turned wares in the seventh century

176 Dijkstra 2011b, 309-312.

and this remained so throughout the eighth and ninth century. In the north of region 3 handmade pottery was always dominant (fig. 4.32).

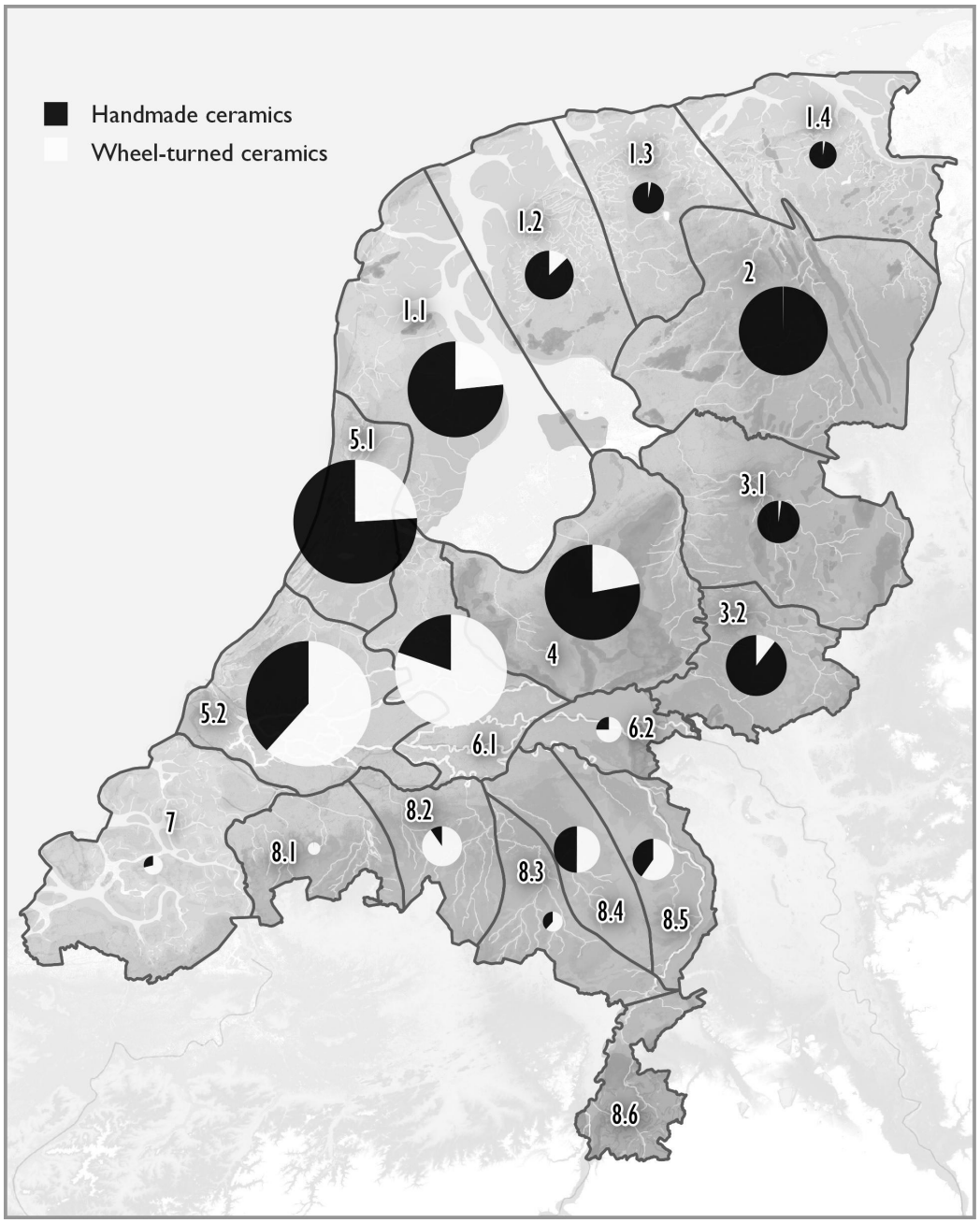


Fig. 4.32 Proportion handmade to wheel-turned pottery per subregion. The size of the charts is relative to the total number of sherds assigned to either handmade or wheel-turned pottery in the research area.

An issue with such comparisons based on percentages is that the proportional increase in the use of handmade wares may mask simultaneous growth in absolute amounts of wheel-turned ceramics in certain regions during our period. In other words, although handmade pottery became more important in household assemblages during our period, that does not necessarily mean wheel-turned pottery was being consumed in lesser numbers. This aspect is difficult to factor in because differences in the absolute amounts of sherds between Merovingian and Carolingian phases of sites may be due to a variety of causes. Either phase may have been shorter or longer than the other, may represent more or less intense habitation, or vessel types may show differing levels of breakage. Handmade vessels for example may have been more prone to breaking, which probably explains why among the inland regions, assemblages in regions 2, 3 and 4 as a whole are often much larger than in region 8.

Site	MER W	MER H	MER T	CAR W	CAR H	CAR T	TOT	% M WT	% M HM	% C WT	% C HM
Alphen (106)	21	4	25	35	0	35	60	84	16	100	0
Huis Malburg (527)	772	1	773	5036	148	5184	5957	100	0	97	3
Stenen Kamer (521)	110	6	116	4012	410	4422	4538	95	5	91	9
WbD de Geer (201)	484	0	484	748	121	869	1353	100	0	86	14
Beugen (104)	407	25	432	454	625	1079	1511	94	6	42	58
Hummelo (35)	73	93	166	130	585	715	881	44	56	18	82
Leiden (157)	143	0	143	197	154	351	494	100	0	56	44
Uden (101)	35	0	35	58	4	62	97	100	0	94	6
Hallum (19)	31	694	725	11	377	388	1113	4	96	3	97
Beers (142)	308	0	308	156	0	156	464	100	0	100	0
Koudekerk (198)	4874	21	4895	2774	1169	3943	8838	100	0	70	30
Naaldwijk (219)	1118	66	1184	625	252	877	2061	94	6	71	29
Nistelrode (120)	370	3	373	187	88	275	648	99	1	68	32
Midlaren (2)	7	282	289	3	855	858	1147	2	98	0	100
Utrecht (525)	2308	14	2322	915	1039	1954	4276	99	1	47	53
Utrecht (526)	853	19	872	563	300	863	1735	98	2	65	35
Valkenburg (155)	1178	14	1192	666	2474	3140	4332	99	1	21	79
Zelhem findspot 3+4	127	328	455	9	0	9	464	28	72	100	0
Zelhem findspot 1 (533)	0	0	0	33	909	942	942	0	0	4	96
Total	**13219**	**1570**	**14789**	**16612**	**9510**	**26122**	**40911**	**89**	**11**	**64**	**36**

Table 4.11 Comparison of wheel-turned and handmade sherd counts in Merovingian and Carolingian assemblages from selected sites. The sites in Zelhem were discovered relatively close together and for the purposes of this comparison can be seen as one entity.

Table 4.11 contains a comparison of the Merovingian and Carolingian assemblages from a few sites that seem to have had roughly similar occupation periods or where the assemblage is large enough to discern a trend with some confidence. The sites can be divided into four groups:

- sites where the amount of wheel-turned pottery increased and handmade decreased
- sites where wheel-turned increased and handmade increased
- sites where wheel-turned decreased and handmade decreased
- sites where wheel-turned decreased and handmade increased

The group where wheel-turned and handmade ceramics both increased can be further divided into sites where the increase in wheel-turned pottery is considerable (Stenen Kamer, Huis Malburg, Wijk bij Duurstede-De Geer) and those where the differences are not so great in absolute terms (Uden, Leiden, Buren, Hummelo). Of the first set of sites Linge/Stenen Kamer and Huis Malburg did not contain clear traces of Merovingian habitation. This partly explains the large difference in the overall size of assemblages from the Merovingian to the Carolingian period. In both cases the percentages of wheel-turned and handmade ceramics changed very little. The group with small increases in wheel-turned pottery each time shows a much larger increase in handmade sherds. In addition, at the sites Beugen and Hummelo habitation appears to have started towards the end of the seventh century so an increase in Carolingian ceramics is to be expected.[177] Only one site saw an increase in the amount of wheel-turned pottery and a decrease in handmade pottery but the assemblage was rather small. Sites where the amount of handmade sherds increases, while wheel-turned fragments decrease contain several where the Merovingian occupation was probably more intensive then the Carolingian period, such as the sites in Utrecht.

Although the sample is not very large and has its problems, the general pattern does not seem to indicate that large increases in wheel-turned ceramics are being masked by even larger increases in handmade pottery. There may not necessarily always have been a decrease in the volume of wheel-turned wares but the figures nonetheless point toward an increasing importance of handmade ceramics in households in the eighth and ninth century compared to previous centuries.

177 Dijkstra 2015b, 507-510; Van der Velde 2015, 72-73.

4.7.3 Analysis of types

As such the distribution of specific ceramic vessel types as opposed to function categories would only be relevant for understanding demand and networks of exchange if those types were desired for their appearance. It is more likely ceramic vessels were selected largely for their function rather than their appearance alone. The exceptions were perhaps biconical pots type WVII and jugs of Tating type and type WXI in the Dorestad typology which were decorated and probably intended as tableware. This does not mean appearance played no role in the choice of ceramics in our period, simply that it was a secondary consideration at best. The limited variability in the types of vessel available for different functions that there appears to have been at any given time during our period points in this direction. Nonetheless, differences in distributions of specific types can be instructive in understanding how exchange networks functioned and perhaps also for how they developed.

First wheel-turned ceramics are examined. Region 2 and the east of region 3 are not represented by any specific wheel-turned types due to a lack of diagnostic fragments (see appendix I for the distribution and relative frequency of individual types per site). The eastern part of region 1 is also poorly represented. The WII and WIII type vessels of the Dorestad typology have been found in all other areas, often together on the same sites (fig. 4.34). The types WVII, WVIII and WXI occur infrequently and because they are for the most part limited to two fabrics it is best to discuss their distribution in the section on fabrics.

Starting with vessel types that are known to have been manufactured in the Vorgebirge, relief-band amphoras type WI have roughly the same distribution as WII jars but in regions 7 they make up a considerably larger proportion of rim types than in other areas (fig. 4.33). The small overall number of rims in region 7 makes it impossible to determine the significance of this anomaly. In general WI vessels make up a very small proportion of ceramic assemblages in regions (table 4.13). Type WII consists of three separate vessels-types, jars, spouted pots and more rarely bowls. The latter vessel-type has been found, or perhaps it is better to say recognised, so infrequently it has been left out of the analysis. In most regions there is little difference in distribution between the jars and spouted pots, WIIx and WIIy respectively (fig. 4.35). The exceptions are the eastern part of region 6 and region 8. The pattern in the east of region 6 can be partly explained by the fact that the number of sherds of wheel-thrown pottery is very small on several of these sites. For quite a few sites in regions 6 and 8 only information on the presence or absence of types was available and this may have led to only specific types being mentioned. However, particularly in region 8 this does not seem a likely explanation as it would imply that only globular pots would have been mentioned (see below) and WII types neglected, but the possibility cannot be entirely excluded. The size of assemblages may also play a part, particularly in regions 3 and 8 where the amount of diagnostic sherds per site is generally limited. Considering these kind of limitations it is necessary to be cautious when interpreting the importance of the presence or absence of a particular type.

Type WIII shows a slightly wider distribution than WI and WII, primarily in region 8 where the globular pot occurs quite often as the only (recognisable) Rhineland vessel type on sites.

Small jars of type WIV exhibit a much more restricted distribution than other types from the Vorgebirge production centres. They occur far less often in region 8, and not at all in the east of region 6 and region 3. The small amount of WIV jars in the interior of region 8 compared to vessel type WII may indicate that these small jars were not a common element of household assemblages in this region.

Type/Region	1	2	3	4	5	6	7	8	Total
HI	318	667	268	659	2004	388	7	78	4389
HIII	62	363	46	196	140	16	-	1	824
HIV	8	195	166	13	8	2	-	1	393
WI	2	-	2	2	92	26	5	5	134
WI/II	-	-	1	-	5	5	4	-	15
WIII	173	-	17	38	1071	403	2	158	1862
WIIx	22	-	4	3	212	135	3	50	429
WIIy	35	-	-	5	100	69	4	18	231
WIIz	3	-	-	-	1	-	-	-	4
WIV	73	-	-	0	93	33	-	8	207
WIX	9	1	-	0	238	102	-	10	360
WV	7	-	-	-	153	34	-	3	197
WVI	6	-	-	0	81	10	2	8	107
WVII	3	-	-	3	22	2	-	-	30
WVIII	4	-	-	-	-	-	-	-	4
WX	4	-	1	-	49	19	-	4	77
WXI	-	-	-	-	5	-	-	-	5
WXII	-	-	-	0	10	3	-	-	13
WXIIb	-	-	-	-	1	-	-	-	1
WXIIy	-	-	-	-	-	2	-	-	2
WXIV	-	-	-	-	-	37	-	-	37
WXIV amphora	-	-	-	-	14	1	-	1	16
WXIV biconial	-	-	-	-	-	-	-	1	1
WXIV glob	-	-	-	-	2	-	-	-	2
WXIV jar	-	-	-	-	15	-	-	2	17
Total	**729**	**1226**	**505**	**919**	**4318**	**1287**	**27**	**348**	**9359**

Table 4.12 Number of rim fragments per type and per region on rural sites.

Hunneschans pottery is not a vessel-type as such as it is mainly characterised by its combination of roulette-stamp and paint decoration. Its distribution is considerably different from many other Vorgebirge vessel-types and wares. It has hardly been found on sites in the coastal area and the west of region 6 where other types are present most frequently. On the other hand it represents one of the few finds of wheel-turned pottery in region 2. It has been discovered on several sites in the east of region 8 and on two of the four sites containing pottery in region 7. The two sites Kerk-Avezaath-Stenen Kamer and Buren-Huis Malburg (521 and 527) yielded a remarkably large amount of this pottery. The limited distribution of Hunneschans is undoubtedly influenced by the fact that its identification requires the two types of decoration to be present on sherds and that it is believed to have been produced for a relatively short period. Nonetheless, other more obscure types have all been found on a wide array of sites in regions 5 and 6 so the absence of Hunneschans is noteworthy.

Type/Region	1	2	3	4	5	6	7	8	Total
HI	43.6%	54.4%	53.1%	71.7%	46.4%	30.1%	25.9%	22.4%	46.9%
HIII	8.5%	29.6%	9.1%	21.3%	3.2%	1.2%	-	0.3%	8.8%
HIV	1.1%	15.9%	32.9%	1.4%	0.2%	0.2%	-	0.3%	4.2%
WI	0.3%	-	0.4%	0.2%	2.1%	2.0%	18.5%	1.4%	1.4%
WI/II	-	-	0.2%	-	0.1%	0.4%	14.8%	-	0.2%
WIII	23.7%	-	3.4%	4.1%	24.8%	31.3%	7.4%	45.4%	19.9%
WIIx	3.0%	-	0.8%	0.3%	4.9%	10.5%	11.1%	14.4%	4.6%
WIIy	4.8%	-	-	0.5%	2.3%	5.4%	14.8%	5.2%	2.5%
WIIz	0.4%	-	-	-	-	-	-	-	0.0%
WIV	10.0%	-	-	-	2.2%	2.6%	-	2.3%	2.2%
WIX	1.2%	0.1%	-	-	5.5%	7.9%	-	2.9%	3.8%
WV	1.0%	-	-	-	3.5%	2.6%	-	0.9%	2.1%
WVI	0.8%	-	-	-	1.9%	0.8%	7.4%	2.3%	1.1%
WVII	0.4%	-	-	0.3%	0.5%	0.2%	-	-	0.3%
WVIII	0.5%	-	-	-	-	-	-	-	0.0%
WX	0.5%	-	0.2%	-	1.1%	1.5%	-	1.1%	0.8%
WXI	-	-	-	-	0.1%	-	-	-	0.1%
WXII	-	-	-	-	0.2%	0.2%	-	-	0.1%
WXIIb	-	-	-	-	-	-	-	-	0.0%
WXIIy	-	-	-	-	-	0.2%	-	-	0.0%
WXIV	-	-	-	-	-	2.9%	-	-	0.4%
WXIV amphora	-	-	-	-	0.3%	0.1%	-	0.3%	0.2%
WXIV biconical	-	-	-	-	-	-	-	0.3%	0.0%
WXIV globular	-	-	-	-	-	-	-	-	0.0%
WXIV jar	-	-	-	-	0.3%	-	-	0.6%	0.2%

Table 4.13 Proportion of rim fragments from rural sites per type within regions.

The analysis of the type of vessels that have been categorised as WXIV in the Dorestad typology is hampered by the fact that the types were defined first in 2009 when the remainder of the harbour excavations were published. Up to that point there was no widely available typology for these vessels and it is likely that they were classed as miscellaneous or Merovingian. As it stands they appear to be limited to the central Dutch river area, the western coast and sites along the Meuse in region 8 (fig. 4.38). Another early type, WIX pots, have been identified more often and in slightly more areas. Just as type WXIV they have been discovered in the central Dutch river area, western coast and sites along the Meuse in region 8, but a few isolated finds have been discovered in regions 1, 3, 4 and more westerly parts of region 8. Outside the central river area and the coast, WX bowls have only been discovered in the east of region 8. Bowls seem to be a feature of both early and late assemblages.

It is informative to compare the distribution of early types WIX and WXIV with that of WI, WII and WIII (fig. 4.37). Even though the early types are relatively uncommon generally, it remains noteworthy that they are mostly found on sites along the Rhine in the west of region 6 and region 5, and on sites to the north of the Rhine in region 5. The later types have a much wider distribution. The difference is not just observable in the spread of the two groups but also in the proportions each group comprises per region. Tables 4.14 and 4.15 also show that the later types are generally far more frequent than early types. Although type WIV is often considered contemporary with types WI and WII its distribution is far more limited and broadly similar to that of type WIX.

Aside from chronological aspects, the more restricted distribution of other wheel-turned types than WI, WII and WIII is probably also due, at least in part to size of assemblages. Regions 5, 6 and the west of region 1, where the distributions of many of the minor types are concentrated are also the areas with the largest assemblage sizes. This means that determining the extent to which the exchange of these types was actually limited to the coastal and riverine regions or whether their distribution depends largely on methodological issues is problematic.

Type/Region	1	2	3	4	5	6	7	8	Total
WI	0.6%	-	8.0%	3.9%	4.2%	3.0%	25.0%	1.9%	3.6%
WI/II	-	-	4.0%	-	0.2%	0.6%	20.0%	-	0.4%
WIII	50.7%	-	68.0%	74.5%	49.4%	45.7%	10.0%	59.0%	49.6%
WIIx	6.5%	-	16.0%	5.9%	9.8%	15.3%	15.0%	18.7%	11.4%
WIIy	10.3%	-	-	9.8%	4.6%	7.8%	20.0%	6.7%	6.2%
WIIz	0.9%	-	-	-	-	-	-	-	0.1%
WIV	21.4%	-	-	-	4.3%	3.7%	-	3.0%	5.5%
WIX	2.6%	100.0%	-	-	11.0%	11.6%	-	3.7%	9.6%
WV	2.1%	-	-	-	7.1%	3.9%	-	1.1%	5.2%
WVI	1.8%	-	-	-	3.7%	1.1%	10.0%	3.0%	2.9%
WVII	0.9%	-	-	5.9%	1.0%	0.2%	-	-	0.8%
WVIII	1.2%	-	-	-	-	-	-	-	0.1%
WX	1.2%	-	4.0%	-	2.3%	2.2%	-	1.5%	2.1%
WXI	-	-	-	-	0.2%	-	-	-	0.1%
WXII	-	-	-	-	0.5%	0.3%	-	-	0.3%
WXIIb	-	-	-	-	-	-	-	-	0.0%
WXIIy	-	-	-	-	-	0.2%	-	-	0.1%
WXIV	-	-	-	-	-	4.2%	-	-	1.0%
WXIV amphora	-	-	-	-	0.6%	0.1%	-	0.4%	0.4%
WXIV biconical	-	-	-	-	-	-	-	0.4%	0.0%
WXIV globular	-	-	-	-	0.1%	-	-	-	0.1%
WXIV jar	-	-	-	-	0.7%	-	-	0.7%	0.5%

Table 4.14 Comparison of the proportions of wheel turned vessel types per region, based on rim fragments.

Region	WI	WIII	WIIx	WIX	WXIV
1	2	67	28	3	0
2	0	0	0	100	0
3	7	70	22	0	0
4	0	84	16	0	0
5	5	56	28	9	2
6	23	45	20	9	3
7	32	16	53	0	0
8	4	64	27	4	1
Total	**10**	**54**	**19**	**8**	**2**

Table 4.15 Proportions of the main early and late types per region.

Type	1	5	6	8	Total
WV	53.8%	65.4%	77.3%	27.3%	64.8%
WVI	46.2%	34.6%	22.7%	72.7%	35.2%

Table 4.16 Comparison of the proportions of types WV and WVI per region where they have been recorded.

One way of testing whether the more frequent occurrence of less common wheel-turned types in regions 5 and 6 is more than just a consequence of assemblage size is to compare the percentages of the types per region. In table 4.14 the handmade vessel types have been excluded because in regions 1 to 4 they are so dominant that comparison of imported types is made problematic. The table reveals that the differences between regions 5 and 6, and region 8 are not so great, in fact types WII and WIII are proportionally better represented in regions 3 and 8. Undoubtedly, as far as type WIII is concerned, this is partly due to higher instances of early vessel types in regions 5 and 6.[178] In addition, the limited number of rims, particularly in regions 3 and 4 should ward against putting too much weight on the variations. On the other hand, the fact that the main differences between the regions lies with types WV, WIX and WXIV implies that it was during the early stages of importing wares from a wider area that regions 5 and 6 diverged from others. By the time types WII and WIII had become the dominant imports regional variability was less marked. It is therefore likely that the more limited distribution of early types is the result of actual differences in the spread of these vessels in the early stages of our period.

Another interesting aspect is the differences in proportions between types WV and WVI (table 4.16, fig. 4.36). Type WV is more common than WVI in regions 5 and 6 while the reverse is true for region 8. In light of the evidence presented above regarding early types, the difference could be interpreted either as an indication that WV should be dated slightly earlier than WVI, that their provenance is different or a combination of both.

Turning to handmade pottery, an overview of the presence or absence of Hessens-Schortens (type HIII) vessels and *Kugeltöpfe* (type HI) shows that whereas *Kugeltöpfe* have been found at virtually all sites where handmade ceramics were identified, Hessens-Schortens exhibits a more variable distribution (fig. 4.39/40). In regions 2, 3 and 4 it is present on most sites, in regions 1, 5 and the west of region 6 it is found on a more select number of sites and in the east of region 6, and regions 7 and 8 it does not occur at all except at Hulsel (107). The relative proportions of *Kugeltopf* and Hessens-Schortens confirm that the latter was a more important part of ceramic assemblages in the east of the research area than in the coastal zone. In regions 5 and 6 the proportion of Hessens-Schortens only exceeds 10% at Utrecht-Appellaantje (526) where it makes up 22% of handmade ceramics. However, in the northern coastal area, in region 1, at the few sites where Hessens-Schortens has been discovered it exceeds 10% of the handmade assemblage in each case. Sites in the north of region 2 show a similar picture with *Kugeltopf* being dominant but also attesting a considerable proportion of Hessens-Schortens. On sites in the south of the region on the other hand Hessens-Schortens tends to be most common. Sites in region 3 exhibit a mixture of sites where either group is prevalent, but *Kugeltopf* is most common in the majority of cases.

The sites in region 4 represent two extremes. Two sites have a very small proportion of Hessens-Schortens (Kootwijk (529) and Uddel (530)) while the third has a similarly small percentage of *Kugeltopf*. The difference can be nuanced somewhat because for the latter site, Putten-Husselerveld (538) the manner in which the data was published made it difficult to distinguish Carolingian *Kugeltopf* from younger examples. Therefore *Kugeltopf* on this site may be underrepresented in our dataset. On the other hand, the wheel-turned assemblage suggests a peak in activity in the tenth and eleventh century implying much of the *Kugeltopf* sherds date to this period rather than earlier. In addition, a comparison of the number of rims makes clear that even if all *Kugeltopf* rims were

178 Because the types in question (WIII, WV, WIX and some examples of WXIV) all mainly served the same purpose, namely cooking pot.

considered to date to our period, which is unlikely, Hessens-Schortens rims would still make up 27% of the total. This is considerably higher than at Kootwijk and Uddel.

Part of the differences in proportions between sites in regions 2, 3 and 4 may be due to their chronology. Hessens-Schortens vessels were after all the precursor of the *Kugeltopf*. Sites with a higher proportion of Hessens-Schortens might in several cases be earlier in date (or have been abandoned earlier) than those with a higher percentage of *Kugeltopf*. In region 2, sites with high proportions of type HI often are presumed to have started in the ninth century and continued into later centuries, whereas sites with high percentages of HIII and HIV types generally started earlier and do not show subsequent continuity.[179] Midlaren (2) is the only exception to the rule. The development of the settlement suggests a peak in habitation in the seventh and eighth century followed by a strong decline in activity in the ninth. The ceramics associated with the Carolingian habitation phase consist of 75% *Kugeltopf* and 25% for types HIII and HIV combined. This is an indication that the relative proportions of Hessens-Schortens and *Kugeltopf* cannot necessarily be used as a proxy for developments in the intensity of habitation during the period of occupation at a given site in the east of the research area.

In region 3 the picture is similar but complicated by the fact that some sites have explicitly been dated to a large extent on the basis of the proportions of HI to HIII/HIV. Concerning region 4, we saw above that the proportion of Hessens-Schortens at Putten was relatively high. At the same time, no Merovingian wheel-turned sherds were found. The Merovingian sites Kootwijk 4 and 5 both yielded high proportions of Merovingian wheel-turned pottery.[180] At the Carolingian site Kootwijk 2 ceramics in a Merovingian tradition made up 1% of the total and the proportion of HS was just 6% of the handmade pottery. At the eighth to tenth century site of Uddel the percentages are similar. This suggests that the high proportion of HS at Putten relative to Kootwijk 2 and Uddel is not exclusively related to the presence of an earlier phase of habitation that is absent at the other sites, because in that case one would expect at least some Merovingian wheel-turned ceramics. It is possible that the inhabitants of the Putten settlement, which lies on the edge of the ice-pushed ridge and close to the shore of the Almere, adhered to a different ceramic tradition than those on sites lying on the ice-pushed ridge such as Kootwijk.

When the proportions of the three main handmade types on sites of our period are examined, it becomes clear that type HIV constitutes a significant proportion of handmade vessels in regions 2 and 3, while it is marginal in other areas (fig. 4.40). For example at Warnsveld (532), no rims could confidently be assigned to type HIII, but 60% belonged to type HIV. The importance of HIII and HIV in assemblages of regions 2 and 3 clearly sets them apart from other regions, including region 4. This conforms with what Verhoeven concluded based on a comparison of the Kootwijk assemblage with a selection of sites in Germany, namely that Kootwijk exhibits elements of both the inland handmade repertoire of his region III and the Dutch coastal zone.[181] The similarities with the coastal zone were deemed greater than with inland areas. The assemblages of Warendorf and Liebenau to the east of our research area on the other hand have proportions of Hessens-Schortens vessels and neckless bowls (types HIII and HIV) which are comparable to sites in regions 2 and 3.[182]

179 Obviously the ceramics will have played a part in the dating of the sites, but building typology is often a more important consideration.
180 Heidinga 1987, 20.
181 Verhoeven 1998, 211-219.
182 Steuer 1975; Röber 1990, 35, abbildung 9.

A few remarks can be made regarding differences in the prevalence of types within regions. In region 3 types WI, WII and WIII hardly occur north of Deventer, in subregion 3.1, and have mostly been discovered on sites along the IJssel and in the southeast of the region (subr. 3.2). In terms of the percentages of wheel-turned to handmade pottery in region 1, the west of the region (subr. 1.1) is similar to the north of region 5 (subr. 5.1), while the east of the region (subr. 1.3/1.4) is more similar to region 2. This also seems to be true for the distribution of less common types, which occur on many sites in the north of region 5 and the adjacent part of region 1, but only at Wijnaldum in the provinces of Friesland and Groningen. The common Rhineland types are more abundant in the west of Friesland (subr. 1.2) but have hardly been discovered on more easterly sites. In region 6, there are considerable differences in the volume of sherds between sites in the east (subr. 6.2) and the west (subr. 6.1) of the area. This can partly be attributed to differences in the nature of excavations but it remains notable that types WIV, WV and WVI and fabrics W13 and W14 have hardly been found on any sites in the eastern part of the region. Finally, it is notable that the less common types WIV, WV, WVI and WIX have almost exclusively been discovered in the eastern half of region 8 (subr. 8.3-5). In addition *Kugeltöpfe* have also been found more abundantly on sites in the east of region 8. This does not appear to be the result of, for example, larger assemblages in that area. Part of the explanation could be that *Kugeltöpfe* were more readily assigned to the ninth century on sites in the east of the region. However, the situation remains virtually the same when only finds from structures dated to the Carolingian period are considered (fig. 4.31).[183]

183 The comparison also reveals that far more of the Carolingian ceramics from sites in the west than the east of region 8 were recovered from structures or features not dated to the Carolingian period.

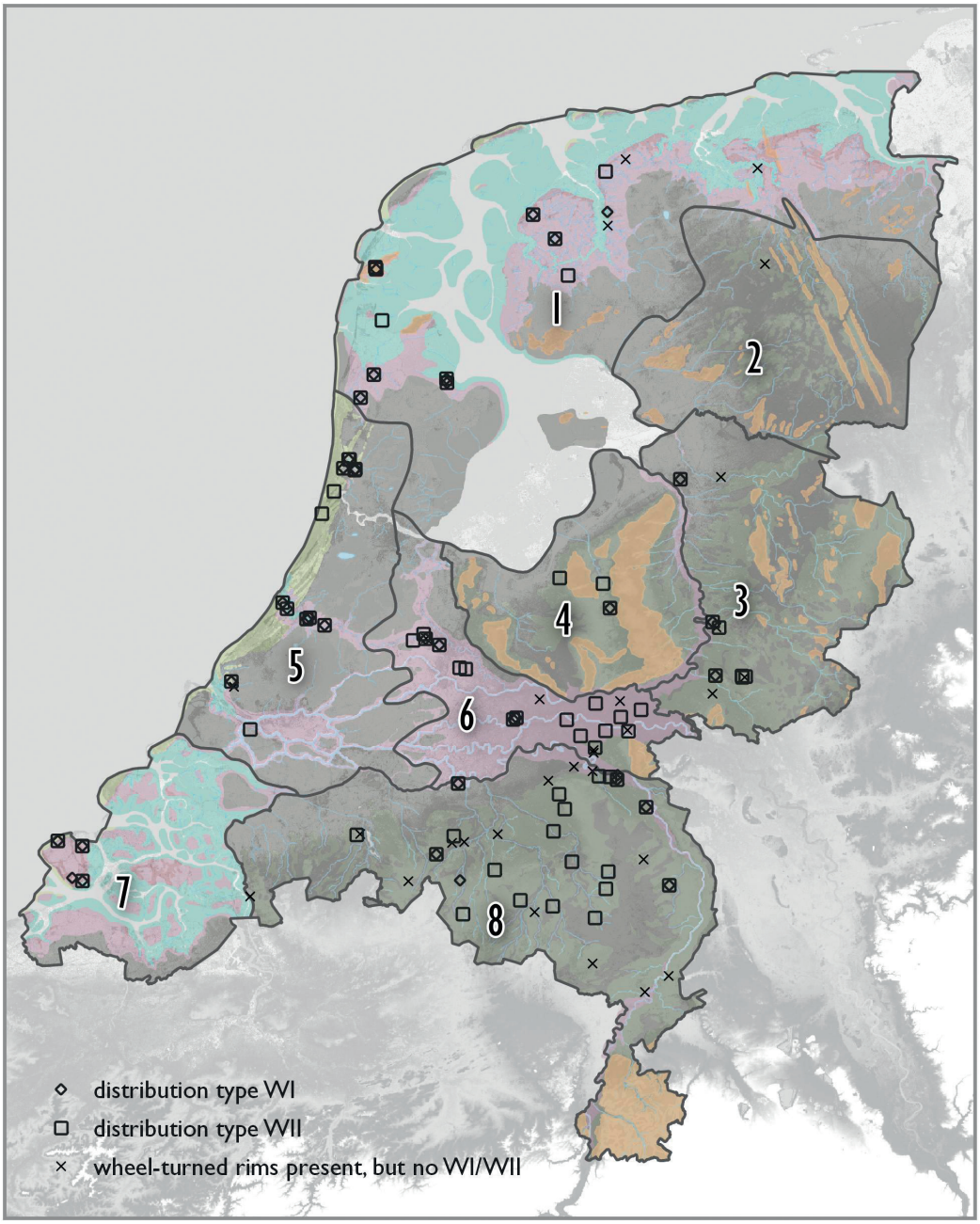


Fig. 4.33 Comparison of distributions of types WI and WII.

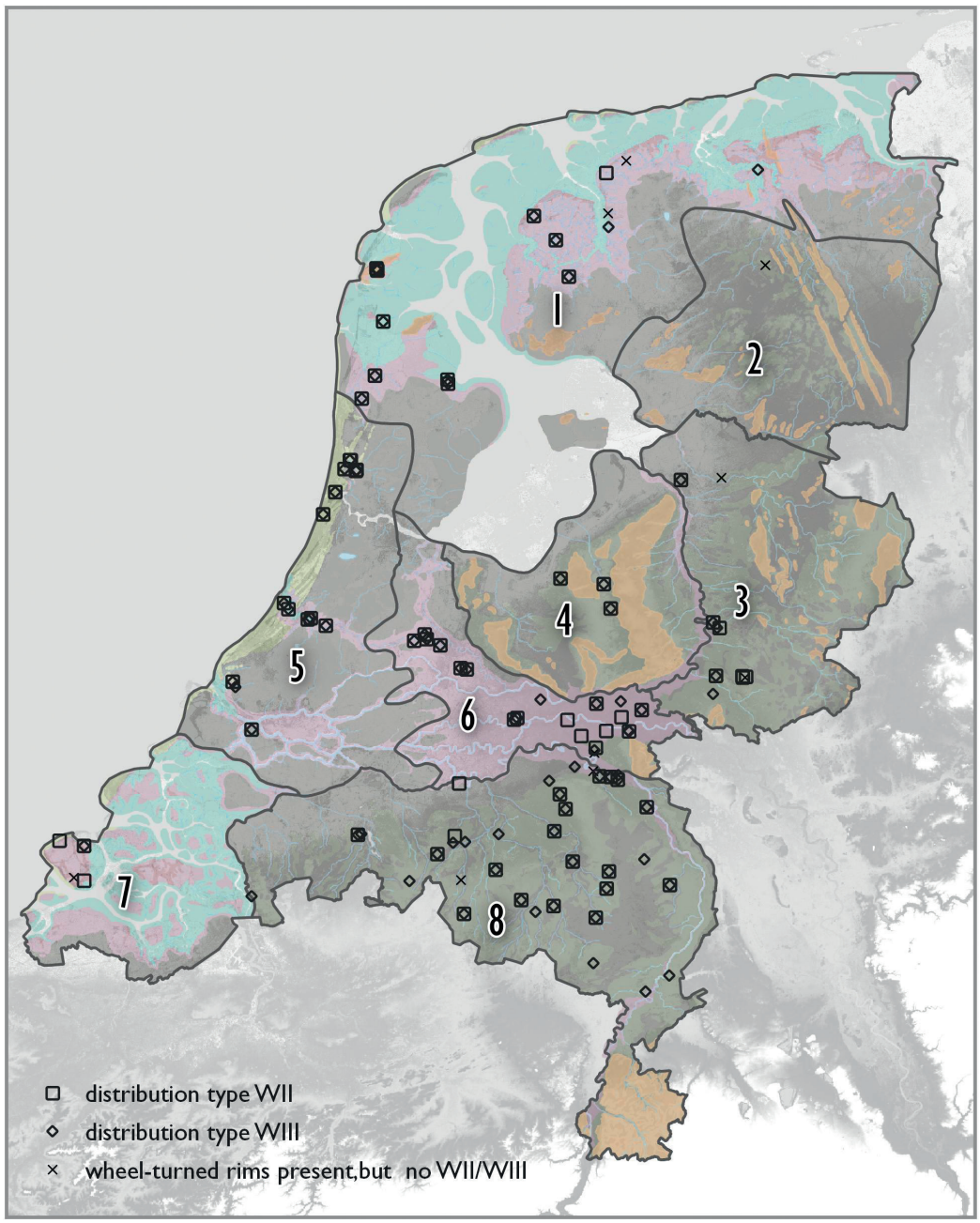


Fig. 4.34 Comparison of distributions of types WII and WIII.

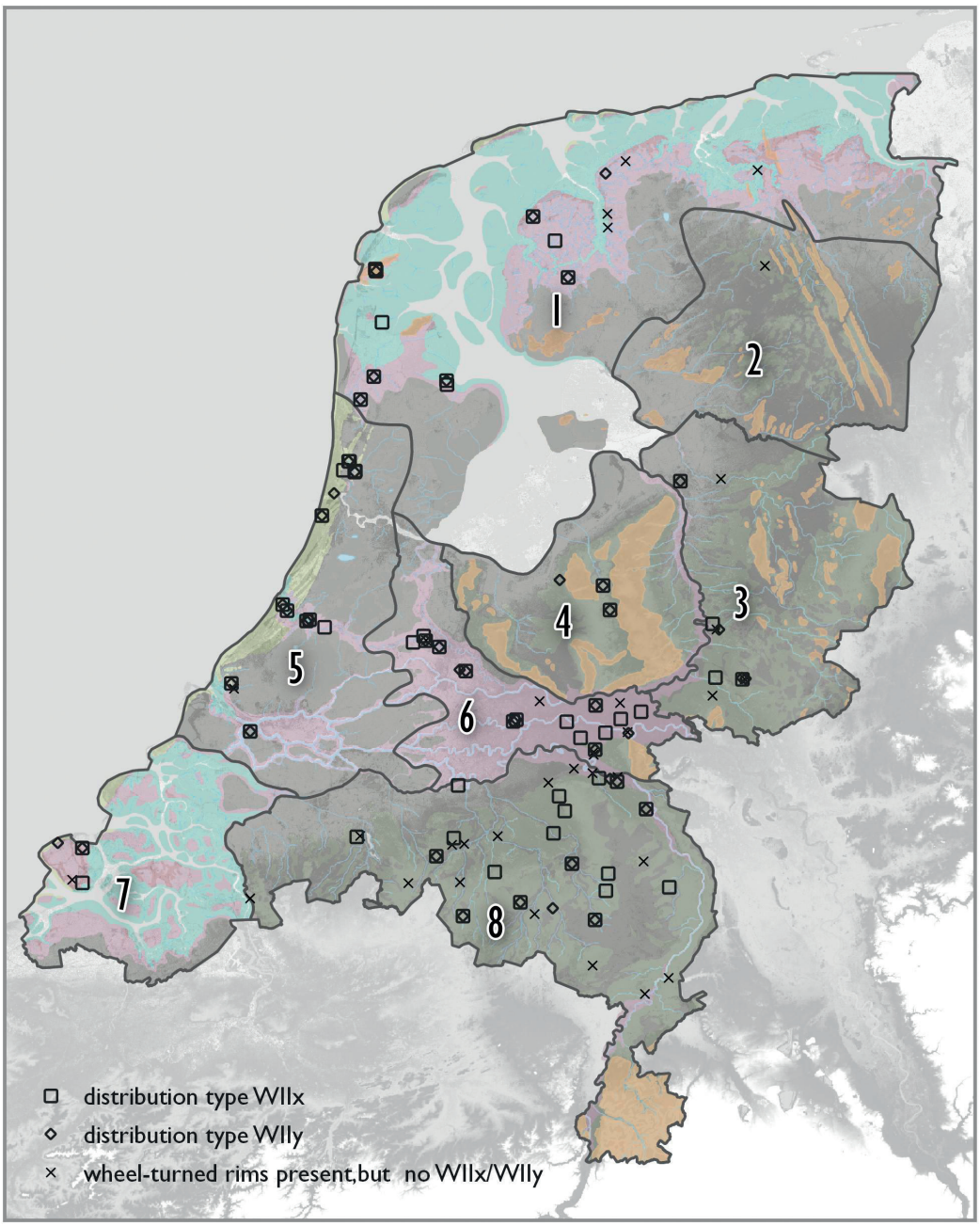


Fig. 4.35 Comparison of distributions of types WIIx and WIIy.

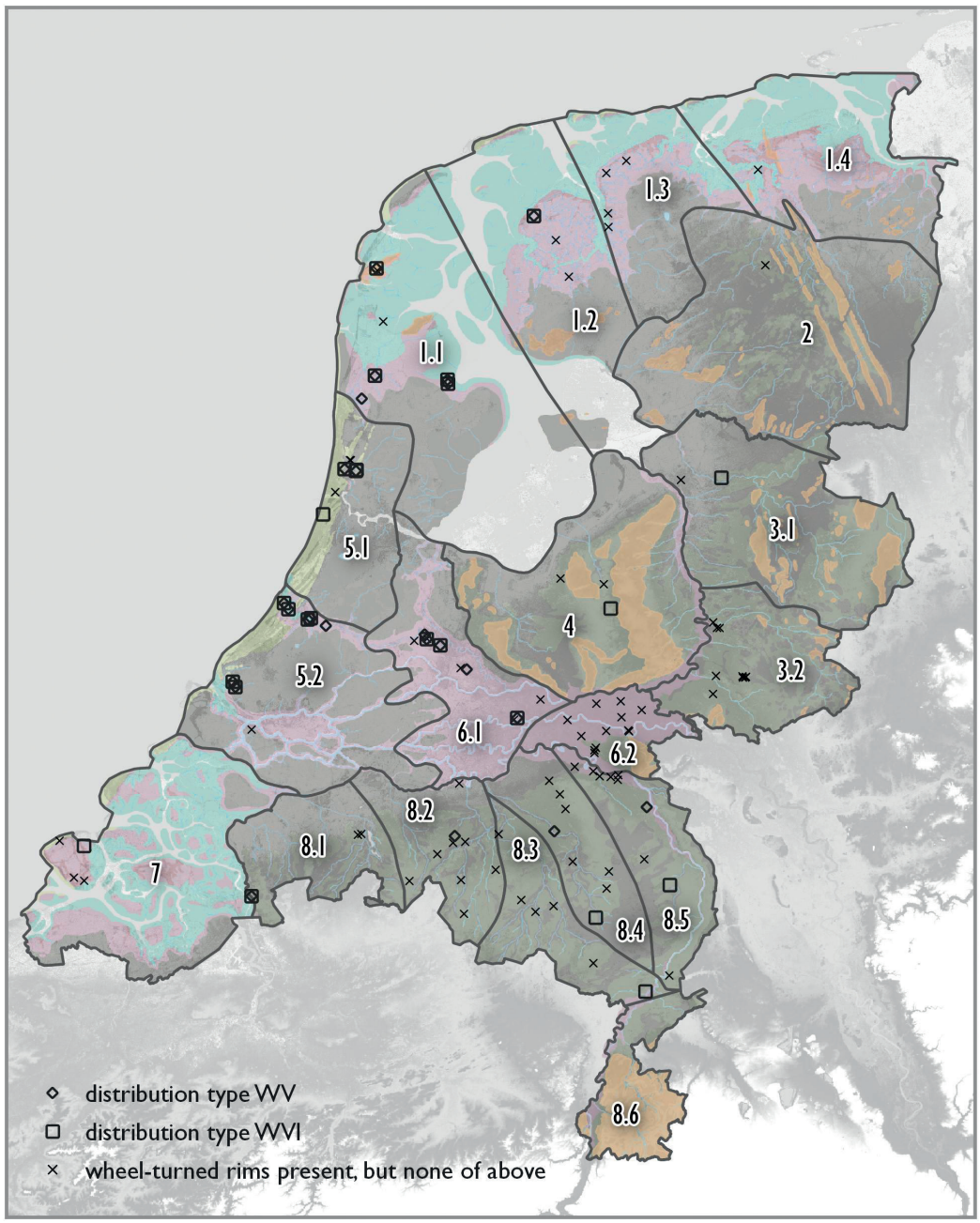


Fig. 4.36 Comparison of distributions of types WV and WVI.

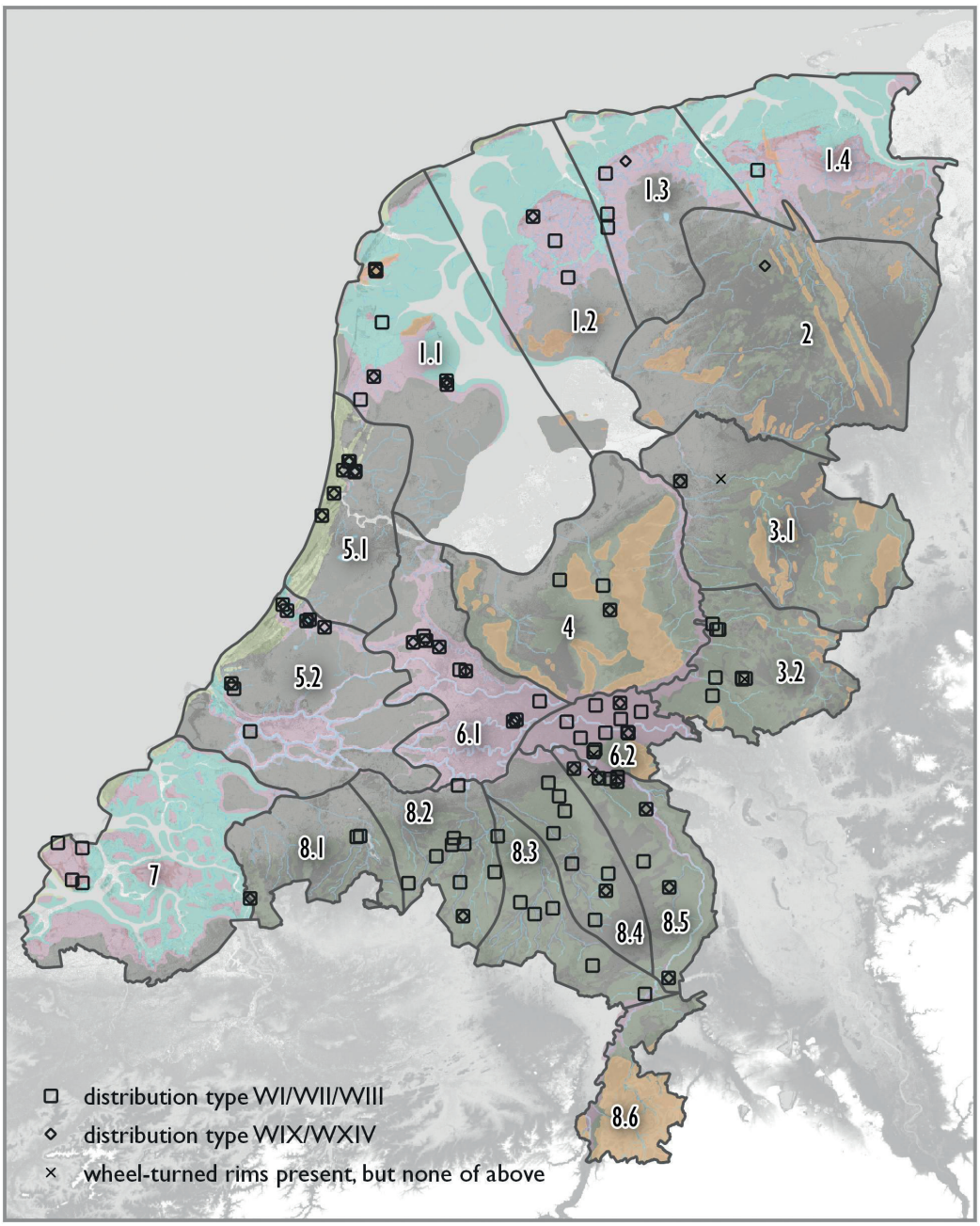


Fig. 4.37 Site where at least one example of either type WI/II/III has been found, and those where either WIX or WXIV has been discovered.

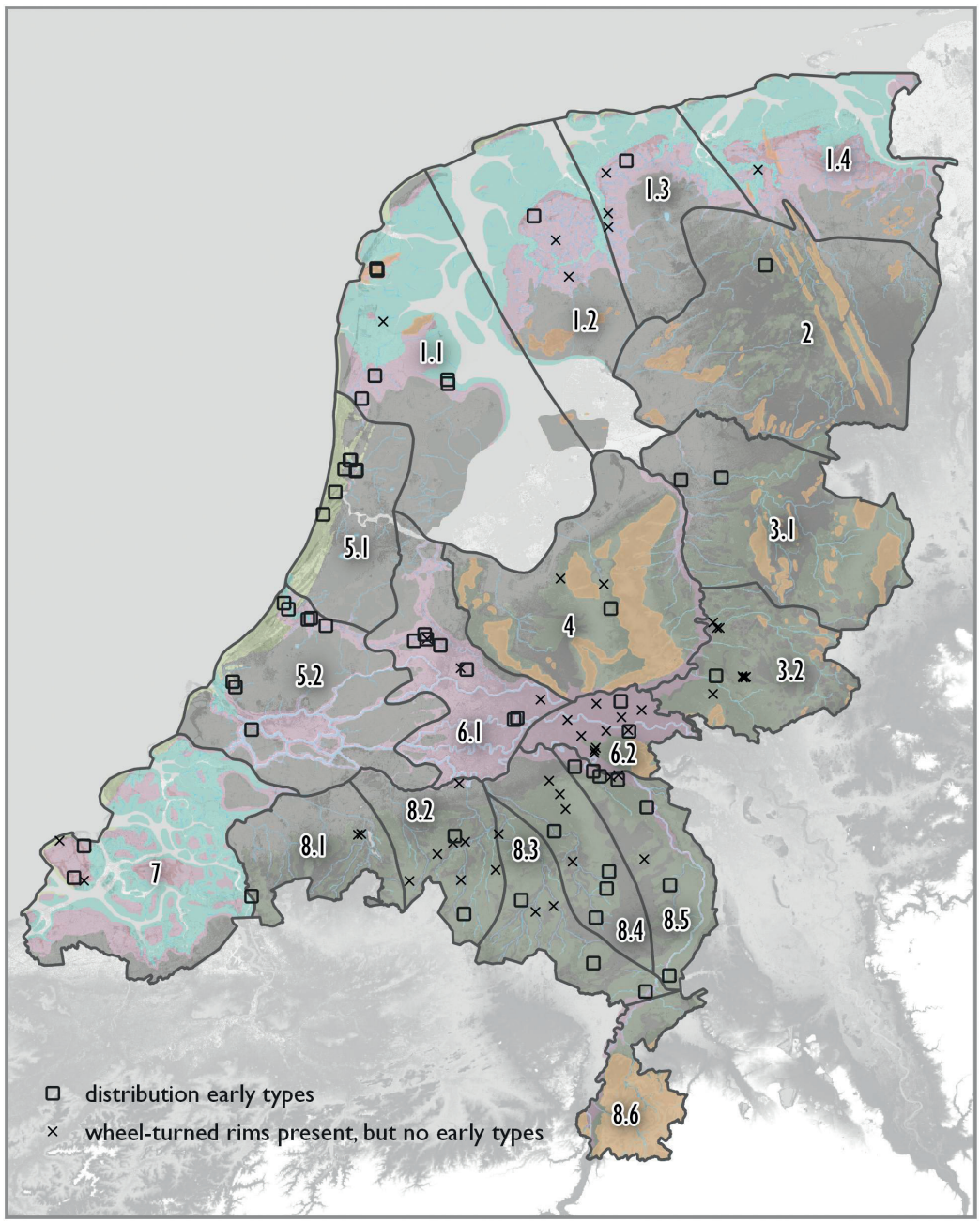


Fig. 4.38 Sites where 'early' types have been found.

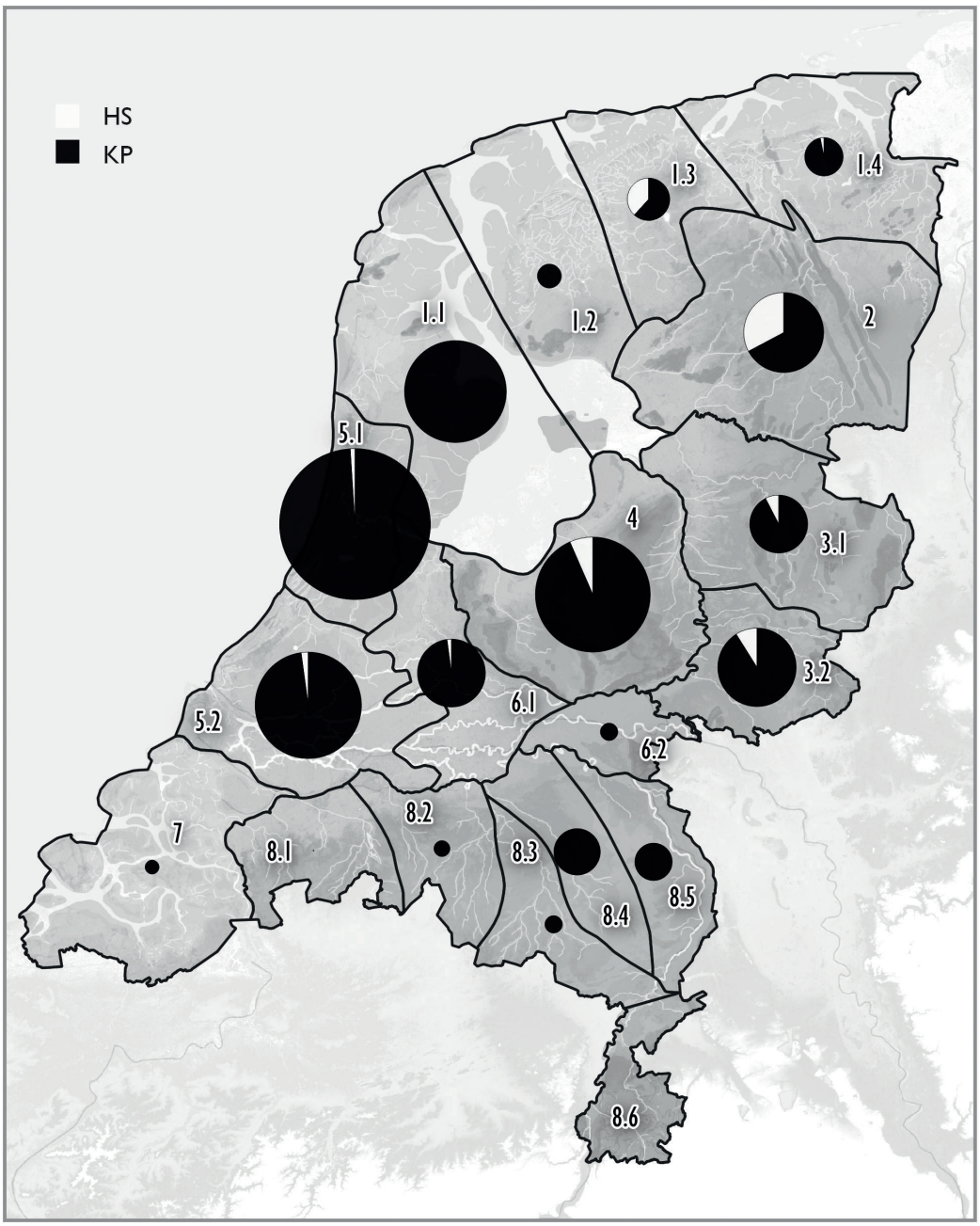


Fig. 4.39 Proportions Hessens-Schortens and Kugeltopf per subregion.

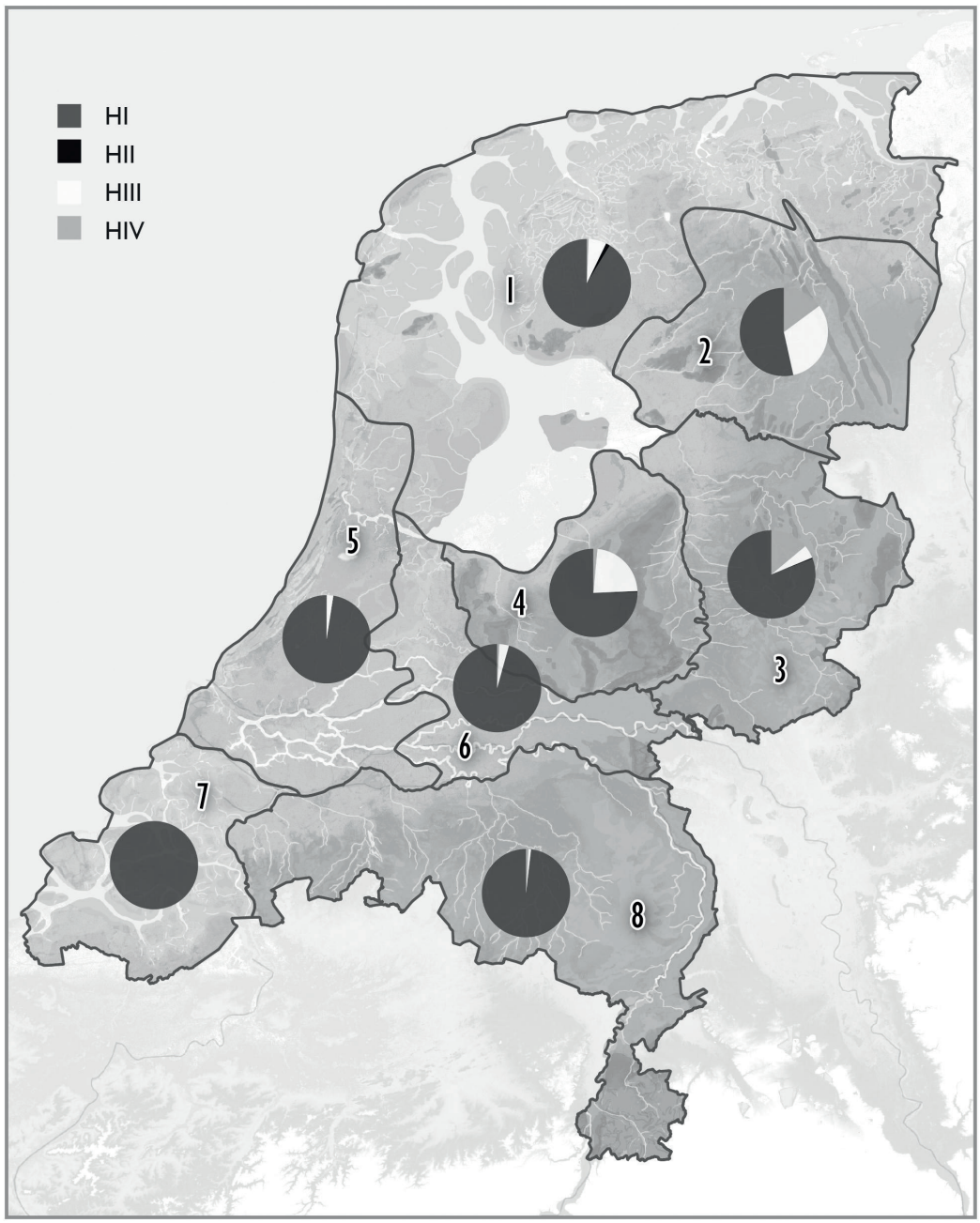


Fig. 4.40 Proportion of handmade types per regio.

4.7.4 Fabrics

At least one of the Vorgebirge fabrics has been identified at virtually all sites where wheel-turned pottery has been recovered (see appendix II for the distribution and relative frequency of individual fabrics per site). At the few sites where this was not the case either MAY fabrics were present or the fabrics of ceramics were not published (fig. 4.41). The fabrics assigned to BAD in the Dorestad fabric-system account for the greatest number and distribution of the Vorgebirge fabrics, other wares from the production centre occur less commonly both in terms of volume per site and their distribution. Ceramics in MAY fabrics exhibit an almost equally widespread distribution, though in virtually every case they are less frequent than BAD fabrics when found at the same sites. Also, BAD fabrics appear to have had a wider distribution, particularly in some of the more outlying areas of the research area. For example in the northeast and northwest of region 1 and the east of region 3 BAD occurs more often without accompanying MAY fabrics. The same is true of three of the four sites in region 7 which yielded ceramic finds. To a degree the fact that MAY and BAD fabrics are so ubiquitous on Carolingian sites will be due to them being an important, if not the only means of dating some sites to the period. For small-scale excavations where buildings may not be present or not recognisable, finding these ceramics might be the only way to determine whether features should be dated to the Carolingian period. Nonetheless, the fact that no site has been dated to the Carolingian period based on the find of another identifiable fabric of wheel-turned pottery seems to suggest ceramics in BAD and to a slightly lesser extent MAY fabrics were indeed one of the few choices of ceramics available. In other words, there appears to have been limited choice when it comes to wheel-turned vessels for inhabitants of the research area. In comparison, the sherds of ceramics designated WALB (w3, w4 and w8) are much less widely dispersed. They are completely absent on many sites in region 1 and 3, and do not occur in the eastern part of region 6, the adjacent part of region 8 or in region 7 (table 4.17/18).

The relationship between the three main fabric groups, BAD, MAY and WALB and the main vessel types WIIx, WIIy and WIII is shown in table 4.19 (also fig. 4.43). First, MAY and WALB are almost exclusively associated with vessel type WIII. Not only that, at almost every site globular pots mostly occur in MAY fabric. Even when BAD and WALB are combined the picture does not change much. The implication is that the higher proportions of Badorf sherds are mostly caused by the fact that the Vorgebirge production sites exported a wider array of vessels,[184] not that their wares were more in demand per se. The figures in table 4.19 do not reveal a chronological component to the preference for MAY cooking pots. Both relatively early and late sites show predominantly MAY fabric in combination with type WIII. However, a comparatively high amount of WALB may be an indicator for at least an early phase at a site given the figures for Bloemendaal (212) and Utrecht (525) where the excavated sections of the settlement are thought to have been abandoned by the ninth century.

Considering the consistency with which globular pots are predominantly found in MAY fabric on sites in the research area, variations in the proportions of sherds in BAD and MAY fabric at a regional level might be interpreted as variations in the importance of vessels other than type WIII in BAD fabric, even though rim-sherds have not actually been found. This should be especially true where early Vorgebirge types do not appear to have circulated, such as parts of region 3 and 8. Therefore, households in (sub)regions with particularly high proportions of BAD wares might have mainly been acquiring storage and pouring vessels from the Rhineland, rather than cooking pots

184 Some of which were also larger, producing a greater number of sherds when broken, assuming a similar degree of fragmentation.

(fig. 4.42/43, table 4.20). If this was indeed the case, it seems to have occurred particularly in the south of region 3 and the west of region 8.[185]

The two most common fabrics after the Rhineland wares, W13 and W14 are often believed to be closely related due to the similarities in vessel morphology of the types the fabrics occur in (fig. 4.44/45). In regions 5 and 6 they are frequently present at the same sites, in fact they both occur on most sites where ceramics have been recorded in these areas. However, in regions 3 and 8 the distributions of the two fabrics differs slightly. In the south of region 3 fabric W13 has been identified at quite a number of sites while W14 was only discovered at one. In the south there is a clear concentration of finds of both fabrics in the eastern half of region 8 and again W13 has a wider dispersal. The almost complete lack of either fabric in the east of region 6 is notable considering the frequency of their occurrence on sites in surrounding areas. When both fabrics have been discovered at the same site there seems to be a tendency for W14 to constitute a very high proportion on sites in region 8, and W13 to be comparatively more frequent (though not always dominant) on sites in other areas.

The distributions of less common fabrics are problematic to interpret but nonetheless some interesting observations can be made. Sherds of Tating-ware have been discovered at a limited number of sites, mostly along the coast. The highest number of sites containing the fabric lie in region 1, both in the north of the province of Noord-Holland, at Schagen-Waldervaart (169) and the two sites at Medemblik (164 and 170), as well as the west of Friesland, at Wijnaldum (18), Goutum (42) and Sneek (47). In region 5 it has been discovered at Valkenburg (155) and Naaldwijk (219), in region 6 at Kerk Avezaath-Stenen-Kamer/Linge and Buren-Huis Malburg (521 and 527). The fact that this kind of pottery has been discovered very seldom in general, but relatively often in the west of region 1 implies this is more than just a coincidence. The other Carolingian smooth-walled fabric W16 has a wider distribution even though the overall sherd-count is not much higher than for Tating-ware. Its distribution exhibits similarities with some of the less common vessel types, mostly along the Rhine. There are a few finds in regions 1 and 4 and none in region 2 or 3. The east of region 8 is relatively well represented while no W16 sherds have been recorded in the western half. In the north of region 5 the fabric shows a more limited distribution compared to that of other less common fabrics and types. The distribution of Carolingian regional production found

185 The areas with the lowest proportions of MAY are the east of region 1, the south of region 3, the west of region 6, region 7 and an area in the west of region 8 (Fig. 4. 42, Table 4.18, subregions 1.3/4; 3.2; 6.1; 8.2). The lack of MAY in the east of region 1 can be seen as something of an extension of the overall limited amount of wheel-turned pottery in region 2. It appears that in these areas there was either limited access to wheel-turned ceramics, or there was little need for them, especially of the kind that was already produced locally, namely globular cooking pots. The relatively low frequency of MAY in the west of region 6 is caused by its limited presence on two sites with very large assemblages (Buren-Huis Malburg (527) and Kerk Avezaath-Stenen Kamer/Linge (521)). But even when disregarded, the picture the remaining sites provide is mixed. Some sites have similarly low proportions of MAY while on others it is higher and more similar to sites along the Rhine in region 5.
Despite what was said above in relation to the numbers in table 4.19, the finds from sites in region 7 (and perhaps also Buren and Kerk Avezaath) are an indication that there is a chronological aspect to limited numbers of MAY sherds in assemblages. MAY has been identified in the region, but only at Serooskerke (165), the sole site to have yielded evidence for habitation in the eighth and early ninth century in the area. The absolute dating evidence from two of the other sites (Oost-Souburg (163) and Domburg (191)) point to habitation at the very end of our period. The data presented in section 4.7.1 also suggested not only MAY, but globular pots in general were in decline at that time.
On most sites in the south of region 3 and the west of region 8 BAD is dominant and WALB is completely lacking. By contrast the easterly areas in the region 8 (particularly subregion 8.4) contain sites where MAY is actually the more common fabric. A similar picture emerges from the adjacent eastern half of region 6. What these differences imply exactly is difficult to distil from a single piece of analysis such as this, but there do appear to be consistencies in the divergence between areas within regions.

on several sites in region 8 seems to be limited to the interior of the region, in other words sites at some distance from the Meuse. Although not believed to be a regional product the distribution of fabric W11 is mostly concentrated along the Rhine, roughly downstream from Wijk bij Duurstede, and at the mouth of the Meuse.

With regard to handmade pottery, the two most common kinds of fabric are grit-tempered (h1) and shell-tempered wares (h2) (table 4.21). The handmade ceramics in use on most sites in region 8 have been categorised as a separate group, Southern-Netherlands handmade pottery (hsn). While grit-tempered ceramics are common in all regions barring region 8, shell-tempered pottery has a more selective distribution. It is found on the vast majority of sites in regions 1, 4, 5, 7 and the west of region 6. It has also been recognised at Zwolle (61) in region 3 near the mouth of the IJssel, as well as three sites in the north of region 2. This distribution suggests a relationship between proximity to the coast and the availability of shell-tempered ware, the coast including the shores of the Almere. As such this observation is not novel, but the contrast between the omnipresence in coastal areas and virtual absence inland is striking. The proportion of shell-tempered wares in relation to the entire handmade assemblage on sites is quite varied and does not point to much regional differentiation (fig. 4.46/47). A number of sites with high proportions of shell-tempered sherds have quite small assemblages which could easily be skewed by finds from a single context (for example Buren-Huis Malburg (527), Houten-Loerik (524) or Goutum (42)). If these sites are ignored, in regions 5 and 6 the percentages of shell-tempered sherds among the handmade pottery lie roughly between 3 and 12%, while in region 1 the picture is more mixed. Some sites have percentages below 10% while others easily exceed a quarter of the total assemblage. In region 4, though all three sites for which the ceramics have been recorded yielded shell-tempered sherds, in each case they represent only a fraction of a percent of the total. For the three sites in region 2 where shell-tempered sherds were recorded two allowed the calculation of percentages, 14% at Peelo and 17% at Midlaren, in other words in line with what we find in region 1.

Region 7 stands out because two of the three sites where handmade pottery has been recorded contained no grit-tempered sherds but rather examples with sand or shell-temper. This once more points to the relatively late date of the sites in region 7. Only a small number of grit-tempered sherds from the Domburg site were assigned to the Carolingian phase. However, much of the wheel-turned Carolingian pottery was discovered in topsoil. It is not unlikely that a portion of the sand-tempered pottery from the topsoil also belongs to the ninth century habitation phase.

Southern Netherlands handmade ceramics are strictly speaking not a fabric but a general term for a combination of technological and morphological aspects of handmade ceramics, specific for the Meuse-Demer-Scheldt region. A characteristic which all fabrics that fall under this term seem to share is that they are sand-tempered rather than grit-tempered.[186] What stands out in the distribution of Southern Netherlands handmade pottery is that it is not found on sites along the Meuse River (subr. 8.5). In that section of region 8 grit-tempered sherds similar to those in other regions have predominantly been discovered. Schotten, has suggested that tenth/eleventh century KUG in Limburg is more similar to examples from above the Rhine and dissimilar to Southern

186 Verhoeven 1993, 75-76.

Netherlands handmade pottery based on finds from Venlo and Venray.[187] Sites along the Meuse in our dataset suggest this may have also been the case in the (late-) Carolingian period.[188]

Category/Region	1	2	3	4	5	6	7	8	Total
MA	2	-	-	-	15	-	1	1	19
BAD	751	5	270	1129	5711	7271	167	2361	17665
HU	-	-	5	-	19	138	53	39	254
KD	9	-	7	17	1631	193	-	145	2002
KGL	5	-	-	3	39	18	-	11	76
KR	-	-	-	-	-	-	-	66	66
LBAD	7	-	31	12	151	1036	7	64	1308
MAY	572	7	69	459	3259	1905	30	1125	7426
RBA	49	-	73	2	269	738	29	120	1280
TAT	9	-	-	-	9	26	-	1	45
W11	-	-	3	-	67	48	-	2	120
W13	21	-	7	-	360	104	-	79	571
W14	34	-	4	132	262	85	14	114	645
W17	1	-	-	-	-	-	-	1	2
WALB	52	-	5	92	587	574	-	192	1502
WALR	-	-	1	-	18	25	-	6	50
Total	1512	12	475	1846	12397	12161	301	4327	33031

Table 4.17 Number of sherds per fabric per region.

Category/Region	1	2	3	4	5	6	7	8	Total
MA	0.1%	-	-	-	0.1%	-	0.3%	-	0.1%
BAD	50.0%	41.7%	57.7%	61.7%	53.0%	60.8%	55.5%	56.5%	56.9%
HU	-	-	1.1%	0.0%	0.2%	1.2%	17.6%	0.9%	0.8%
KGL	0.3%	-	-	0.2%	0.4%	0.2%	-	0.3%	0.2%
KR	-	-	-	-	-	-	-	1.6%	0.2%
LBAD	0.5%	-	6.6%	0.7%	1.4%	8.7%	2.3%	1.5%	4.2%
MAY	38.1%	58.3%	14.7%	25.1%	30.3%	15.9%	10.0%	26.9%	23.9%
RBA	3.3%	-	15.6%	0.1%	2.5%	6.2%	9.6%	2.9%	4.1%
TAT	0.6%	-	-	-	0.1%	0.2%	-	-	0.1%
W11	-	-	0.6%	-	0.6%	0.4%	-	-	0.4%
W13	1.4%	-	1.5%	-	3.3%	0.9%	-	1.9%	1.8%
W14	2.3%	-	0.9%	7.2%	2.4%	0.7%	4.7%	2.7%	2.1%
W17	0.1%	-	-	-	-	-	-	-	<0.1%
WALB	3.5%	-	1.1%	5.0%	5.5%	4.8%	-	4.6%	4.8%
WALR	-	-	0.2%	-	0.2%	0.2%	-	0.1%	0.2%

Table 4.18 Percentage of sherds per fabric per region.

187 Schotten 2012, 137-138.

188 Grit-tempered ceramics have been identified at some other sites more inland in region 8. At the sites Uden-A50 (101) and Nistelrode (120) only one grit-tempered sherd each was assigned to the Carolingian period making it difficult to determine whether the finds can be linked to the situation on the Meuse valley sites in the adjacent part of the region, or are simply anomalies.

Finally, as already mention in the section on types, there is a considerable difference between the amount of handmade ceramics found in association with Carolingian structures in the east and the west of region 8. The amount at the three more westerly sites does not exceed 10 fragments, while five of the seven sites in the east of the region have between 77 and 645 sherds. In both groups several of the larger settlements in the region are represented, so intensity of habitation or size of excavation would not appear to explain the differences in the volume of sherds.

			BAD			MAY			WALB			TOT
Region	Site N	Site	WIII	WIIx	WIIy	WIII	WIIx	WIIy	WIII	WIIx	WIIy	
1	169	Schagen	6	3	7	33	-	-	10	-	-	59
	18	Wijnaldum	12	14	33	72	-	-	37	-	-	168
	47	Sneek	-	2	1	-	-	-	1	-	-	4
3	35	Hummelo	1	1	-	8	-	-	-	-	-	10
	532	Warnsveld	-	1	-	6	-	-	-	-	-	7
4	530	Uddel	2	3	3	12	-	1	7	-	-	28
	538	Putten	9	-	1	-	-	-	-	-	-	10
5	159	Castricim	3	2	-	12	-	-	-	-	-	17
	160	Limmen	-	14	10	-	-	-	-	-	-	24
	161	Uitgeest	293	442	15	264	-	-	3	-	-	1017
	172	Wijk aan Zee	3	-	6	7	-	-	4	-	-	20
	175	Uitgeest	3	14	-	19	-	-	7	-	-	43
	212	Bloemendaal	2	6	38	60	-	-	22	-	-	128
	48	De Lier	4	-	-	6	-	-	2	-	-	12
	155	Valkenburg	60	75	28	172	4	4	54	1	1	399
	157	Leiden	40	7	12	39	-	-	14	2	-	114
	158	Leiderdorp	55	72	18	88	-	-	2	1	1	237
	197	Katwijk	1	1	-	4	-	-	-	-	-	6
	219	Naaldwijk	16	1	1	45	-	-	7	-	-	70
	221	Spijkenisse	1	1	-	3	-	-	1	-	-	6
6	216	Harmelen	13	1	-	-	-	-	-	-	-	14
	521	Kerk Avezaath	29	57	21	55	-	-	6	-	-	168
	525	Utrecht	18	17	5	61	-	-	69	-	-	170
	526	Vleuten	35	9	6	27	-	-	4	-	-	81
	527	Buren	46	81	37	119	-	-	16	-	-	299
	540	Houten	3	2	18	18	-	-	2	-	-	43
	500	Lent	1	-	-	2	-	-	-	-	-	3
	501	Wijchen	-	1	1	-	-	-	-	-	-	2
	502	Lent	5	-	2	9	-	-	-	-	-	16
	511	Beuningen (Gld.)	-	4	-	-	-	-	-	-	-	4
	515	Zetten	1	2	1	-	-	-	-	-	-	4
	549	Huissen	3	1	-	1	-	-	-	-	-	5
7	165	Serooskerke	1	1	3	2	-	-	-	-	-	7
8	204	Breda	-	3	-	4	-	-	-	-	-	7
	50	Berkel-Enschot	-	2	-	-	-	-	-	-	-	2
	68	Herpt	-	10	-	-	-	-	-	-	-	10
	106	Alphen	-	-	-	3	-	-	-	-	-	3
	107	Hulsel	-	4	1	1	-	-	-	-	-	6
	139	Berkel-Enschot	-	-	-	2	-	-	-	-	-	2

			BAD			MAY			WALB			TOT
Region	Site N	Site	WIII	WIIx	WIIy	WIII	WIIx	WIIy	WIII	WIIx	WIIy	
	140	Tilburg	9	6	7	9	-	-	2	-	-	33
	203	Oirschot	-	2	-	3	-	-	-	-	-	5
	102	Veldhoven	-	1	1	3	-	-	-	-	-	5
	132	Geldrop	-	-	1	4	-	-	-	-	-	5
	64	Heesch	-	-	-	4	-	-	-	-	-	4
	101	Uden	-	1	-	4	-	-	-	-	-	5
	120	Nistelrode	8	8	-	12	-	-	-	-	-	28
	124	Deurne	1	1	-	2	-	-	-	-	-	4
	125	Veghel	3	1	-	4	-	-	1	-	-	9
	146	Someren	10	1	2	18	-	-	3	-	-	34
	202	Milheeze	-	2	-	4	-	-	-	1	-	7
	59	Swalmen	4	-	-	3	-	-	-	-	-	7
	104	Beugen	1	3	9	5	-	-	6	-	-	24
	128	Escharen	-	7	-	-	-	-	-	-	-	7
	142	Beers	3	6	1	13	-	-	-	-	-	23
	150	Meterik	8	10	-	19	-	-	6	-	-	43
Total			**717**	**908**	**295**	**1267**	**4**	**5**	**286**	**5**	**2**	**3489**

Table 4.19 Number of sherds found per site in types WIIx, WIIy and WIII, in BAD, MAY and WALB fabric.

		BAD		MAY		WALB		Total
Region	Subregion	N	%	N	%	N	%	
1	**1.1**	590	55.4%	462	43.4%	13	1.2%	1065
	1.2	128	46.9%	106	38.8%	39	14.3%	273
	1.3	21	84.0%	4	16.0%	-	0.0%	25
	1.4	12	100.0%	-	0.0%	-	0.0%	12
2	**2**	5	41.7%	7	58.3%	-	0.0%	12
3	**3.1**	25	69.4%	11	30.6%	-	0.0%	36
	3.2	245	79.5%	58	18.8%	5	1.6%	308
4	**4**	1129	67.2%	459	27.3%	92	5.5%	1680
5	**5.1**	1787	67.9%	677	25.7%	166	6.3%	2630
	5.2	3924	56.6%	2582	37.3%	421	6.1%	6927
6	**6.1**	7062	75.6%	1708	18.3%	574	6.1%	9344
	6.2	209	51.5%	197	48.5%	-	0.0%	406
7	**7**	167	84.8%	30	15.2%	-	0.0%	197
8	**8.1**	67	59.3%	46	40.7%	-	0.0%	113
	8.2	819	78.7%	181	17.4%	41	3.9%	1041
	8.3	170	69.7%	70	28.7%	4	1.6%	244
	8.4	704	51.5%	616	45.1%	47	3.4%	1367
	8.5	601	65.8%	212	23.2%	100	11.0%	913
Total		**17665**	**66.4%**	**7426**	**27.9%**	**1502**	**5.6%**	**26593**

Table 4.20 Sherd-count and percentages of BAD, MAY and WALB fabrics per subregion.

Region	Site Nr	h1		h1s		h2		h3		hsn	
		N	%	N	%	N	%	N	%	N	%
1	14	397	64.2%	-	0.0%	218	35.3%	3	0.5%	-	0.0%
	15	46	46.0%	1	1.0%	53	53.0%	-	0.0%	-	0.0%
	19	659	90.3%	-	0.0%	47	6.4%	24	3.3%	-	0.0%
	20	5	19.2%	-	0.0%	21	80.8%	-	0.0%	-	0.0%
	21	90	60.4%	-	0.0%	55	36.9%	4	2.7%	-	0.0%
	23	109	87.9%	-	0.0%	15	12.1%	-	0.0%	-	0.0%
	38	19	76.0%	-	0.0%	6	24.0%	-	0.0%	-	0.0%
	39	191	90.5%	1	0.5%	18	8.5%	1	0.5%	-	0.0%
	40	19	100.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%
	42	-	0.0%	-	0.0%	4	100.0%	-	0.0%	-	0.0%
	47	258	82.7%	-	0.0%	39	12.5%	15	4.8%	-	0.0%
	49	32	91.4%	-	0.0%	2	5.7%	1	2.9%	-	0.0%
	169	1585	91.5%	-	0.0%	148	8.5%	-	0.0%	-	0.0%
	217	81	100.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%
2	2	848	73.1%	1	0.1%	192	16.6%	119	10.3%	-	0.0%
	4	3518	100.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%
	7	124	100.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%
	10	13	100.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%
	13	78	98.7%	-	0.0%	-	0.0%	1	1.3%	-	0.0%
	66	42	8.2%	244	47.6%	0	0.0%	227	44.2%	-	0.0%
3	27	5	100.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%
	35	63	22.3%	92	32.6%	1	0.4%	126	44.7%	-	0.0%
	41	29	76.3%	6	15.8%	-	0.0%	3	7.9%	-	0.0%
	45	-	0.0%	26	43.3%	-	0.0%	34	56.7%	-	0.0%
	46	632	99.8%	-	0.0%	-	0.0%	1	0.2%	-	0.0%
	532	136	100.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%
	534	908	99.9%	-	0.0%	-	0.0%	1	0.1%	-	0.0%
	535	13	100.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%
	536	42	100.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%
4	507	67	90.5%	-	0.0%	1	1.4%	6	8.1%	-	0.0%
	529	4570	99.9%	-	0.0%	6	0.1%	-	0.0%	-	0.0%
	530	2644	100.0%	-	0.0%	1	0.0%	-	0.0%	-	0.0%
	538	206	99.5%	-	0.0%	1	0.5%	-	0.0%	-	0.0%
5	48	15	100.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%
	155	2725	89.0%	-	0.0%	149	4.9%	189	6.1%	-	0.0%
	157	148	96.1%	-	0.0%	6	3.9%	-	0.0%	-	0.0%
	158	1409	77.8%	8	0.4%	144	8.0%	250	13.8%	-	0.0%
	159	611	93.4%	1	0.2%	4	0.6%	38	5.8%	-	0.0%
	161	389	96.0%	-	0.0%	16	4.0%	-	0.0%	-	0.0%
	172	-	0.0%	-	0.0%	393	100.0%	-	0.0%	-	0.0%
	175	76	95.0%	-	0.0%	3	3.8%	1	1.3%	-	0.0%
	197	1	100.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%
	212	857	95.0%	-	0.0%	34	3.8%	11	1.3%	-	0.0%
	219	131	58.0%	3	1.3%	7	3.1%	85	37.6%	-	0.0%
	221	42	51.9%	-	0.0%	39	48.1%	-	0.0%	-	0.0%
6	185	151	100.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%
	200	6	75.0%	-	0.0%	2	25.0%	-	0.0%	-	0.0%
	501	16	100.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%
	502	35	100.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%

Region	Site Nr	h1		h1s		h2		h3		hsn	
		N	%	N	%	N	%	N	%	N	%
	524	2	25.0%	-	0.0%	6	75.0%	-	0.0%	-	0.0%
	525	1076	84.3%	11	0.9%	166	13.0%	23	1.8%	-	0.0%
	526	142	93.4%	4	2.6%	6	3.9%	-	0.0%	-	0.0%
	540	352	98.3%	-	0.0%	-	0.0%	6	1.7%	-	0.0%
	548	-	0.0%	-	0.0%	-	0.0%	1	100.0%	-	0.0%
7	**165**	-	0.0%	-	0.0%	7	26.9%	19	73.1%	-	0.0%
	166	-	0.0%	-	0.0%	1	1.9%	52	98.1%	-	0.0%
	191	8	100.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%
8	**50**	17	100.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%
	67	2	100.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%
	68	-	0.0%	-	0.0%	-	0.0%	17	100.0%	-	0.0%
	101	1	100.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%
	107	24	100.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%
	110	-	0.0%	-	0.0%	-	0.0%	-	0.0%	134	100.0%
	117	-	0.0%	-	0.0%	-	0.0%	-	0.0%	3	100.0%
	120	1	1.2%	-	0.0%	-	0.0%	76	90.5%	7	8.3%
	124	-	0.0%	-	0.0%	-	0.0%	10	3.5%	278	96.5%
	128	80	100.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%
	132	-	0.0%	-	0.0%	-	0.0%	-	0.0%	170	100.0%
	139	-	0.0%	-	0.0%	-	0.0%	-	0.0%	10	100.0%
	140	-	0.0%	-	0.0%	-	0.0%	-	0.0%	8	100.0%
	141	2	100.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%
	146	-	0.0%	-	0.0%	-	0.0%	-	0.0%	645	100.0%
	150	40	37.7%	-	0.0%	-	0.0%	66	62.2%	-	0.0%
	202	-	0.0%	-	0.0%	-	0.0%	-	0.0%	77	100.0%
	204	-	0.0%	-	0.0%	-	0.0%	-	0.0%	1	100.0%
Total		**25788**	**83.9%**	**398**	**1.3%**	**1811**	**5.9%**	**357**	**1.2%**	**1333**	**4.3%**

Table 4.21 Sherd-count and percentages of fabrics used in handmade vessels per region and per site.

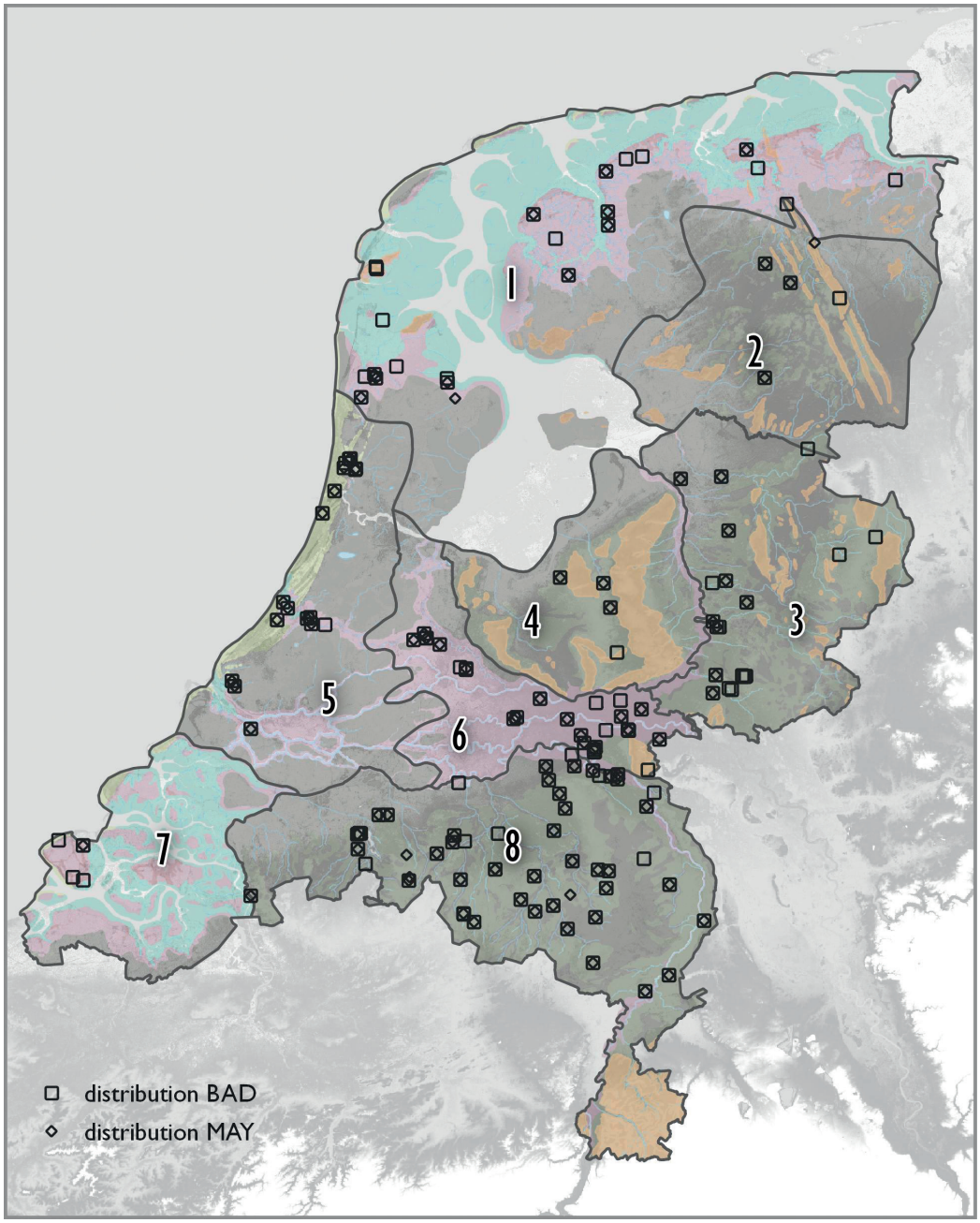


Fig. 4.41 Comparison of distributions of BAD and MAY fabrics.

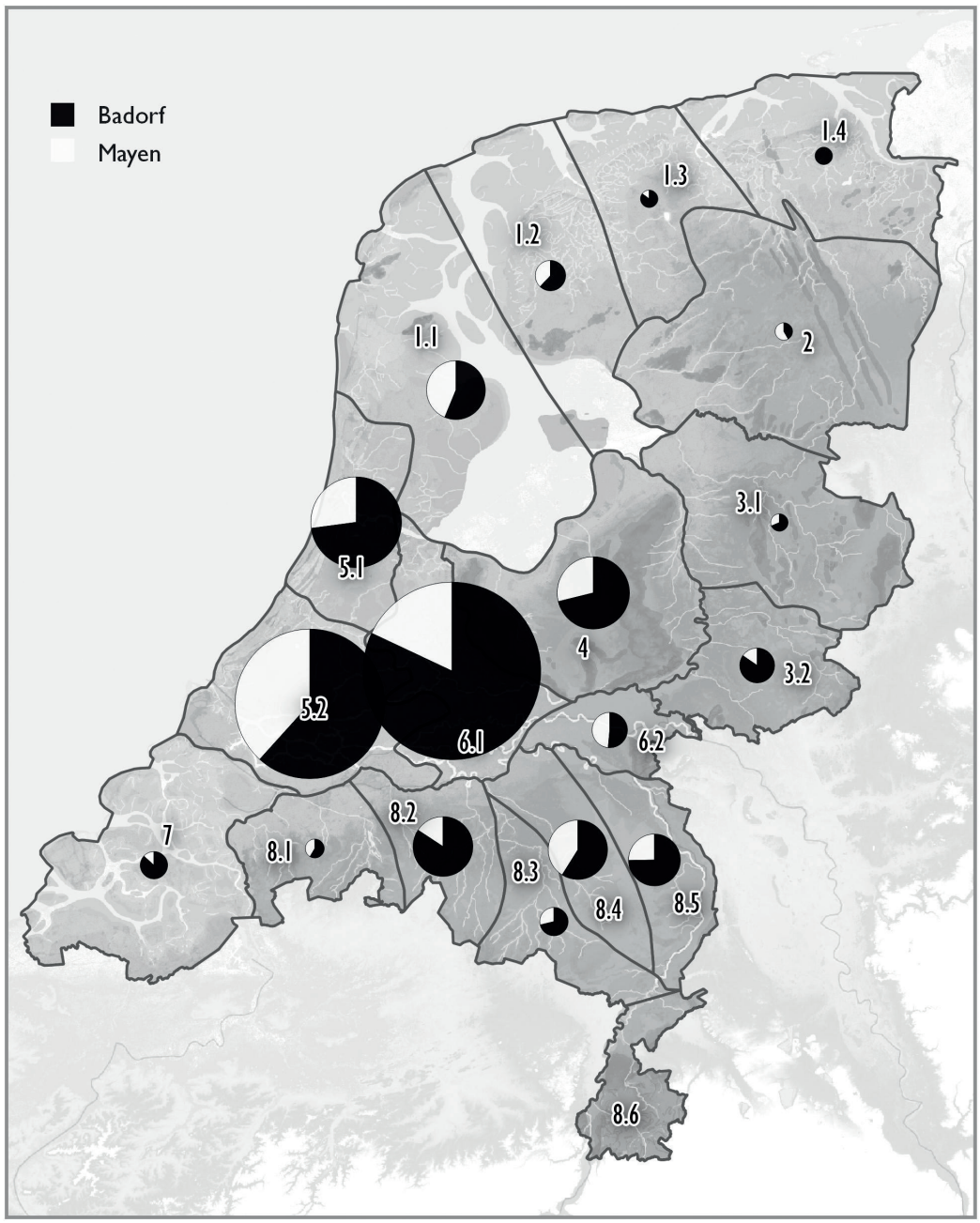


Fig. 4.42 Relative amount of BAD and MAY fabrics per subregion.

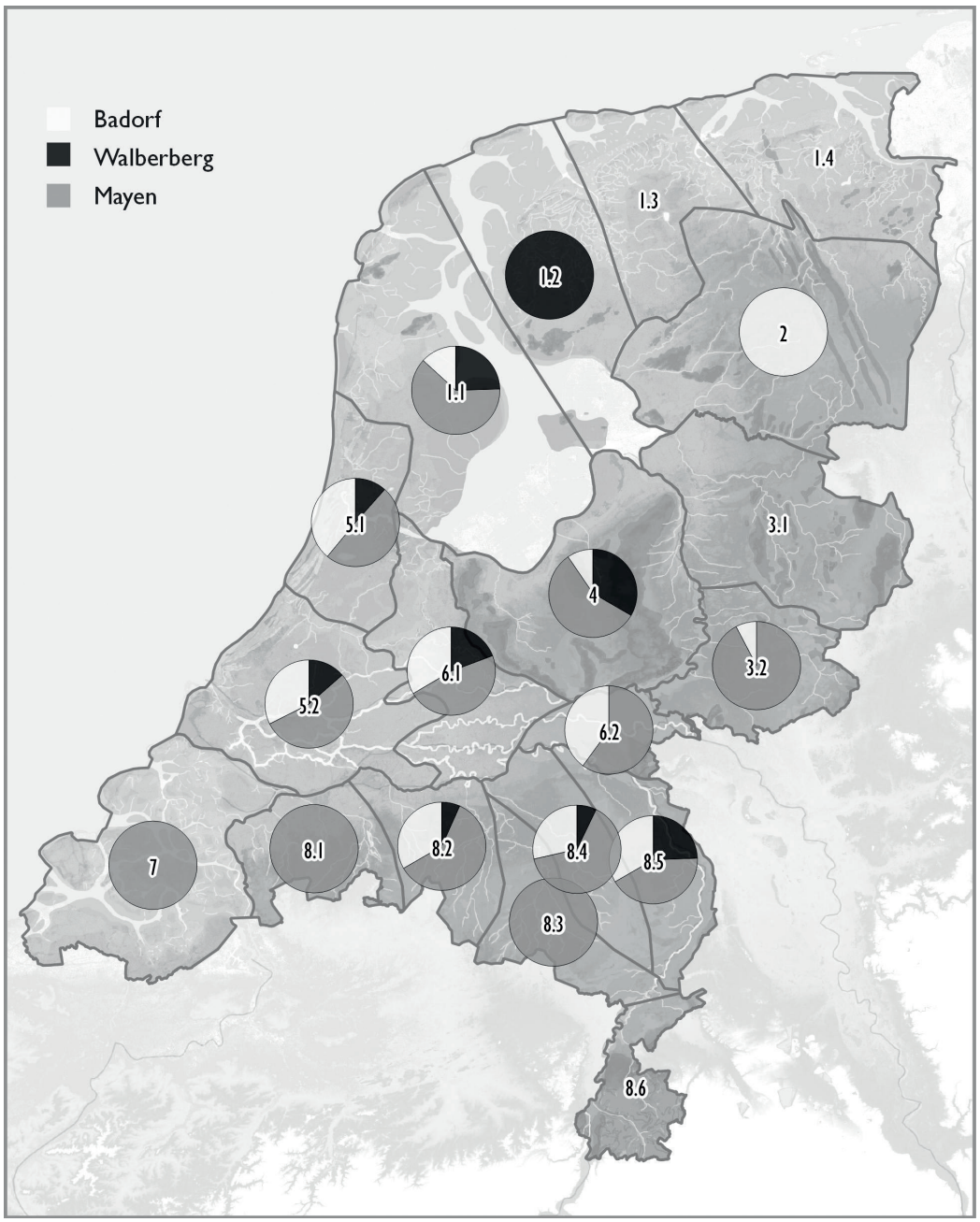


Fig. 4.43 Relative amount of BAD, MAY and WALB fabrics among type WIII vessels per subregion.

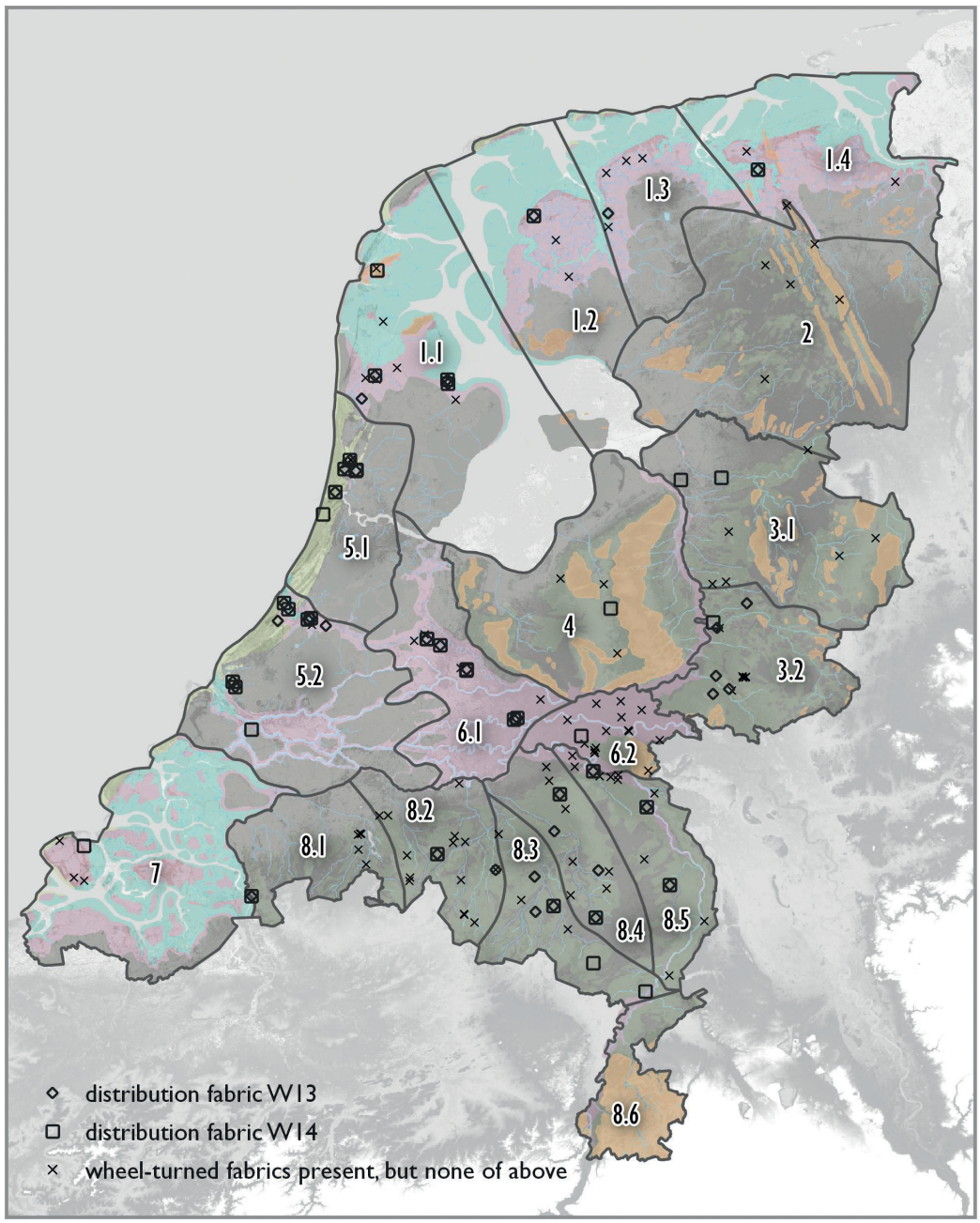


Fig. 4.44 Comparison of distributions of W13 and W14 fabrics.

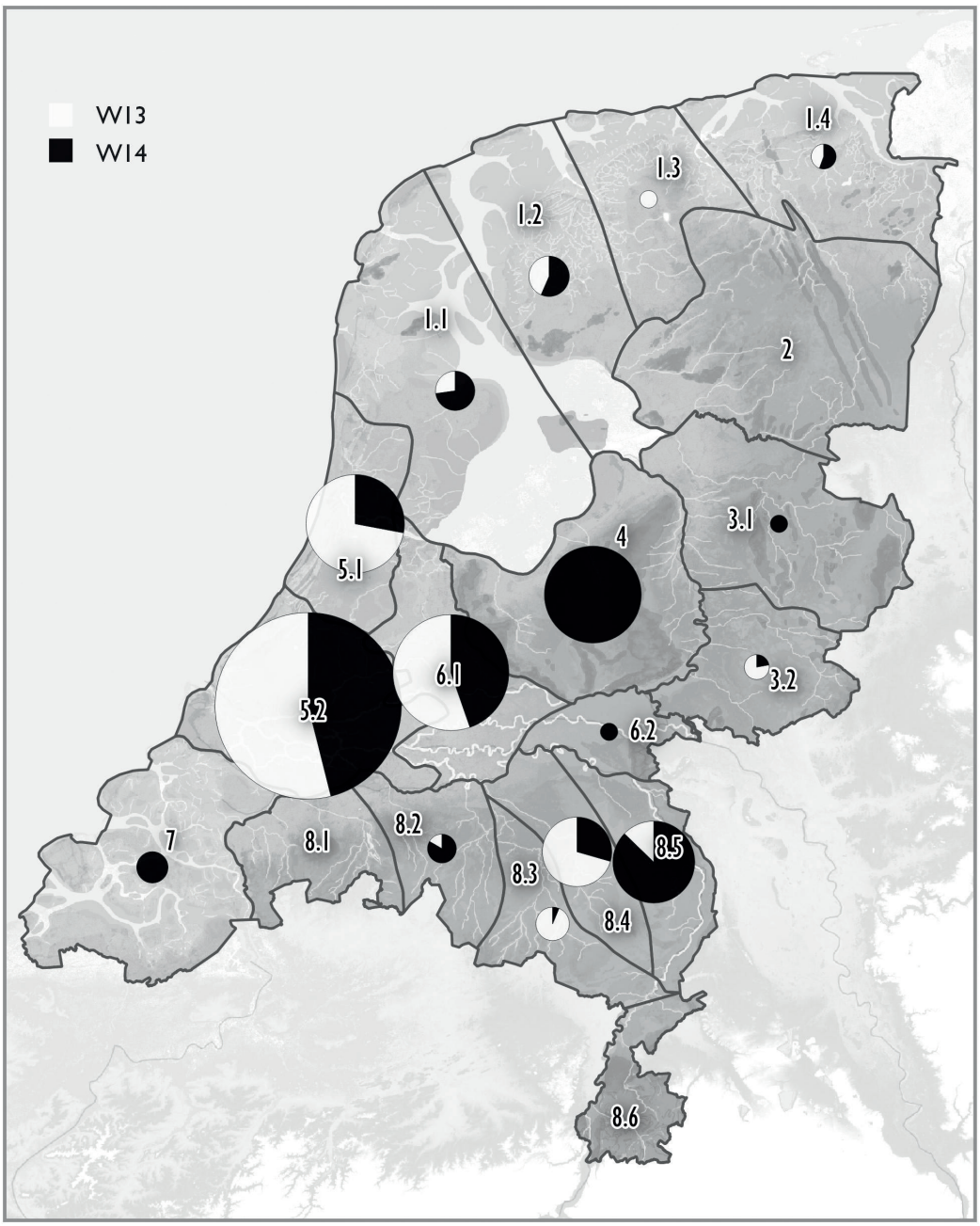


Fig. 4.45 Relative amount of W13 and W14 per subregion. The size of the charts is relative to the total number of W13 and W14 sherds in the inventory.

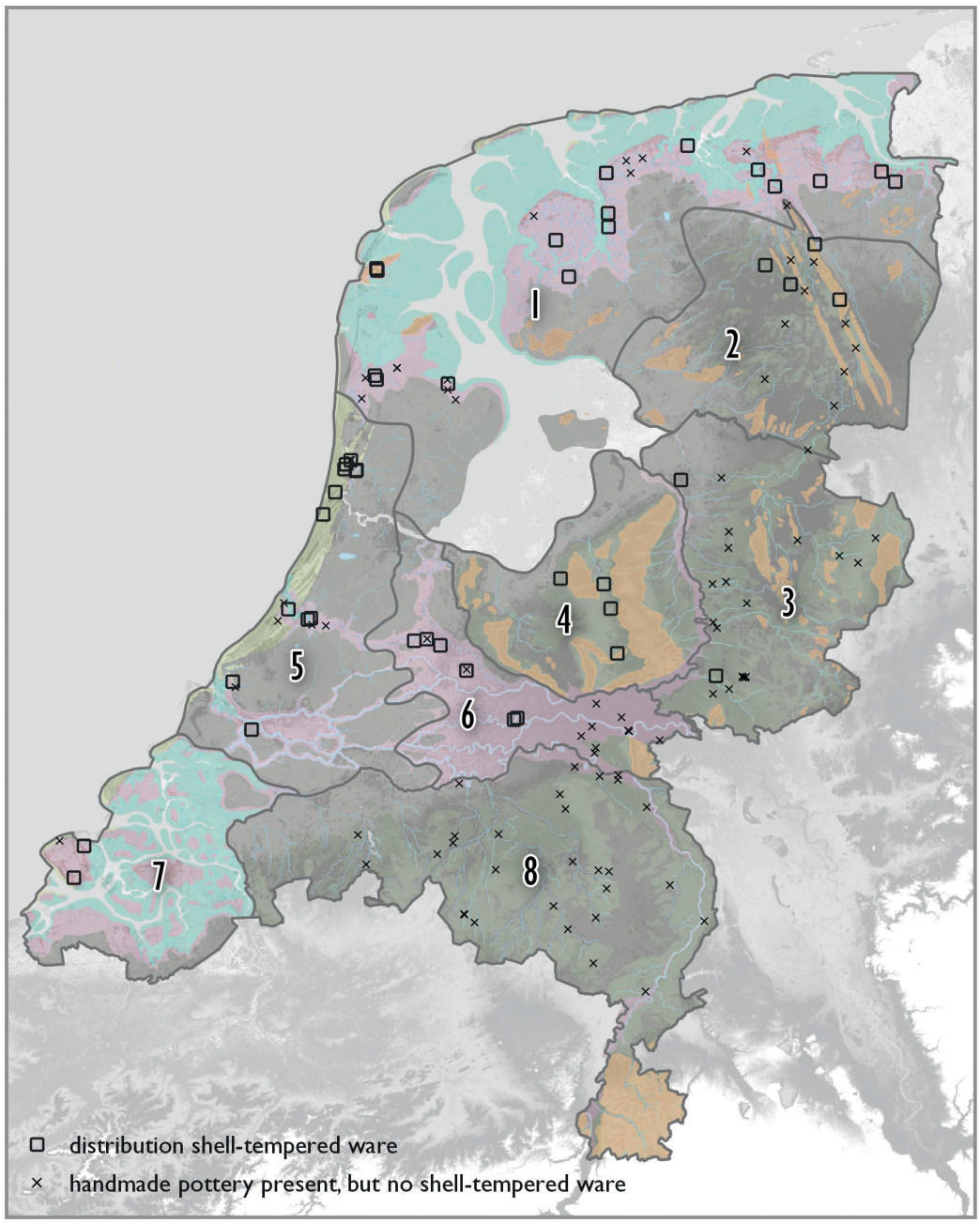


Fig. 4.46 Distribution of shell tempered ware in the research area.

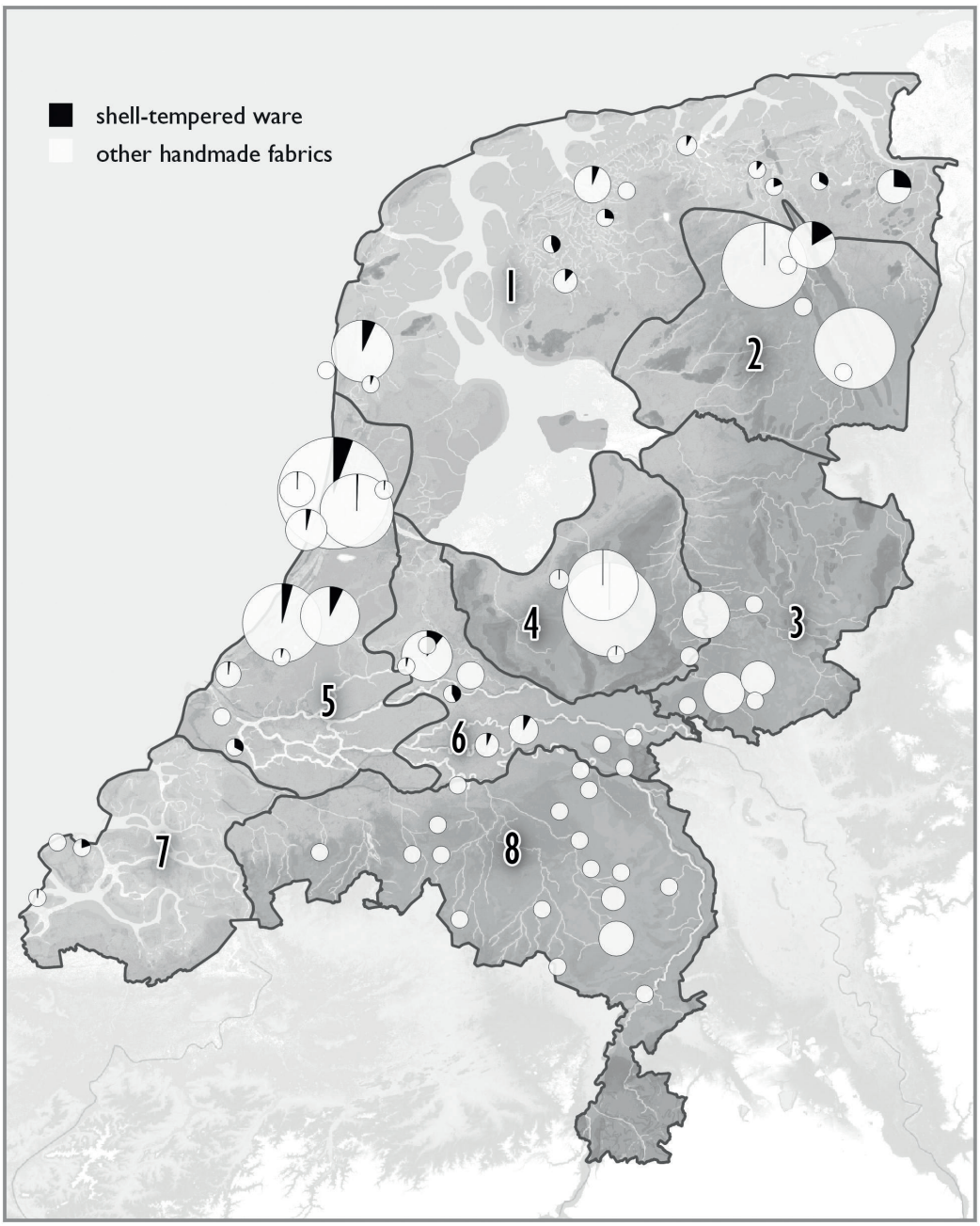


Fig. 4.47 Proportion of shell-tempered ware compared to all other handmade fabrics per site. The size of the charts is relative to the total number of handmade sherds in the inventory.

4.7.5 Groups according to function and provenance

As already discussed, the division of ceramics into types is mostly an analytical tool. The same can be said for fabrics. What we are really interested in within the context of this study is the kind of vessels that were circulating on rural sites in the research area and where they came from. To this purpose the bulk of types can be reduced to four function groups: cooking, storage, tableware and pouring (table 4.22). Some ascriptions of types to a particular category might be debatable and pouring vessels could also be considered tableware. However, a degree of simplification was necessary in order to be able to make comparisons. Fabrics have been assigned to eight provenance groups (table 4.23). First the two characteristics, function and provenance, will be examined separately and then combined in order to track developments in the relationship between function groups and provenance.

Function category	Types
Cooking	WIII, WV, WVI, WIX, WXIVD/K, HI, HIII
Storage	WI, WIIx, WXIVA/C
Tableware	WIV, WVII, WX, WXIVG/H, HIV
Pouring	WIIy, WVIII, WXI, WXIIb, WXIVB/E/F

Table 4.22 The types that have been assigned to each function group.

Provenance	Abbreviation	Fabrics
Vorgebirge	VOR	w1, 2, 3, 4, 8, 10
Mayen	MAY	w6, 9, 12, 16, 17
Meuse valley	MV	w13, 14
Local	LOC	h1, 3
Regional	REG	Regional wheel-turned
Supra-regional	SREG	w15, h2
Local/Regional	LOC-REG	Southern Netherlands handmade
Rhineland	RHI	Not specified other than Rhenish

Table 4.23 Relationship between fabrics and provenance.

It is important to stress that in almost each region vessels which are mainly associated with cooking make up the majority of assemblages (table 4.31). Only the problematic region 7 is an exception. In region 3 tableware comprises a rather large proportion which is due to the relatively high amount of type HIV vessels on sites. The proportion that handmade ceramics constitute in each region has a considerable effect on the figures because except for region 3 the vast majority belongs to *Kugeltöpfe (table 4.29)*. In addition, *Kugeltöpfe* did not comprise an equally important part of assemblages in each region. Therefore, in order to assess the importance of imported cooking vessels in each region the wheel-turned ceramics have been analysed separately (table 4.30).

An analysis of developments in the proportions of respective function categories among wheel-turned wares throughout the eighth and ninth century is problematic for several reasons. As we have already seen the types dated to the second half of the eighth and the ninth century are much more common on sites in our region than those dated solely to the eighth century. Therefore the figures for the middle and late part of our period are far more robust than for the earliest phase and the same holds for the very latest phase. In addition some vessel types such as WIV and WX are difficult to pin down chronologically, and as these represent the main types among tableware,

placing them in one or other phase has noticeable effects on the figures. Furthermore, type WIII, which is most common, has a wide date-range and cannot easily be designated as either early or late. For these reasons the relative proportions per phase should be viewed as a rough indication for developments, and cannot be used to identify variation between regions at any specific time. The emphasis lies on comparing trends between regions.

Phase	Pouring	Storage	Cooking	Tableware
E	3.2%	2.5%	93.6%	0.7%
E/EM	1.7%	1.6%	74.6%	22.1%
E/EM/M	0.9%	0.8%	87.3%	11.1%
EM/M/ML	7.7%	18.7%	62.7%	10.9%
M/ML/L	10.4%	24.8%	64.3%	0.6%
ML/L	27.6%	65.8%	6.0%	0.6%
L	18.0%	36.9%	45.0%	0.0%

Table 4.24 Attempt at reconstructing developments in the presence of vessels with various function present on rural sites throughout the eighth and ninth century.

Phase	Pouring	Storage	Cooking	Tableware
Pre 800	22	21	1472	123
Post 800	174	471	625	105

Table 4.25 Comparison of rim-sherd count of examples dated up to or after 800 found on sites in regions 5 and 6. Type WIII and WIV divided equally across both groups because they cannot be clearly assigned to either period.

Table 4.24 is an attempt at discerning trends in the occurrence of function groups. Starting with vessels certainly not dating after 800 each successive phase represents the proportion of vessels belonging to a function group based on the cumulative amount of rim sherds of roughly contemporaneous types. The percentages for the ML/L phase highlights the limitations of this method. The low proportion of cooking vessels is caused by the fact that phase ML consists mainly of WI and WII vessels in BAD fabric. Nonetheless, the trend of increasing proportions of storage and pouring vessels to the detriment of cooking vessels is clear (fig. 4.48/49).

The figures from regions 5 and 6 can be used to determine whether the proportional decrease in cooking pots can also be seen in absolute numbers. For these regions we can be fairly confident that Rhineland ceramics were being consumed from the earliest phase onward. In table 4.25 the sherds from these two regions have been assigned to either before or after 800 while types WIII and WIV have been divided equally over both periods, because these are most difficult to assign to either period. This results in a less dramatic drop in tableware but a considerable decline in cooking pots. In order for the amount of sherds of cooking vessels to be equal in each period 72.5% of type WIII sherds would have to be assigned to the latter period. It is certainly possible that a large proportion of globular pots belongs to the period after 800 rather than before. However, the figures suggest that, not only did cooking vessels become proportionately less important among imported wares, but they actually decreased in absolute terms on sites in the research area. Overall, the figures strongly imply that wheel-turned cooking vessels and to a lesser extent tableware became less important in ceramic assemblages on rural sites throughout the eighth and ninth centuries while storage and pouring vessels became more prevalent. The decline in wheel-turned cooking pots is almost certainly related to the increase in the use of *Kugeltöpfe* in each region in the same period.

Although it is difficult to follow developments in assemblages in terms of function groups on rural sites at an inter-regional level, it is possible to compare them in the period when types WI, WII and WIII were most prevalent (table 4.26). Regions 3, 5, 6 and 8 are quite similar, the majority of rim-sherds belonging to cooking pots, followed by storage vessels and smaller proportions of pouring vessels and tableware. Regions 1 and 4 clearly have lower percentages of storage vessels, but for different reasons. In region 1 the proportions of tableware and pouring vessels are relatively high. In region 4 cooking pots are particularly frequent, but not too much can be read into the figures because they are effectively based on the finds from one site.

	Pouring		Storage		Cooking		Tableware	
Region	**N Rim**	**% Rim**	**N Rim**	**% Rim**	**N Rim**	**% Rim**	**N Rim**	**% Rim**
1	40	12.5%	24	7.5%	173	54.2%	82	25.7%
3	0	0.0%	8	30.8%	17	65.4%	1	3.8%
4	5	9.6%	5	9.6%	39	75.0%	3	5.8%
5	103	6.3%	309	18.8%	1071	65.1%	162	9.8%
6	72	10.3%	166	23.9%	403	57.9%	55	7.9%
7	5	25.0%	13	65.0%	2	10.0%	0	0.0%
8	19	7.8%	56	23.0%	158	64.8%	11	4.5%
Total	**244**	**8.1%**	**581**	**19.4%**	**1863**	**62.1%**	**314**	**10.5%**

Table 4.26 Percentages of function groups per region for period EM/M/ML.

	Pouring		Storage		Cooking		Tableware	
Rural/Town	**N Rim**	**% Rim**	**N Rim**	**% Rim**	**N Rim**	**% Rim**	**N Rim**	**% Rim**
Rural	267	7.2%	600	16.1%	2533	68.1%	319	8.6%
Town	2874	9.6%	8405	28.1%	16549	55.3%	2107	7.0%
Total	**3141**	**9.3%**	**9005**	**26.8%**	**19082**	**56.7%**	**2426**	**7.2%**

Table 4.27 Comparison of cumulative proportions of function groups between rural and town sites.

		Pouring		Storage		Cooking		Tableware	
Site	**Harbour section**	**N Rims**	**% Rims**	**N Rims**	**% Rims**	**N Rims**	**% Rims**	**N Rims**	**% Rims**
58	HS I	212	10.3%	658	31.9%	1059	51.4%	132	6.4%
	HS II	241	7.5%	803	25.1%	1939	60.6%	216	6.8%
	HS III	241	9.8%	600	24.4%	1463	59.5%	154	6.3%
	HS IV	59	5.2%	187	16.5%	801	70.8%	85	7.5%
	HS O	71	6.9%	131	12.7%	752	73.2%	74	7.2%
58 Total		824	8.3%	2379	24.1%	6014	60.9%	661	6.7%
187		343	9.8%	790	22.7%	2051	58.8%	303	8.7%
189		26	10.7%	72	29.6%	135	55.6%	10	4.1%
190		2	5.1%	5	12.8%	24	61.5%	8	20.5%
201		140	23.6%	110	18.5%	313	52.8%	30	5.1%
528		1494	9.7%	4939	32.1%	7851	51.1%	1086	7.1%
Total		**2829**	**9.6%**	**8295**	**28.0%**	**16388**	**55.3%**	**2098**	**7.1%**

Table 4.28 Comparison of proportions of function groups between sites in Wijk bij Duurstede.

An interesting comparison can also be made between rural and town assemblages (table 4.27). The percentage of storage and pouring vessels is higher on town sites while cooking vessels are more common on rural sites. At the various sites excavated in Wijk bij Duurstede there are clear variations in the proportions of function groups (table 4.28). The figures for Hoogstraat O and IV, where cooking pots are more prevalent than in other sections of the site, might be related to a relatively early dating of the areas excavated. What is particularly interesting is that De Heul (528) and David van Bourgondiëweg (189) sites, part of the settlement area of Dorestad, have higher proportions of storage vessels than most of the harbour area. If types WI and WIIx had been primarily used as packaging material one might expect their proportions to have been lower in the settlement area and conversely cooking pots to have been more numerous. The only settlement area with percentages for storage vessels comparable to rural sites is De Geer (190/201) but there the frequency of pouring vessels and tableware is elevated rather than cooking pots.

Region	Cooking	Tableware
1	97.9%	2.1%
2	84.1%	15.9%
3	65.4%	34.6%
4	98.5%	1.5%
5	99.6%	0.4%
6	99.5%	0.5%
7	100.0%	0.0%
8	98.8%	1.3%
Total	**93.0%**	**7.0%**

Table 4.29 Proportion of handmade assemblage assigned to function category.

Region	Pouring	Storage	Cooking	Tableware
1	11.7%	7.0%	57.0%	24.3%
2	0.0%	0.0%	100.0%	0.0%
3	0.0%	30.8%	65.4%	3.8%
4	9.6%	9.6%	75.0%	5.8%
5	5.7%	15.1%	71.6%	7.6%
6	8.5%	19.8%	65.2%	6.5%
7	22.7%	59.1%	18.2%	0.0%
8	8.1%	21.3%	66.2%	4.4%
Total	**7.2%**	**16.1%**	**68.1%**	**8.6%**

Table 4.30 Proportion of wheel-turned assemblage assigned to function category.

Region	Pouring	Storage	Cooking	Tableware
1	5.5%	3.3%	78.8%	12.5%
2	0.0%	0.0%	84.1%	15.9%
3	0.0%	1.6%	65.4%	33.0%
4	0.5%	0.5%	97.2%	1.7%
5	2.9%	7.5%	85.6%	4.0%
6	5.8%	13.3%	76.3%	4.6%
7	17.2%	44.8%	37.9%	0.0%
8	6.3%	16.5%	73.6%	3.7%
Total	**2.9%**	**6.4%**	**83.1%**	**7.6%**

Table 4.31 Proportion of assemblage assigned to function categories, both wheel-turned and handmade.

With regard to the provenance of ceramics on sites there are important differences between but also within regions (table 4.32, fig. 4.50). From the analysis of the frequencies of handmade and wheel-turned pottery between regions it is apparent that a rough division can be made between the north, centre and south of the research area. This is also clearly reflected in variations in the respective importance of local/regional and supra-regional pottery in each area. In the north, in region 1 there are obvious changes in the composition of assemblages from west to east. They basically comprise a decrease in imported wares and an increase in (supra-)regionally produced wares the further east one looks. In particular the proportion of shell-tempered ware rises considerably in the more easterly parts of the region. In adjacent parts of Northern Germany the *Kugeltopf* with shell-temper can comprise virtually complete assemblages.

A similar lack of imported wares is evident in the northeast of the research area, in region 2 and the north of region 3 (subr. 3.1). In the south of region 3 (subr. 3.2) supra-regionally sourced ceramics may not make up a high percentage compared to locally produced pottery but they are consistently present, in contrast to the north of the region. In this respect the south of region 3 is more similar to the adjacent part of the central Dutch river area (subr 6.2).

In region 4 and the north of region 5 the proportion of local ceramics was also high, though not as all-encompassing as in much of regions 1, 2 and 3. Close to 80% of ceramics were produced at the local or regional level during the eighth and ninth century. This represents a considerable change compared to the seventh century when wheel-turned wares made up the bulk of the pottery assemblages of households (compare figures 4.51 and 4.52). Whether seventh century wheel-turned pottery was largely imported or regionally produced is not clear, though sites such as Bloemendaal-Groot Olmen (212) suggest at least a proportion was made in the Rhineland.

Region	Subregion	VOR	MAY	RHI	MA	SREG	REG	LOC_REG	LOC
1	**1.1**	18.9%	14.2%	-	0.7%	4.7%	-	-	61.5%
	1.2	7.6%	3.8%	0.2%	0.9%	2.4%	-	-	85.1%
	1.3	2.1%	0.3%	0.1%	0.1%	10.8%	-	-	86.7%
	1.4	1.3%	-	-	1.0%	32.7%	-	-	64.9%
2	**2**	0.1%	0.1%	-	-	2.1%	-	-	97.8%
3	**3.1**	1.7%	0.7%	-	0.1%	-	-	-	97.4%
	3.2	8.4%	1.3%	0.4%	0.2%	-	-	-	89.7%
4	**4**	14.8%	4.3%	1.5%	1.3%	0.1%	-	-	78.0%
5	**5.1**	12.1%	4.1%	0.4%	0.8%	2.8%	-	-	79.8%
	5.2	33.8%	18.4%	2.3%	3.6%	2.8%	-	-	39.1%
6	**6.1**	66.0%	11.9%	0.5%	1.3%	2.0%	-	-	18.4%
	6.2	35.0%	25.9%	13.6%	0.1%	0.3%	-	-	25.1%
7	**7**	60.5%	7.1%	-	3.5%	1.9%	-	-	27.0%
8	**8.1**	59.5%	38.0%	0.8%	-	-	0.8%	0.8%	-
	8.2	76.9%	10.7%	0.1%	0.8%	-	1.1%	1.1%	9.4%
	8.3	40.4%	15.7%	-	3.6%	1.1%	0.4%	38.8%	-
	8.4	27.8%	22.0%	0.8%	2.4%	0.2%	1.6%	40.8%	4.4%
	8.5	38.1%	10.4%	6.5%	4.7%	0.1%	-	-	40.1%
Total		**26.1%**	**8.6%**	**1.1%**	**1.4%**	**2.3%**	**0.1%**	**1.5%**	**58.9%**

Table 4.32 The proportion of ceramics of various provenances per subregion.

In sum, the regions to the north of the Rhine river have markedly higher proportions of local or regionally produced pottery than those along or to the south of the river. From almost 80% or above locally sourced ceramics north of the Rhine, the figures drop to between roughly 10 and 40% below the Rhine. The proportions for sites along the Rhine (subr, 5.2, 6.1 and 6.2) exhibit some variation, with the highest concentrations of imports found in the area between Wijk bij Duurstede and Utrecht. Further south in region 8 there appears to be an east-west divide. In the east are relatively high proportions of locally or regionally produced pots while in the west imported wares dominate. Additionally Vorgebirge pots seem to have been relatively more frequent than Mayen vessels in the west than in the east of the region. A strong link with the middle Meuse valley is perhaps to be expected for the most easterly part of the south (subr. 8.5) and that appears to be confirmed by the highest proportion of Meuse valley ceramics of any part of the research area. The almost complete absence of local ceramics in assemblages in the most westerly part of the south (subr. 8.1) is noteworthy because sites in neighbouring parts of Belgium have high proportions of locally produced pottery.[189] The figures for region 7 may represent the ceramics that were in circulation at the end of our period, considering the dating of the sites in the area. If so it indicates that from the late ninth century ceramic imports from the Rhineland were dominated by Vorgebirge products.

In tables 4.33a-d an attempt has been made to illustrate developments in the relationship between provenance and function of vessels in a similar fashion as above for function groups. Once again the exact figures are not important so much as the trend that can be discerned. Two important observations can be made. First, for almost each combination of function group and provenance, in every phase, cooking vessels comprise the largest category. Secondly, only among Vorgebirge products did the proportion of cooking pots progressively decrease while that of storage vessels increased.

189 See chapter 7.

Provenance	Pouring	Storage	Cooking	Tableware
MA	2.4%	0.0%	96.4%	1.2%
LOC	0.0%	0.0%	97.1%	2.9%
LOC_REG	0.0%	0.0%	100.0%	0.0%
MAY	0.4%	0.4%	95.0%	4.2%
REG	0.0%	50.0%	50.0%	0.0%
RIJ	4.4%	4.4%	71.3%	19.8%
SREG	0.8%	0.0%	97.1%	2.1%
VOR	14.3%	29.1%	45.3%	11.2%
Total	**2.0%**	**3.8%**	**90.0%**	**4.2%**

Table 4.33a Proportion of vessels per provenance and function group combined (all periods).

Provenance	Pouring	Storage	Cooking	Tableware
MA	1.8%	0.0%	97.0%	1.2%
LOC	0.0%	0.0%	95.7%	4.3%
MAY	0.0%	0.0%	100.0%	0.0%
REG	0.0%	100.0%	0.0%	0.0%
RIJ	12.3%	8.8%	78.9%	0.0%
SREG	0.0%	0.0%	100.0%	0.0%
VOR	11.7%	5.2%	83.0%	0.0%
Total	**3.9%**	**1.8%**	**92.2%**	**2.2%**

Table 4.33b Proportion of vessels per provenance and function group combined (up to 800).

Provenance	Pouring	Storage	Cooking	Tableware
MA	100.0%	0.0%	0.0%	0.0%
LOC	0.0%	0.0%	97.2%	2.8%
LOC_REG	0.0%	0.0%	100.0%	0.0%
MAY	0.5%	0.4%	94.9%	4.3%
REG	0.0%	0.0%	100.0%	0.0%
RIJ	2.5%	3.4%	69.5%	24.6%
SREG	0.8%	0.0%	97.1%	2.2%
VOR	14.7%	32.8%	39.5%	13.0%
Total	1.8%	3.9%	89.9%	4.3%

Table 4.33c Proportion of vessels per provenance and function group combined (period EM, M, ML, L).

Provenance	Pouring	Storage	Cooking	Tableware
MA	100.0%	0.0%	0.0%	0.0%
LOC	0.0%	0.0%	99.3%	0.7%
LOC_REG	0.0%	0.0%	100.0%	0.0%
MAY	0.5%	0.4%	99.1%	0.0%
RIJ	4.0%	5.3%	90.7%	0.0%
SREG	0.5%	0.0%	98.9%	0.6%
VOR	20.9%	46.3%	31.3%	1.5%
Total	**2.0%**	**4.3%**	**93.0%**	**0.7%**

Table 4.33d Proportion of vessels per provenance and function group combined (period M, ML, L).

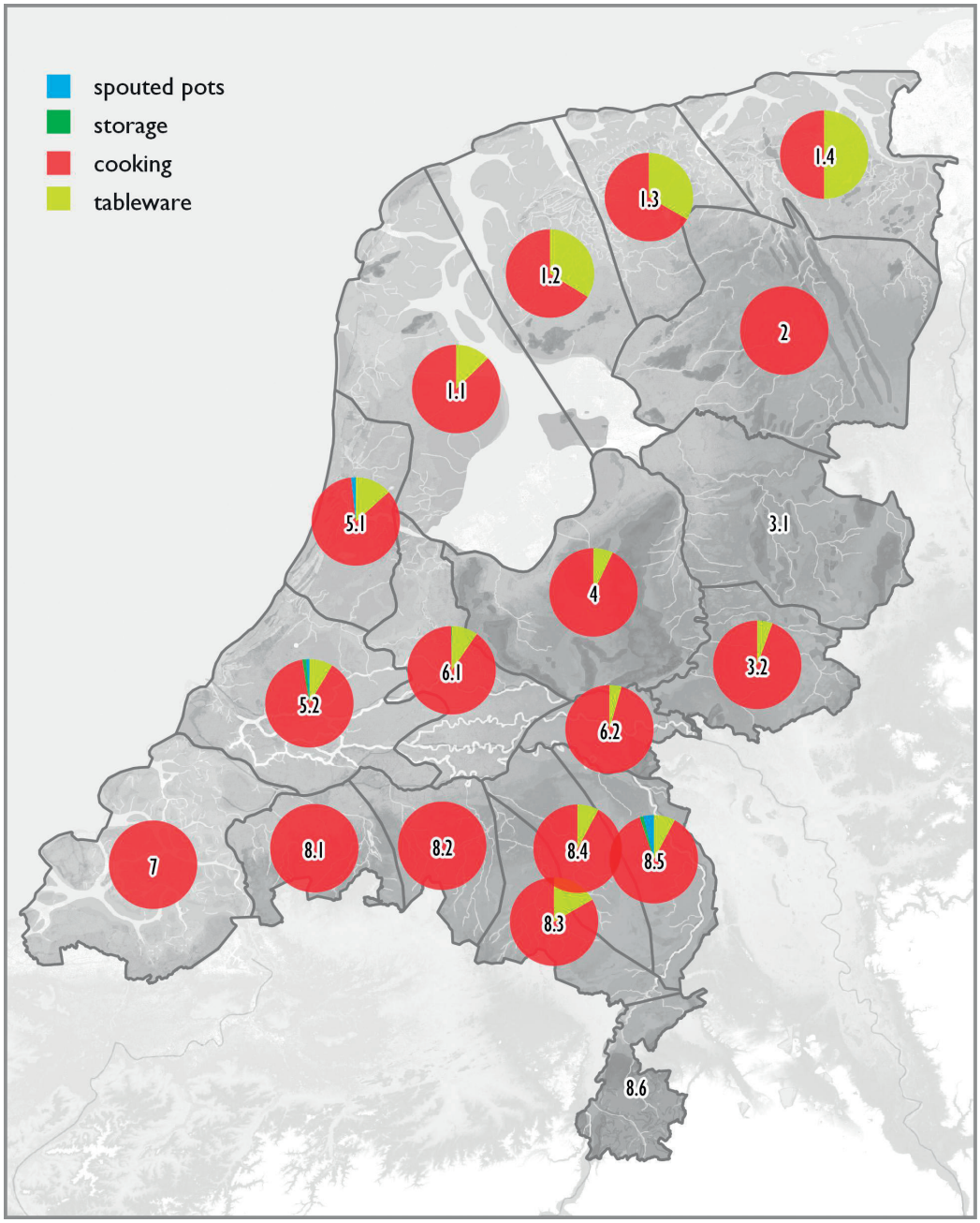


Fig. 4.48 Proportion of each function category per subregion for wheel-turned ceramics dated up to 800.

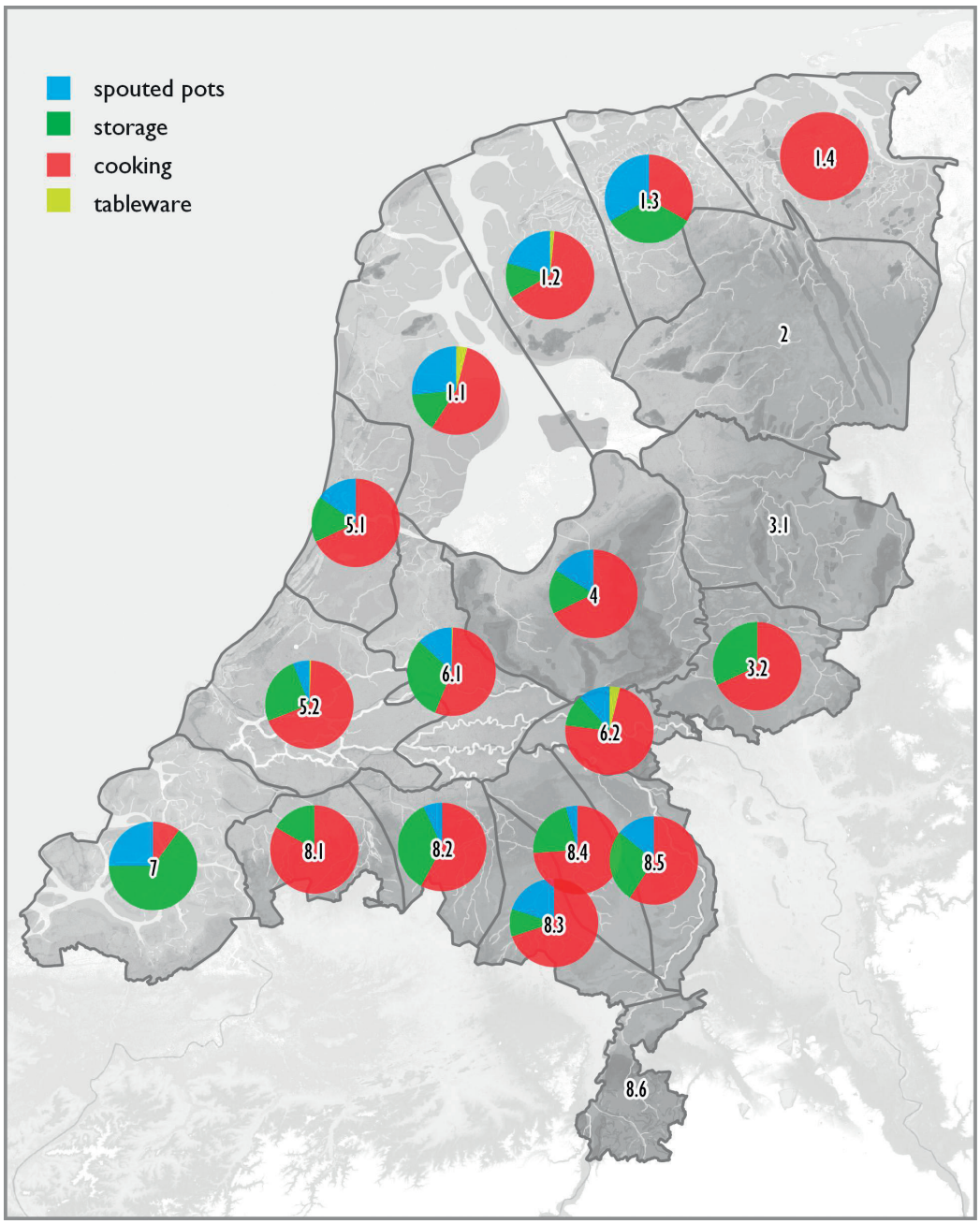


Fig. 4.49 Proportion of each function category per subregion for wheel-turned ceramics dated after 800.

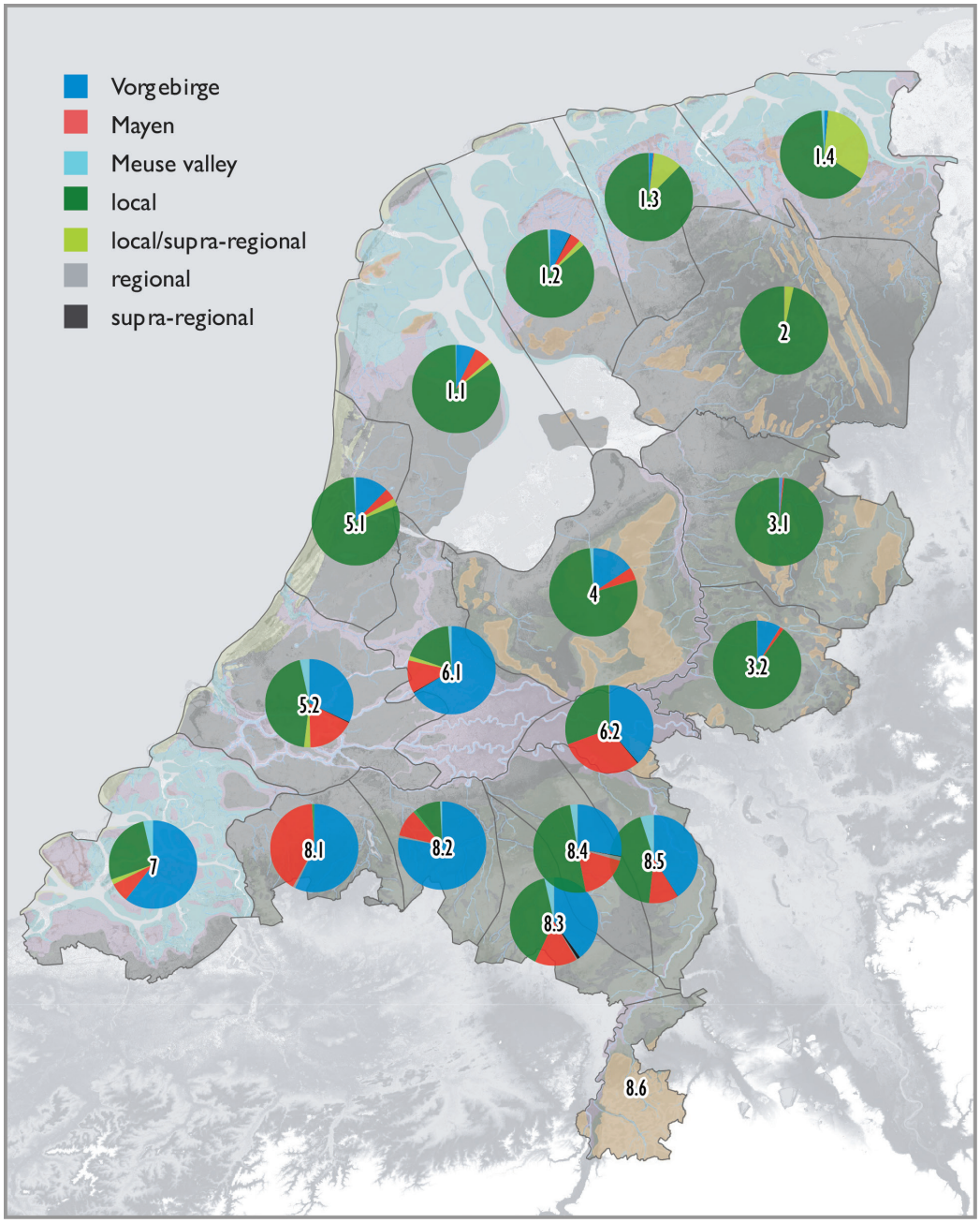


Fig. 4.50 Proportion of each provenance group per subregion.

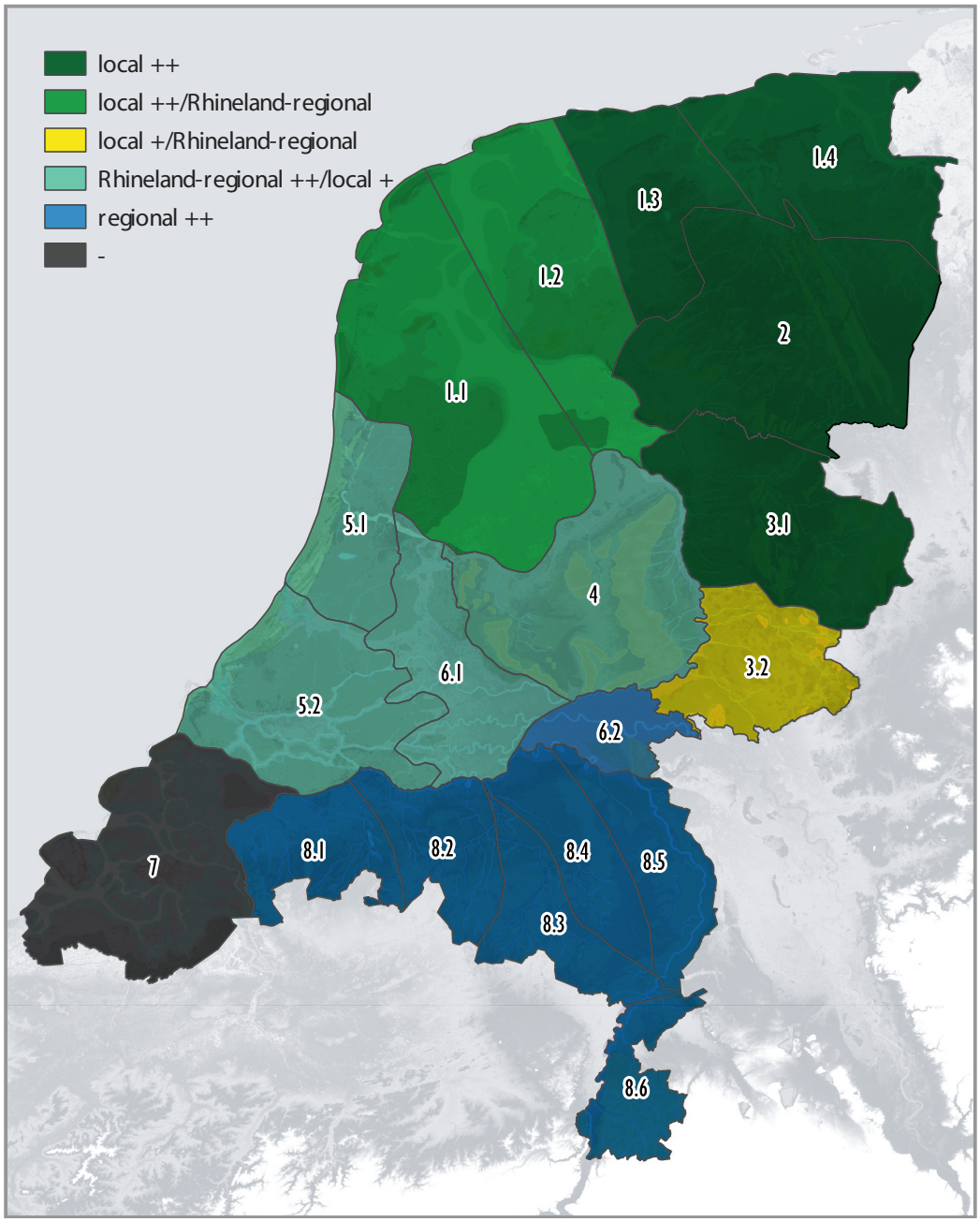


Fig. 4.51 Impression of the relative importance of provenance groups in each subregion in the seventh century.

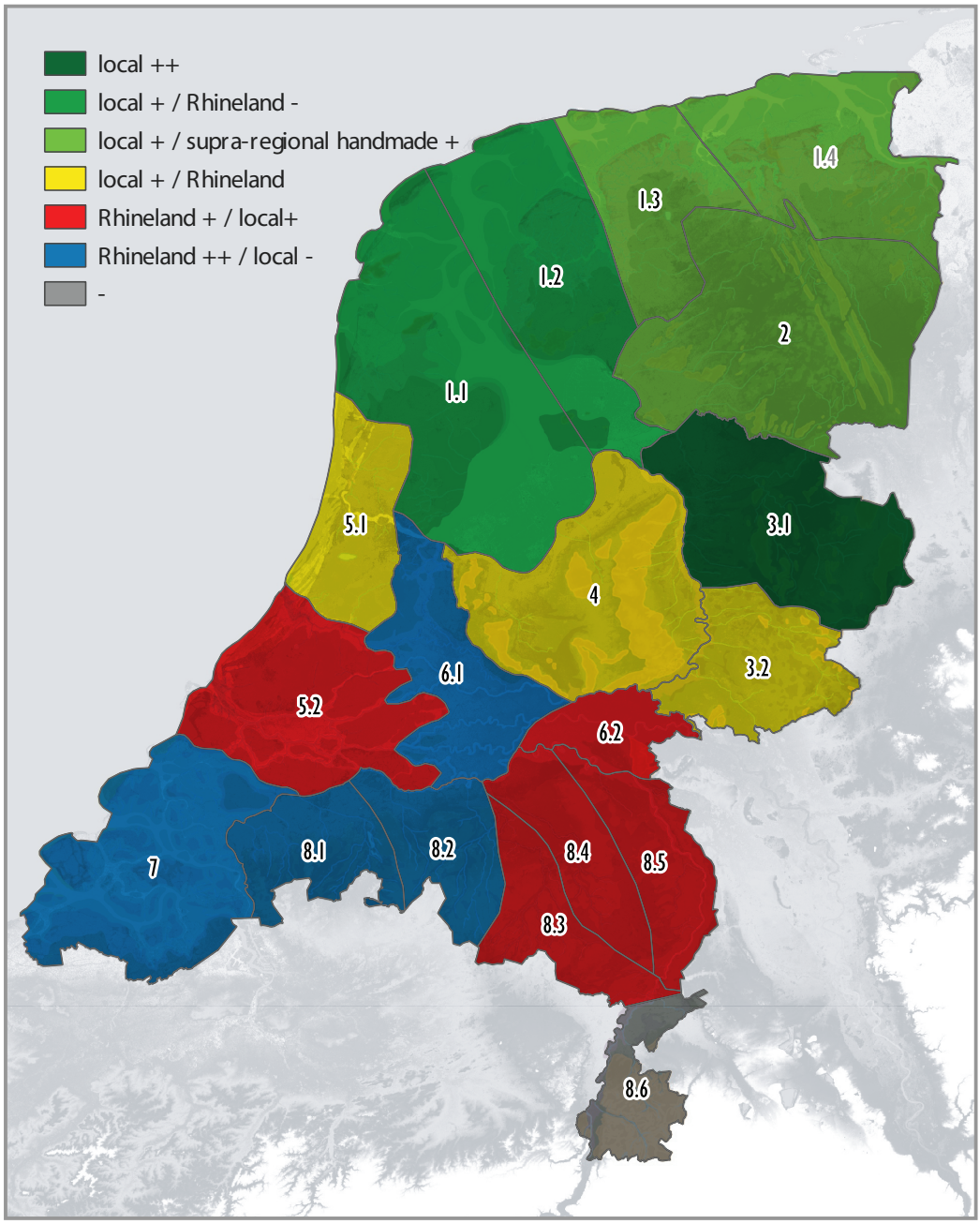


Fig. 4.52 Impression of the relative importance of provenance groups in each subregion in the ninth century.

4.7.6 Discussion

In terms of developments in the proportions of imported and locally or regionally produced wares it is clear that while in some areas change in the composition of household assemblages was limited, in others it was profound (fig. 4.51/52).[190] In large parts of the north and east of the area researched (regions 1, 2 and 3) there was considerable continuity as locally made pottery remained the norm throughout the eighth and ninth centuries just as it had been in earlier centuries. In the central river area imported pottery continued to account for the bulk of ceramics on sites. However, the areas directly to the northwest of the Rhine ((sub)regions 1.1, 4, 5.2) saw a complete shift in the supply of pottery from a situation where most was sourced at a regional or supra-regional level to one where locally made pottery dominated. A similar shift happened in the east of region 8, but it was less dramatic and was probably initiated a little later. Another fundamental change in the supply of ceramics happened earlier in the south when, probably during the first thirds of the eighth century a regional pottery tradition was replaced by Rhineland products.

Not only will this have entailed a reorientation of the relationship between producer and consumer, but it brought with it important changes in the appearance of ceramics. Similar adjustments in the integration of pots in household regimes were undoubtedly necessary in the west of the research area and in the central Dutch river area when the shift from a Merovingian to a Carolingian ceramic tradition took hold. The vessels from the Rhineland that were prevalent in the eighth and ninth centuries were different in shape from the types in a Merovingian tradition.

Equally, the increased use of handmade ceramics in some regions will have altered the appearance of the pots present in rural households. Wheel-turned cooking vessels generally became more thin-walled and less porous. In addition, both wheel-turned and handmade pottery of our period represented a change in the colour of pots from what was available in previous centuries in areas where wheel-turned ceramics dominated in the seventh century. It is debatable whether the variability of the ceramic corpus present in individual households changed to a considerable degree during our period. Nonetheless, these developments in the appearance of ceramics mean that even if the proportion of vessels with a particular function within households remained roughly the same from the seventh to the ninth century, the composition of their inventory was substantially transformed. These kind of changes are not trivial or simply a matter of shifting tastes. For example, alterations in the shape and porosity of pots can influence the preparation of food and the colour of vessels has been shown to be important in creating categories in household assemblages. The themes of changing relations between producers and consumers and adaptations in the composition of household assemblages are discussed in more detail in chapter 7. Here it is necessary to highlight several, more specific aspects of (developments in) ceramic assemblages that have arisen from the analysis of pottery in our research area. These observations will play a part in the analysis of how exchange systems may have functioned, carried out in chapter 8.

First, the increase in the volume of storage vessels and a concomitant decrease in globular pots originating from production sites in the Rhineland in assemblages is important. The introduction of vessel types explicitly designed for the function of storing goods in itself represents a significant change from Merovingian assemblages. Vessels intended for pouring and tableware were a feature of the Merovingian corpus but often made up only a very small proportion on settlement sites. Therefore the increase in pouring vessels alongside storage pots on our sites is also notable.

190 See section 4.7.2.

Important questions ensue: why were these vessels with a specific function introduced at all? Did rural consumption have anything to do with it?

Second, there are clear differences in the distributions of earlier and later wares and vessel types. Finds of early ceramics are mainly concentrated in the central Dutch river area and the western coast. However, the section of the Rhine between the modern Dutch boarder with Germany and Wijk bij Duurstede seems to have been passed over, because earlier types and wares do not occur in site assemblages. At the same time, sites in the east of region 8, in the south of the research area have yielded some early ceramics suggesting these parts were connected with exchange networks involving Rhenish pottery from an early stage.

Third, the virtual omnipresence of 'Badorf' and 'Mayen' products on sites where wheel-turned ceramics have been found suggest there was little other choice available.

Fourth, the adoption of handmade pottery was not equally swift in every part of the research area. On sites along the western coast and in the Dutch Central River area it appears to have gained ground relatively quickly, while in the south it only became important after the middle of the ninth century. In the east it took more than half a century for the *Kugeltopf* to have decisively replaced the earlier style of egg-shaped pots.

Fifth, In areas where handmade pottery dominates there are still significant differences in the composition of assemblages between parts of the research area. Examples are the variable proportions of shell-tempered ware and bowls (type HIV).

4.8 Conclusion

The aim of this chapter was to examine the ceramics discovered on rural sites in the research area in order to provide indications of how goods were transported and exchanged and how consumptive preferences may have influenced the scale of production and dispersal of wares. Before analysis of the collected data was possible it was first necessary to take stock of existing literature relevant to the ceramics on our sites, on the one hand to establish a basic frame of reference for types and fabrics, but also because the dating of pottery of our period is by no means a *fait accompli*. The typo-chronology established for the excavations at Dorestad was scrutinised in considerable detail, and although in general the typology is a useful tool for the description of types and wares, the arguments for the dates assigned to each type are not always robust. The archaeology of the harbour area of Dorestad does not provide a sufficiently accurate context for refining dates for types and wares, leaving mainly arguments derived from other studies for establishing date-ranges.

Studies that focus on the dating of pottery produced in the Vorgebirge area of Germany can be split into two categories, either attempting to date production based on developments in fabrics or in morphological traits. Examination of the various studies reveals that fabrics only allow rather broad date ranges to be determined, while for typo-chronological approaches the lack of accurately dated contexts means that it is difficult to assign absolute dates to typological developments. Similar conclusions can be drawn for the products of other manufacturers. Moreover, for a number of wares found on sites in our research area it is not possible to establish with certainty where they were produced.

An attempt has been made to alleviate some of these problems by examining to what extent the data from our sites can help refine existing chronologies. The main conclusions are that Rhineland pottery was already available in parts of the research area in the seventh century, that the transition from a Merovingian to a Carolingian pottery tradition probably took place in the first third of the

eighth century, and that globular pots from the Rhineland were present from the early eighth century. Other important conclusions are that storage and pouring vessels considered to be typical for Vorgebirge production may only have been introduced towards the end of the eighth century, and that Mayen ceramics had almost completely disappeared from assemblages by the end of our period, just as wheel-turned globular pots. Examination of the existing literature and the data from our sites indicate that in terms of production and distribution the major developments that took place during the late seventh, eighth and ninth centuries lay in the scale of production and the distance between producer and consumer. Two production sites in the German Rhineland came to dominate the supply of wheel-turned pottery. Particularly in Mayen there appears to have been a significant transformation of the organisation of production. Where the potters first manufactured a fairly wide array of vessel types, at some point in the late seventh or early eighth century production became concentrated on the making of one kind of vessel, the globular pot. In some parts of our research area the Rhineland products replaced a previously existing tradition of regionally made wheel-turned pottery. At the same time, in other parts of the research area Merovingian style ceramics, either with a regional or supra-regional distribution, were replaced by locally manufactured vessels. These developments will have entailed changes in relations between producers and consumers (and in some cases also intermediaries).

The composition of household assemblages also changed due to the introduction of new vessel types with a different appearance and more clearly delimited purposes, requiring at least some degree of adaptation. The observed variability in the composition of assemblages between regions suggest consumptive preferences regarding pottery differed considerably. Combined with the evidence from the next two chapters, these variations and developments will form the basis for further analysis in part III.



The metal artefacts

Introduction

Metal artefacts are among the few items that were produced within the research area on sites with both a predominantly rural as well as a non-rural character. Metal artefacts are, more than ceramics and stone, dependent on favourable preservation conditions for their survival in the ground. This can make it difficult to determine the extent of the use of metal artefacts on rural sites and the range of objects available to rural dwellers in a region with diverse ecological and soil conditions such as the Netherlands. This chapter starts with an overview of our current knowledge of iron production in the research area and the extent to which iron ore was transformed into raw iron. This is followed by a review of the evidence for the manufacture of metal artefacts. Finally the inventoried finds from Carolingian sites are discussed. The range of objects potentially available to rural dwellers can be deduced from the dataset of the Dorestad excavations, which have yielded a wide array of artefacts. By comparison the range of objects on rural sites is much less impressive. Two groups of artefacts which occur particularly often will be discussed in some detail, namely (copper-alloy) brooches and coins.

5.1 Production

Regarding the production of metal objects, two aspects will be highlighted here: the procurement of the raw materials and the production of the items themselves.[1] Only iron appears to have been produced from raw materials during the Early Middle Ages in our research area. In fact, evidence for working of metals other than iron is rare on Carolingian sites. The study of early medieval iron production in the Netherlands was for a long time a prerogative of amateur archaeologists and was more or less completely ignored by academics.[2] The amateur archaeologist Moerman[3] mapped many so-called iron pits and slag heaps (see table 5.1 for a brief explanation of the terms relating to iron production and working used in this chapter) in part of the Veluwe area situated roughly to the west of the line Apeldoorn-Rheden (fig. 5.1).[4] He also dug test pits in several of the iron pits in order to establish their composition. The pits were always found in rows, often two and sometimes three parallel to one another. In all, circa 82 kilometers of pit rows and 57 slag heaps were recorded.[5]

Only when the University of Amsterdam began to excavate on the Veluwe did iron production come into focus as a topic for academic research. During the 1970's, 80's and 90's several sites were examined in this area which showed clear indications of iron production. The number of iron pit rows and slag heaps identified by Moerman led Heidinga to conclude that there must have been extensive iron production on the Veluwe.[6] Iron production was thought to have been conducted by professional iron smelters.[7] Initially the production was dated between the seventh and twelfth century, based partly on the results of the first excavations carried out by the university, and partly on finds recorded by Moerman in association with slag heaps.

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1 For a more complete description of aspects of iron production and working see for example Pleiner 2006.
2 Heidinga 1987, 194-195.
3 He was not alone in doing this, but he has gained most notoriety thanks to his published find reports.
4 Moerman 1928; Moerman 1957; Moerman 1960; Moerman 1968/69; Moerman 1970.
5 Van Nie 1997, 34.
6 Heidinga 1987, 195.
7 Heidinga 1987, 197-199.

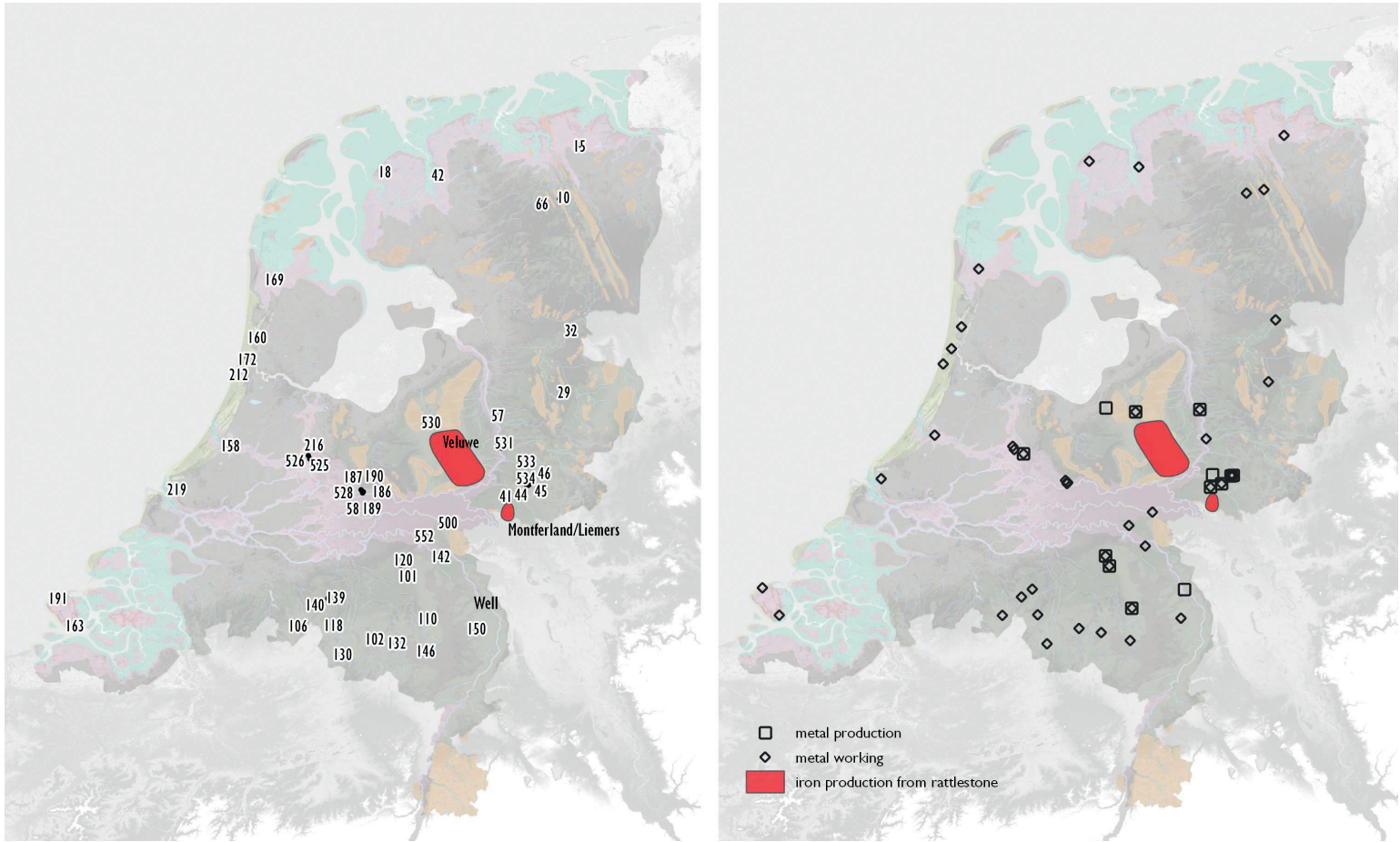


Fig. 5.1 Sites and regions where evidence for iron production or working have been discovered. Not all sites where traces of iron working have been found are discussed in the text, mainly because the nature of iron working activities could not be discerned from the reports or because the evidence was scant.

Term	Description	Phase of iron production/working
Bloom	Initial product of iron production. Can be refined or worked directly.	Intermediary product
Bog iron ore	Type of iron ore retrieved from built-up layers of iron-oxide in wet environments	Raw material
Coppicing	Forest management in order to ensure future supplies of wood for charcoal production	Procurement raw material
Furnace lining	Burnt loam lining of iron production furnace	Iron production waste
Hammerscale	Very small slag formed during smithing process, often indicative of location workshop	Iron working waste
Hearth bottom slag	Slag which forms at the bottom of a smiths hearth	Iron working waste
Hearth lining	Burnt loam lining of iron smithing furnace	Iron working waste
Iron ore	Raw material needed to produce iron. In research area can be either bog iron ore or rattlestone ore	Raw material
Iron-pit/trench	Trench dug in order to acquire rattlestone ore	Procurement raw material
Rattlestone	Type of iron ore found in ice-pushed ridges	Raw material
Reheating slag	Slag formed when bloom is purified. Not always easy to distinguish from smithing slag	Waste of intermediary production phase
Slag heap	Heap mainly containing production slag	Iron production waste
Smithing slag	Slag formed during smithing process	Iron working waste
Tap slag	Slag produced during iron production in a tap-furnace	Iron production waste

Table 5.1 Glossary of terms relating to iron production and working.

Small scale excavations were conducted on an iron pit row near Asselt and the largest known slagheap in the Orderbos to the west of Apeldoorn, in order to gain a better insight into the organisation of production.[8] The iron pits were found to in fact be trenches which followed the rattlestone iron ore that was present in the subsoil as bands circa 15 cm thick and between 2 and 4 meters deep.[9] Somehow the people mining the ore were able to recognise a potential seam and subsequently followed it until it was depleted. The excavation at the Orderbos slagheap yielded the remains of several furnaces and a large quantity of tap slag, the by-product of a particular kind of furnace.

8 Van Nie 1990, 91-93; Van Nie 1997, 35; Van Heeringen *et al.* 2014, 82-107.
9 Several of the terms relating to iron production used in this section will be explained more fully later in the chapter.

Van Nie dated the production at the Orderbos between the first half of the eighth and second half of the ninth century, primarily based on a Carolingian sherd found amongst the slag.[10] He dated the production of iron on the Veluwe roughly between the seventh and tenth century with a peak in the eighth and ninth century. The start date was inferred from evidence acquired during a trial trench campaign at a site known as Hoog Buurlo-Braamberg. It revealed traces of a settlement where iron bloom was either improved or selected and which was dated to the seventh century on the basis of ceramic evidence.[11] Van Nie questioned the dating value of Moerman's discoveries of eleventh and twelfth century pottery associated with slag heaps because the context of the finds was not clear, and moreover the sherds were lost.[12] Heidinga had dated the end of habitation at Kootwijk in the tenth century and related this to a dry period in which the Veluwe experienced extensive sand drifts, presumed to be due to deforestation.[13] This deforestation in turn was thought to have been caused by the enormous demand for charcoal, essential in the iron production process. Therefore, the demise of iron production on the Veluwe was placed at the end of the ninth or beginning of the tenth century. The drought itself was not believed to be a direct cause for this, but rather the lack of fuel, together with increased competition from areas in the German Rhineland and political developments.

Subsequent research into the output of iron in the Veluwe region during the Early Middle Ages has raised doubts over deforestation and lack of fuel as causes for the decline of iron production. The total amount of slag once present in the area is estimated at circa 110,000 metric tons.[14] This number has been used by Joosten to calculate the total amount of charcoal required for production, and the yield in terms of bloom, namely 105,000 metric tons of charcoal and 55,000 metric tons of iron. These numbers were then divided by the presumed production period, circa 250 years. In terms of charcoal production this means that the forests of the Veluwe would probably have been depleted long before the rattlestone-ore seams. Therefore Joosten deems it likely that coppicing was practised and that the production of charcoal for iron smelting was not the direct cause of deforestation and sand drifts from the tenth century onward.[15] The iron smelters are believed to have moved around the Veluwe, continually revisiting smelting sites when the surrounding forest had had time to regenerate. The fact that the Orderbos slag heap actually consisted of three smaller heaps covered by more slag, making it look like one heap, was taken to be an indication that the site indeed had been revisited on several occasions.

A recent re-evaluation of both the extent of rattlestone mines in the municipality of Apeldoorn and the excavation of the slag heap at the Orderbos has provided new insights into the extent of production and its organisation. By studying detailed elevation models of the area surrounding Apeldoorn some 3000 new iron pits have been identified.[16] These findings indicate that rattlestone was mined very extensively in this part of the Veluwe and may imply that an important reason

10 Van Nie 1997, 38.
11 Heidinga 1987, 195-196.
12 Van Nie 1997, 38.
13 Heidinga 1987, 197. Heidinga later revised his positions as far as deforestation due to iron production as a consequence of sand drifts is concerned (Heidinga 2010, 76).
14 Unfortunately it is not clear what this number is based on. Joosten uses this number in her dissertation and refers to an article by Van Nie (Joosten 2004, 85). However, in the article Van Nie only mentions that the Orderbos slag heap probably represent less than 1 percent of the amount once present in the iron producing area. The Orderbos slag heap was estimated to contain circa 650 metric tons of slag which indeed represents circa 0.6% of the supposed overall total for the area. However, this still does not explain on what grounds the estimated percentage was obtained.
15 Van Nie 1997, 35; Joosten 2004, 91-92.
16 Which as already mentioned are actually the visible remains of trenches. Van Heeringen *et al.* 2014, 86.

for the demise of iron production on the Veluwe as a whole was the depletion of readily available rattlestone-ore rather than fuel shortages.

During the excavation at the Orderbos slag heap several samples for carbon dating were taken from various contexts in order to date the site better. For whatever reason these samples were never analysed until a re-examination of the site commissioned by the municipality of Apeldoorn led to their rediscovery. Six samples were analysed and the results showed that the heap had developed between the seventh/eighth and eleventh/twelfth century, that is over a (much) longer period than initially assumed.[17] The new evidence appears to confirm that the site of the slag heap in the Orderbos was revisited over several centuries, only over a longer period, which has implications for the calculation of the required amount of charcoal and in particular the output of iron per annum.[18] Two samples dated to the sixth or seventh century with high probability (565-660 with 95,4% confidence at 2-sigma and 600-710 with 91,6% at 2-sigma) while one sample showed a high probability of dating to the eleventh to thirteenth century (1030-1220 with 95,4% confidence at 2-sigma). Several of the analysed charcoal samples were shown to originate from oak of relatively old age. This implies that the calibrated radiocarbon dates have been made to seem older due to the "old wood' effect. Therefore the earliest dates in particular are more likely to be seventh or eighth century rather than sixth century.

If the production period at the Orderbos is taken as an indication for the Veluwe as a whole[19] iron was produced for up to twice as long as was assumed in previous models. Furthermore, examination of the excavation drawings gave an impression of a rather disorganised production process. Taken together this evidence might be interpreted as indicative of seasonal production of iron as a supplemental activity of inhabitants of the Veluwe, not necessarily professional smelters deriving an income solely from iron production. Van Nie already suggested that the bottleneck in iron production created by fuel procurement made it possible that iron producers were also involved in agriculture, particularly during the most labour intensive periods.[20]

In the following paragraphs the evidence for iron production at more recently excavated sites is evaluated in order to put the Veluwe evidence discussed above in a broader context.

Uddel-Heegderweg/Aardhuisweg (530) is a site dated to the 8th and 9th centuries. It lies slightly to the north of the iron production area defined by Heidinga and close to the Hunneschans, a semi-circular earthwork that is an important element in Heidinga's reconstruction of exchange systems of iron on the Veluwe.[21] Here all phases of iron production and working are attested in the form of slag, bloom and furnace and hearth lining.[22] Most production slag by far was found in the construction pit of the only well discovered at the site. This means production certainly took place before the well was constructed and considering the low amount of production slag in other areas of the site it suggests iron production took place before but not during the period of habitation. A slag heap may have been levelled when clearing the area prior to habitation, a large amount ending up in the pit dug for the construction of the well. The presence of bloom fragments, reheating slag and the size and shape of certain hammerscale fragments point to purification of bloom on site. No

17 Van Heeringen *et al.* 2014, 99-102.
18 Though not on the conclusion that coppicing would have been necessary.
19 As is the case in Joosten and Van Nie's calculations.
20 Van Nie 1997, 39.
21 Heidinga 1987, 203-206.
22 De Rijk 2015b, 108-126.

obvious concentrations of smithing slag were found at Uddel and it is therefore unclear whether for example reheating of bloom and smithing of iron took place in the same location(s). Furthermore, due to a lack of iron artefacts it remains uncertain what kind of objects were being produced here. The author argues that the available evidence shows that iron was worked for the settlements own needs. However, due to the incomplete nature of excavation of the settlement it was not possible to rule out surplus production intended for wider circulation.

The site **Putten-Husselerveld (538)**, to the northwest of the iron producing area on the Veluwe. shows evidence for iron production but it is not entirely clear what period the production dates to.[23] The site was inhabited during the Late Iron Age/Early Roman period, Early Middle Ages and Central Middle Ages and production slag has been found associated with structures dated to each period. However, it is not clear from the excavation report whether production actually took place during each period. In the report the production method that utilises a tap furnace is used to explain the manufacture of iron. It is highly unlikely that a tap furnace was used in the Roman period as this type of furnace is not believed to have been employed in the Netherlands before the Early Middle Ages. Therefore, if the slag found in the vicinity of Roman structures did contain tap slag this would be an indication that the material was probably only discarded there, rather than actually belonging to the period. However, because the raw data regarding slag material has not been published it was not possible to verify what type of slag exactly was associated with each period.

At this stage it is worth noting that we know virtually nothing about iron working at the **Kootwijk 2 (529)** settlement. The find material from the site has not been published extensively and it is therefore difficult to determine the level of metalworking at Kootwijk 2, yet what we do know is that the large amount of sunken huts did not yield many finds.[24] The discovery of a crucible may indicate the presence of a smithy at some stage during the settlements development, but this points to the working of non-ferrous metals. Heidinga also mentions 'slag like lumps' found at Kootwijk 2 which may point to the processing of bloom.[25] However, on the limited data available, Kootwijk 2 does not appear to be comparable to Uddel in terms of the scale of iron working activities.

The Veluwe was not the only iron-producing region in the Netherlands during the Early Middle Ages. The region known today as Montferland/Liemers in the east of the Netherlands has also yielded ample evidence for iron production from rattlestone-ore. The production of iron from rattlestone was initially dated between the late eighth and early tenth century in this region, though the dating evidence was even less secure then for the Veluwe.[26] It has been suggested that the Montferland/Liemers production was a continuation of the failing Veluwe industry[27] but given the latest dates from the Orderbos it appears the two regions could have produced simultaneously for some time. The evidence for slag heaps and iron ore mining are also less clear in the Montferland/Liemers area. It is presumed most of the slag heaps have been buried under the current villages surrounding the glacial landform which contained the rattlestone ore.[28] Consequently the estimates for annual iron production during the production period are uncertain but they suggest the Montferland/Liemers area was much less productive than the Veluwe in terms of average annual output.[29]

23 Huisman 2005, 134-137.
24 Heidinga 1987, 28.
25 Heidinga 1987, 196.
26 Van Nie 1993, 13-14; Van Nie 1995, 106. Before any extensively excavated sites were available in the area.
27 Van Nie 1995; Groothedde 2016, 76.
28 Joosten 2004, 103.
29 Joosten 2004, 107.

Site/region	Type of slag	Volume (gr)	Interpretation dispersal raw iron/bloom
Veluwe	Slag heaps		Supra-regional.
	Mining trenches		
Montferland/Liemers	Slag heaps		Supra-regional.
	Mining pits		
Uddel- Heegderweg/ Aardhuisweg (530)	Tap slag	10000	At least for local use, perhaps wider area but yield could not be determined.
	Furnace slag	600	
	Furnace lining	2500	
	Bloom	1000	
	Reheating slag	14200	
Putten- Husselerveld (538)	?	?	Not defined.
Doetinchem- Lookwartier (44)	Tap slag	2919	Not defined.
	Bloom	?	
Wehl- Motketel (41)	Tap slag	97000	Estimated yield ca. 20 kg. Local use.
	bloom	?	
	ore	200	
	Furnace slag	11100	
	Furnace lining	3800	
Zelhem- Vinkenkamp (46)	Reheating slag	?	Local needs and surplus production.
Zelhem- Zelhemse Enk (534)	Reheating slag	13400	Exceeded local needs.
Zelhem- Stikkenweg- Gildenweg (45)	(Production) slag	910	Not defined.
Hummelo- Keppelseweg (35)	Reheating slag	27000	Not defined specifically. Small scale production or short-lived.
Utrecht- A2 (525)	Tap slag	?	Not certain, perhaps for local use but surplus for exchange not ruled out.
	Furnace slag	?	
	Reheating slag?	?	
Uden- A50 (101)	Tap slag	?	Not defined.
	Pit furnace slag	?	
	Bloom	?	
Well- Werkvak 4	Ore	1600	Not defined, yield estimated between 14 and 35 kg.
	Tap slag	22700	
	Furnace slag	39100	
	Furnace lining	21800	
Bakel- Achter de Molen (110)	Tap slag	?	Local needs.
	Furnace lining	?	
	Reheating slag	?	
Nistelrode- Zwarte Molen (120)	Ore	700	Not defined
	Tap slag	11900	
	Furnace slag	14400	
	Furnace lining	800	

Site/region	Type of slag	Volume (gr)	Interpretation dispersal raw iron/bloom
Deventer (57)	Tap slag	13113	Not defined.
	Reheating slag	?	
	Ore	?	
	Furnace lining	?	
	Bloom	?	

Table 5.2 Sites where evidence for iron production has been found.*30*

An excavation in **Doetinchem-Lookwartier (44)** provides evidence for iron smelting, reheating of bloom and smithing activities. The site lies in the direct vicinity of the ice pushed ridge containing rattlestones. Most features on the site have been dated to the post-Carolingian period but some production slag, smithing slag and bloom were discovered in wells dated roughly between 700 and 900/1000. In addition two charcoal production pits were carbon dated to between 660-780 and 770-970 respectively and a pit containing production slag and fragments of furnace lining was dated between 680 and 890.[31] The dating of the features leaves some doubt over when production actually started at the site. Most of the features mentioned were radiocarbon dated with a wide date range between the late seventh and late ninth century. The use of old oak trees for the production of charcoal will almost certainly have led to the samples from the production pits to seem older than they are.[32] The majority of iron production and -working slag was discovered in buildings and wells dated to the Central Middle Ages and only one small building was assigned to the Early Middle Ages, the second half of the ninth century to be precise. Therefore it is more likely that the start of production lies towards the end of the radiocarbon date ranges rather than earlier.

A further issue is that charcoal production cannot be directly linked to iron production. The former may to some extent have been a by-product of reclamations. Archaeobotanical research on samples from the site indicate that by the ninth or tenth century oak, which was the main type of wood identified in the charcoal pits, had largely disappeared from the surrounding landscape. The charcoal that was produced from the logged oaks could have been put to various other uses rather than iron production. In sum, the finds from the Doetinchem site point to iron production in the Early Middle Ages, but perhaps only towards the end of the ninth century. It appears that all aspects of iron production except ore winning and subsequent purification of bloom took place at the Doetinchem site during the entire period of habitation. The process does not seem to have been very efficient and it is suggested production may have taken place on just a few occasions annually.[33]

The site **Motketel (41)**, on the outskirts of the village of Wehl revealed evidence for almost all processes from iron production to smithing.[34] Only reheating slag was not identified implying that the smith may have worked directly with bloom without first purifying it. The iron producing and working activities are dated roughly between 800 and 1100. The iron ore used was rattlestone of which some 10 fragments were found. By far the most common type of slag was tap slag providing clear evidence for iron production. There appears to have been some physical separation of iron production and iron working, the former activity taking place circa 100 meters away from the main

30 A small amount of tapslag was discovered at Heesch (64) in the fill of a well dendrochronologically dated between 814 and 838. The site has not been included in the table or on the map of sites (fig. 5.1) because no other traces of iron production or working were discovered at the site, making it impossible to determine whether production actually took place at the site, or whether slag was for example used as paving (see below).

31 Koster 2010, 155-164.

32 See note 17. Nonetheless the actual fell-date of the trees from which the samples ultimately originated could still lie within the current date range.

33 Koster 2010, 164.

34 De Rijk 2013, 191-210.

cluster of buildings.[35] Concentrations of smithing activity are less obvious but much of the smithing slag was discovered in wells adjacent to the medieval buildings. Nonetheless it is clear that the two activities were combined at this site and the author presumes that, given the amount of slag found, production was aimed at the direct needs of the settlement, not at wider dissemination. The Doetinchem and Wehl sites suggest that, just as on the Veluwe, iron production took place over an extended period, but perhaps starting slightly later, in the ninth century.

Evidence for iron production dating to the Early Middle Ages has been discovered in other regions of the Netherlands, but has not left surface traces such as on the Veluwe or in the Montferland/Liemers area. Traces of iron production in other parts of the research area have only come to light during excavations conducted in the past 20 years or so. In the area immediately surrounding the Montferland/Liemers production zone several sites have provided evidence of processes relating to the production of iron. Just to the north of the Montferland/Liemers region a site dated to the ninth and tenth centuries near the town of Zelhem (**site 534, Zelhem-Zelhemse Enk**) did not contain finds directly related to bloom manufacture but it did yield a relatively large quantity of reheating slag. The site consisted of a settlement and an area outside the settlement where a large quantity of slag was discovered as well as several pits containing slag.[36] Because no evidence for iron ore smelting or the manufacture of objects was discovered, iron working is interpreted to have been limited to the purification of bloom in order to manufacture iron ingots.[37] It is presumed that iron smelting took place in the immediate surroundings of the site as there would have been an ample supply of bog iron ore nearby.

Two other sites in the vicinity of Zelhem have also revealed evidence, albeit limited, for working of bloom. At the site **Zelhem Stikkenweg-Gildenweg (45)**, dated to the ninth and tenth centuries, fragments of furnace lining, slag and iron ore were discovered which may indicate either iron production or reheating of bloom.[38] The slag was not published in detail making it difficult to determine what exactly took place on site. The fragments of ore point to production, if not on site at least nearby. For the site **Zelhem Vinkenkamp (46)** the evidence for reheating seems clearer due to the total volume of slag recovered and the nature of its distribution.[39] Circa 107 kg of slag was recovered, most of which in three clusters, probably remnants of slag heaps. No production slag was identified, but hammerscale was, indicating that iron may also have been worked on site. The settlement was dated between the eighth and tenth centuries based on pottery finds, building typology and carbon dates.[40] It is not clear from the published data what type of ore was used for the iron worked on the sites around Zelhem. The identification of part of the slag material from the latter two sites as reheating slag must be treated with caution because it was not studied by a specialist and it is difficult to distinguish between reheating slag and smithing slag macroscopically.[41]

An additional site dated between the late seventh and tenth centuries in the southeast of region 3, **Hummelo-Keppelseweg (35)** also yielded reheating slag. In fact no other type of slag was identified.

35 However, it should be noted that the area between the inhabited zone and the area where production waste was found was not excavated. Nonetheless, the area where evidence for iron production was found did not contain remains of medieval structures, so it is probably safe to assume production took place at least at some distance from the inhabited area.
36 Kenemans/Van der Velde 2002, 26-41.
37 Joosten 2002, 54-55.
38 Van der Kuijl 2003, 14.
39 Peen/Van der Linden 2006, 96-97.
40 Van der Linden 2006.
41 Joosten 2004, 18.

The site lies slightly to the northwest of the Montferland/Liemers production area. It is assumed by the excavators that the relatively low quantity of slag (27 kg) compared to other sites in the region points to small-scale production of metal in the immediate vicinity of the settlement.[42]

A further six sites in the research area, outside the Veluwe, and the Monteferland/Liemers and its surrounding area, have revealed evidence of iron production. Iron production and working occurred during almost the entire habitation period of the site **Utrecht-A2 (525)** in region 6, from the middle of the seventh century until the end of the eighth century.[43] Several features contained both production and smithing slag implying that these two activities were carried out within roughly the same areas of the site.

At a site excavated in **Uden (101)**, located in region 8, slag representing various stages of iron production and working was discovered in association with a late-Merovingian/early Carolingian settlement.[44] Interestingly the site not only provided evidence for the use of a tap furnace but also pit furnaces, a type usually linked to the (Late) Roman phase of iron production in the Netherlands.[45] The bulk of iron production at the site has been tentatively dated to the Carolingian period, chiefly because of the large quantity of slag found in the core fill of a Carolingian well lying near to the area with a high concentration of slag. The construction pit of the well hardly contained any slag, indicating that production was not (long) underway in this area when the well was constructed. Also, postholes belonging to Carolingian buildings contained reasonable amounts of slag while very little was found in postholes belonging to Merovingian buildings. The finds of smithing slag and hammerscale point to iron working on site. It is assumed bog iron ore was used in the production process because this would have been available in the immediate surrounding area.

At a relatively short distance a similar situation was found at the site **Bakel-Achter de Molen (110)**.[46] Here production was dated to the second half of the ninth and tenth century. More or less the whole range of production waste associated with iron production and working was discovered. Evidence for the use of a tap-furnace was found though no clear concentration of slag could be identified that might hint at the location of a smithy. Both in the case of Uden and Bakel the scale of production is believed to have been limited, based on the excavated material. A third site in this part of region 8, **Nistelrode-Zwarte Molen (120)** revealed evidence for both production and working of iron in the Carolingian period, perhaps continuing into the eleventh century.[47] Just as at Uden bog iron ore is deemed to be the most likely source of ore, which would have been available reasonably close by (to the east of the site).

During excavations near the village of **Well** in Limburg, also in region 8, a total of circa 90 kg of slag was discovered.[48] The only other archaeological features dated to the Early Middle Ages discovered within the excavated area were charcoal production pits. Production slag, furnace lining and bog iron ore were identified, clearly indicating iron production at this location. The size of the production slag suggests that it was dumped in the excavated pits shortly after production. Several carbon dates of charcoal found in charcoal production pits and the possible remains of a furnace indicate a long period of production, perhaps starting in the sixth century and continuing into the

42 Nooijen/Van der Velden 2015, 47.
43 Kerkhoven 2009, 241-243.
44 Van Hoof/Koster 2002, 64-69.
45 Joosten 2004, 30-32.
46 Koster 2003, 138-144.
47 De Rijk 2016, 253-274.
48 Bouma 2014, 97-98; De Rijk 2014, 171-182.

Central Middle Ages.[49] The production slag discovered on site points to the use of tap-furnaces and chemical analysis on two slags showed that the slag assemblage was the result of several smeltings. The yield of the production process was difficult to estimate but probably lay somewhere between 14 and 35 kg of iron.

Deventer, in region 3, has provided evidence for almost all stages of iron production.[50] Production and reheating slag has been recovered at two separate locations. At both locations the slag was discovered in what has been interpreted as a destruction layer resulting from the Viking raid of 882, and in features pre-dating this layer. One of the locations also yielded fragments of iron ore and bloom as well as furnace lining. Deventer is seen as an important centre for exchange from the late ninth century onward. Its location along the IJssel River means it is relatively close to the iron producing region of the Veluwe as reconstructed by Heidinga and Van Nie. Heidinga suggested that the area along the IJssel would have been an important consumer of the iron produced on the Veluwe during the later eighth and ninth century, Deventer included.[51] He is less outspoken about Deventer's potential role as intermediary in the iron trade. Although the total amount and weight of the material found in Deventer is not known, the fact that the Smedenstraat excavation contained more than thirteen kg of production slag makes it likely that bloom manufacture did in fact take place in Deventer.[52]

Finally, the **Heul (528)** and **Harbour (58)** excavations at **Wijk bij Duurstede** have revealed finds associated with iron production, namely tap slag and reheating slag.[53] The total number of slag fragments found was 8392 but the total weight and the exact proportions of each kind of slag are unpublished.[54] Joosten mentions that the majority probably consists of smithing slag and one gets the impression that tap- and reheating slag was fairly uncommon among the finds.[55] The evidence for reheating of bloom in particular appears limited. During the **Veilingterrein (187)** excavation in 2007 and 2008 a total of circa 9000 fragments of slag were recovered weighing 238 kg.[56] Only slag found in closed contexts was analysed in detail and among this material was a relatively small amount of production slag and bloom.

Aside from what seem to be small quantities of production related slag, an argument against iron production in Dorestad is the analysis carried out by Joosten on the specific chemical composition of tap slag found at Dorestad. It was compared to tap slag from the Veluwe region that is the result of manufacture using rattlestone ore. A proportion of the Dorestad samples clearly resembled the composition of the Veluwe tap slag.[57] However, other samples were much more similar to bog iron ore samples from elsewhere. Of course, rattlestone could have been brought to Dorestad and smelted there, but the close relationship between mining pits and production sites on the Veluwe make it unlikely that ore would be transported to Dorestad rather than bloom. The evidence for reheating of bloom also appears to be limited. At the time Joosten published her dissertation there were no

49 Bouma 2014, 93-94, 98. Not all the charcoal production need have been directed toward iron production so there remains some uncertainty over the longevity of iron production at this site. Also, as stated several times, the use of older trees for charcoal production can make radiocarbon dated samples seem older than they are.
50 Bartels 2006, 61.
51 Heidinga 1987, 208-209.
52 If for example the slag had been used as paving or infill in Deventer it would be necessary to explained why only the Smedenstraat excavation yielded such a high quantity.
53 Joosten 2004, 95.
54 Van Es/Verwers 2015, 319-323.
55 Joosten 2004, 77.
56 De Rijk 2012, 421-432.
57 Joosten 2004, 83-84, 94-95.

known sites where bloom was consolidated on the Veluwe and Dorestad was suggested as a site where this might have been practiced.[58] However, with the results of the excavation of the site at Uddel there is no longer a need to presume a role for Dorestad. The analysis of smithing slag from the Veilingterrein excavation points toward the use of so-called '*consolidated iron billets*', something of an intermediate stage between bloom and iron bars. Tap slag may have been unintentionally transported along with bloom or iron. However, De Rijk argues that it is unlikely that tap slag was unintentionally brought to the town because during the production process tap slag would not have adhered to the bloom. He believes it is more plausible the production slag was brought to Dorestad on purpose, perhaps to harden roads or fill in damp areas of the settlement.[59]

How should the more recent evidence for iron production be interpreted in relation to the organisation and scale of production in the Carolingian period? In order to assess this it is necessary first to consider the nature of the evidence for production on the Veluwe and the Montferland/Liemers area compared to what has been discovered in other regions. Concerning the Veluwe and to a lesser extent the Montferland/Liemers the main evidence for large-scale production consists of traces of the production process which are still recognisable in the landscape. Rattlestone ore is a particular phenomenon of ice pushed ridges which only occur in a limited part of the research area. The trenches dug to acquire rattlestone ore are visible in the landscape to some degree and the use of elevation models has revealed the true extent of ore winning on the Veluwe. Slag heaps are still relatively numerous on the Veluwe even though many were exploited commercially in the nineteenth century.[60] Moreover, large parts of the Veluwe were not particularly intensively occupied or farmed in the past and this remains the case today. So, even though slag heaps on the Veluwe were utilised as a resource in more recent times it is an area where such heaps are perhaps more likely to have survived relatively intact than elsewhere. In the Montferland/Liemers area some slag heaps remain, but far less than on the Veluwe. The volume of production in the two areas has been calculated based largely on these slag heaps. In effect, knowledge of early medieval iron production on the Veluwe and in the Montferland/Liemers area largely depends on field surveys and not on excavations.

In other areas bog iron ore was the raw material for producing iron and the extraction of this material is unlikely to leave lasting traces in the landscape.[61] If a relatively large scale industry did exist in another part of the research area, which was based on manufacture from bog iron ore and where land-use in later centuries obliterated any above ground traces such as slag heaps, we are not likely to recognise it. It could of course be argued that even if it is not possible to identify production in the landscape, it should have been identified in excavations if it had been present. But what would that look like?

In several publications the volume of either tap slag or reheating slag is taken as an indicator for the overall output of the site and its intended outlet (see table 5.2). The conclusion for each of the sites in question is that production was likely intended for local use with perhaps a small surplus for wider dispersal. These estimations are somewhat problematic. The volume of production on the Veluwe often appears to be implicitly taken as a marker to gauge the relative importance of production at other sites. However, the slag related to production that is found on excavated sites cannot readily be compared to estimates based on slag heaps of the Veluwe. There is no objective scale against which

58 Joosten 2004, 95.
59 De Rijk 2012, 429.
60 Van Nie 1993, 13.
61 Bog iron ore forms in swamps and stream valleys where it can be found near the surface or in dried up streambeds. Once harvested bog iron ore can regrow and be re-harvested, sometimes within a generation (Van Nie 1990, 19-20).

to compare the volume of excavated slag and slag heaps, and any attempt to judge the intended outlet for the produced iron is at best an educated guess. In essence, it is difficult to compare the output of the Veluwe and that of other regions because much of the evidence is not comparable.

Another issue that makes it difficult to assess the relative importance of the Veluwe compared to other iron producing regions relates to the location of the various production processes. As far as can be assessed slag heaps on the Veluwe were not located in the vicinity of settlements. Iron was produced in close proximity to the main sources of raw materials, iron ore and timber. The Uddel site on the Veluwe, as well as the Braamberg site which is dated slightly earlier than our period, suggest that bloom was taken from production sites and consolidated within settlements. Something similar appears to have taken place in the vicinity of Zelhem where a series of sites surrounding the current town centre have yielded ample evidence for the consolidation of bloom. The bloom must have been produced elsewhere, perhaps where the (bog?) iron ore was sourced. At Well production slag, but no reheating slag was discovered, again suggesting that the bloom may well have been treated elsewhere.

If it is in fact the case that large scale iron smelting such as on the Veluwe was located at a distance from settlements, this means the chance of finding smelting sites elsewhere is limited. Archaeology in the Netherlands, certainly for the past 15 to 20 years, has been dominated by settlement research with very little regard for "off-site" phenomena. Many of the settlements in our database have not been fully excavated, let alone a reasonable proportion of the surrounding area. Furthermore, production sites may be located exactly in areas which are considered marginal for habitation and are therefore quickly deselected for further research. This makes it difficult to determine whether the Veluwe is exceptional in terms of surplus iron production in the Middle Ages, or that other areas in the Netherlands were also producing a surplus of iron beyond local needs.

One reason to believe the Veluwe and Montferland/Liemers were indeed exceptionally productive is the rattlestone-ore which could be mined there. On average it seems to have produced a higher yield than bog iron ore given the contemporary smelting technology.[62] This would have made it a more attractive source of iron, particularly considering the overall inefficiency of the production process in the Early Middle Ages. In addition, even if the slag heaps and mining trenches are features which are difficult to factor in to comparisons with areas where they are not present in the landscape, their sheer quantity and distribution over a comparatively wide area cannot be ignored. The growth of the Kootwijk 2 settlement in the eighth to tenth century and the amount of imported pottery have also been identified as indicators for the importance of the iron industry in an area where growth in agricultural output would have been difficult.[63] It seems reasonable to connect the growth of the Kootwijk settlement to the iron industry but whether its development can be directly associated with the rise and fall of iron output is less evident.

Another area where the Veluwe stands out is evidence provided by records of donations of landed property. These records, dating to the first half of the ninth century suggest that something specific was happening in the heart of the iron producing region of the Veluwe.[64] The donations, of two donors in particular, Gerward and Folker, are noteworthy because they explicitly mention grants of (parts of) forests and nothing else.[65] None of the donations situated on the Veluwe specifically

62 Joosten 2004, 116-118.
63 Heidinga 1990, 10.
64 Heidinga 1987, 199-203.
65 Both Gerward and Folker also donated property in other areas, but in these cases the subject of donation are estates, variously described as (part of a) *villa*, *mansi* or *hubas*, or (land intended for) livestock. There are three exceptions among Folker's donations where forest was donated alongside other property. The property has all been located on the northwestern edge of the Veluwe, namely in Ermelo, Putten and a location in the vicinity of Putten.

mention iron production which led Heidinga to suggest that production was managed by outside elites through control over fuel. According to his model, payment for use of the forests would have taken place in the form of iron. Whether or not this was the case, the specific nature of the donations in the vicinity of Apeldoorn and Kootwijk imply a particular interest in this area which was not related to agriculture.[66] It may speak for the importance of the iron industry in this part of the Veluwe, but not necessarily for its relative importance in relation to other potential iron producing regions. Forest could simply have been the only resource worth owning in this area whereas in other regions it was part of a wider array of assets.

With regard to the organisation of production, Heidinga believed the iron producers of the Veluwe were professionals who were fully reliant on producing and selling a surplus in order to acquire food and other goods.[67] As we just saw, he believed they were controlled indirectly by elites residing outside the production area. These elites owned tracts of forest and therefore a resource which, when transformed into charcoal, was both a vital component of the production process and a source of fuel. Through their exchange networks with the wider world the iron producers were conduits for the dissemination of imported goods to agrarian settlements in the region. The main reason to assume such a full time iron producing workforce was the presumed scale of production and volume of output.

The Orderbos excavation (which after all was one of the main constituents of Heidinga and Van Nie's models in terms of calculating output) has put the professional nature of the iron producers in a different light. By no means can it be disproved that the iron producers were professional artisans and the production process certainly required a level of communal or top-down organisation, at least for the management of the forest. The work would also have required a degree of specialist knowledge. However, the longer period of production indicated by the carbon dates from the Orderbos opens up the possibility of iron production being a seasonal activity undertaken during lulls in the agricultural calendar.[68] It has been suggested that the iron producers of the Veluwe might be comparable to brick burners in more recent times.[69] They generally performed hard labour for low wages, had low social standing and lived on the margins of society.

Whether iron production was a seasonal activity remains open for debate but whatever the case, seasonality does not imply a fundamental difference in the importance of iron production for the inhabitants of the area compared to full time production. The creation of a surplus in the form of iron intended for exchange could well have been an important component of household incomes in what was likely an agriculturally marginal area.

What seems clear is that several stages in the process of transforming iron ore into raw iron were undertaken at distinct locations in several areas on the Veluwe, in the Montferland/Liemers area and its surroundings, and at Well in the south of the research area. Such splitting up of the production process can be viewed as evidence for top-down organisation but may equally be simply the most effective way of doing things when the ore is located in areas otherwise unsuited to settlement.[70]

Outside the Veluwe finds from several sites that have yielded *direct* evidence for iron production exhibit a different way of organising its manufacture.[71] At Wehl, Uden, Bakel, Nistelrode and Deventer

66 Although mast feeding of pigs cannot entirely be ruled out.
67 Heidinga 1987, 197-198; Joosten/Van Nie 1995, 209-211.
68 A similar seasonal character of iron production has been identified in medieval Sweden (see chapter 7).
69 Van Heeringen *et al.* 2014, 15.
70 Joosten/Van Nie 1995, 209.
71 Here direct evidence is meant to imply the presence of either tap slag or furnace lining.

finds indicate production took place quite close to settlements if not on their periphery. At these sites, there is evidence not only for production but for reheating and working of iron as well. These are also sites where the volume of slag recovered is relatively low.[72] Deventer is an exception, but this can hardly be considered a rural site and is therefore probably not comparable to sites such as Uden and Utrecht-A2 in terms of output.

Wehl provides an example of another possible variation of the organisation of production. It is almost certain that the rattlestone ore used in the production process was sourced at least three kilometers away. In this case then, the ore was moved rather than smelted near the seams. In all other aspects the site is similar to those where production took place in a settlement or on its periphery. What this shows is that we should not be looking for a single model for iron production in our research area, but rather need to consider the possibility that a variety of production models existed between, but also within iron producing areas. Perhaps cases where various distinct production processes took place at several different sites can be considered an indication for relatively large scale production, because it suggests a regularity and consistency which one would not immediately expect with small scale production for local use. The latter situation appears to fit better with the kind of production found close to settlements where all of the production phases are present and the volume of slag indicates limited output, in as far as slag from settlement contexts can inform us on that matter. For the Montferland/Liemers both these 'systems' appear to have functioned alongside each other. As for the Veluwe this is less evident because of the small number of settlements excavated to date. Uddel and the ore smelting sites certainly point to a degree of segregation of stages of the production process but Putten might provide an example of smaller scale production for local needs.[73] In both cases production could have been seasonal. Furthermore, the splitting up of the process does not necessarily imply the producers were full-time professionals, they may also have been involved in agriculture.

Conclusion

The Veluwe and to lesser extent the Montferland/Liemers have long been seen as the only parts of the research area where iron production on a significant scale was practised during the (Early) Middle Ages. Here, rattlestone iron ore deposits, specific to ice-pushed ridges, were exploited. On current evidence production on the Veluwe started in the seventh century and continued into the eleventh century at least. When production commenced in the Montferland/Liemers is less clear, but it was certainly underway by the ninth century. Until recently the main source of evidence for iron production in these two parts of the research area consisted of features observable above ground. More recent excavations have made it clear that iron was produced in other parts of the research area as well during the Early Middle Ages. It has become apparent that to the east of the IJssel, in the south of region 3, inhabitants in a wider area than just the Montferland/Liemers were involved in iron production. In the south of the research area, in subregion 8.4, another cluster of sites have revealed traces of iron production in the eighth and ninth centuries. In these areas bog iron ore was used as raw material instead of rattlestone ore.

The available evidence makes it difficult to compare the scale of production in the various iron producing regions. The mining of rattlestone ore leaves lasting traces in the landscape whereas

72 The Doetinchem site also contained reheating slag but this could not directly be related to Carolingian features.
73 As mentioned, the find report of Putten-Husselerveld is not entirely clear on the association of production waste with habitation periods.

the winning of bog iron ore does not. In addition, large parts of the Veluwe have not witnessed a similar degree of (agricultural) exploitation as other areas since the time when iron production took place. This means slag heaps, the waste deposits of the production process, have remained relatively intact on the Veluwe, but are absent above ground elsewhere. The location of slag heaps indicate production took place at some distance from settlements. As excavations are generally focused on the investigation of settlements this means remains of the production process are also less likely to be discovered archaeologically.

Where evidence for iron production is present on settlement sites the assemblages indicate that this is primarily related to a different organisation of production than on the Veluwe. On these sites virtually all stages of iron production and working have been identified, whereas on the Veluwe iron production and working took place at different locations. Such a separation of production processes is not unique to the Veluwe, it has also been identified to the east of the IJssel and in the south of the research area. The different ways in which production was organised may be indicative of the relative scale of production. Production close to settlements, where all the stages of manufacture took place was perhaps intended for local needs, whereas physical separation of the various stages could imply production aimed specifically toward the creation of a surplus. However, it is important to keep in mind that differences in the organisation of production need not always be directly correlated with scale of production. For instance, small-scale producers concentrated in a limited area may collectively have been responsible for substantial surplus production.

5.2 Metal-working

5.2.1 Non-ferrous metal-working

Evidence for working of metals other than iron is rare on Carolingian sites. In region 1 gold working probably took place at **Wijnaldum (18)** somewhere between 650 and 750 AD, based on the find of a crucible fragment with drops of gold, a stray drop and a piece of gold-wire.[74] Other evidence for gold working was found in a context dated between 850 and 900 alongside silver droplets and a gold object, possibly a touch-needle. The silver droplets point to silver working on site as well. A touchstone discovered in a well dated to the ninth century showed traces of gold, but this does not necessarily indicate gold working. Finally, some fragments of lead might be related to lead working in the period 850-950, though it may equally point to the manufacture of moulds for casting copper-alloy items. Otherwise no traces of copper-alloy working were discovered for the period between 650 and 950, whereas ample evidence was available for the period between 550 and 650. This last period also saw the greatest intensity of iron working at Wijnaldum.[75]

The finds recovered at **Schagen-Waldervaart (169)** in the west of region 1 included part of a casting mould of a key, which may date to the Carolingian period. However, because the finds were not published in relation to features it cannot be ruled out that it dates earlier, in the sixth or seventh century. A reason for dating the mould to the Carolingian period is that copper alloy keys seems to be a characteristic artefact of the period, more so than for the preceding centuries.

Excavations in **Zutphen (531)** in region 3 have revealed traces of iron (see below) and lead working and copper-alloy casting in the second half of the ninth century, in the form of slag, hearth

74 Tulp 1997, 53-54.
75 Tulp 1997, 58.

lining and crucibles.[76] There are indications that lead and bronze were refined at the site, implying that lead, tin and copper ore was brought to Zutphen for further processing. Recycled copper-alloy may have been used as well. Metal-working appears to have continued on a modest scale after the ninth century in the town itself, while on the settlements in the surrounding area iron working became more important after 900.[77]

In region 5 fragments of two crucibles and a cupel were recovered during the excavation **Limmen-De Krocht (160)**, all dated to the Carolingian period.[78] No traces of metal were present on the crucibles, but the cupel points to melting of either silver or gold. It is presumed that a gold- and/or silversmith was active on the site at some point during the ninth century.

In region 6 a casting canal used for copper-alloy casting was found in the construction pit fill of a well discovered in a trial trench at **Wijchen-Klapstraat (552)**. The pottery recovered from the same fill was dated to either the Merovingian or Carolingian period and because the well was only recorded at the excavation level, in other words not sectioned, it is not certain to what period the remains belong.

At **Domburg (191)** in region 7 a casting mould and copper-alloy casting waste, as well as possible fragments of crucibles, point to copper-alloy working.

The evidence for non-ferrous metal working from **Wijk bij Duurstede** should also be mentioned even though it is not a rural site. Numerous crucible fragments were found during the Harbour (58) and the Heul (528) excavations, but all appear to be linked to post-Dorestad habitation.[79] No other form of evidence for non-ferrous metal working could be identified among the finds. During the Veilingterrein (187) excavation almost all elements associated with brass production were found in several pits and layers within a limited area.[80] Although few of the features containing these finds could be dated and several were dated younger than the Carolingian habitation phase, it is assumed by the authors of the excavation report that the remains belong to a floor level of a workshop which was active in the Carolingian period.[81] The excavation Wijk bij Duurstede-De Geer II (190) yielded one droplet, probably silver.[82] The find was not discovered in relation to other finds or features that can be associated with silver-working. In addition, the dating of the context of the droplet is not certain, meaning it is not possible to infer the presence of a silversmith at this location during the Dorestad habitation phase.

Finally, it is worth mentioning that whereas indications of metalworking, among which copper-alloy and gold or silver, have been found on several Merovingian sites in the lower delta of the Rhine, no such activities can be associated with Carolingian habitation phases in this area.[83]

5.2.2 Iron-working

Evidence for iron working on Carolingian sites can at times be ambiguous. If smithing slag is found in low quantities and is highly dispersed over a site, it cannot readily be attributed to iron-

76 Groothedde 2016, 64.
77 Groothedde 2016, 67.
78 Dijkstra/De Koning/Lange 2006, 107-108.
79 Van Es/Verwers 2015, 323.
80 Van Os 2012, 405-410.
81 I myself am not so convinced, the overall composition of the find complex in my view points more toward a post-Carolingian date.
82 Nooijen 2013a, 69.
83 See for instance Dijkstra 2011b, 166 for an overview, more specific 121 for Rijnsburg and 153 for Katwijk.

working. In addition, slag cannot be dated independently and therefore has to be discovered in clear association with features of a particular period in order to assign them to that period. The clearest evidence for iron smithing is provided by hammerscale, a kind of slag which generally forms when iron is being worked into shape.[84] It is usually very small and travels a limited distance from the anvil to the floor, where it is often quickly trampled into the ground. Therefore concentrations of hammerscale are a good indicator for smithing activities having taken place in the direct vicinity. Unfortunately the small size of hammerscale fragments also means that they are generally only found through sieving or holding a strong magnet over features or soil samples. This is not yet common practise and therefore hammerscale may have gone unnoticed in some cases, especially where older excavations are concerned.

In fact, hammerscale has only been identified at seven of our sites, all but one of which have already been discussed in relation to iron production.[85] At Uddel, Uden and Zelhem smithing and production or reheating of bloom took place within the same settlement, while the evidence provided by Wijk bij Duurstede- Veilingterrein strongly points to smithing being the only form of iron working, just as at Berkel-Enschot- Enschotsebaan (139). It is not clear what kind of objects were being made at any of these sites, although there is some evidence for the production of knives or perhaps swords at Wijk bij Duurstede.[86] Generally the assumption is that most of the iron working on sites in the Netherlands was intended for use on the investigated settlement and its immediate surroundings due to the relatively small quantity of smithing slag retrieved.

As already discussed, **Wijnaldum (18)** in region 1 provides limited evidence for metalworking in the period between 650 and 900, and the trend is continually downward in successive phases of habitation.[87] The only clear traces of iron working in this period are dated between 650 and 750 and come in the form of slag, tuyeres and hearth lining. Iron ingots are considered possible indications for iron working in the period 750 to 900, but no concentrations of finds related to manufacture could be identified.

In region 2 clear traces of iron working have only been discovered at **Norg (66)**. The roughly 2,3 kg of slag was discovered in one single well.

The relatively large quantity of slag found at **Zelhem- Vinkenkamp (46)** in region 3, is mostly related to iron production and reheating of bloom. The presence of hammerscale points to some degree of iron working on site, but because few finished artefacts and no iron bars were discovered, the scale of smithing is deemed to have been limited.[88] The large amount of slag is seen as evidence for production of iron for export. A similar situation is believed to have existed at **Zelhem- Zelhemse Enk (534)** where a considerable amount of reheating slag was discovered, some hammerscale and no iron objects.[89] At **Doetinchem- Lookwartier (44)** smithing appears to have taken place throughout the occupation period of the site, on each identified yard. No hammerscale was recovered, even though it was actively sought after. The lack of finished or semi-finished artefacts is seen as evidence for small-scale production.[90] Another site in region 3, **Wierden- Huurne (29)**, yielded a small amount of slag and no hammerscale. Nonetheless, the concentration of slag in a limited number of features

84 Mills/McDonnell 1992; Pleiner 2006, 110-112.
85 Uddel (531), Uden-A50 (101), Utrecht-A2 (525), Wijk bij Duurstede-Veilingterrein (187), Zelhem-Vinkenkamp (46), Zelhem-Zelhemse Enk (534).
86 Van Es 1990, 174.
87 Tulp 1997, 56-58.
88 Van der Linden 2006, 97.
89 Kenemans/Van der Velde 2002.
90 Koster 2010, 164.

and the presence of hearth fragments point to small-scale iron-working.[91] The slag discovered in the Stadhuis excavations in **Zutphen (531)** has not been studied in detail and therefore it remains uncertain whether iron was only worked there or if it was also produced. An indication for the latter is the presence of several fragments of bog iron ore found in association with other remains of metalworking.[92] From the first half of the tenth century the evidence for metalworking in the town of Zutphen declines and it seems that iron working started to become common on settlements surrounding the town around the same time. Further down the IJssel river, the slag material from **Deventer (57)** has not been studied extensively making it difficult to determine the scale and context of iron working there.

As we saw in the previous section, iron was probably produced at **Uddel (530)** on the Veluwe in region 4, before the settlement was established, but there is also ample evidence for reheating of bloom and smithing during the habitation phase. Generally speaking reheating and smithing slags are poor indicators for the exact location of a smithy as the smith would not have wanted it accumulating in the workshop.[93] Two areas in Uddel, one in the north and one in the south of the excavated area, show concentrations of hammerscale, which point to the presence of a smithy in the vicinity. Much of the hammerscale was recovered from two sunken huts but it is thought unlikely that smithing took place in these huts due to the fumes that are produced during the heating of bloom and charcoal.[94] For Uddel it has been concluded that the amount of slag recovered points to production of bloom and objects for local needs, but the incomplete excavation of the settlement hampered a comprehensive assessment.

Circa 26 kg of smithing slag was uncovered during the excavation **Limmen-De Krocht (160)** in region 5.[95] However it cannot be deduced from the publication how much of this slag actually belongs to the Carolingian habitation phase rather than later phases. It is believed smithing took place during the entire habitation period of the site, from the eighth to the twelfth century. Production is deemed to have been aimed at the inhabitants' own needs.

In region 6, at the site **Lent-Lentseveld (500)** circa seven kg of slag was discovered, part of which was hammerscale.[96] The hammerscale was discovered in a pit containing a relatively large amount of charcoal and which was associated with a building dated to the tenth century. The scale of production is believed to have been limited and geared towards local demand.

At the **Veilingterrein (187)** site in Wijk bij Duurstede a clear concentration of hammerscale was discovered on the southern limit of the excavation. Several concentrations of smithing slag were identified, presumably indicating the areas where slag was deposited, and perhaps the presence of multiple workshops.[97] Several concentrations of smithing slag were identified at **the Heul (528)** excavation, again suggesting there may have been several smithies active at Dorestad. However, the finds have not been analysed in sufficient detail to determine whether multiple smiths were active simultaneously or whether we are dealing with successive smiths workshops. At any rate the amount of slag found at the Veilingterrein site is believed to indicate that a smithy was active here for an extensive period of time.[98] Why the large amount of slag could not be the result of a relatively brief,

91 De Rijk 2005, 47-49.
92 Groothedde 2016, 64-67.
93 De Rijk 2015b, 124-125.
94 De Rijk 2015b, 126.
95 De Rijk 2006, 117-121.
96 Den Braven/Kars 2011, 114-115.
97 Dijkstra 2012, 592.
98 De Rijk 2012, 431.

large scale production of iron objects is not clear. Moreover, no estimate for the scale of production is provided. According to Verwers and Van Es the distribution of slag over the Heul excavation suggests iron working began towards the end of the eighth century or later at Dorestad.[99]

Evidence for iron working was recovered during trial trenching at **Haarzicht (216)** to the west of Utrecht in the form of slag and hearth lining.[100] Due to the nature of the excavation no more is known of the context of iron working at this site. At **Utrecht-Appellaantje (526)**, both production slag and smithing slag was found.[101] The slag was discovered in several loose clusterings and in relatively small quantities. A clearly delimited area where iron working and or production[102] took place cannot be identified on the available evidence. The dating of the finds is not entirely clear, they could be either Merovingian, Carolingian, both or neither although the latter option seems unlikely. At the **Utrecht-A2 site (525)** traces of iron smithing comprise smithing slag and hammerscale. The distribution of slag implies that iron working took place during the entire habitation phase of the site. The total weight of the recovered slag has not been published making it difficult to determine what the scale of production may have been. Nonetheless it seems justified to conclude that production was not at a level greater than most other sites discussed in this section.

At the ringfort of **Oost-Souburg (163)** in region 7, smithing activity was identified by the discovery of circa sixteen kg of smithing slag associated with buildings belonging to the first phase of habitation in the late ninth and tenth century.[103] Analysis of several samples of slag, and iron fragments found along with the slag, indicated that the iron used was probably produced from bog iron ore. An excavation within the ringfort of **Domburg (191)** yielded just over five kg of smithing slag.[104] Given the limited size of the excavation the amount of slag is characterised as considerable by the report's authors, indicating intensive iron working.

In region 8, the indications for iron smithing at **Uden-A50 (101)** are limited but clear. Nine of the ten investigated soil samples from the area where evidence for iron working was concentrated contained hammerscale.[105] Because the site was not excavated completely it is difficult to say much about the scale of iron working, but it does not appear to have been extensive as the amount of smithing slag recovered was limited to two fragments. Most of the circa 125 kg of slag discovered at **Berkel-Enschot-Enschotsebaan (139)** was smithing slag, with a small component of hammerscale.[106] A large proportion of the smithing slag and hammerscale was recovered from two locations, one probably indicating the dump site of the smith and the other the smithy itself. The size of hammerscale and composition of smithing slag suggests relatively uncontaminated iron was worked, probably consolidated iron billets. The smithy is thought to have been active somewhere in the eighth or early ninth century and does not appear to have had a successor within the settlement. Nothing is stated explicitly about the scale of production by the authors, but the assumption seems to be that iron-working was geared towards use by the inhabitants of the settlement. It is not known what kind of items were being produced. At **Alphen-Molenbaan (106)** a reasonable amount of smithing slag was discovered, most of which in early medieval features.[107] Although 33 of the 51 slag fragments found during the excavation, weighing four kg, were discovered in a well dated to the Carolingian

99 Van Es/Verwers 2015, 323.
100 Hoegen/Jansen 2008, 53.
101 Den Hartog 2010, 111-112.
102 The evidence for iron production was not deemed sufficient to include the site in section 5.1.
103 Joosten 1995, 173-178.
104 Daleman/Koopstra 2011, 127-128.
105 Van Hoof/Koster 2002, 66.
106 De Rijk 2015a, 277-291.
107 Meijlink 2005, 71.

period, other slag was recovered from Merovingian features. Therefore it is not completely clear at what point during the Early Middle Ages iron working was practiced at this site.

5.2.3 Conclusion

A few observations can be made regarding the evidence for metalworking on sites in the research area. First, traces of both ferrous and non-ferrous metalworking appear to decrease on rural sites in the central Dutch river area and along the western and northern coast from the seventh to the ninth century. The sites to the west of the city of Utrecht where metals were worked all had ceased to exist by the ninth century. Settlements near the mouth of the Rhine have revealed traces of various kinds of metalworking dating to the seventh century, but no clear evidence for the eighth and ninth centuries.[108] At Wijnaldum some iron working may have been practiced, but there appears to have been a general decline in metalworking activities from the seventh to the ninth century. On three sites with the clearest traces of non-ferrous metal working, Domburg, Limmen-De Krocht and Zutphen, manufacture took place toward the end of our period. It seems that for much of the eighth and ninth century smiths working with copper-alloys, silver and gold operated at locations which have not yet been archaeologically identified.

Secondly, the almost complete lack of evidence for iron-working on sites in the west of the research area (region 5) is noteworthy because of the relative abundance of iron artefacts in assemblages. This may indicate that finished items were brought from outside the region, or that production was concentrated at a limited number of sites which have not yet been located.[109] Wijk bij Duurstede is one such location where the manufacture of iron goods perhaps became concentrated. From there they could have been distributed further west. At the same time it seems likely that large quantities of iron tools, fittings and fixings would have been necessary at Dorestad itself, so production may have been geared primarily towards local needs.

Finally, each part of the research area, except region 2, contains at least one site where evidence for ironworking has been discovered. In almost every case the output (where specified) is deemed to have been intended for local use. There is however some variation in the circumstances encountered on our sites. There are sites with signs of production of raw iron as well as iron-working such as at Zelhem and Nistelrode. Nistelrode is also among a group of sites where iron-working appears to have been practised throughout the medieval occupation period. Then there are sites with evidence for only incidental or at most a single generation of metal working such as at Berkel-Enschot. On several of these sites the traces of iron working are so limited it can be questioned whether smiths were permanently present. Travelling artisans may be a more likely option, particularly where no other traces of the production of raw iron are present. Activity may have been limited to repairs, rather than the manufacture of new items.

108 Dijkstra indicates iron working at Valkenburg (155) but this appears to be speculative (Dijkstra 2011b, 143, 166).
109 Although the finds from Limmen-De Krocht (160) suggest some small scale production did take place.

5.3 Artefacts

The metal objects found on Carolingian sites may seem diverse at first glance (see tables 5.3 and 5.5), but generally exhibit limited variety at site level. First the iron artefacts are presented briefly, then items manufactured in copper-alloys with a particular emphasis on brooches, and finally coinage is discussed.

5.3.1 Iron artefacts

As the previous section demonstrates, there appears to have been a substantial amount of iron produced in various parts of our research area. This raises the question what all this iron was intended for, and in particular to what extent rural consumption was responsible for the level of raw-iron output. If the quality of excavation and publication is taken into account, in most regions there are few sites where iron finds might reasonably have been expected but were not found.[110] Only regions 3 and 8 contain a considerable number of sites where no iron artefacts were recovered even though they may have been expected. This number can be reduced somewhat by taking into consideration whether finds were published by structure, because many iron artefacts cannot easily be dated independent of context. However, in regions 3 and 8 this still leaves a quarter and roughly a third of sites respectively where no iron artefacts have been discovered despite favourable excavation and publication practices. Aside from excavation and publication practices, formation processes play a role in recovery rates. The effects of land-use discussed in chapter 3 may partly explain the lower recovery rate of iron artefacts in the two regions, where medieval and post-medieval agricultural practices led to earlier habitation levels being incorporated into the arable soil. Combined with the use of plaggen mixed with manure in order to improve fertility, leading to relatively acidic soils, the conditions for preservation are generally not as favourable in regions 2, 3 and 8 as they are in regions 1, 5 and 6.[111]

In total, (fragments of) iron artefacts were recorded at 44 sites. Circa 85% of all artefacts were recovered from sites designated as town, the majority from Wijk bij Duurstede. Many of the objects discovered at Wijk bij Duurstede have not been found elsewhere, but the assemblage is perhaps a reasonable representation of the range of iron items available to rural dwellers during the Carolingian period in the research area (see tabel 5.4). As far as the available data allows for comparison, the conclusion seems to be that iron artefacts were present on most, if not all rural settlements in the research area. The largest assemblages of iron artefacts on rural sites can be found in region 5, mainly at Leiderdorp (158), Wijk aan Zee (172), Bloemendaal (212) and Naaldwijk (219), where conditions were relatively favourable for recovery, but also elsewhere in the region on sites where this was less obviously the case.[112] On the other hand rural sites in region 6 have yielded comparatively few iron artefacts.

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110 Sites where metal finds might have been expected are defined as having a quality of publication score of 1 or 2, a quality of excavation score of 1 or 2, and are sites where metal detectors were (or are expected to have been) employed. Publications below this score cannot be guaranteed to contain all the recovered artefacts, especially unidentifiable iron objects. Excavations with a score lower than 2 are either not detailed enough or are less likely to have yielded finds due to their limited extent.

111 Regions 4 and 7 are more difficult to compare with other regions due to the limited number of sites.

112 See chapter 3.

Function category	Artefact	1	2	3	4	5	6	7	8	Total
unknown	fragment								2	2
construction	(hinge) pin								1	1
	clamp					1			1	2
	hinge					1				1
	nail	2	2		1	6		1	6	18
	rivet set					1				1
dress accessory	buckle					4				4
	strap end					1				1
fishing/hunting	fish hook	1								1
	fishing speer					1				1
keys/locks	hook					2				2
	key	2		1		2			3	8
	latch					1				1
	lock					1				1
needles/pins	needle					2				2
other	cowbell					1				1
	handle					1	1			2
riding	horse-tackle					1				1
	spur			1						1
shipping	boat hook					1	2			3
	clamp					1				1
	rivet					1				1
tool	axe					1		1		2
	blade/ploughshare?					1				1
	chain					1			1	2
	knife	2	2	2		6		1	7	20
	piercer					1				1
	shears					1				1
	sickle				1					1
	spoon drill			1		1				2
weaponry	lance			3		2				5
	sword			1		1				2
weaponry/hunting	arrowhead								1	1
Total		**7**	**4**	**9**	**2**	**44**	**3**	**3**	**22**	**94**

Table 5.3 Iron artefacts discovered on rural sites by region.

Examining the function category of the various artefacts from rural sites makes it clear that, excluding nails, tools form the largest identifiable group and that several other groups can be characterised as 'practical' items. Among the tools, knives are by far most common, other tools are axes, chains, piercers, shears, spoon drills, and objects related to agriculture, namely a sickle and a ploughshare. Tools occur on sites in almost all regions and knives appear to have been a particularly common item on rural sites.

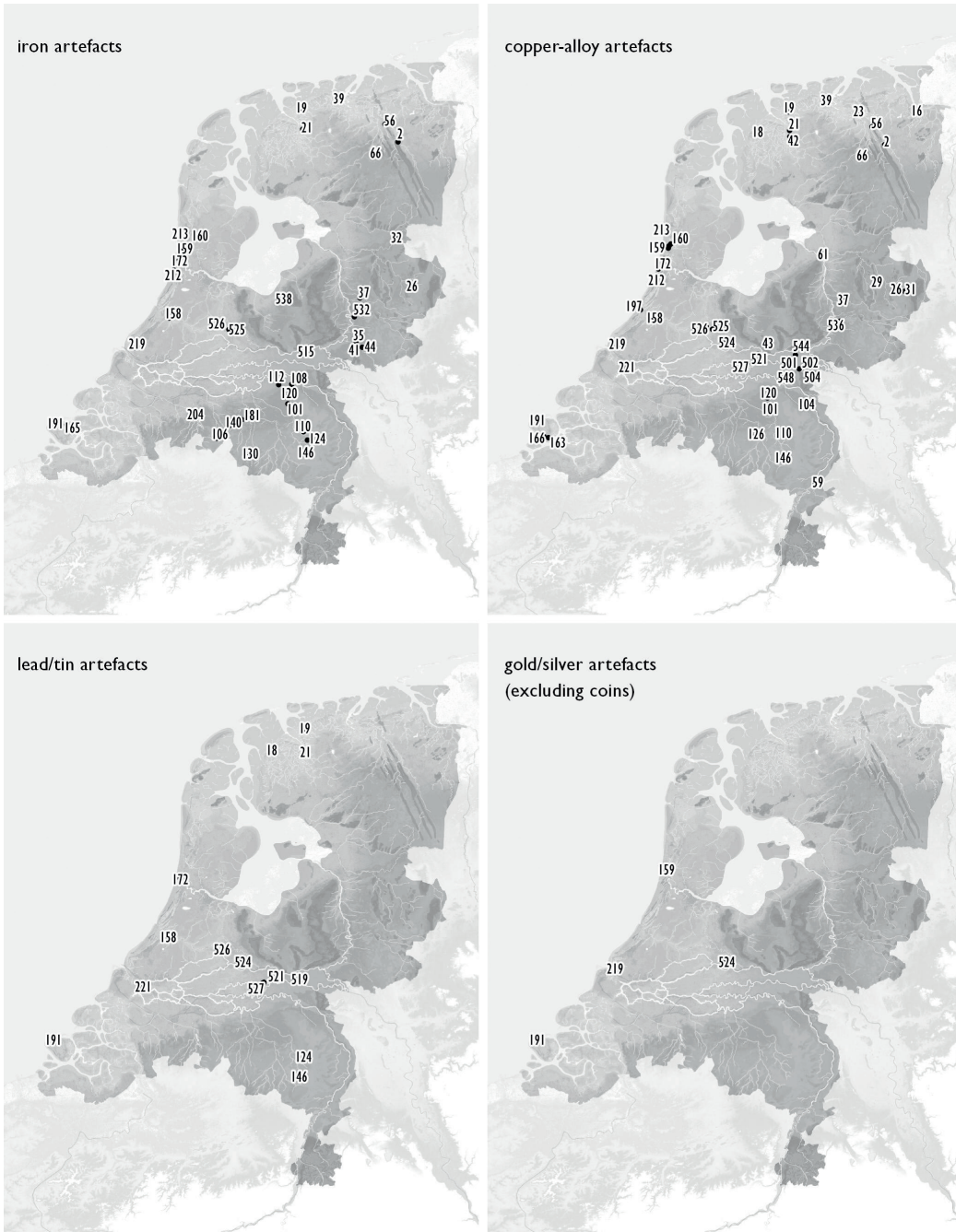


Fig. 5.2 Rural sites where metal artefacts have been discovered.

Artefact	Total	Artefact	Total
adze	5	lock spring	2
anvil	1	loop	1
arrowhead	4	nail	6
axe	4	needle	1
boat hook	10	pen	1
boat nail	1	pilum	1
brooch	1	pin	3
bucket handle	3	pitchfork	1
buckle	5	ploughshare	2
butt ferrule	4	plough points	1
chain	5	ring	2
chisel	1	rivet	1
chopper	1	rod	2
clamp	4	shaft	1
comb	1	shears	2
fiddle-key	1	shield boss	2
fire-iron	1	shovel	3
fitting	4	sickle	2
fork	1	socket	1
hackle	2	spoon drill	4
hammer	5	spoon drill?	1
handle	1	spur	3
hinge	1	staple	1
hook	1	stirrup	3
hoop	1	strip	3
horseshoe	1	suspension gear	1
key	13	sword	7
knife	19	tongs	1
lance	5	trivet	1
latch	1	tweezers	1

Table 5.4 Overview of iron artefacts discovered during excavations at Wijk bij Duurstede.

Keys or parts of lock-mechanisms also seem to have been relatively common, especially when the examples made of copper-alloy and unspecified metals are included. The total number then amounts to 24 pieces,[113] the majority of which have been found in coastal areas but also some on inland sites, in regions 3 and 8. Perhaps unsurprisingly, artefacts related to shipping have been discovered on three sites along waterways, two sites to the west of Utrecht (sites 525 and 526) and at Leiderdorp (158), but otherwise none at sites along the coast. Dress accessories are represented only by buckles and strap-ends. All examples were recovered from three sites relatively close together in region 5. This is also the only region where artefacts related to horse riding have been found, all three at Wijk aan Zee (172), a site which is exceptional in terms of its find assemblage of metal artefacts. Some items of weaponry were recorded, namely a lance at Hardenberg (32) on the boundary between region 2

113 The type of metal was not specified in two cases.

and 3, at Naaldwijk (219) in the southwest of region 5 and Bloemendaal (212), also in region 5. An arrowhead was recovered at Deurne (124) in region 8.[114]

There are problems interpreting the dataset of iron artefacts meaningfully. There are of course the issues relating to preservation conditions set out in chapter 3, but another factor is the degree to which iron was recycled. Few studies have explicitly focused on the recycling of iron in the Early Middle Ages (or other periods for that matter). The subject is usually glossed over by those who study the methods of blacksmiths in the past, and attention is instead directed toward sources of fresh iron.[115] Relatively recently it has been proposed that after the collapse of the Roman state in Britain recycling of iron must have become widespread, mainly because no traces of iron production have been identified for the period from the fourth to the seventh century.[116] Though a welcome contribution to an understudied field, the research contains little direct archaeological analysis of iron artefacts themselves in order to bolster the arguments pertaining to recycling.[117] There is more evidence for recycling in the later Middle Ages and pre-modern times.[118] Investigation of iron building materials used in large constructions in the south of France in the Central- and Late Middle Ages, combined with historical sources has provided direct archaeological evidence for recycling.[119]

Although more research is necessary on the subject, it is highly likely that iron was recycled by early medieval blacksmiths. Henning in fact suggests this is an important reason why few tools are recovered during archaeological excavations of rural sites.[120] Relatively large implements such as elements of ploughs and scythes would have been especially suited to recycling to produce smaller items. Along with variable preservation conditions, this makes it is very difficult to determine whether the range of artefacts discovered on the rural sites under study is a reasonable representation of eighth and ninth century inventories or not. In the past severe doubts have been raised over the availability of iron to rural inhabitants in early medieval northwest Europe.[121] These doubts were part of a more broadly held, pessimistic view of developments in agriculture and the economy at large that existed for a time in historiography.[122] With the subsequent, more positive appraisal of economic developments in the rural sphere, particularly regarding the eighth and ninth century, the estimation of the availability of iron has also changed. A closer examination of written sources indicates the use of iron implements was common on manorial estates.[123] Mostly through the work of Henning, archaeology has provided evidence that technological improvements in iron

114 Items of weaponry dated to our period have been found repeatedly as stray finds in the research area, often in waterlogged conditions (Maczek 2016). These finds hint at the possibility that weapons were more common in our research area than it appears based solely on the settlement finds, in a similar way that Merovingian burials indicate a much wider occurrence of weaponry in rural areas than settlement evidence would suggest.
115 For example, in his overview of early European blacksmiths, Pleiner occasionally mentions in passing recycled iron as a raw material, but does not discuss it separately in a chapter listing the sources of iron available to a blacksmith (Pleiner 2006).
116 Fleming 2012.
117 It has also been suggested that post-Roman iron production in Britain was located at a distance from settlement sites, making it difficult to identify it using current archaeological research methods (Birch 2011, 8-10). If that was the case the need for recycling of iron may not have been as great as Fleming believes.
118 For Britain Woodward 1985.
119 Dillmann/L'Héritier 2009.
120 Henning 2009, 168.
121 For example Duby 1966; Duby 1973, 22-24; Fossier 1982, 621-625.
122 Devroey 2006a. Also see chapter 1.
123 Verhulst 2002, 76-78.

agricultural tools were not a development of the Carolingian period, but can be traced back to the fourth and fifth centuries.[124]

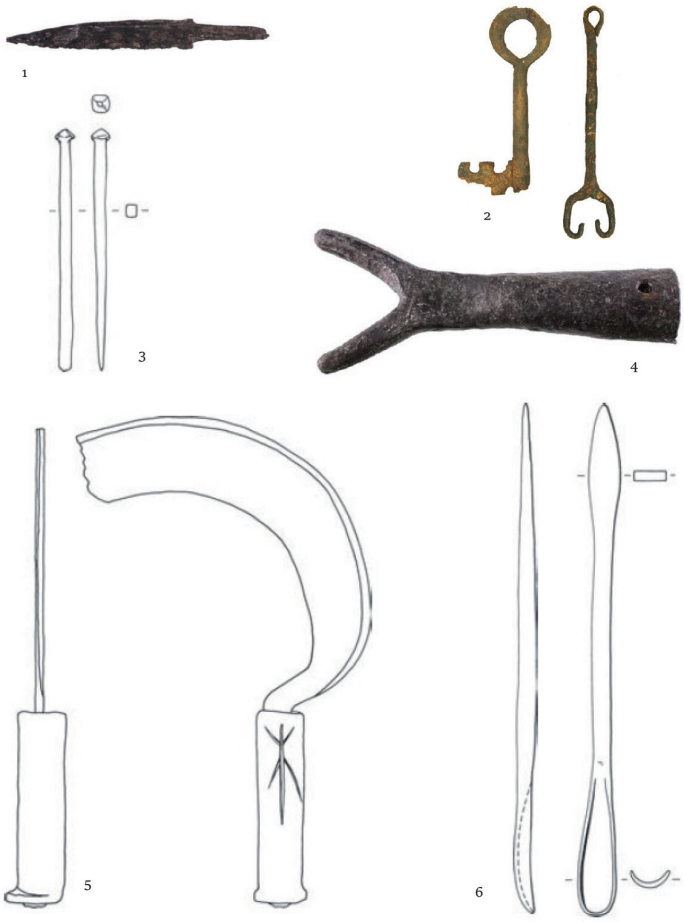


Fig. 5.3 Some of the more common iron artefacts found on rural sites. 1= knife (Utrecht (525), Kerkhoven 2009, 224, afb. 10.10), 2= keys (Wijk aan Zee (172), De Koning 2015, 101, afb. 5.13), 3= nail (Wijk bij Duurstede (58), Van Es/Verwers 2009, 224, fig. 182.1), 4=boathook (Utrecht (525), Kerkhoven 2009, 237, afb. 10.25), 5= sickle (Wijk bij Duurstede (58), Van Es/Verwers 2009, 225, fig. 184), 6= spoon drill (Wijk bij Duurstede (58), Van Es/Verwers 2009, 222, fig. 179). Scale 1:4.

On rural sites in our research area iron was mainly used for practical utensils, many of which might be considered to be best suited to their function when made of iron, rather than any other available metal (alloy) or hard material. All the items classed under tools found on rural sites, except two fragments of chains, are intended in some way for cutting. In that sense it could be argued that iron was used efficiently and sparingly, which in turn might point to a restricted supply. However, the

124 Henning 2004; Henning 2009.

comparatively high (though in absolute terms still low) number of iron keys suggests that iron was not so uncommon as to limit its use to the bare necessities of agricultural life. This seems to be true for both coastal and inland areas, though with apparent regional variations. If we also consider the evidence for iron production in several parts of the research area, as well as the sites where there is good evidence for metal working, and the likelihood of recycling it seems justified to believe that iron was by no means a scarce resource on rural sites.

5.3.2 Copper-alloy objects

Copper-alloys were used for the production of very different objects than those made of iron (table 5.5), though some items were manufactured in both metals, such as keys. By far the largest function group among copper alloy objects is dress accessories, which accounts for almost 85% of the identifiable artefacts. Two of the more important remaining groups are pins or needles, which mostly can also be considered dress accessories, and coins. Brooches are by far the most common form of dress accessory, followed by strap-ends, a single belt fitting, a buckle and an unspecified fitting. Because of their numerical importance and more significantly the variability in temporal and geographical distribution that they demonstrate, brooches are examined here in greater detail than other copper-alloy artefact groups.

Function category	Artefact	1	2	3	4	5	6	7	8	Total
dress accessory	belt fitting					1				1
	brooch	36	1	7		34	51	25	14	168
	buckle							1		1
	fitting					1				1
	strap end					4			1	5
exchange	coin		2			2	6			10
jewellery	bracelet			1						1
	pendant					1				1
keys/locks	key	2		1		4	3			10
metal working	casting canal						1			1
	pouring waste							1		1
needles/pins	decorative nail					1				1
	needle	2				3			1	6
riding	buckle						1			1
tool	tweezers			1						1
vessel	strainer					1				1
Total		**40**	**3**	**10**	**0**	**52**	**62**	**27**	**16**	**210**

Table 5.5 Copper-alloy artefacts discovered on rural sites. Copper-alloy (fragments of) objects that cannot be identified as a specific artefact have been omitted from the table.

Brooches

The brooches discovered on our sites mainly comprise two basic forms, namely disc brooches and equal-arm or ansate brooches. Of the 168 copper-alloy brooches in the inventory that were found on rural sites, disc brooches are by far the most common with 123 examples followed by ansate brooches (33), rectangular brooches (5), cross-shaped brooches (4), and a single bird-shaped brooch

(table 5.6).[125] Brooches manufactured in other metals account for a further 33 disc brooches, seven ansate brooches and three rectangular brooches.[126] Before analysing the brooches discovered on our sites it is useful to discuss the available literature on their dating and distribution.

Information regarding brooches in existing literature

The main sources of information on disc brooches, rectangular brooches and cross-shaped brooches are an inventory compiled by Frick which covers the northwest of Germany, the Netherlands, eastern Britain and part of Scandinavia, an article by Wamers that is mainly based on finds from Mainz, and the inventory of finds from the terpen zone in Friesland amassed by Bos.[127] Recently an overview has been published of brooches dating from prehistory up to and including the Early Middle Ages discovered in the Low Countries.[128] In order to create uniformity in the designation of types, this latest typology has been applied to all brooches in the dataset.[129] For ansate brooches three typologies by Van Bellingen, Bos and Thörle provide a framework for dating and distribution patterns.[130] The characteristics of the typologies will be discussed briefly below as they pertain to each basic brooch group.

Rectangular brooches are found in the later phases of Merovingian cemeteries, and a gradual development from a rectangular to a square shape is suggested by Wamers for the period between the second half of the seventh century and the tenth century, mainly on stylistic grounds.[131] The brooches form a heterogeneous group with many variations in the shape of the plate and decoration and in some typologies rectangular brooches are considered a subset of disc brooches. To illustrate the heterogeneous nature, Frick defined two subtypes with two and three variants respectively, but even within these variants distinctions are made in shape and decoration. This makes the dating Cross-shaped brooches (fig. 5.5, as opposed to disc brooches decorated with a cross, either enamelled or not) show a rather curious development if we are to believe Wamers. The first examples have been dated to the second half of the seventh century after which there was supposedly a hiatus in the eighth century when cross shaped brooches disappeared, only to return in the late eighth century.[132] Why a hiatus has been inferred and whether the late seventh century and the late eighth century examples represent a single development (as suggested by Wamers' diagram) is not discussed. Several instances of finds dated to the ninth century are provided by Wamers, in particular from a layer carbon dated to the end of the ninth century, and part of a stratigraphic sequence uncovered during an excavation at Neustadt an der Saale. of individual examples problematic. Only two specimens from burials in the cemetery of Wijster-Looveen have been dated to the second half of the eighth century based on the location of the graves in the cemetery. In all other cases where examples have been recovered from dated contexts, the features were assigned to the ninth century.

125 In addition the inventory contains one unspecified type of brooch and a Roman tutulus brooch. A further three disc brooches were manufactured in lead.
126 The inventory also contains a bow brooch and a pseudo cameo brooch, both made in an unspecified metal.
127 Frick 1992/93; Wamers 1994; Bos 2007/08.
128 Heeren/Van der Feijst 2017.
129 Though the original type designations, for example of Frick or Bos, were also recorded.
130 Van Bellingen 1988; Thörle 2001; Bos 2005/06.
131 Wamers 1994, 588-589.
132 Wamers 1994, 589-590.

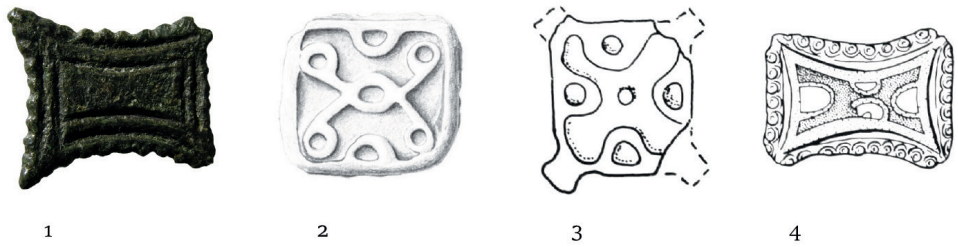


Fig. 5.4 Examples of rectangular brooches. 1= Wijk bij Duurstede, site 187 (Nooijen 2012, 247, afb. 5.21); 2=Nistelrode, site 120 (Jansen 2007, 428, figuur 11.19); 3=Wijhe-Herxen (Verlinde 1993, 148, afb. 8); 4=Wijthmen (Verlinde 1987, 184, afb. 6). Scale 1:1.

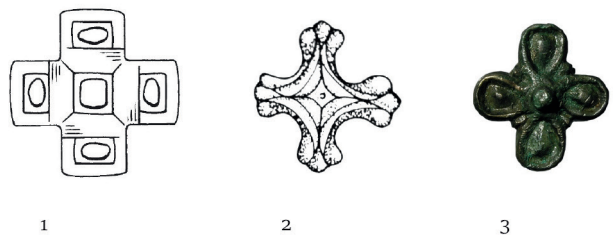


Fig. 5.5 Examples of cross-shaped brooches. 1=Wijnaldum (18) (Bos 2007/08, 791); 2=Wijthmen (Verlinde 1990, 142, afb. 10.4); 3=Wijk bij Duurstede (187) (Nooijen 2012, 247, afb. 5.28). Scale 1:1.

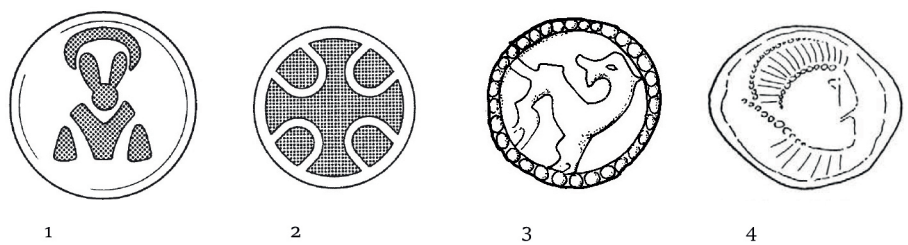


Fig. 5.6 Examples of disc brooches. Enamelled/non- enamelled 1=saint-type (Bos 2007/08, 788), 2=enamelled cross (Bos 2007/08, 784), 3=animal-type (Kerk Avezaath (527), Nooijen 2000, afb. 8.15), 4=pseudo-coin (Katwijk (197), Knol 2008, 304, afb. 14.13).

Heeren/Van der Feijst		type	other	86	88	89	90	Total
site	region	type						
9	2	disc		1				1
16	1	disc			1			1
18	1	cross				1		1
		disc	3	6	5	10		24
		ansate					7	7
19	1	disc		1		2		3
21	1	disc		1		1		2
		ansate					1	1
29	3	disc			1			1
37	3	disc	1	2				3
39	1	disc				1		1
43	6	cross			1			1
59	8	disc		1		1		2
61	3	disc				1		1
66	2	disc		1				1
104	8	disc				3		3
110	8	disc		1				1
120	8	disc				3		3
		ansate					1	1
		rectangular				1		1
126	8	disc				2		2
128	8	pseudo cameo	1					1
146	8	disc		1				1
158	5	ansate					1	1
159	5	disc			1	2		3
		ansate					2	2
160	5	disc		1		1		2
163	7	disc		1	1	5		7
		ansate					2	2
166	7	disc		1				1
172	5	ansate					2	2
175	5	disc		1				1
184	8	disc				1		1

Heeren/Van der Feijst site	region	type	other	86	88	89	90	Total
191	7	disc	2	4	3	1		10
		ansate					6	6
		rectangular			5			5
197	5	disc		4		1		5
		ansate					4	4
213	5	disc				1		1
219	5	disc		2		6		8
		ansate					3	3
221	5	disc		8		2		10
501	6	disc				1		1
502	6	cross			1			1
		disc				4		4
		rectangular			1			1
504	6	disc		1		4		5
516	6	disc		4		4		8
		ansate					2	2
519	6	disc			1	1		2
		ansate					2	2
		rectangular				1		1
521	6	disc		3		2		5
		ansate					2	2
524	6	disc			1	4		5
		ansate					1	1
525	6	disc				2		2
526	6	disc	2					2
527	6	cross			1			1
		disc	4	1	2	10		17
		ansate					1	1
536	3	bird	1					1
		disc		1		2		3
544	6	ansate					1	1
548	6	disc			1	2		3
		ansate					2	2
Total			**15**	**47**	**26**	**82**	**40**	**210**

Table 5.6 Brooches found on rural sites in the research area.

Rectangular brooches (fig. 5.4) dated to the eighth and ninth century have mostly been discovered to the north of the Rhine in the Netherlands and north of the Lippe in Germany, though a few are known from Mainz and its surroundings.[133] According to Frick's inventory the area along the Rhine roughly between Mainz and the Dutch border has not yielded any examples.

Both Frick and Bos describe cross shaped brooches as a type of disc brooch, Frick as a subtype of rectangular brooches[134] and Bos as a separate type. Both provide examples that date to the ninth century, Frick from a burial context[135] and Bos a specimen which was present in a layer at Wijnaldum dated between 850 and 900.[136]

Ansate brooches basically consist of a bow with terminals on each side (fig. 5.8/9-5.11-13). Except in rare cases the terminals are equal in shape and decoration. The terminals are usually decorated, while the bow may or may not be depending on the specific type. Decoration can be engraved or moulded and the shape of the bow and terminals varies considerably between (and in Thörle's typology also within) types. The earliest examples of ansate brooches in the research area have been dated to the sixth century and they remained in use until the ninth or tenth century.[137] The eighth century is problematic, mainly because finds of ansate brooches from contexts securely dated to that time remain elusive. The dating issues surrounding ansate brooches are discussed in more detail below.

Bos, Frick, Haseloff,[138] Heeren/Van der Feijst and Wamers have all created typologies for disc brooches (fig. 5.6) and each has its own logic. This means that in some cases specific subtypes are grouped under different main types by the various authors.[139] There is also no clear consensus on the dating of types. The inventory of disc brooches compiled by Frick provides the most comprehensive overview of brooches from reasonably confidently dated contexts. The brooches as a whole tend to be dated between 750 and 1100 AD but the evidence for individual types is (sometimes by Frick's own admission) not always strong. Wamers provides only a few concrete arguments for assigning absolute dates to his typology. Bos largely follows either Frick or Wamers for the dating of his types, but in some cases offers (roughly) dated contexts from excavations at Wijnaldum.

The lack of finds securely dated to the eighth and early ninth century is a common theme. If the dating of all these brooch types is correct it would appear the use of brooches declined during the earlier part of the eighth century and saw a revival towards the end of the century. The question is whether this decline is a reflection of actual brooch use during this period or is purely a consequence of the archaeological dataset and the manner in which typologies are constructed. In figure 5.7 all the early medieval brooches compiled by Heeren and Van der Feijst have been apportioned to 25 year timeslots in order to get an impression of the rise and fall of the amount of brooches throughout the

133 See Frick 1992/93, Karte 6 and 7.
134 Rechteckfibeln typ 2, variant 3 (Frick 1992/93, 286).
135 Frick 1992/93, 286.
136 Bos 2007/08, 780.
137 Bos 2005/06, 458.
138 Haseloff 1990.
139 For example rectangular brooches are a separate kind of brooch from disc brooches for Wamers and Bos, while they are a main type of disc brooch in Frick's typology.

period between circa 400 and 1050.[140] The chart makes it clear that the middle of the eighth century is a period to which few brooches have been assigned. It also shows that the nadir in the eighth century is preceded by a sharp decline in the number of recovered brooches dated (partially) after the middle of the sixth century. Similarly, after 750 the number of brooches steadily increases with a peak between roughly 850 and 1000 due to the fact that many disc brooches have been dated to that period in Heeren and Van der Feijst's typo-chronology. This suggests that although the eighth century was indeed a period in which brooches were less common than before or after, it was a stage in a longer development.

At the same time the apparent drop in the eighth century may at least in part be attributable to the nature of the dataset. Ansate brooches were not studied in detail by Heeren and Van der Feijst and most examples have been dated very broadly between 550 and 1050. Yet analysis of the ansate brooches from our sites and stray finds discovered in the research area indicates there is reason to believe the majority of ansate brooches were in use before the tenth century which, translated to figure 5.7, would make the low-point of the eighth century somewhat less pronounced.

The image the chart presents is that for most of the eighth century the ansate brooch constitutes the only brooch type that would have been widely available, though most typo-chronologies of ansate brooches in fact largely avoid dating them to that time.[141] Thörle argues it is highly likely there was a transition from seventh and early eighth century types to those which can be securely dated to the ninth century, but which the archaeological evidence does not allow us to grasp.[142] The only other explanation would be that for a time hardly any brooches were in use. This appears unrealistic, not only in and of itself, but also because it would mean the ansate brooch was abandoned for at least 50 years and then reintroduced.

Thörle has compiled the most comprehensive overview of ansate brooches found in continental Europe.[143] The study suggests that there was a peak in the use of ansate brooches in the seventh and early eighth century, and that in this period they mainly occurred in northwestern France, Belgium and Germany. During the remainder of the eighth and the ninth century the centre of gravity of brooch distribution moved towards the North Sea area and the overall amount of brooches declined.

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140 The chart is not without its problems. For example, some types have been dated very generally, but it is highly likely that the bulk of the finds of those types date to a much shorter period. A case in point are pseudo-coin brooches, that can occur from the fifth century onward, but the majority of which belong to a variety which is presumed to imitate coins of Louis the Pious (Heeren/Van der Feijst 2017, 223). However, these were not treated as a separate type by the compilers of the inventory and can therefore not be distinguished from earlier examples. Also, the dates chosen by the authors for some specific types and subtypes might not represent the entire period during which they were in use, either because dates are based solely on cemetery research, or due to judgements over which dates of contexts are reliable or not. For several enamelled disc brooch types the authors, rightly or wrongly, simply do not trust the contexts which provide evidence for a late eighth or early ninth century date and choose to only consider contexts pointing to a late ninth century start of production.
A further point is that the chart should be treated as an approximation of the relative amount of brooches in use. It cannot be ruled out that the recovery and recognition of specific brooch-types has been over- or underrepresented due to a wide variety of factors. All these issues might cause the peaks and troughs of the graph to be more, or less pronounced than they were in reality. However, the chart at the very least shows a pattern in the data that requires more thorough explanation than is currently available.
141 Van Bellingen 1988, 78-92; Bos 2005/06, 458
142 Thörle 2001, 221.
143 Thörle 2001. However, it should be noted that Bos' inventory was not available to Thörle.

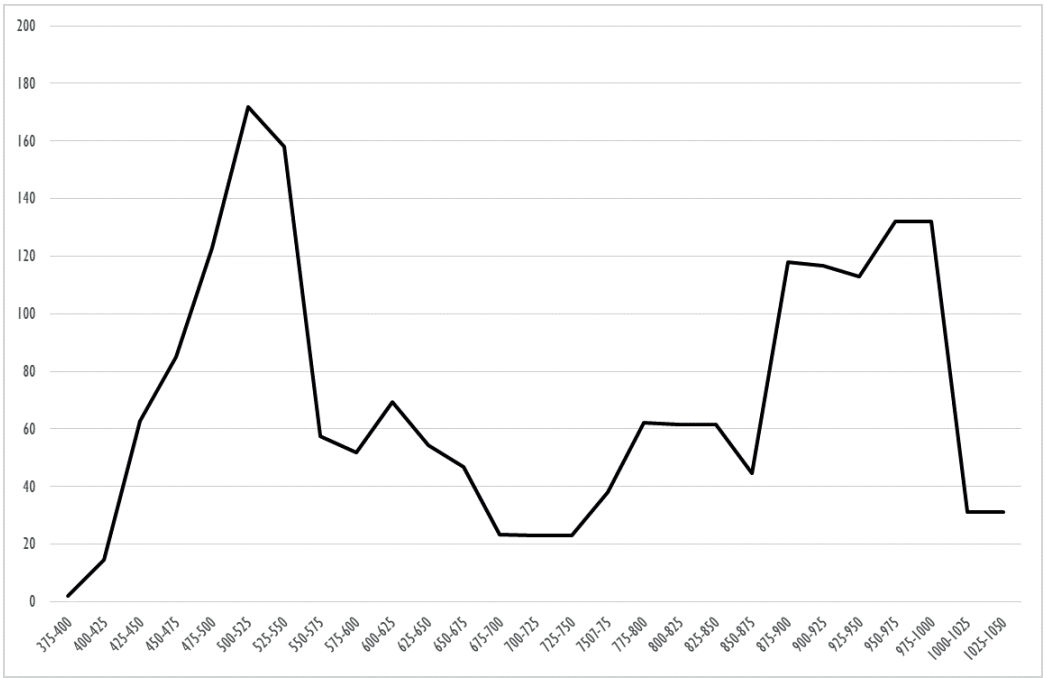


Fig. 5.7 Chart showing the number of recovered (and recorded) brooches per time-slot of 25 years between 400 and 1050. Data taken from Heeren/Van der Feijst 2017.

However, this may be a false image. Regarding the decline in numbers, the vast majority of brooches in Thörle's inventory were discovered in burial contexts, and there are simply far more excavated seventh century cemeteries than there are for the eighth and ninth centuries. In addition, the seventh century cemeteries are most common in France, southern Belgium and the German Rhineland whereas stray finds are much less often recorded in these areas. The reverse is true for the Netherlands, and to an extent also the north and west of Belgium, where there are far fewer excavated seventh century cemeteries and a greater amount of recorded stray finds. In order to correctly assess the chronological and geographical distribution of ansate brooches, it needs to be established whether the types prevalent in the eighth and ninth century[144] in the North Sea area may also have circulated elsewhere (and earlier) but have simply not been recorded, and whether earlier types are lacking in the Netherlands due to a limited number of sixth and seventh century cemeteries with furnished burials (which additionally are also mostly restricted to the south of the Netherlands and the central Dutch river area).

With regard to the first question it can be observed that among the finds catalogued by Thörle, later types are not completely lacking in France, but are simply limited mainly to the very northwest. The same is true for Belgium, where finds of later types are concentrated in the west, particularly along the Scheldt river. In Germany examples of ansate brooches dated to the eighth and ninth century have also been found. This indicates that brooch groups which belong to Thörle's later types were present in several areas where they were also common in the seventh century, but the distribution was apparently more limited. The case could be made that the overall smaller amount of stray finds in these areas implies that the use of ansate brooches did not decline significantly

144 Or at least dated to the eighth and ninth centuries by Thörle.

but rather that changes in the volume of finds can be related to a combination of the nature of find contexts (decline of furnished burials) and research methods (limited metal detecting).

The lack of earlier groups in the Netherlands can less easily be attributed to research methods, at least as far as the northern Netherlands is concerned. Bos' relatively large inventory, which chiefly consists of metal detectorists' finds, contains very few types which he dates to the seventh century and even these do not fit well into Thörle's typology. Examples of ansate brooches typical for the seventh century in France and Germany have been discovered in small numbers in other parts of the research area.[145]

Aside from dating issues, a further complicating factor for the interpretation of the distribution of ansate brooches is the immense variability in shape and decoration. The typologies of Bos and Van Bellingen appear to have been constructed primarily in order to classify a corpus of material, not to answer any specific questions. The large variability in shape and decoration within a rather open typology, particularly in the case of Bos, led to the creation of many subtypes which often consist of just one or two examples (roughly 60% of Van Bellingen's subtypes consist of one or two examples, that figure is 80% for Bos' typology). Thörle's typology was based on a much larger corpus and perhaps for that reason subtypes show considerably more variability, which makes it easier to connect shape and decoration variants to specific distribution areas. Many of Thörle's (sub)groups can be assigned to a particular area though some are widely distributed over northwestern Europe. For example, some types occur in a relatively limited section of northwestern France delimited roughly by the Seine, Somme and Marne, while others are found everywhere in northern France but not in that specific area. Still others seem restricted to the west of Switzerland and neighbouring parts of France or to regions south of the Alps.

The lack of groups, which are elsewhere typical of the seventh century, in the north of the Netherlands, may therefore be attributable to the existence of a regionally specific corpus of brooches which differed from what was in circulation in other parts. The few early types identified by Bos perhaps represent the range of types available in the northern Netherlands in the seventh and early eighth centuries. For the remainder of the Netherlands it is more difficult, on the basis of published inventories, to reconstruct whether ansate brooches were common in the seventh century, and whether the types are an extension of the known distribution areas to the south or form a separate regional group.

Turning to disc brooches, the contexts available to Frick for dating individual (sub)types were either settlement features, burials or hoards. When the number of dated contexts are collated per context type and date range (appendix III) it becomes clear that many of the settlement finds have been discovered in contexts dated to the tenth or eleventh century while virtually all burial contexts are dated to the eighth or ninth century. This implies that brooch types for which the dated contexts consist exclusively of burials will be dated earlier than types (also) found in dated settlement contexts. This is largely confirmed when the start and end date of types are considered. There is a group of brooches with start dates up to 775 that have mainly been dated through burial contexts, a second group with start dates between 800 and 875 which have a reasonably even amount of either dated burial or settlement finds and finally a group with dates of 900 and later where the brooches have been discovered almost exclusively in settlement contexts. With regards to end dates all but two dated settlement finds have an end date of 900 or later while just over half of the dated burial finds have been dated up to 900. In effect this means that a brooch-type which can only be dated

145 Heeren/Van der Feijst 2017, 236.

based on burial finds will likely be assigned to the eighth and ninth century, types that have only been recovered from dated settlement contexts to the late ninth and tenth or eleventh century and the types which are found in both context generally to the ninth and tenth century. This raises the question whether the dated contexts can be taken as representative for the entire production and use period of the brooch types, especially when there is often a limited number of dated contexts available per type.

Wamers believes many of the disc brooches from settlement contexts represent residual material and therefore form an unreliable basis for dating.[146] However, considering the consistency with which brooches have been discovered in tenth century contexts it seems rash to dismiss their dating value entirely. Frick's work (and finds from our sites, see below) strongly suggests that at least some disc brooch types remained in use into the tenth century.

There is considerable uncertainty regarding the introduction of disc brooch types that were in circulation during our period. Eleven of Frick's 57 subtypes have a start date in the eighth century (appendix III). Among these is a rectangular brooch of which it can be questioned whether it truly fits the category of disc brooches.[147] The others belong to the groups of enameled and non-enameled cross brooches, saints brooches, brooches with pelta decoration and plateau brooches. Their dating is based on one, two or three dated contexts each, mostly burials, though one pelta decorated brooch type was assigned an eighth century date solely on the basis of a single settlement find (type 4.1.1). The dating of enameled cross brooch type 3.1 is founded on the type's association with other single finds, mainly ceramics, recovered from the city of Groningen. There is however some debate on the context of these finds. It is possible they were recovered from soil transported from the surrounding area of Groningen, which implies that they were discovered in a secondary context.[148] Therefore it is possible the various finds are not directly associated chronologically. Enameled cross type 1.9 and non-enameled cross type 2.1 have been dated based on chorologically derived dates assigned to the graves which contained them, while for pelta-decorated type 4.1.2 only the overall dating of the cemetery involved was available.

Finally saints brooches of type 6.1 were not dated on archaeological contexts at all but on stylistic similarities between the saints brooches and enameling on other items dated to the eighth and ninth century. A study of early medieval enameled objects by Haseloff shows a group which include decorative elements that are more or less similar to the figures which appear on examples of type 6.1. One of these items is a reliquary from Sion in Switzerland which carries an inscription indicating it was commissioned by Altheus.[149] There was a bishop Altheus present at Sion between 780 and 799 making it likely the reliquary dates within that timeframe. All the other objects with figures similar to those depicted on saints brooches cannot be dated securely. No archaeologically dated contexts were available for the saints brooch subtypes 6.2.1-4 and their dating largely relies on stylistic similarities with type 6.1. However, the former types are far more crude in terms of their technical execution and in the depiction of the figures. In addition, they have a more northerly distribution than type 6.1 which occurs scattered mainly to the south and east of our research area. One might therefore question whether the date of subtype 6.1 can so easily be translated to the other subtypes.

146 Wamers 1994, 595.
147 Wamers 1994, 586-587. It is the example from Wijster-Looveen mentioned above in the description of rectangular brooches.
148 Boersma 1990, 51-53. In any case the brooches were not discovered *in situ* but as stray finds in the soil heaps of excavations and development projects.
149 Haseloff 1990, 83.

In Wamers' view there is no clear evidence that any of the disc brooch types were introduced in the eighth century.[150] His dates for disc-brooches are largely founded on stylistic similarities with cross-shaped brooches and particular decoration styles, that is, not on dated contexts. This reliance on stylistic similarity is problematic because one might just as well point to parallels between enameled cross brooches and elements of some sixth century garnet-inlay disc brooches.[151] There is no evidence for a direct connection between these two sets of brooches, and to some extent the same applies to Wamers' assertions.

As mentioned, Bos largely follows either Frick or Wamers in his dating of disc brooches from the northern Dutch coastal area. A small number of examples of Bos' types were discovered during the Wijnaldum excavation. Unfortunately the majority of these were recovered from topsoil and could only be given a *terminus post quem* date based on the dating of features directly under the topsoil. In most cases these features were dated between 800 and 900. The site is thought to have been inhabited up until the middle of the tenth century[152] making it less likely that the brooches discovered in the topsoil were in use after that time. One pseudo-coin brooch was recovered from a feature dated between 850 and 900. Another two disc brooches which could not be assigned to a type were discovered in features dated between 800 and 900, and 800 and 850 respectively.

Distribution and dating of brooches based on the inventory of finds from Carolingian sites

The chronology and distribution patterns of ansate brooches as suggested by Bos and Thörle imply that there may have been limited production and/or consumption in the seventh century in the research area (if they were produced here at all) but that larger scale consumption started in the eighth or ninth century. To an extent this is supported by the finds from our Carolingian sites. As our inventory includes sites that have sixth and seventh century precursors, it might be expected that they should yield brooches characteristic for the seventh century in northern France, Belgium and Germany, if those brooches circulated in the research area. However, with a few exceptions the bulk of the ansate brooches on our sites belong to groups which Thörle assigns to the eighth and ninth century and which occur almost exclusively around the North Sea and parts of neighbouring Belgium and northwestern France.

Among the possible exceptions five belong to the group of ansate brooches with circular terminals (group IIC2, fig. 5.8). One was discovered in a layer of a silted up gulley in the Overbetuwe (site 544) that was probably filled in completely during the eighth or ninth century. The fill mostly contained ceramics dated to the seventh and early eighth century with a small amount of eighth/ninth century material, so Thörle's dating in the seventh and early eighth century for the brooch group (IIC2a, fig. 5.8.2) fits quite well in this case. The site Utrecht-Appellaantje (526) revealed another brooch (fig. 5.8.1) with circular terminals that either belongs to group IIC2a or b.[153] The latter seems more likely and according to Thörle would place it in the eighth or ninth century rather than earlier.

150 Wamers 1994, 596.

151 See for example the brooch in grave 166 of the Rhenen cemetery which has a centerpiece that is very similar to Frick's enameled cross brooch type 1.1 (Wagner/Ypey 2011, 153, Abbildung 49, A).

152 Gerrets/DeKoning 1999, 98.

153 The photograph of the brooch was taken at an angle making it difficult to distinguish the relative breadth of bow and terminals.

Brooch type	Frick	Bos	Research area[154][155]
Enamelled cross	31,5 %	31 %	42 %
Non-enamelled cross	6 %	10 %	0.75 %[156]
Hubcap-shape	2 %	11,5 %	0 %
Central cloison	7,5 %	16 %	4.5 %
Saints brooch	9 %	4 %	13.25 %
Animal	10 %	2,5 %	3 %
Pelta	5,5 %	1 %	0.75 %
Plateau	3,5 %	3,5 %	0.75 %
Pseudo-coin	16,5 %	19,5 %	35 %
Central bulge	6 %	0,5 %	0 %
Rosette	2 %	0 %	0 %
Star	0,5 %	0,5 %	0 %

Table 5.7 Percentage each disc-brooch type comprises among the respective inventories.

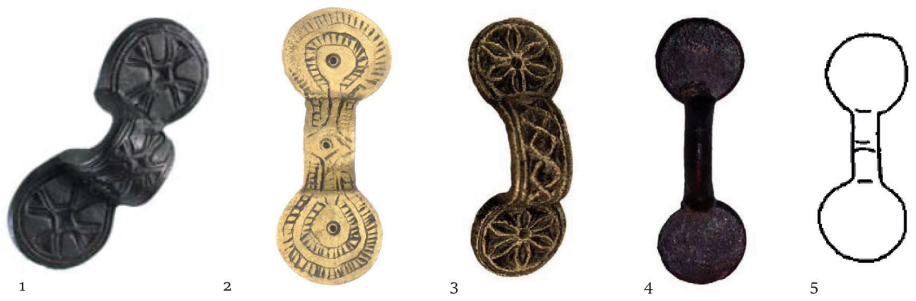


Fig. 5.8 Examples of type IIC2 from rural sites. 1= Utrecht (526) (Hendriksen 2010, 98, afb. 5.16)) , 2= Overbetuwe, 544 (Janssens 2010, 71, figuur 7.2), 3/4=Katwijk (197) (Knol 2008, 302, afb. 14.9), 5= Oost-Souburg (163) (Van Heeringen 1995, 183, afb. 124c).

Another example of an ansate brooch with circular terminals was discovered in Katwijk (197) as a detector find without any further archaeological context. In the previous chapter on ceramics it was argued that it is unlikely the area in which excavations took place was intensively exploited after the beginning of the ninth century, perhaps even somewhat earlier.[157] This seems to be confirmed by the overall brooch-assemblage of the site which to a large extent consists of finds recovered by metal detectorists, who worked not just on the excavated trenches but also in the surrounding area. Sixteen out of a total of 42 brooches recovered could be dated to the fifth and sixth centuries among which bird- and S-shaped brooches, a garnet inlay disc brooch and disc-on-bow brooches.[158] A further

154 Disc brooches which could not be assigned to a specific type and those which were described in publications in such a way that they could not be associated with Frick's types have been omitted.
155 The brooches in Bos' inventory lie within the research area but many were not recovered from archaeological contexts or the find conditions were not recorded. Therefore they have not been included in the present studies' inventory.
156 Some of the enameled crosses may in fact be non-enameled crosses. The description of the brooches was not always sufficiently detailed to make a distinction.
157 See section 4.7.1.
158 Knol 2008, 295-304; Nooijen 2011, 72.

twelve belong to small long brooches of the so-called Domburg-type[159] that dates to the sixth and seventh centuries. Five other brooches date either more widely or could not be dated accurately, but all can probably be assigned to the seventh century at the latest. Of the four ansate brooches found at the site two are dated by Thörle to the seventh century while the two others have a rather broad date range. These last two brooches contain one which has circular terminals (fig. 5.8.3) and is somewhat similar to that found at the Overbetuwe site while the other could not be ascribed to a specific type with certainty. What is lacking from the Katwijk finds is any of the ansate brooch groups which otherwise are quite common on our sites in the coastal area, particularly Thörle's group XIIA1.

One final example (fig. 5.8.5) of an early type from our sites was discovered at Oost-Souburg (163) which is almost the last place one would expect to find it considering the overall dating of the site. It belongs to a group which is dated to the seventh century and otherwise occurs in western France and Belgium. In this case perhaps the context of the find should be regarded as evidence that the type was in use over a longer period, possibly into the ninth century.

The situation in the northern coastal part of our research area has already been mentioned. There are strong indications that a regionally distinct ansate brooch type, characterised by a heavy bow, was in use roughly during the sixth and seventh centuries. The type does not appear among Thörle's groups and equally has not been identified among the finds in our inventory outside the northern coast. Two examples were discovered during excavations in the terp of Hallum (19) where evidence suggests they at least date before the Carolingian occupation phase.[160] One variant was recovered from a feature dated between 550 and 650 at the Wijnaldum excavation and another in a burial in the Oosterbeintum cemetery, dated between 625 and 750. At the same time Bos' inventory of finds from the terpen area contains only a handful of brooches that can be assigned to seventh and early eighth century groups in Thörles typo-chronology and even those are up for discussion.[161]

Aside from the brooches which were discovered on sites in our inventory, there is a relatively small number of stray finds of ansate brooches in the research area which in Thörle's typo-chronology date to the seventh or early eighth century. Of the 94 brooches recorded by Thörle from our research area only 12 belong to early groups.[162] These have been discovered at Domburg, Wijnaldum and at several locations in the central Dutch river area. Two additional early examples from the latter area are included in Heeren & Van der Feijst's inventory.[163] A few unpublished examples are known from the south of the Netherlands, at least in two cases in a burial context.[164]

These stray finds, combined with the few examples from our sites indicate that early ansate brooch types were present in the research area. However, when the overall quantity of metal

159 Not to be confused with an ansate brooch denoted 'Domburg-type' by Hübener which Thörle sees as a variant of group XIIA1.

160 They were found in layers which were revealed at the third excavation level. This level contained several structures assigned to a Carolingian occupation phase. The excavation report does not rule out the possibility that the layers belong to the same phase, but it seems more likely they were deposited prior to the Carolingian habitation phase.

161 A few brooches with trapezoidal terminals have been discovered that fit into Thörles group VC but these could just as easily be seen as variants of group VF and in that case would more likely date to the eighth or ninth century.

162 The figures are 5 out of 30 when the finds from Domburg are excluded.

163 Heeren/Van der Feijst 2017, 235, types, 90a4 and 90a5. The publication does not allow to determine whether the depicted brooches are the only recorded examples of their type.

164 Personal comment F. Theuws, 14-7-2017. Dommelen: a specimen with trapezium shaped terminals in a burial dated to the later 7th century, Uden: a specimen with circular terminals in a burial dated to the second quarter of the 7th century. Two other ansate brooch finds from region 8 are recorded in Archis, namely at Geldrop and Bergeijk. However, it cannot be ascertained from the database what type of ansate brooch these are and consequently whether they belong among the earlier or later types.

artefacts recovered in the central Dutch river area and the northern coast (particularly the west of Friesland) is taken into account, the amount of ansate brooches is negligible.[165] The find assemblage from Katwijk indicates early ansate brooches types were not very numerous in the western coastal area either, certainly compared to other, contemporaneous brooches. Only in the south is it difficult to draw any firm conclusions in this respect due to an overall dearth of metal artefacts.

Among the later ansate brooch types discovered in our research area a few are so similar to one another they were almost certainly cast either with the same mould or by the same artisan or within the same workshop (fig. 5.9). Aside from the brooch with circular terminals mentioned above another ansate brooch was found at Oost-Souburg (163) which is almost identical to an example discovered at Naaldwijk (219), as far as can be determined from the illustrations. Both are examples of Thörles group XIIA1. A brooch discovered at the site Linge (521) is very similar to a unique piece assigned to group VIII by Thörle and to type 4.4 by Van Bellingen. It was found in Werken in the west of Belgium and has been dated by both authors to the eighth and ninth centuries based on shape and decoration. A final instance is a brooch that was discovered during excavations in the ringfort of Domburg (191) and almost certainly belongs to the so-called Lincoln-type. Two other examples were already known from Domburg as stray finds. Thörle dismissed a find of this type in a late ninth or tenth century context in Lincoln as residual because he believed the overall shape and decoration pointed to a Merovingian date for the brooch type.[166] The Domburg find however also points to a late ninth century date or later considering the overall dating of the excavated remains and the lack of any other clearly older residual material.

Beyond these few very specific examples some broader groups with distinct distributions can be identified among the later ansate brooches. Two of the most common groups of ansate brooches found on our sites, Thörle's groups VF and XIIA1, consist of specimens with what can be described as three-fingered terminals. The three 'fingers' are often created by the addition of grooves and in some cases protrusions, or they can be moulded. They are termed 'bow-tie' types by Bos, Thörle places most of them among a group described as mimicking vegetation. Both authors assigned variants of brooches with three-fingered terminals to different main groups, though Thörle does mention the similarities.[167]

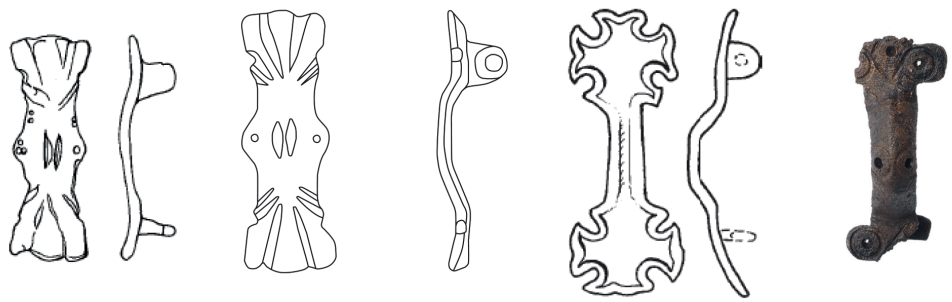


Fig. 5.9 Brooches that show considerable similarity to other known examples. 1 and 2 were discovered at Oost-Souburg (163) (Van Heeringen 1995, 183, afb. 124a) and Naaldwijk (219) (Van der Feijst/De Bruin/Blom 2008, 276, Bijlage III, plaat 2) respectively. 3 is similar to a brooch found in Werken in Belgium (Van Bellingen 1988, 52. tabel 1). 4 is an example of a Lincoln-type brooch discovered at Domburg (191) (Ufkes 2011, 208, bijlage 3).

165 Compare Heeren/Van der Feijst 2017, 370, fig. 8.2.
166 Thörle 2001, 137.
167 Bos among main groups 1.8 and 1.9, Thörle under groups V and XII.

Here a slightly different grouping of brooches with three-fingered terminals is suggested which highlights an interesting pattern in their distribution. Among these brooches a distinction can be made between those that have a bow with moulded decoration (fig. 5.12) and those with a relatively simple, convex bow (fig. 5.11). The groups largely, but not entirely coincide with either Thörle's group XIIA1 (Bos 1.9) or group VF (Bos 1.8.2) respectively. When the bow is used as a criterion to distinguish between groups of three-fingered brooches, it becomes apparent that hardly any brooches with moulded decoration occur along the northern Dutch coast, while those with a simple convex bow rarely occur outside that area. Only at Naaldwijk (219), Wijk bij Duurstede (187) and Zetten (519) similar brooches to group VF have been discovered on our sites. Thörle's inventory contains just two other findspots of type VF outside Wijnaldum, found at Maurik near Wijk bij Duurstede and Wijhe-Herxen, lying along the IJssel just to the south of Zwolle. All other brooches with three-fingered terminals on sites in the Netherlands have a moulded bow and have almost exclusively been discovered in the coastal and riverine regions 5, 6 and 7 (fig. 5.10).

The Destelbergen-type brooch (fig. 5.13) is one of the few ansate brooch types found in regions 3 and 8 that can be dated to the ninth century. Examples have been discovered at Nistelrode (120) and Zutphen (531) and a further stray find was recently recovered during excavations in Veldhoven, to the west of Eindhoven in region 8.[168] A final specimen from the south of our research area was uncovered in Grevenbicht along the Meuse near Sittard. In light of the otherwise relatively large number of late ansate brooches in regions 5, 6 and 7 it is striking to see that in these areas the Destelbergen type has only been discovered at Domburg and in the east of region 6. Along with the overall spread of this brooch-type to the south of our research area and the absence of the type along the coast and in the central Dutch river area it can be considered a type firmly associated with more inland communities. Very few other examples of ansate brooch groups have been discovered in inland parts. Other than the find from Zutphen, only one other specimen is known from region 3, the previously mentioned stray find just to the south of Zwolle. None have been uncovered further inland, to the east of the IJssel. The few later ansate brooch types recovered as stray finds in the south (region 8) have mostly been discovered in relatively close proximity to the Meuse. Only in Drenthe are there clear signs that later ansate brooch types known from coastal regions might have been more commonly used. At least four brooches from region 2 can be dated to the eighth or ninth century, two of which from burials. The brooches that could be assigned to a group consist of two XIIA1 and one XB1 examples, in other words brooches which we also see in regions 5, 6 and 7 rather than the types common in region 1.

Turning once more to disc brooches, the relative frequencies of the different main types are listed in table 5.7 and the distributions of the four most important types are shown in figure 5.14.[169] Brooches with some kind of depiction of a cross clearly form the largest group among the disc-brooches. Moreover, many of the plateau and pelta brooches also contain some form of cross bringing the percentage of disc brooches with a cross motif to over 50% of the total. On sites in our research area cross decorated brooches have been discovered in all areas but region 2. Frick's inventory contains examples from Germany, the Netherlands, Britain and Scandinavia and a small number from Belgium and France.[170]

168 Van der Veken/Blom 2012, 113-115.
169 The distribution of central cloison brooches is not shown because it is a type that mostly belongs to the tenth and eleventh centuries.
170 See Frick 1992/93, Karte 1-5.

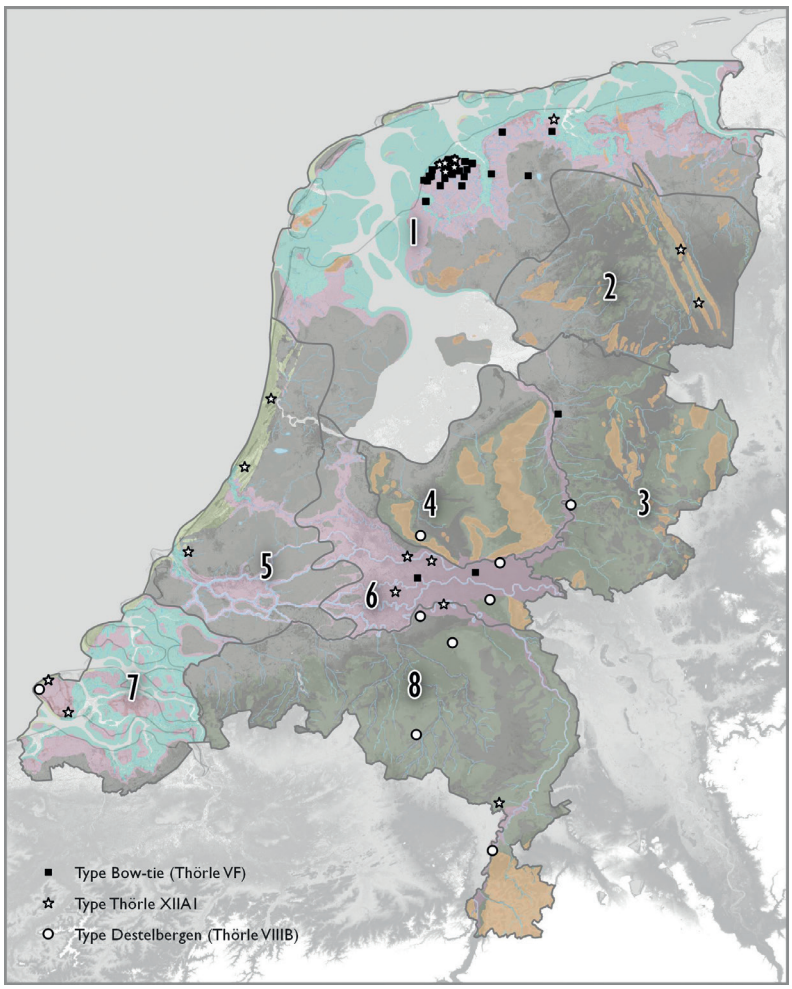


Fig. 5.10 Distribution of the three most common ansate brooches found in the research area.

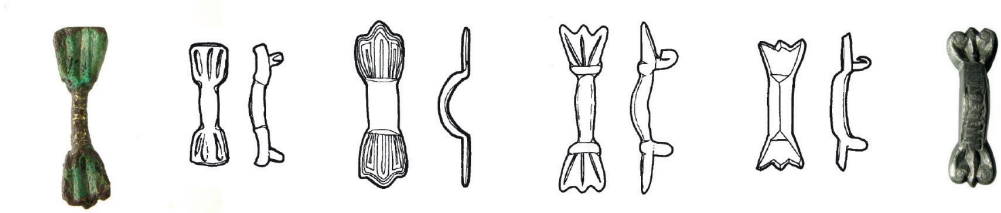


Fig. 5.11 Examples of ansate brooches with 'three-fingered' terminals, characterised by a bow without moulded decoration. From left to right discovered at Leeuwarden (21) (Dijkstra/Nicolay 2008, afb. 6.19), Wijnaldum (18) 4x (Bos 2005/06, 474, fig. 6; 476, fig. 8; 2x 475, fig. 7), Wijk bij Duurstede (187) (Nooijen 2012, 245, afb. 5.14).



Fig. 5.12 Examples of ansate brooches with 'three-fingered' terminals, characterised by a bow with moulded decoration. From left to right discovered at Domburg (191) 3x (Ufkes 2011, 207, bijlage 3), Wijnaldum (18) (Bos 2005/06, 476, fig. 8), Wijk aan Zee (172) (De Koning 2015b, 99, afb. 5.11).



Fig. 5.13 Examples of Destelbergen type ansate brooches. Left found in Zutphen (531) (Koster 2011, 51, afb, 19), right at Nistelrode (120) (Jansen 2007, 428, figuur 11.19).

Saints brooches (fig. 5.6.1) also have a rather wide distribution, both in the research area and throughout northwest Europe, though according to Frick's inventory they do not occur in Britain at all, and it is one of the few types to have been discovered on sites along the Rhine between Mainz and the Dutch border. Since Frick's inventory was compiled a handful of examples have been discovered in the east of England.[171] It is noteworthy that in the research area hardly any saints brooches have been discovered in region 7 where ansate brooches and disc brooches with enameled cross are well represented.[172]

Pseudo-coin (fig. 5.6.4), hubcap-shape and central cloison brooches are particularly abundant in the Netherlands, the latter two types showing strong concentrations in the northern Dutch coastal area.[173] Pseudo-coin brooches are the only disc brooches to have been discovered in settlement contexts in region 2. In fact they have been discovered on rural sites in every region apart from region 4, though several stray finds are known from the area.

Brooches with an animal depiction (fig. 5.6.3) have mainly been discovered outside our research area, in Norfolk and Suffolk, but they are also relatively common in Friesland (subregions 1.2 and 1.3). Outside these areas only isolated finds are attested. The Frisian and English examples each belong to distinct subtypes and examples of both rarely occur in the other area. The variant that is most prevalent in England is also the type found on sites in the central Dutch river area, mainly

171 Portable Antiquities Scheme website, viewed on 22-8-2017.
172 The latter mainly on the island of Schouwen rather than at Domburg.
173 They are particularly abundant in Bos' inventory.

along the Waal and Meuse. The Meuse connection is particularly interesting because a mould for a brooch which is believed to show an animal depiction was discovered during an excavation in Eijsden in the very south of Limburg. It was dated to the ninth century on stylistic grounds, but virtually all the evidence from the site points to a tenth century date at the earliest.[174]

Stray finds help fill in some relatively empty sections of the research area, particularly in the east of region 3 where there are few sites with good excavation data.[175] The area around Zwolle in region 3 has produced several stray finds of cross decorated brooches, as have the areas around the Dommel and Aa rivers and along the Meuse river near Roermond in region 8. Drenthe (region 2) however remains virtually empty except for one burial find.

The literature regarding enameled disc brooches in a Carolingian tradition suggests they were first introduced in the (late) eighth century at the earliest, though the available dating evidence for the eighth century is not particularly strong. Some disc brooch types supposedly remained in use into the tenth and perhaps also the eleventh century. There is disagreement over the exact dating of specific disc brooch types and to what extent there were chronological differences in the introduction of decorative motifs on enameled disc brooches. For example, Frick dates the introduction of saints brooches slightly earlier than that of the first enameled cross brooches even though there is no hard evidence to support this.

The evidence from our sites does little to help in solving these dating issues. A disc brooch with enameled cross was discovered at Utrecht-A2 (525), a site that probably ceased to be inhabited before the end of the eighth century. However, as with virtually every copper-alloy find in our database, the brooch was recovered from topsoil and may therefore be related to a younger phase of the settlement which may have been located at a short distance from the excavated site. Several pseudo-coin brooches were recovered at Katwijk (197) which, given the overall dating of the site could point to an eighth or early ninth century date for the brooches. Again, the fact they were discovered in undated contexts makes it impossible to determine whether they belong to the period when the site was settled or are related to younger, more extensive usage of the area.

The data does contain several clear indications for late ninth century and later dating of (enameled) disc brooches. Sites such as Domburg (191), Oost-Souburg (163), Limmen-De Krocht (160), Linge (521), Swalmen (59) and Spijkenisse (221), where various kinds of disc brooch have been recovered, all have yielded settlement traces most likely starting in the second half of the ninth century.[176] At each of these sites at least one enameled cross brooch or saints brooch has been discovered. Finds from the excavation Eindhoven-Blixembosch (126) suggest saints brooches were still in use in the late ninth century or perhaps even tenth century, in contrast to Frick's dating of 750 to 850 AD.

174 Nooijen 2013b, 109.

175 The stray finds have mainly been derived from Frick's inventory, with some additions from ARCHIS (dataset downloaded on 11-7-2013).

176 Limmen might begin slightly earlier. The start date for habitation is set around 825, essentially based on the number of yards thought to predate the 10th century and assumptions about the number of yards per generation (Dijkstra/De Koning/Lange 2006, 200-201).



Fig. 5.14 Distributions of the four most important disc brooch types in the research area.

What remains is to consider the relationship between the two major brooch groups found on our sites, disc- and ansate brooches (fig. 5.15). This is made difficult by the problems with establishing firm dates for the introduction of each. Although a gradual transition from seventh and early eighth century ansate brooches to ninth century examples seems a logical development it is not easy to reconstruct. The earliest absolute date available for group XIIA1 is the Emmen hoard with a *terminus*

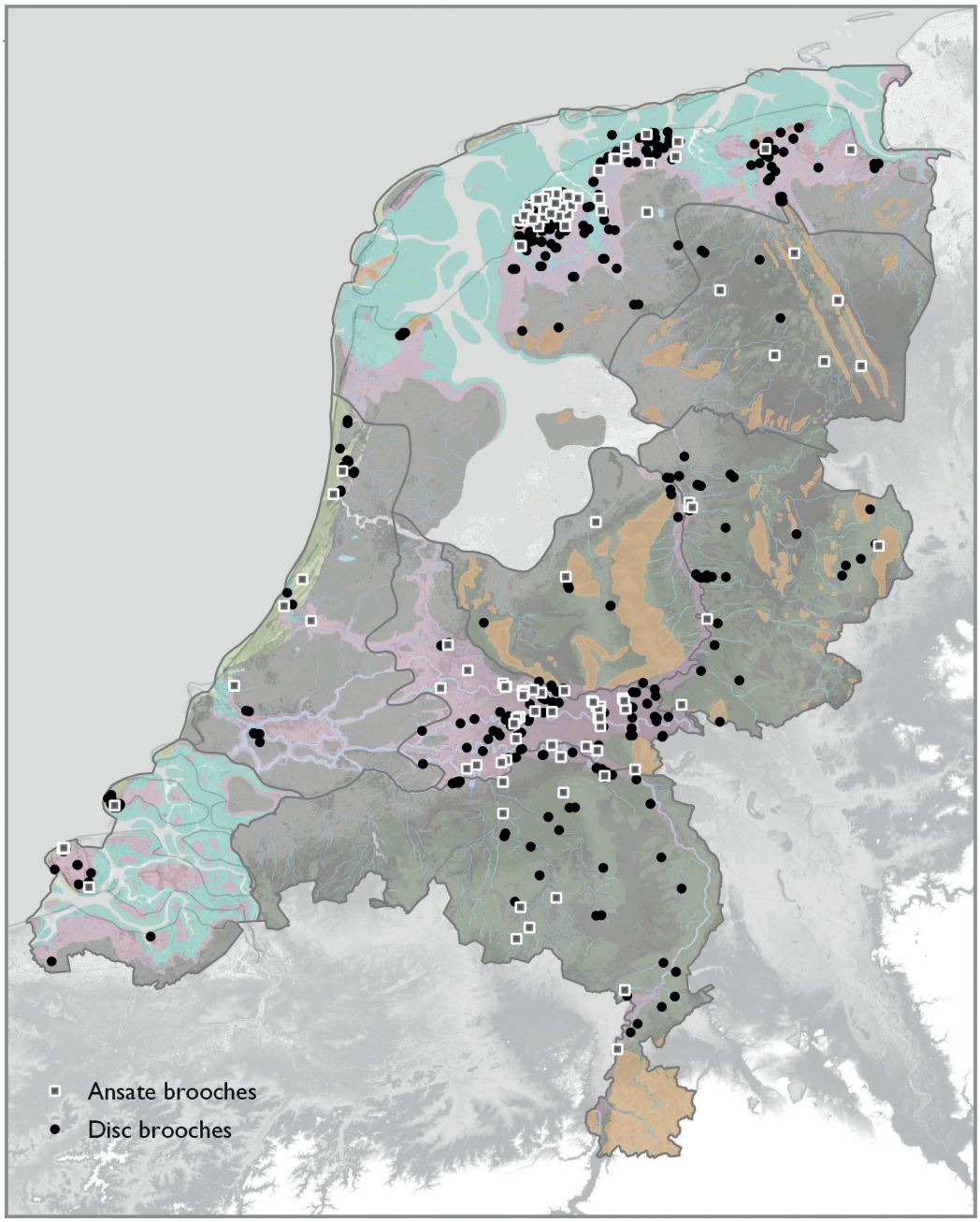


Fig. 5.15 Comparison of the distributions of ansate and disc brooches.

177 Thörle 2001, 222.
178 Bos 2005/2006, 465-466.
179 Roxbourgh/Huisman/Van Os 2016, 119-125.

Other copper-alloy artefacts

Other than brooches, copper alloy artefacts are relatively uncommon on rural sites and represent a myriad of objects (table 5.5). What the distribution of these objects across the regions shows is that the dispersal of copper alloy brooches is not necessarily correlated with the general spread of copper alloy artefacts. For example in regions 1 and 7 the number of brooches amounts to 39 and 21 respectively, while others artefacts number just six and five. Regions 5 and 6 on the other hand have yielded comparable numbers of brooches and non-brooch finds with a reasonable degree of variety in the artefacts, such as part of a harmonica and a strainer. However, most copper-alloy finds are fragments of some larger object which cannot be identified. A comparatively high number of copper alloy items has been discovered in region 3, but this is largely due to the excavations in Zutphen where 74 of the 77 copper-alloy artefacts found in the region were recovered. The only copper alloy artefacts to have been discovered in region 2 are coins. Copper coins have also been found in regions 5 and 6.

Many of the artefacts other than brooches were found at the same sites where brooches were recovered (just 7 out of 38 sites containing copper-alloy objects did not yield brooches, 14 contained only brooches) suggesting that either conservation conditions, excavation methods or both had some role to play in the observed distributions. The only other relatively common object types in copper-alloy are keys (fig. 5.16) and needles. They have almost exclusively been found in coastal regions and along major rivers except for one needle unearthed at Nistelrode-Zwarte Molen (120). Formation processes and research methods such as described in chapter 3 are likely to have played a role in producing these differences.

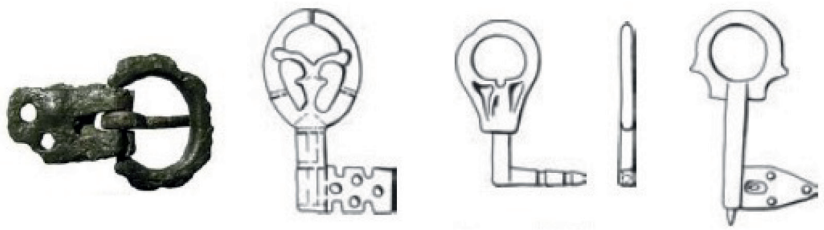


Fig. 5.16 A copper-alloy buckle from Wijk bij Duurstede (187) (Nooijen 2012, 250, afb. 5.45) and keys found during the harbour excavation at Wijk bij Duurstede (58) (Van Es/Verwers 2009, 216, fig. 171).

5.3.3 Artefacts in other metals

Objects manufactured in other metals mainly consist of coins. These will be discussed separately. Lead artefacts form the largest group of items among the remaining metals, followed by gold and silver. Most identifiable artefacts made of lead are related to weighing or weighing down. Almost half of the artefacts are weights of some sort and there are also weaving and fishing related objects. Additionally, three brooches and a button manufactured in lead have also been found. Other finds were either part of an unidentifiable artefact or scrap.

Although the numbers are small, more silver than gold finds (other than coins) have been recovered from Carolingian sites. The artefacts in gold consist of a brooch, a pendant and an ingot that were all discovered during excavations in Wijk bij Duurstede (sites 58 and 528). The artefacts

made of silver can all be characterised as dress and personal accessories; several brooches, a bracelet, a bead, a ring and a sword pommel. Again, most have been recovered from various locations in Wijk bij Duurstede (sites 58, 187, 190 and 528). The only rural sites to have yielded artefacts made of precious metals are Castricum (159), Naaldwijk (219), Houten (524) and Domburg (191) of which the latter site may not qualify as truly rural.

5.3.4 Coins

It should be pointed out at the start of this section that it will mainly deal with coinage as an artefact that was a non-local item on our Carolingian sites. A discussion on coinage in relation to the level of monetisation of the Carolingian economy is part of the wider issue of how exchange functioned in our period. It is better to reserve this for chapter 8 where an attempt is made to reconstruct exchange networks based on the material culture presented in this part of the research.

The inventory of finds from Carolingian sites in our research area contains 471 coins (Appendix IV). Three of these date to the Roman period, one tremissis and nine denarii belong to the Merovingian period, and one coin dates to the twelfth century.[180] A small number of coins was certainly not struck on the continent, namely four stycas and four pennies from England and a single dirhem found at Wijnaldum (18). Because the period under investigation overlaps partly with the time when sceattas were in circulation these have also been added, including those not found in a Carolingian context. Except for one gold imitation of a solidus of Louis the Pious discovered at Nistelrode-Zwarte Molen (120, this site also yielded the tremissis just mentioned) and several copper-alloy sceattas, the sceattas and coins struck on the authority of Carolingian rulers were produced in silver. The Carolingian issues number 287 while the sceattas amount to 161 examples of various types. To be clear, these numbers only include the coin-finds which were discovered during excavations or which have been directly associated with an excavation, not stray finds in the same area that have been found before or after an excavation but cannot be directly associated with it.[181]

If the Wijk bij Duurstede finds are excluded the inventoried sites actually contain more sceattas than Carolingian denarii and obols, 129 sceattas compared to 84 denarii and three obols. Eleven sites have revealed both sceattas and Carolingian coins, usually in relatively similar numbers, though the former are clearly in the majority at Katwijk (197) and Utrecht A2 (525). Nine rural sites have yielded more than one Carolingian issue. This includes the Borne site (26) where coins were found in a man's grave next to a house. A second is the small hoard from Aalst (135) which was discovered during an excavation directly adjacent to a (later) church built on the site of an older settlement. If we exclude for the moment these two hoard finds it would bring the number of denarii down to just 58 on rural sites, that is slightly less than a third of the number of sceattas.In the following discussion on coin distribution in our research area I will mainly use the evidence from single finds as recorded in NUMIS, the online database of coins discovered in the Netherlands, because it provides a better picture of the overall coin distribution than just the finds from rural sites.[182] The database is well maintained and therefore quite reliable in contrast to sources at our disposal for stray finds of other artefact categories.

180 These older and younger coins were included because they were discovered in a Carolingian context.
181 For example the number of single finds from Wijk bij Duurstede is much greater than the amounts in the database. The quantity of coins in the NUMIS database, that includes stray finds and hoards, is also markedly higher.
182 https://nnc.dnb.nl/dnb-nnc-ontsluiting-frontend/#/numis/.

Before examining distribution patterns it is important to consider how the collection of coins may have come at our disposal. In the simplest terms there is a chain of occurrences which in a general sense is relevant to all archaeological finds. A coin is produced (which is itself a chain of events), brought into circulation (or hoarded), lost or intentionally deposited, recovered by various means and finally recorded. This is not always a linear path, for example coins may be lost and then recovered again and brought back into circulation or melted down, or coins may never be lost and at some point simply be recorded without the intermediate steps. Which combination of events conspired to produce the record we now have is virtually impossible to reconstruct in detail. It has been suggested that there is probably a correlation between the amount of coins in circulation and the number of coins lost.[183] Generally speaking more coins in circulation is thought to lead to a higher loss-rate. The rate of loss, and by extension the relative quantity of coin in circulation, is believed to be reflected in our datasets, though more so through single finds than for example hoards or coins found in burials. This is because single finds are deemed more likely to represent day-to-day loss and in combination with their recovery in a piece by piece fashion are considered a largely random sample of coin distribution in the past.

There are problems with this approach. First, it requires us to accept the assumption that little happened in the intermediate period between loss and recording to disturb the pattern of loss. It can easily be demonstrated that this is not the case. For example, soil condition and how land was exploited in later centuries both can have a distinct influence on the chances of coins surviving and being recovered, which relatively speaking may be either positive or negative. The same holds for the intensity and legality of metal detecting in any given area, the willingness to declare finds and the ease with which they can be recorded, and the depth of Carolingian features below surface level.[184]

Secondly, it is questionable whether the correlation between circulation and loss is such that it always allows a full understanding of coin distribution in the past. Higher volume circulation may give a reasonably accurate picture of the overall dispersal of a particular coinage, but it can less easily be determined whether the distribution of lower volume coinage is representative or not. A related, third set of complicating factors are the differences in the timespan during which various coins were issued and how long the issues remained in circulation after they were replaced or reminted.

Numismatists have developed methodologies to counter some of these problems. With regard to the speed of circulation, study of coin hoards from the Carolingian period has made it very likely that at least in the time of Louis the Pious this was quite rapid.[185] Two hoards found in southern France which, judging by their contents were amassed within the space of five years contained coins from mints with a wide geographical distribution. The same is likely true of Charlemagne's monogram coinage struck between 793/4 and 814 AD. Hoards have also provided evidence that at least replacements involving several of the more important Carolingian coin issues were conducted relatively quickly and efficiently, in a matter of a few years. The main exception is Louis the Pious's class III *Christiana religio* (XR) coinage, believed to have been minted between 822 and 840, which does not appear to have been taken out of circulation after his death and is found in coin hoards dating several decades after 840.

One way to compare the volume of coin output of different issues is to calculate the average number of coins per year that a particular issue was in circulation. Coupland has conducted such

183 Blackburn 1993, 39-43.
184 These issues are discussed more fully in chapter 3.
185 Coupland 2014b, 265-266.

an analysis on several sites, and on the total assemblage of single finds discovered on the continent.[186] These analyses have revealed regional variation but also a consistent peak in the quantity of Louis the Pious Class II and XR coins on most sites and for stray finds as a whole. The stray finds also indicate a steady growth of the coin stock from Pippin III's reign up till a peak period starting in the 820's. The period after 840 saw a decline in volume, but still above pre 820 levels.

When the stray finds in NUMIS are compared to Coupland's figures for the continent the differences lie mainly in a lower percentage of Charlemagne's pre 793/4 reform coins and higher percentages of Louis' XR and Lothar I's coins in the NUMIS figures. If the single finds of Wijk bij Duurstede in NUMIS are not included in the comparison, the amount of Charlemagne's monogram coinage, minted after 793/4, also drops and Lothar's issues rise further (table 5.8). This would effectively indicate a sharper increase in the volume of coinage in circulation during Louis' reign for rural sites in our research area compared to the overall composition of Carolingian single finds on the continent and Wijk bij Duurstede as well. It also suggests the decline in coinage after circa 840 was less dramatic for rural areas than appears to have been the case at Dorestad. Because the increase in volume of coinage in the 820s and 830s is a consistent feature among single finds over a wide geographical area it makes it likely that it is a true reflection of the relative volume of coins in circulation in this period compared to earlier and later decades. With this in mind it is interesting to examine the distribution patterns of various groups of Carolingian single coin-finds recorded in NUMIS.

When the various Carolingian issues are compared by ruler it can first be observed that those of Pippin III and Charlemagne before the reform of 793/4 are limited to the Rhine and Meuse and several tributaries and to the northern coast in region 1 (fig. 5.17). The picture is not much different for Charlemagne's coins issued after the coinage reform and Louis the Pious' Class 2 coinage, though now the whole coastline is represented. For Louis' reign an important watershed is the introduction of the *Christiana religio* coinage in 822 or 823. The coins which can certainly be dated before their introduction are limited in number and distribution, which must in part be due to the short time they were in circulation which in turn is a result of an effective re-minting program and control of circulation. However, *Cristiana religio* coins show a much wider distribution than all the previous issues of Carolingian monarchs combined. They have been found in all regions, though not in all areas within them. For example in region 2 the coins have mainly been discovered in the northern half and along the glacial landform known as the Hondsrug. In region 8 they are restricted to an area along the course of the Dommel and its tributary streams and the Meuse. Whereas the west of region 6 has yielded examples of all Carolingian rulers coinage, the first coins in the east of the region are of Louis the Pious. In region 1, where coin-finds are particularly concentrated in the west of the province of Friesland, coinage of Louis has a wider distribution than previous issues.

The coinage issued by Louis' successors when taken together, indicate a partial regression towards earlier coin distributions. The coinage of Lothar I is still found in some outlying areas such as in region 2, and the east of region 6 remains relatively well represented, but most examples are as usual found along the Rhine and Meuse in regions 5 and 6 and along the coast.

186 Coupland 2010; Coupland 2014b, 266-275. To be clear, in this manner Coupland takes the longer period that certain issues, for example *Christiana religio* coinage, remained in circulation into account.

	Coupland		NUMIS		NUMIS WbD		NUMIS non-WbD		date
Pippin the short	124	6.8%	21	5.4%	8	7%	13	4.8%	751-768
Charlemagne pre reform	190	10.5%	8	2.1%	1	1%	7	2.6%	768-793
Charlemagne monogram	367	20.2%	72	18.6%	41	35%	31	11.5%	793-814
Charlemagne portrait	15	0.8%	3	0.8%	0	0%	3	1.1%	812-814
Louis the Pious portrait	47	2.6%	9	2.3%	3	3%	6	2.2%	814-816
Louis the Pious class 2	237	13.1%	35	9.0%	7	6%	28	10.4%	816-823
Louis the Pious XR	722	39.8%	188	48.6%	50	43%	138	51.1%	822-840
Lothar I	119	6.6%	51	13.2%	7	6%	44	16.3%	840-864
Charles the Bald pre 864	108	5.9%	2	0.5%	0	0%	2	0.7%	840-864
Pippin II of Aquitaine	48	2.6%	6	1.6%	0	0%	6	2.2%	840-864
Total	**1816**		**387**		**117**		**270**		

Table 5.8 Number of coins per Carolingian ruler in Coupland's inventory at a European level, and NUMIS. The finds recorded in NUMIS have been separated into those discovered at Wijk bij Duurstede and all other finds.

So, the coins produced during Louis the Pious' reign have been found in greater numbers and over a wider area than any issued before or after. This tallies well with the figures regarding volume of coinage discussed above and a link between volume, duration of circulation and spatial distribution may reasonably be inferred for coinage of the 820's and 830's. However, although volume and geographical dispersal might appear to be linked this is not necessarily the case. The peak in volume represented by *Christiano religio* coins and their wider geographical distribution could in theory be a coincidence. What volume would be required to show the full extent of dispersal of an issue and do Louis' coins fit the bill? Moreover, as already mentioned the *Christiano religio* coins remained in circulation for several decades after 840, in contrast to earlier issues.

This question is impossible to answer, given the many variables involved in producing the observed distribution patterns, but it is crucial for our understanding of the dispersal of coinage in the decades before 820 and after 840. For these periods the volume of coinage was lower than in the intermediary period as we have seen. Can we infer that the more limited distribution of coins from these decades is simply down to lower rates of production, reflected in loss-rates? Would we see a similar distribution to that of *Christiana religio* coins had more examples been in circulation in the first place? Or were coins actually less common in regions further removed from major rivers and the coast in the later eighth and early ninth century, and later at the end of the ninth century? One way of trying to answer these questions is to examine the distribution of coins in the NUMIS database at particular periods before and after ours. This will give some idea of areas where coins are always found in considerable numbers and areas which are comparatively empty throughout the timeframe covered by NUMIS. In turn this can provide a frame of reference to identify areas where Carolingian coins seem to be lacking or abundant compared to the overall picture.

Two periods bookend a time when coinage in general was relatively scarce in our research area. For the Late Roman period, roughly the late third and fourth century, coin finds are still quite frequent though slightly lower in volume and dispersal than for the previous centuries. Only for coins of the thirteenth and fourteenth centuries do the frequency and distribution of coins start to resemble the Roman situation once more (fig. 5.18). This second period is all the more interesting because coinage at that time was still mainly produced in silver and remained quite similar to their Carolingian predecessors in terms of their dimensions, though they perhaps weighed less. The period when sceattas were in circulation is also of interest because they directly precede our Carolingian issues and have been found in much greater quantities.

What is immediately apparent when comparing the distribution of Carolingian coins with that of the Late Roman and the thirteenth/fourteenth centuries is that concentration in the province of Friesland and the central Dutch river area are common in all these periods. We saw in chapter 3 how research methods and preservation conditions favoured the recovery of metal artefacts in these areas so in that sense there should be little surprise. What this means however is that it is impossible to say anything meaningful about the relative abundance of coinage in these areas. The same is true of finds along the Dommel in region 8 where coinage is also present in most periods. This however is not such a problem as long as we are mainly interested in determining which areas were receiving coin and which were not.

Areas where coins seem to be lacking in the Carolingian period, but are abundantly present in the Late Roman and/or thirteenth/fourteenth centuries indicate where soil conditions or lack of metal detecting are less likely to be the reason for the absence of Carolingian issues. Prime examples are the west of region 8 and the southeastern part of the same region. In both areas Late Roman coins are relatively common. In the fifth and sixth centuries the number of coins in the west of region 8 drops quickly while the south of the province of Limburg still contains a reasonable number of finds. Carolingian coins however are almost entirely absent in both areas and it takes until the thirteenth century for levels to come back up. In the west of region 4 coin finds remain limited for all periods until roughly the twelfth century. Here the small frequency and distribution of Carolingian coinage is therefore also likely a reasonable reflection of circulation in the past. The same is true for region 7 where increased volume of high and late medieval finds is presumably related to increased habitability of the region, something that also explains increases in the former peat areas of region 5 and the west of region 1.

For other areas the overall lack of coin finds makes it difficult to assess whether Carolingian coinage was really not in circulation or if we are dealing with lack of research or poor preservation conditions. One such area is the east of region 4 which today is largely occupied by forest and national parks. Presumably due to this modern land use coin finds are generally scarce. Much of the east of region 3 also shows few recorded coin finds in any period. However, along the rivers IJssel, Overijsselse Vecht and Oude IJssel which run through region 3 quite a number of older and younger finds are known but relatively few Carolingian issues. Finally an area along the Meuse, between Venlo and Cuijk has yielded very few coin finds of any period from the late third to fourteenth century so it is not strange that Carolingian coins are lacking too.

The evidence gleaned from these comparisons is mostly negative, in the sense that we can only tell whether the distribution of Carolingian coins is either likely to be a reasonable reflection of past distributions or not. Region 2 presents an opportunity to identify a distribution pattern which seems to be particular for the Carolingian period. Although Carolingian coins, mainly issued under Louis the Pious, are present in areas where Late Roman and fourteenth century coinage is also present, for much of the intermediary periods the area is empty. What coins there are in the region in the centuries before and after the Carolingian period mainly lie along its periphery and not on the Hondsrug.

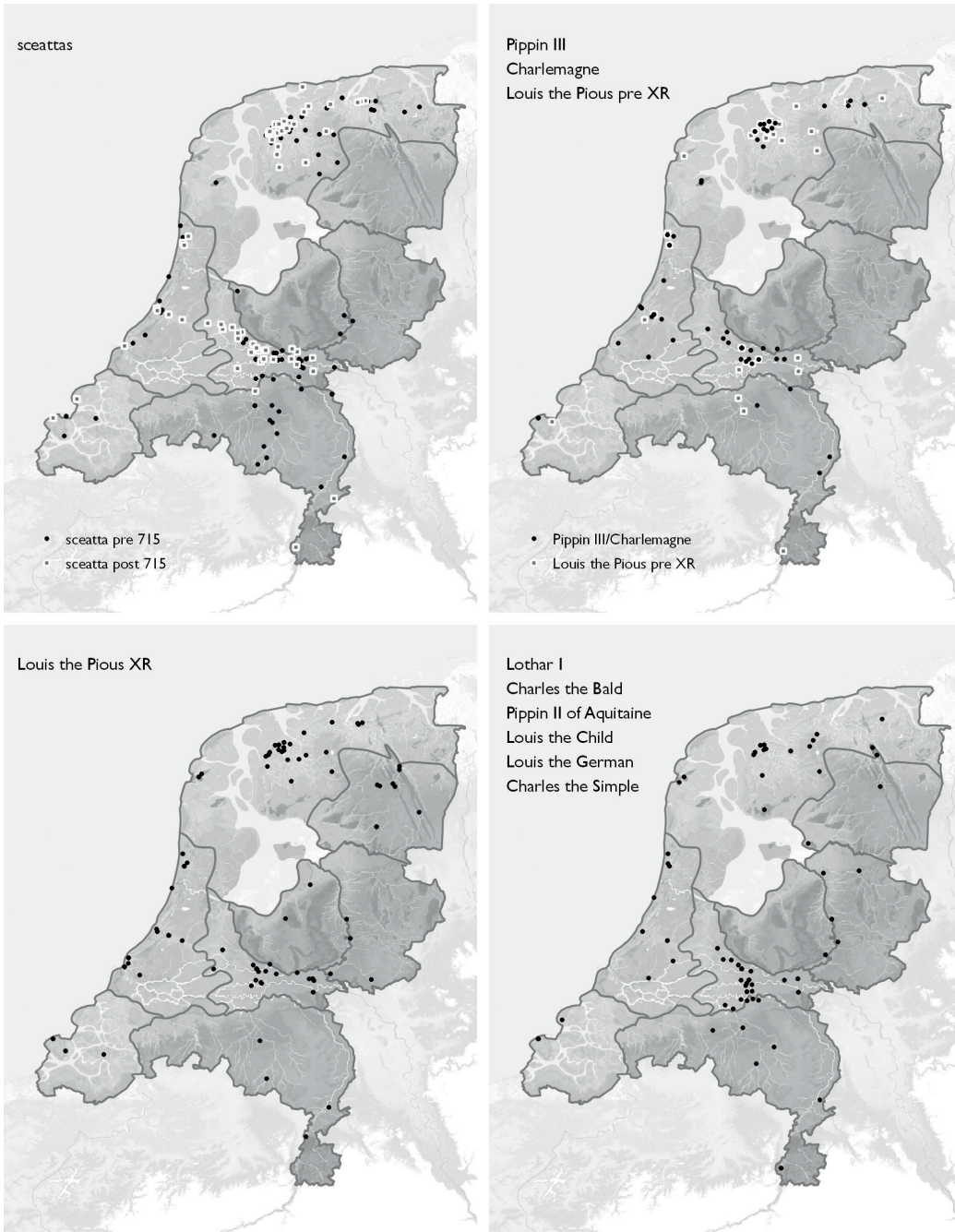


Fig. 5.17 Distribution of coinage of various issues throughout the research area (maps based on data taken from NUMIS).

The above analysis was mainly based on the distribution of Louis the Pious' issues. As mentioned above coinage of earlier and later rulers are more limited in number and dispersal. In principle the observed patterns should apply to these issue as well implying coinage produced under the other rulers was overall less abundant and probably less widely distributed. We can test whether this was indeed the case to some extent by looking at the period directly preceding and succeeding ours. When the distribution of sceattas is compared to the coinage of the first two Carolingian rulers some considerable overlap can be observed (fig. 5.17). This convergence increases when only the sceattas dated after 715 are considered. In that case both distributions concentrate along the Rhine, the western and northern coast and to a lesser extent the Meuse. This may indicate that early Carolingian coinage was used in networks which were already functioning in the second half of the seventh and first half of the eighth century. These networks do not appear to have extended inland to rural areas as far as the use of coinage is concerned. However, this should not necessarily be taken as evidence for these areas being cut off from wider exchange networks entirely.[187]

The distribution of tenth century coins is more widespread than issues by Carolingian rulers following Louis the Pious. The number of findspots along the Waal increases markedly for the tenth century while finds along the Rhine appear to drop. For both periods discoveries in the west of Friesland show a considerable decline compared to earlier centuries. In fact tenth century finds may have increased in frequency and distribution relative to the late ninth century, but in many areas they struggle to reach the levels of Louis the Pious' issues. For the late ninth century then it is much more difficult to conclude whether there was any significant change in the availability of coinage in rural areas. The fact that Louis' coinage was certainly used for several decades after his death only further compounds the issue.

5.3.5. Conclusion

The availability of iron implements on rural sites is difficult to assess due to (differential) preservation conditions, but also because the extent of recycling is almost impossible to estimate. The ubiquity of iron tools has to be deduced from the evidence for iron production and working rather than from the artefacts themselves. Among copper-alloy artefacts, brooches are an interesting category in the context of this study because particular types show regionally specific distributions. Though ansate brooches dated to the eighth and ninth centuries present in the research area at first glance represent a vast array of types and subtypes, most can be reduced to a much smaller number of main types. Among these are types specific for the northern coastal area, for the western coast, and for more inland areas. The other major brooch type of our period, the disc-brooch also comes with a variety of decorative motifs, but there is much more consistency within types than with ansate brooches. The distribution of disc brooches also differs from ansate brooches as they occur in every region, including inland areas of the research area with no clear differentiation between types. The observed differences in the consistency of production and regional distribution patterns between ansate- and disc brooches indicate that production and/or distribution were organised in different ways. Because the evidence suggests that ansate brooches started to be produced earlier than disc brooches, but disc brooches remained in use after ansate brooches ceased to be manufactured it may

187 Blackburn 1993, 43-44.

also be possible to make tentative inferences regarding developments in production and circulation of brooches during our period.

Carolingian coinage up to Louis the Pious' Christiana religio issue shows a similar distribution as earlier sceattas, namely in the central Dutch river area and in the northern coastal area, specifically the area known as Westergo. However sceattas have been discovered in far greater numbers in these areas. This raises the question to what extent the state of an economy can be determined based on variations in loss patterns of coins. There may be specific reasons why coinage was widely used within one sphere of transactions and much less so in another, that a narrow focus on the level of monetisation obscures. The distribution of Christiana religion coins suggests coinage became more common in other parts of the research area during the ninth century. The relatively long period in which the coin-type remained in circulation may account for this pattern to some extent. Nonetheless, for some regions it can at least be demonstrated that the distribution pattern is not a consequence of variable preservation conditions or application of research methods, but likely represents a development specific to our period.

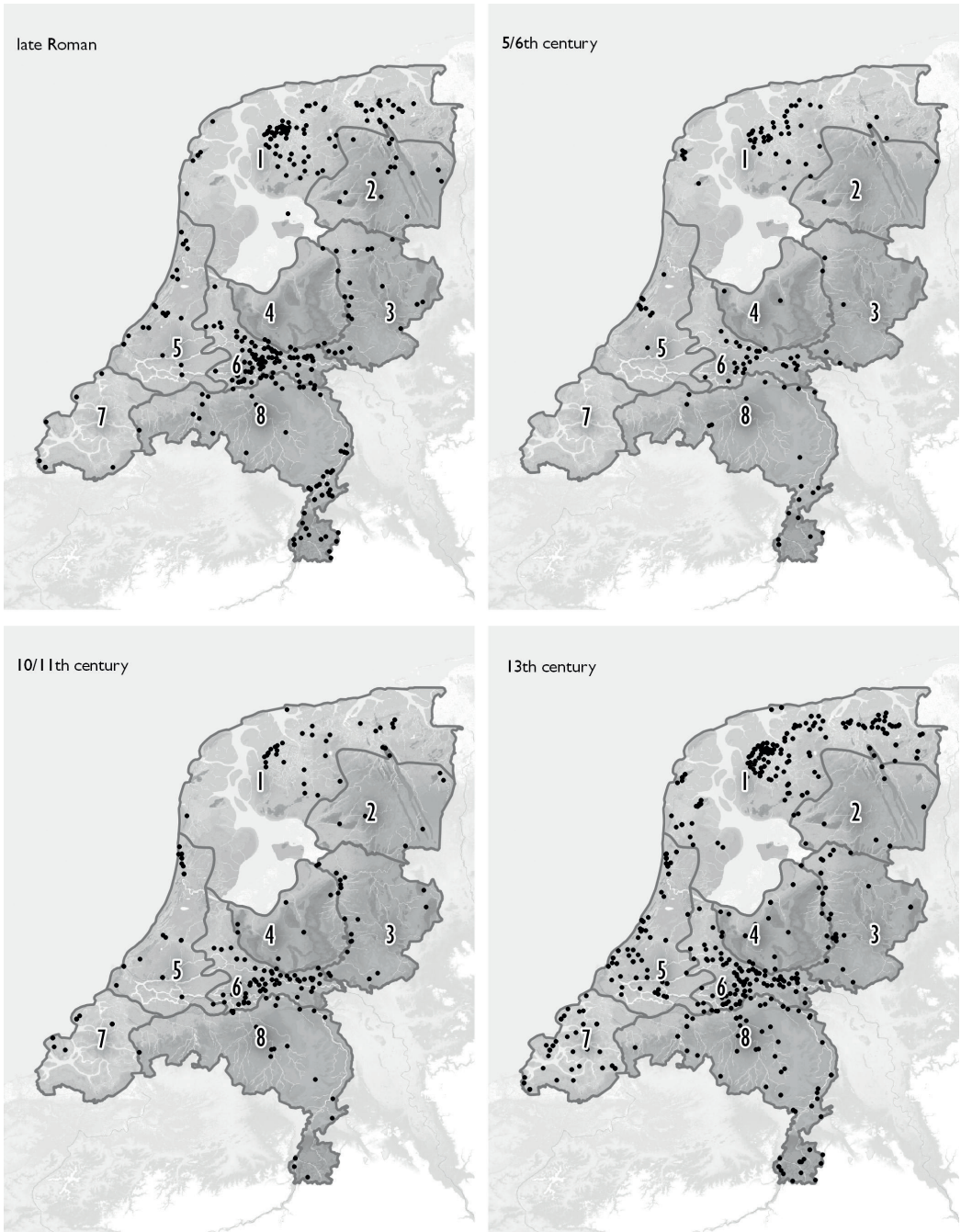


Fig. 5.18 Coin finds of other periods as recorded in the NUMIS database.

5.4 Conclusion

This chapter has outlined developments in the production, distribution and consumption of metal items in the research area during the eighth and ninth centuries. Unlike ceramics, metal artefacts encompass a myriad of different items. The most common metal artefacts discovered on rural sites in our research area can be divided into three main groups, namely iron tools, copper-alloy dress accessories and silver coins. The manufacture of some of these goods, such as iron tools, took place on rural sites in the research area, whereas others, like disc brooches and coins did not.

Iron production took place in at least three parts of the research area and was organised in several different ways. In these three areas production was dispersed over multiple settlements that all have a rural character. Though part of production may have been realised by what were effectively professional artisans, in a substantial portion of cases it was probably one element of rural household subsistence.

Evidence for iron working has been discovered on settlements in most of our regions. This means raw iron would have needed to be transported to regions where it was not produced. For sites along the western coast the lack of clear evidence for iron working on sites of the eighth and much of the ninth century suggests finished items may have been brought in, rather than raw iron. However, centralised production in this region is another possibility. The combination of evidence for iron production, working and consumption indicates that iron tools were common on rural sites in the research area.

The indications for non-ferrous metal working on sites in our regions is more obvious for the seventh century than the eighth and ninth centuries. If copper-alloy artefacts were manufactured in the research area in the latter two centuries this does not seem to have taken place on rural sites. This development from relatively dispersed to more centralised production is also reflected in the morphology and composition of the two major brooch types of the period. Ansate brooches of the eighth and ninth centuries demonstrate considerable variability in form and decoration, combined with regional specificity, whereas disc brooches of the ninth and tenth century are morphologically more uniform over a much wider geographical area.

Silver coins of our period were certainly not manufactured on rural sites. The evidence for an increase in control and centralisation of production of coins under Carolingian rulers is clear. However, for this study changes in the dispersal of coinage are of greater interest. The most important development was a seemingly wider circulation of coinage in (some) rural areas in the ninth century compared to the late seventh and eighth centuries. However, this does not necessarily imply a coinciding increase in the level of monetisation.

The developments highlighted here regarding rural production, increasing homogeneity of goods and centrality of manufacture of some items, and the circulation of coinage in rural areas are the aspects of metal (related) artefacts that will help inform the interpretation of the nature of exchange systems in our period.



Stone artefacts

Introduction

Stone artefacts are often difficult to date independently from morphologically distinct features. Therefore it is likely that the number of stone objects assigned to the Carolingian period is underrepresented, particularly on sites with several periods of occupation. Only millstones sometimes show attributes which can be used to make chronological distinctions. Furthermore, in most cases this is the only kind of stone artefact found on our sites that can be provenanced. For other artefact groups it can usually only be determined whether the source was likely local or non-local. The following will deal with the stone tools, first millstones, the sharpening tools, weights and finally miscellaneous objects. The last group mainly comprises artefacts discovered at Wijk bij Duurstede. They are included here in order to give an impression of the kind of goods produced in stone that were available in the Carolingian period.

6.1 Millstones

The millstones discussed here, those which were prevalent on rural sites in the research area, were roughly between 45 and 50 cm in diameter (fig. 6.1). They were shaped out of tephrite cut in quarries in the German Eifel region, around the modern town of Mayen.[1] Two rural sites have produced (likely) fragments of millstones made of sandstone, namely Berkel-Enschot-Enschotsebaan (139) and Serooskerke (165). Tephrite has several advantages for usage as millstone compared to other kinds of rocks. It will not contaminate flour with crystals or rock particles and the surface of the stone is constantly renewed in the process of milling.[2] At the same time it is not so soft as to wear too quickly.

Non-rotating millstones from the Mayen area were present in the research area from the Bronze Age, but the first rotating millstones were probably introduced in the second century BC.[3] Under the Romans output from the quarries intensified, but after the Roman period there appears to have been a decline in production.[4] The exact output is not clear for the time between the Roman and Carolingian period and it has even been suggested, based on British and northern German evidence that during the sixth and seventh century the export of Mayen quernstones largely halted.[5] However, although this may be true for Britain and parts of Germany, millstone fragments have certainly been found on seventh century sites in the Netherlands.[6] The sixth century situation is perhaps less clear, but this may be due more to the lack of sites clearly dated to the sixth century and well published, than anything else.[7] At this time it is not possible to determine whether the geographical spread of millstone distribution increased during the sixth to ninth centuries. For sites along the Rhine, in the IJssel valley and along the coast the evidence suggests there was considerable continuity in the availability of millstones from the Eifel. However, in areas like Drenthe or much of Limburg it

1 Parkhouse 1997, 98.
2 Kars 1980, 401-402.
3 Van Heeringen 1985, 371-383.
4 Mangartz 2008, 106.
5 Bischop 2000; King 1986, 97.
6 To name but a few: fragments of tephrite have been found at Geldrop (136) in wells dendrochronologically dated to the seventh century, Oegstgeest-Rijnfront zuid (Hamburg/Hemminga 2006, 89), Deventer-Kloosterlanden (Groenewoudt 1987, 239), Zelhem-Provinciale weg vindplaats 4 (Kenemans/Van der Velde 2002, 73), Hallum (19), Groot Olmen (212).
7 An excavation in Colmschate near Deventer revealed traces dated mainly to the 4th and fifth century as well as some sixth century features. Several features and structures dated to the early middle ages contained millstone fragments (Vermeulen/Mittendorff/Hermsen 2009, 73).

is difficult to determine because of a general lack of sites for parts of the early middle ages or due to insufficiently detailed excavation reports. An excavation in Beegden (67), along the Meuse in the province of Limburg was dated to the late seventh and early eighth century and did not yield tephrite fragments, despite a range of other stone artefacts being present.[8] Whether this is representative for sites along this section of the Meuse cannot be determined due to lack of material for comparison.



Fig. 6.1 Almost complete quernstone found at Boxmeer (104, Blom/Van der Velde 2015, 293, afb. 7.36).

At any rate, an increase in activity is assumed in the quarries near Mayen from the eighth century onward. However, the dating of this revival is based on limited data and seems to be essentially founded on a lack of evidence for sixth and seventh century export.[9] Small scale excavations in one of the quarried areas revealed a single rim-sherd in Mayen fabric ME and of type F18, generally dated to the eighth and ninth century, besides a few prehistoric and Roman sherds. No sixth and seventh century pottery was recovered during the investigation. The remains of millstones recorded during the excavation did not show the typical Roman cone shape and may have been either Roman stones in a very early stage of production or early medieval stones, which have more or less flat grinding surfaces. However, this one find context can hardly be considered conclusive evidence for a lack of production in the sixth and seventh century.

Carolingian millstones were not finished on site in the quarry as they had been in prehistory, or on sites in the town of Mayen and the harbour of Andernach as in the Roman period.[10] Only blanks, without the central aperture were created at the quarries. These were subsequently shipped, which meant the stones needed additional dressing at some stage before final use. Parkhouse argues this was done to minimise the risk of breakage, which was probably at its highest when creating the aperture.[11] The so-called 'roughouts' were transported to various destinations throughout northwest Europe. Among the sites where they have been found in Carolingian contexts are Dorestad, Haithabu and Ipswich, in other words mainly on sites which have been directly linked to interregional exchange.[12] Evidence from the Dorestad site certainly suggests roughouts were finished on site, but it cannot be said for certain whether this was part of the artisanal activities in the town aimed

8 Melkert 2015, 64.
9 Mangartz 2008, 121 and 124.
10 Hörter/Michels/Röder 1950, 26-27; Mangartz 2008, 73-80.
11 Parkhouse 1997, 104.
12 Parkhouse 1997, 99-102.

at exchange or simply intended for the settlements own needs.[13] The Dorestad finds do not include waste from dressing stones and creating the apertures, which has been discovered at Haithabu and the Thames-Exchange site in London. Therefore Parkhouse believes only the millstones needed in the settlement were finished at Dorestad.[14] Although the Eifel quarries were not the only sites to be active in the Carolingian period, it does seem to be the only supplier in our research area and its wider surroundings.[15]

The greatest obstacle when interpreting the spatial distribution of millstones on sites in our database is the fact that millstone can only rarely be dated on morphological criteria. The dating of the finds is therefore dependant on the context they are found in. It is possible that some sites did produce remains of millstone that were used in the Carolingian habitation phase but which could not be recognised as such because they were not discovered in a Carolingian context. Furthermore, stone objects are one of the artefact categories which are often poorly documented and published and therefore problematic to assign to specific features and structures. This means that besides the fact that it is difficult to assign millstone fragments to the correct time period, the amount and weight of the fragments is more often than not unknown. All these factors mean comparisons of relative frequency and find-density of millstones between sites and regions is not possible.

In order to make some distinctions in the probability of stone tools, and in particular millstones being present on a site the presence or absence was recorded as discussed in chapter 4. Stone artefacts can be either present and recorded at a site, definitely not be present, it can be unclear due to lack of documentation, and finally documentation may be lacking but the presence of artefacts is probable.

Figure 6.2 is a map showing the presence or absence of stone artefacts on Carolingian sites according to these criteria. The contents of the map caution against over-emphasising the significance of 'empty' areas. For example in in the central Dutch river area (region 6) there is a large number of sites where no artefacts have been found, but closer inspection shows that most of those sites consist of either small excavations or trial trench campaigns. The publication of sites between the Meuse and the Peel area in region 8 do not all contain the level of detail needed to assign artefacts to features and structures. The same is true for most of the sites in the eastern part of region 3. In order to get a better idea of areas that are actually devoid of stone artefacts it is necessary to factor in the nature of excavations and the quality of publications.

A second map (Figure 6.3) is an attempt to do this for millstones. It shows all sites where millstone fragments have been recorded, but also sites with a publication quality of 1 or 2 and an excavation score of 1 to 3 where they have not been recorded. This leaves a small number of sites which have been excavated and published well enough to have produced Carolingian millstones, but which did not. Many of these fall in the category 'small-scale excavations' (score 3). This suggests a lack of millstone fragments on sites present in the database is primarily due to factors relating to the nature of excavations and inadequate publication. What the map shows is that millstones were a common object on Carolingian sites in the research area. Whether this means they were easily acquired or considered valuable or not is another matter. Millstones on rural sites never seem to be present in large quantities. Combined with their wide distribution they were likely regarded not so much as a luxury item buts as an expensive necessity. However, with limited data on quantities of millstones per site this is difficult to assess.

13 Kars 1980, 417-421.
14 Parkhouse 1997, 104.
15 Kars 1980, 402.

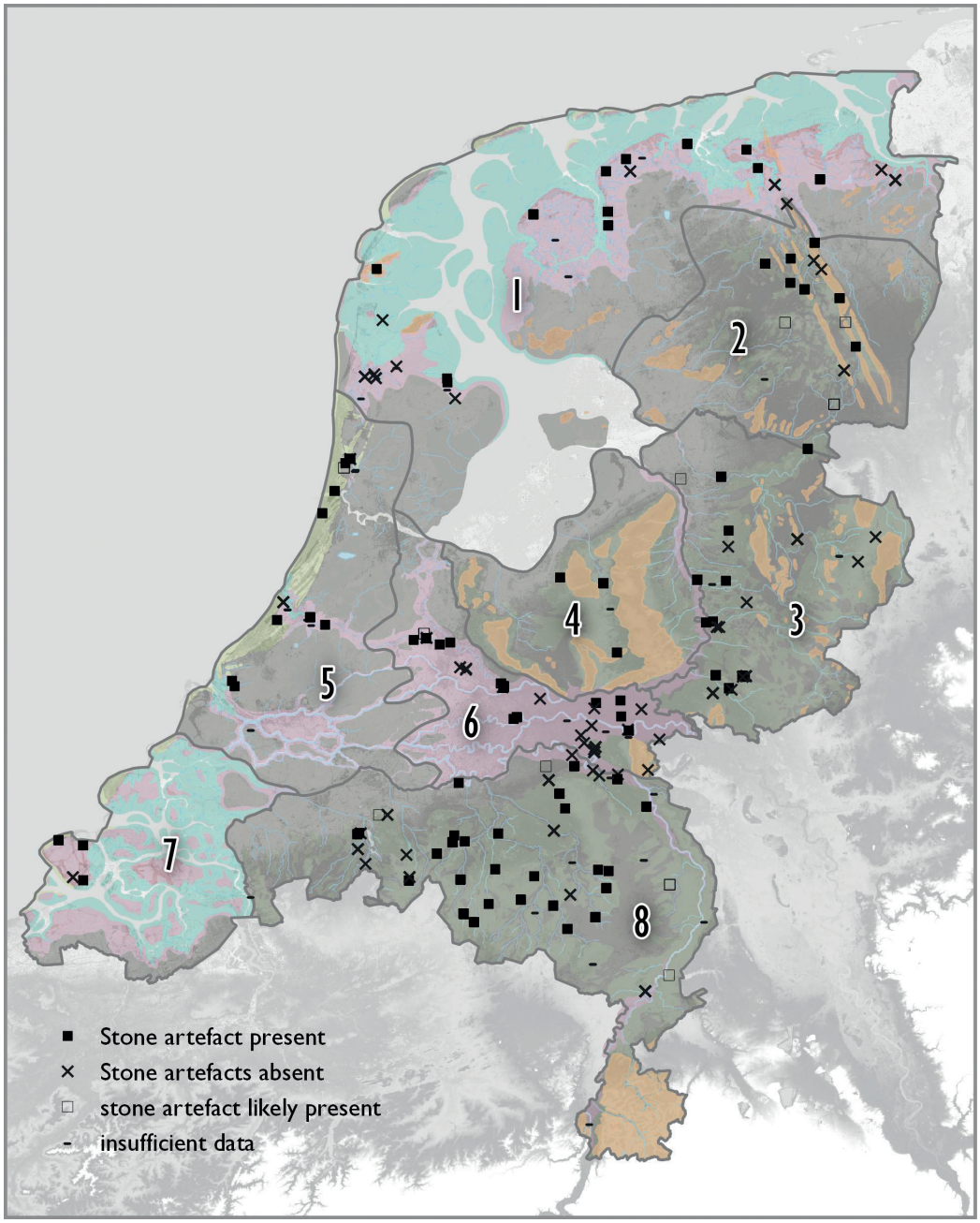


Fig. 6.2 Presence or absence of stone artefacts on Carolingian sites in the research area.

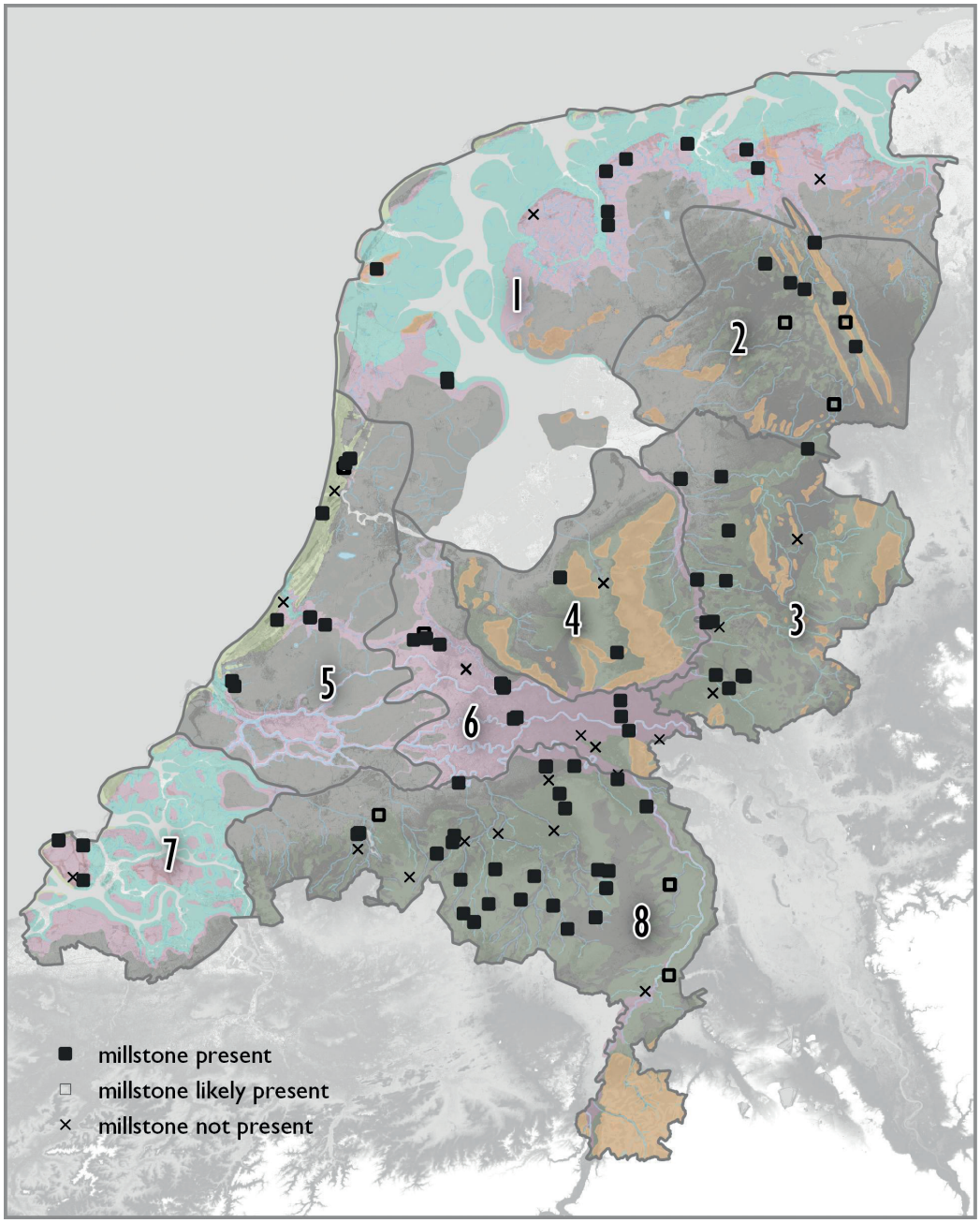


Fig. 6.3 Carolingian sites where millstone fragments have been found. The map also shows sites where the find report is not detailed enough to be certain that millstone fragments belong to the Carolingian habitation phase, but where it is very likely that they do. In additions sites are indicated where millstone fragments might have been expected to have been recorded given the quality of excavation and publication, but were they were not present.

Three sites in the research area have produced (fragments of) roughouts, namely Dorestad (mainly sites 58 and 528) as already mentioned, Medemblik (164) and Naaldwijk (219). The find of a roughout at Medemblik has often been regarded as one indication that it was an important town in the Carolingian period, a subsidiary of Dorestad with a toll station.[16] Because roughouts up till now have mostly been found at sites which are presumed to have had an exchange function they almost become a proxy for this kind of settlement. The find at Naaldwijk puts this in a slightly different perspective. Nothing about the Naaldwijk site otherwise explicitly links it to an exchange function and therefore the find indicates that in some cases at least, millstones were transported to end consumers as unfinished stones to be completed on site. Two sites with a rural character in Schleswig-Holstein also contained semi-finished stones.[17] The fact that we do not find these stones more often in (rural) settlements can be explained simply by assuming the stones were used and therefore worn. However, more evidence for breakage of semi-finished stones might be expected in that scenario. The Naaldwijk find at least suggests that we should not view a single example of a roughout on sites as a direct indicator for a trade function.

6.2 Sharpening tools

Sharpening tools are often divided into whetstones, sharpening blocks and sharpening stones, the size of the objects being the principal discriminator.[18] Whetstones were smallest and meant to be held in hand while block sharpening tools and sharpening stones were large and stationary.[19] In theory some of the sharpening tools could have their origin outside the research area such as Scandinavia, the Ardennes or the German Rhineland.[20] However, reused Roman material is also possible as are local deposits, particularly in areas with ice-pushed ridges. Sharpening tools have been discovered less frequently than millstone fragments, but their distributions are roughly similar (fig. 6.3). Differences can be observed in region 2 and the north of region 3 where just three sites have certainly yielded sharpening tools, compared to at least ten that produced millstone fragments.[21] Region 4, an area in the north of region 8 and the east of region 6 are also less well represented compared to the millstone finds. The discrepancies could be partially explained by the ease with which the respective artefacts can be identified. Identifiable objects made from tephrite are almost always millstone fragments. This makes it plausible to assume that tephrite fragments without characteristic features were also once part of a millstone. Fragments of sharpening tools on the other hand may not be recognised as such, leading to an underrepresentation relative to millstones. This make it difficult to assess what the lack of sharpening tools in some areas implies. In the eastern part of region 6 sites generally have rather small find assemblages and several sites have also not produced millstone fragments. However, as far as sites in the north of region 8 are concerned, several of them are large and relatively well excavated examples.

Sharpening tools would have been used in metalworking, for sharpening utensils such as knives or ploughshares and for wood and bone working. With regard to our dataset the possible relationship

16 Besteman 1989, 21-22.
17 Schön 1995, 101.
18 For example Kars 2001, 347-350.
19 Kars 1983, 3.
20 Kars 1983, 26-34.
21 The evidence for the three sites in region 2 where stone artefacts belonging to the Carolingian habitation phase have likely been recovered only imply the presence of millstone fragments. The same is true for similar sites in other regions.

with metal working is tenuous. Sharpening stones were discovered at Doetinchem-Lookwartier (44) and Berkel-Enschot-Enschotsebaan (139), and other sharpening tools were found at Alphen-Molenbaan (106) and Utrecht-A2 (525). At each of these sites clear evidence for metal working has also been discovered. However, at all other sites containing remains of metal-working no sharpening tools have been found (see chapter 6 for an overview of the sites). The observation made in the previous chapter that iron on rural sites seems to have been used primarily in tools intended for some form of cutting probably provides a better context for understanding the presence of sharpening tools generally.

6.3 Weights

Weights are often identifiable as an irregularly shaped stone with a perforation, or grooves where a rope of some kind was attached. The weights for which the kind of stone was specified in the available excavation reports were made of tuff. Some weights are interpreted as net-sinkers while others are simply described as weight. Most of the weights were found on sites in the direct vicinity of bodies of water (Leens (22), Leiderdorp (158), Utrecht-A2 (525)), which is in line with the interpretation of net-sinker. In his study of the tuff artefacts from Dorestad Kars investigated the likelihood of tuff weights having functioned as net sinkers.[22] He concluded that the effective mass in water of most of the weights would be suitable for use as net sinker but only in water with slow currents and as part of so-called *seine-nets*. These are nets with heavier weights along the bottom and lighter ones along the top, keeping the net vertical in the water. The fact that many tuff weights were found in the harbour excavations of Dorestad is another indication that they were indeed used as net sinkers. One of the stones found at Leiderdorp (158) and interpreted as a net-sinker would appear to be too heavy for use in a seine-net, weighing 1543 grams, where 100-200 grams was common among the Dorestad material.

6.4 Other artefacts

Touchstones were used to determine the purity of gold and therefore might reasonable be connected with exchange. In total 13 touchstones and four lydite pendants which are also believed to have been used as touchstones have been found on Carolingian sites in our research area. The link with exchange seems validated by the fact that all but two were discovered at excavations in Wijk bij Duurstede. The others come from the Groot Olmen site (212) in region 5 and Utrecht-Appellaantje (526).

Another group of artefacts rarely found outside a town context are those made of amber. At Wijnaldum a single amber bead was recovered from a Carolingian context and another was discovered at Wijk aan Zee (172). Considering Wijnaldum and Wijk aan Zee were both investigated intensively, recovery of amber objects and fragments may be as dependant on excavation methods (sieving) as glass artefacts.[23] The abundance of finds from Wijk bij Duurstede can partly be related to excavation methods (Veilingterrein, site 187), concentration in a single feature (De Geer II, site 190) and the sheer quantity of material recovered during the Hoogstraat and De Heul excavations.

22 Kars 1982, 152-159.
23 See chapter 3 on formation processes.

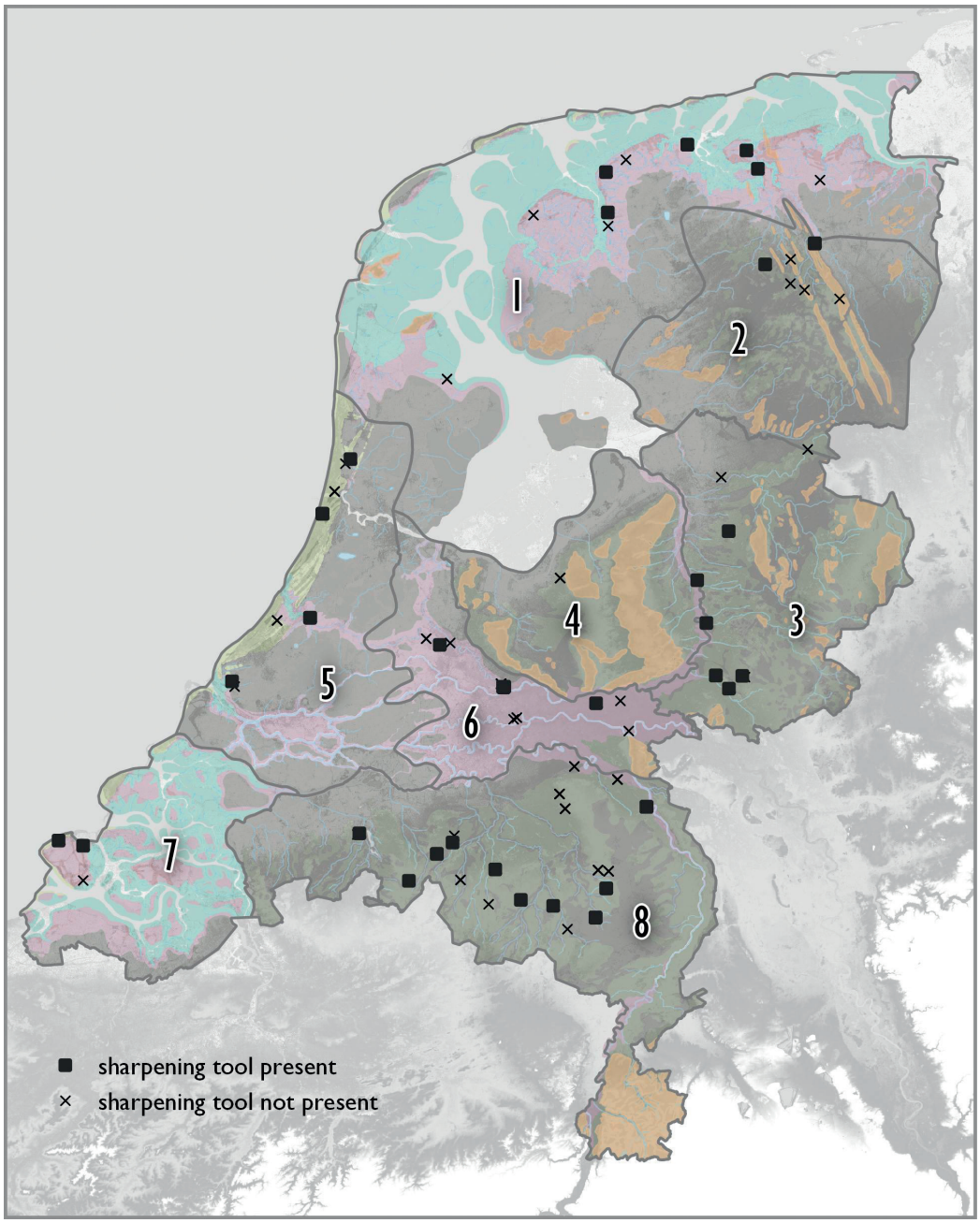


Fig. 6.4 Shows sites where sharpening tools have been discovered and recorded and sites where sharpening tools might be expected to have been recorded but were not found (based on publication and excavation scores and/or presence of other stone artefacts).

For the Wijk bij Duurstede sites there is evidence that amber was worked at several locations. The Heul and Harbour excavation both revealed a concentration of amber fragments and at the De Geer II site a relatively large amount of amber fragments was found in a single pit. For other sites amber production does not seem likely. Wijk aan Zee and Utrecht-Buurkerk (541) both yielded a lump of amber but nothing more to indicate amber working.

Among the few amber artefacts beads are most common, in fact other artefacts were only found at Wijk bij Duurstede. Here the bridge of a lyre, three pendants, four spindle-whorls and two small pegs were discovered in the settlement area of the site and a further pendant and spindle-whorl in the harbour area. These objects may represent (part of) the range of objects produced at the site, though they could also simply have been brought to the site.

Besides the touchstones and amber artefacts, the excavations in Wijk bij Duurstede have produced a series of objects not found on any other site in the research area (table 6.1). Among these are mortars of which 103 fragments have been discovered, five stone spindle whorls, stone tuyeres, and several items of tableware. As most of the objects solely found at the Dorestad site were recovered in very small numbers they probably do not represent objects widely used on rural sites of the period.

Some flint artefacts have also been discovered in Carolingian contexts. It is difficult to determine whether their production was contemporaneous with Carolingian habitation, a residual find related to prehistoric habitation in or around a site, or a prehistoric object recovered and used during the Carolingian period.

Artefact	AM	PH	GY	CH	KW	QW	SL	LY	TE	TU	XX	SA	Total
anvil						1							1
bead	5										1		6
block-shaped object				1									1
bowl											2		2
bridge of lyre	3												3
cup-like object				1									1
dish-like											1		1
fragment	74			2							1		77
funnel				2									2
gaming disc				1									1
hammerstone						1							1
millstone									1227				1227
mortar				95							3	11	109
net-sinker				16					1	73		2	92
peg	2												2
pendant	3							1					4
sharpening tool		1		6	7	13	3	1	3		50	366	451
spacer			1										1
spindle whorl	5												5
touchstone								11					11
tuyere							2			1	2		5
weight										1		1	2
Total	**92**	**1**	**1**	**124**	**7**	**15**	**5**	**13**	**1231**	**75**	**60**	**380**	**2005**

Table 6.1 Stone artefacts from Wijk bij Duurstede sites (sites 58, 186-190, 528). AM= amber, PH= phylite, GY= gypsum, CH= chalk, QW= quartz, KZ= quartz sandstone, SL= slate, LY= lydite, TE= tephrite, TU= tufa, XX= indeterminate, SA= sandstone.

6.5 Conclusion

In many respects stone artefacts would seem of limited use for the questions posed in this research. They cannot be dated accurately and most artefacts cannot be provenanced with any great accuracy either. However, one group of objects, tephrite millstones more than makes up for the general inadequacies. They can be accurately provenanced and their distribution can also be directly compared with another important group of artefacts, Mayen ceramics. Both were produced in close proximity and at least in some cases were transported together over the Rhine.[24] We will consider this relationship more thoroughly in the next part of the research but it is clear from the data presented in this chapter and that on ceramics that both did not have entirely similar distributions.

With regard to the distribution of millstones it was possible to show that they were probably a fairly standard feature of a Carolingian rural household or at least of settlements in our research area. Given the long tradition, dating back to the Bronze Age of tephrite stones being used for grinding in our regions this is perhaps not surprising. Unfortunately, given the state of publishing of stone artefact assemblages it is not possible to determine whether there was a significant increase in the import of millstones from the seventh to the ninth century. However, there is little to suggest there was such an increase on rural sites.

The only other stone artefact group that has been found in reasonable quantities in the research area are various forms of sharpening tools. Though they have been discovered (or recognised) less often than millstones, their distribution mainly differs in detail. What is more important is that both artefact groups show little evidence for regional differentiation. Much like the iron artefacts we saw in the last chapter, millstones and sharpening tools appear to be normal components of rural material culture. At the same time, none are present in great quantities nor do they represent a broad range of objects, suggesting a certain frugality. To what extent this is reflective of rural dwellers demand and their role in exchange systems is a question to be addressed in the following chapters.

24 Ellmers 1972, 298.

PART III



Characterisation of artefact distributions

Introduction

The analysis of ceramics and metal and stone artefacts found on sites in the research area allows several observations which are relevant for understanding how they were produced and distributed in various ways across our regions. This chapter aims to highlight the observations that can provide parameters for models of (developments in) distribution and consumption in the next chapter. In order to better understand the distribution of goods in our research area the wider occurrence of some groups of artefacts have been charted. Ceramics provide the most comprehensive information on regional variability and therefore these are covered in most detail. Both the wider dispersal of Rhineland ceramics in the Early Middle Ages and the ceramic profile of surrounding areas of the Carolingian world are discussed. This highlights shared characteristics but also regional specificity, something that can also be seen in brooch distributions. With regard to the finds in our research area the aspects which may be relevant for reconstructing channels through which exchange took place as well as what drove it are examined. These range from the organisation of production to the cultural contexts in which the consumption and exchanges of goods were embedded.

7.1 Ceramics

7.1.1 Ceramics in neighbouring areas

The distribution of early medieval ceramics produced in the German Rhineland was not confined to Germany or our research area. They have also been found in parts of modern day Belgium, England and Scandinavia. This is presumably part of the reason that they are considered by some historians as a marker of the complexity and volume of exchange in the north of the Carolingian world.[1] A brief overview of the wider distribution of Rhineland wares is necessary to understand the full context of their dispersal in our research area. Additionally, a consideration of the organisation of production and distribution of ceramics in general in neighbouring areas can help determine whether the situation in the Rhineland can indeed be used as a proxy for scale and intensity of exchange systems in our period. The following overview of the dispersal of eighth and ninth century Rhenish wares is undoubtedly incomplete. A more thorough inventory of sites for each region to be discussed would have been necessary to present a comprehensive picture. However, the trends that can be seen in the data from various regions is consistent enough to draw firm conclusions regarding the distribution of Rhineland pottery.

As far as finds in Germany are concerned, the situation in those parts to the east of the Rhine, neighbouring our research area was discussed with regard to developments in handmade pottery in chapter 4.[2] Rhineland pottery does not appear to have been an important part of assemblages there. To the left of the Rhine two well published find complexes in the Lower Rhine region of Germany are of interest. The first comes from the excavations at the Heumarkt in Cologne and the other from the site Hambach 500, located roughly half-way between Cologne and Maastricht.[3] The Heumarkt site consisted of a section of the early medieval town of Cologne, Hambach 500 can be considered a rural settlement.

1 McCormick 2001, 656-661; Wickham 2005, 702-706.
2 Chapter 4, section 4.6. See also Verhoeven 1998, 39.
3 Höltken 2003; Heege 1997.

The finds from Cologne are interesting because of the proximity to the production centres of the Vorgebirge. It would have been the closest large town and therefore might be presumed to have been one of the main consumers of Vorgebirge pottery in the direct vicinity of the production centre. The pottery was recovered from features dated between the eighth and tenth century.[4] These traces were covered by a layer connected with the first market square at the location, established around the middle of the tenth century. A number of observations are particular noteworthy. First, among the globular pots discovered in features of the earliest phase a considerable amount was of Mayen manufacture, but their proportion decreased gradually in each successive phase in favour of Vorgebirge examples.[5] Second, while the percentages of reliefband amphorae, globular pots and bowls are comparable to those for the harbour area of Dorestad (HS I), there are clear differences in the proportions of WII storage vessels and WIX jars.[6] The former are far better represented at Dorestad (39% at Dorestad against 18,6% at the Heumarkt) whereas the latter are more common at the Heumarkt (1,9% at Dorestad compared to 15,9% at the Heumarkt). For Höltken the figures are reason to identify the Heumarkt site as part of a town comparable to Dorestad, particularly because the rural settlement Hambach 500 contained hardly any WI and WII type sherds.

However, the Heumarkt figures seem to be much more analogous to those found on rural sites in our research area than on sites considered to be towns. At Dorestad a similar percentage of WII type pots has only been encountered at the HS O and HS IV parts of the harbour area, both believed to represent relatively early phases in the development of the jetties. At the Heumarkt there was no apparent break in habitation throughout the eighth and ninth century. The characteristics of the excavated buildings and the remains of ovens discovered at the Heumarkt leave little doubt it can be considered a town but at the same time the ceramics do not differentiate it from rural settlements in our research area. It is therefore questionable whether Cologne was the primary market for WII type vessels. It could be argued the vessels were used as containers during transport and intended to be filled with other goods at Cologne. If such transfers of goods did take place the vessels might have been broken less often in Cologne than at Dorestad even though demand for the vessels originated at Cologne. However, if that were the case it needs to be explained why in the late eighth and early ninth century Cologne required such a volume of storage and pouring vessels. Perhaps wine from further downstream was transferred from barrels to pots, though it makes more sense for that to have happened at Dorestad, if it happened at all. Furthermore, wine was almost certainly being exchanged in barrels along the Rhine long before dedicated storage vessels became important constituents of ceramic assemblages.[7]

The Hambach 500 site is interesting mainly for two reasons, its location between the Rhine and Meuse, and the fact it was a rural settlement relatively close to the Vorgebirge production centres. Based on the ceramic evidence the site was continually inhabited from the sixth to the ninth century, though perhaps with a reduction in size in the first half of the eighth century.[8] The site yielded a large amount of Vorgebirge pottery, namely 1259 sherds (735 BAD, 524 WALB) and a reasonable

4 Höltken 2003, 511.
5 Höltken 2003, 532.
6 Höltken 2003, 439.
7 Jansma/Van Lanen 2015.
8 Heege 1997, 146-149. The presumed decrease in settlement intensity may be a problem of archaeological dating methods. Only a few relatively uncommon types are explicitly dated to the first half of the eighth century as was demonstrated in chapter 4. However, some of the Merovingian style pots may have remained in use into the eighth century and globular pots were likely introduced early in the century. This may even out the observed differences with the preceding and succeeding periods.

amount (128) of Mayen fragments was also recovered.[9] The types consisted of some early Vorgebirge pots, mainly *Wölbwandtöpfe*, type WIX jars, globular pots, and a few sherds of WII type vessels and reliefband amphorae. Globular pots dominated the assemblage, with only 6 rims and no more than ten wall sherds showing roulette stamp decoration belonging to WII type vessels. In fact, it is not entirely clear whether storage vessels of type WII were present at all. In addition only three wall sherds of reliefband amphorae were discovered.

The evidence from Hambach clearly indicates that ceramics from the Vorgebirge were transported over land in the area lying between the Rhine and Meuse valleys.[10] Although we have no rural sites available for the southern half of the Dutch province of Limburg, finds discovered during excavation at the abbey of Susteren indicate that relatively large quantities of Vorgebirge ceramics were consumed there.[11] This opens up the possibility that part of the research area was supplied with Vorgebirge (and perhaps also Mayen) ceramics that followed a route over land to the Meuse and then further downstream. The small amount of WII type vessels at Hambach is remarkable when compared to rural sites in our research area. Heege questions whether this should be seen as the result of it being a rural settlement or if it is perhaps due to the chronology of the site.[12] In the context of sites in our research area the comparatively large amount of Walberberg sherds and small number of WII type fragments would likely lead to selecting the second option. However, without more evidence form rural sites in the surrounding area of Hambach it is impossible to be certain.

The situation in Belgium is such that we have reasonably good information for the (north)west but very little for the east of the country. In the period between roughly the fifth and eighth centuries the west can be divided into several distinct regions as far as ceramic traditions are concerned.[13] The differences lie mainly in the proportions of wheel-turned pottery, which was always imported, and in the temper used in locally produced handmade ceramics. On sites along the coast handmade wares were manufactured using chaff temper, and wheel-turned pottery, believed to have been produced in the Eifel and northern France, often made up a proportion of assemblages.[14] Sites in an area roughly delimited by the rivers Leie, Scheldt and Dender were characterised by chamotte tempered handmade vessels and also small proportions of imported wheel-turned pottery.[15] Between this area and the coast lay a zone where handmade vessels manufactured with both kinds of temper could occur. Finally an area equated with the modern province of Antwerp had handmade wares with temper consisting of lumps of iron-oxide.[16] Wheel-turned ceramics are very uncommon on sites of the fifth to eighth century in this region but have been found abundantly in burials. The region lies directly to the south of our subregions 8.1 and 8.2.

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9 Heege 1997, 111-116, 215-219.
10 Heege 1997, 164-166.
11 The ceramics found during the excavations of the abbey have yet to be published, but basic figures were presented in a paper by Henk Stoepker at the conference “Merovingisch Limburg” on 22 April 2016 held in Stein, province of Limburg.
12 Heege 1997, 149.
13 De Clercq/De Groote 2015, 361-372; Demolon/Verhaeghe 1993, 385-407; Hollevoet 2006, 243-248; Verstappen 2015, 93-106.
14 Hollevoet 2006, 243. Unfortunately find reports of sites in Flanders, both of older and more recent date, rarely contain clear figures on ceramics. Therefore it is difficult to assess the relative importance of imported pottery, both for the Merovingian and Carolingian period. Therefore, for the moment we are mainly dependent on regional overviews. In addition, it is only in the last few years that the number of early medieval sites discovered in Flanders has increased, mostly due to new laws making archaeological research part of the process preceding construction work.
15 De Clercq/De Groote 2015, 362.
16 Verstappen 2015, 94-102.

During the ninth century the ceramic profile of each of these regions became very similar. The various recipes for handmade pottery were replaced with sand-temper and the common vessel shape became the handmade globular pot.[17] In most areas wheel-turned ceramics from the Rhineland disappeared almost completely, the exception being the region represented by the province of Antwerp.[18] There Rhenish ceramics were still generally in the minority on sites but at the same time were a much more prominent part of assemblages than further west.[19] The wheel-turned pottery was almost exclusively made in the Vorgebirge, Mayen is rarely found. This is also the region where evidence for the production of Vorgebirge inspired pottery has been discovered.[20] However, the introduction of Rhineland pottery does not appear to have occurred before the ninth century.[21] The Antwerp area seems to be the most south-westerly region where Carolingian Vorgebirge pottery constituted an important part of assemblages on rural sites (Fig. 7.1).

As mentioned, very little information is available on the dispersal of Rhineland pottery in the east of Belgium, simply because there have been few substantial excavations of settlements dating to the eighth and ninth century. In the Middle Meuse valley, roughly between Namur and Liege Badorf and Mayen sherds have been found at several sites.[22] Contrary to many other regions Mayen apparently far outnumbers Vorgebirge wares.[23] Pottery production in the Middle Meuse valley in the Carolingian period was discussed in chapter 4. General characteristics seem to have been production at multiple sites and a distribution that extended into our research area.[24] However, the volume of vessels being transported over large distances does not seem to have been very substantial and production may have been geared mainly toward local or regional consumers. Unfortunately this is impossible to determine with certainty due to a lack of well published rural sites in the Middle Meuse valley and immediately surrounding areas.

When it comes to northern France some developments show similarities with those in our regions, while there are also clear differences. Broadly speaking there is a comparable transition from a Merovingian tradition to a Carolingian tradition. This comprises a reduction and standardisation of vessel forms. In particular, biconical pots and open forms, such as bowls and dishes either disappeared or became much less common.[25] The observed standardisation could be taken as an indication that there were fewer production centres in the eighth and ninth century than in preceding centuries. In some regions such as Centre and Alsace this indeed appears to have happened. Several small-scale production sites with a limited distribution were replaced by larger centres with a wider distribution, perhaps up to a hundred kilometres.[26] However, in other areas the change from one

17 De Clercq/De Groote 2015, 364-366.
18 Several sites in the area surrounding Bruges and Gent have yielded fragments of Vorgebirge pottery but it often seems to be in very small quantities. Examples are Ettelgem-Oudekerkstraat I (Hollevoet 2000, 88), Merendree-Gerolfsweg (De Logi 2015), Roksem-Hoge Dijken (Hollevoet 1991, 190-191), Uitkerke-Groenwaecke (Hermans 2012, 83). Again, it is often difficult to get a clear picture of the exact amount of imported wares, see note 14 above. In addition, in some cases the Rhenish pottery seems to consists only of fragments of reliefband amphora suggesting the finds may be post-Carolingian (for example at Merendree-Gerolfsweg).
19 For example Beerse-Krommenhof (Delaruelle/Doninck 2010, 4-17; Verstappen 2015, 98), Brecht-Zoegweg (Verbeek/Delaruelle 2004), Geel (Mervis/Deville 2014, 238-253), Hove-Cueteghem (Annaert et al. 2015, 239-250).
20 Arts/Siemons in prep. Also see chapter 4, section 4.5.
21 Verstappen 2015, 103-104.
22 De Longueville 2006, 56.
23 Colette et al. 2006, 109.
24 De Longueville 2006, See also chapter 4, section 4.4.
25 This observation is based on the results of three conferences on early medieval ceramics staged at Outreau (Piton 1993), Caen (Hincker/Husi 2006) and Douai (Louis/Thuillier 2015) of which papers were published in three volumes.
26 Châtelet 2015; Bouillon 2015.

tradition to another did not lead to larger scale production and more widely distributed wares. In the area surrounding Douai seven production sites have been identified collectively covering a period roughly between the seventh and twelfth century.[27] None is deemed to have had a particularly wide distribution area, although Douai products are believed to be present on some English sites. The same is true of vessels from the production site of La Londe near Rouen which was also limited to a comparatively small local area, except for a proportion which was transported to England.[28]

The local or regional character of the circulation of pottery is not only evidenced by the dissemination of known production sites but also by settlement finds. In Ile-de-France perhaps two main centres are thought to have existed, but with several smaller producers alongside.[29] In order to determine the distribution of the production site at La Calotterie in Pas-de-Calais samples of ceramics from a nearby settlement site were analysed.[30] Four different origins for the pottery could be distinguished, each most likely having been manufactured in the surrounding area. In Basse-Normandie the start of the creation of larger production centres is dated to the second half of the tenth century.[31] In fact the largest investigated production centre of the eighth and ninth century in northern France, at Serris in the region Centre is thought to have had a distribution area of up to 100 kilometres.[32] Although this is considerable, it is still less than the products of the Vorgebirge, let alone Mayen, travelled before they reached the research area. More commonly the distribution of production sites in France is believed to have been between ten and 50 kilometres, in other words local or regional in character.

Another important difference between French and Rhineland ceramics is not related to production and distribution, but to the nature of developments in ceramics. Although a noticeable shift took place in the kind of vessels that were available in the period from the seventh to tenth century, changes in coarse wares were often gradual rather than dramatic.[33] For example, there appears to have been a gradual disappearance of red wares and introduction of white wares, while grey wares remained common throughout. Production centres where only red wares or a combination of red and grey wares were made generally date to the sixth to ninth centuries and sites where only grey wares were produced mainly date between the eighth and eleventh[th] centuries. Sites with a combination of white wares and red and/or grey wares often date between the eighth and early tenth century, but the red fired examples are often in the minority in those cases. At sites where solely white wares were manufactured production usually started in the tenth or eleventh century.[34] Lenticular bases were probably introduced at least a century after they had been in the Rhineland but painted

27 Louis 2015.
28 Roy 1993.
29 Lefèvre et al. 2015; Lefèvre 2006, 225.
30 Thuillier/Routier/Bocquet-Liénard/Harnay 2015, 113-119.
31 Hincker 2006, 138.
32 Bouillon 2015, 207-209;
33 Georges-Leroy/Lenoble 1993.
34 Examples of only red wares: Ingré (Bouillon 2015, 199), Ludres (Prévot/Prouteau 2015, 261-264), Marboué (Bouillon 2015, 196-197), Trémentines (Dubillot/Valais 2006, 48); examples of red and grey wares: Bayeux (Hincker/Jardel/Savary/Delacampagne 2006, 77-80), Chaudry (Hurard 2006, 68; Lefèvre et al. 2015, 140-142), La Saulsotte (Lagatie 2015, 247-260), Racquinghem (Thuillier 2015, 123-138), Subles (Hincker/Jardel/Savary/Delacampagne 2006, 77-80); examples of only grey wares: Saint-Maurice-Montcouronne (Goustard 2015, 164-171), Sevrey-Les Tulpiniers and Sevrey-Rue Georges-Brusson (Mani/Simonon/Peter 2015, 270-278), Roinville-sous-Dourdan (Lefèvre et al. 2015, 145-146); examples of white and red/grey wares: Baralle (Louis 2015, 64-66), La Caloterrie (Thuillier/Routier/Bocquet-Liénard/Harnay 2015, 113-116), Paris-Tour Saint-Jacques (Lefèvre et al. 2015, 142-145), Vanves (Lafèvre/Peixoto 2015, 157); examples of only white wares: Douai-Rue de l'Eveque (Louis 2015, 67-71), Lassy (Lefèvre et al. 2015, 142), Moulin-sur-Céphons (Querrien/Roy 2015, 213-226), Saint-Maurice-Montcouronne (Goustard 2015, 172-178). La Londe is an exception with production consisting only of white-wares in the eighth century (Roy 1993, 346).

decoration might have become a feature of some French production sites a little earlier.[35] In many respects these developments can be observed in the Middle Meuse valley as well. The reduction in fine-wares did not follow the same course in each region.[36] Lorraine is one area which is similar to some of our regions in that wheel-turned pottery was largely replaced by handmade pottery by the middle of the seventh century and remained so during the Carolingian period, though with some technological changes.[37] In general, handmade pottery seems to have only been of importance in the northwest and northeast of France.[38]

This overview of developments in ceramics in various regions of northern France is by no means comprehensive, and is undoubtedly an oversimplification. However, what it makes clear is that there was quite a lot of variation in how ceramics developed. Additionally, in terms of the distribution of ceramics the main differences with our research area are that even the largest production centres seem to have had a catchment area of around 100 kilometres, although a proportion might have been transported further to England. The two producers of wheel-turned pottery in the research area were situated at a distance of at least 125 kilometres, but potentially over 300 kilometres depending on the region and the route taken. In addition, in many cases sites in France appear to have been supplied by several production centres that lay relatively close by rather than by a limited number further afield.

Several sites in England have produced sherds of Vorgebirge and Mayen pottery, but rarely in any great quantities. The largest published assemblage of Rhineland pottery dating to the eighth and ninth century was found at Ipswich and consisted of 132 vessels.[39] However this is an exception, with finds of Rhineland ceramics hardly making it to double figures on most sites.[40] Early Vorgebirge sherds have been found at sites in London, Ipswich and Flixborough.[41] Several of the isolated finds of Vorgebirge pottery dated to the ninth century concern reliefband amphorae, which could in fact

35 Husi 2006, 174-175. In Alsace red on white painted vessels have been dated to the end of the seventh century which seems very early indeed (Châtelet 2015, 441-443).

36 For example in the area of Saint-André-de-l'Eure where evidence from production and settlement sites indicates a development of more coarse versus fine wares and a reduction in forms happened in the mid sixth to mid seventh century, followed by a period up to the middle of the eighth century where finewares increased as well as the number of production centres. The next century saw a disappearance of open forms, but an increase in the amount of jugs (Adrian 2006).

37 Bressoud/Frauciel/Gazenbeek/Michel 2015; Frauciel/Lansival/Prouteau 2015.

38 In the northwest (regions Pas-de-Calais and Nord) the importance of handmade pottery in the eighth and ninth century is difficult to gauge because of a general lack of research (Demolon/Verhaeghe 1993; Verhoeven 1998, 44-47). At the production site La Caloterrie dated to the eighth and ninth century only a small proportion appears to have been handmade. In the northeast of France handmade pottery is the dominant form in Lorraine and the south of Alsace (Châtelet 2015; Bressoud/Frauciel/Gazenbeek/Michel 2015; Frauciel/Lansival/Prouteau 2015). It is most likely a regional tradition which has nothing to do with handmade ceramics in our area. The exact extent of this tradition is not clear but finds of seemingly similar handmade vessels at Echternach imply the northern extent included parts of Luxemburg (Verhoeven 1998, 53).

39 Coutts 1991.

40 It was not possible to acquire the exact amount for all the sites shown in figure 7.1 but the numbers appear to be below five fragments at Barton Bendish, Caister-On-Sea, Congham, Sedgeford and Thetford (Davies 2010, figure 27), Brandon, Bolton-Percy, Canterbury, Jarrow, Old Windsor, Quinton and Winchester (Coutts 1991, 128 and 266), York (Naylor 2002, 263-264) and Sandtun (Gardiner et al. 2001, 269). At Flixborough 12 sherds of a single late seventh or early eighth century vessel from the Vorgebirge were discovered (Young/Vince 2009, 364-365). Eleven sherds from Lincoln assigned to Badorf may belong to the tenth century (Adams Gilmour 1988, 166) and fourteen fragments from Lyminge were also attributed to the Vorgebirge, though with some hesitation (Jervis 2011). Finds of later eighth and ninth century Badorf in London are said to be infrequent (Blackmore 2001, 31).

41 Blackmore 2001 30-32; Coutts 1991, 137-138; Vince/Young 2009, 364-365.

belong to the tenth century.[42] Published sherds are often not specifically associated with a vessel type, but where they are mentioned it either concerns WII-types or the already mentioned reliefband amphorae. Globular pots do not seem to have reached English sites often, though this is difficult to say for certain. Very few examples of Mayen production have been identified on English sites and none of the illustrated Ipswich finds point to the presence of globular pots.[43] Only one vessel each could be assigned to Mayen and Walberberg production at Ipswich. On many seventh to ninth century sites continental imports mainly consist of wares linked to production centres in France. For example, at York-Fishergate roughly 37% of the seventh and eighth century ceramics were continental imports, the bulk of which consisted of wares associated with North French production.[44] At Hamwic pottery from France and the Low Countries accounts for 97% of the imported wares and just 2% was attributed to the Rhineland.[45] Most of the latter came from Mayen and just two sherds were assigned to Badorf. Finally, Tating ware has been discovered in small quantities at several sites such as Ipswich, Hamwic, London and York.

The picture provided by Scandinavian finds is slightly different. At most sites where Rhineland ceramics have been recovered they represent a minority among the total assemblage, but in some cases their share is still considerable. Haithabu, Ribe and Kaupang stand out because, although the percentage of Rhineland wares is relatively small among the total assemblages, the sherd count is high compared for example to sites in our research area. That is, as far as it can be deduced from the published data which do not always give exact figures and not all campaigns have been fully published. Excavations carried out at Kaupang between 1998 and 2003 yielded 1814 sherds of Vorgebirge pottery, about 36% of the total assemblage by sherd count, though the figure was 24% for stratified contexts.[46] The impression is that the majority of the material consisted of storage and pouring vessels but the number of diagnostic sherds was limited so the presence of globular pots cannot be ruled out. A specific characteristic of Kaupang is the fact that the entire ceramic assemblage is believed to consist of imports. The site itself is dated between 800 and 960/80 but due to the lack of Pingsdorf or any other tenth century wares, the import of Continental ceramics is thought to have ceased by the end of the ninth century.[47]

The figures given here for Ribe are entirely based on the 1970-1976 excavations. The assemblage consisted of 8654 sherds of which 634 were originally considered imports.[48] However, a group of coarse wheel-turned pottery later turned out to be a regional product of which manufacture was apparently limited to the first half of the eighth century.[49] Wheel-turned pottery production had no antecedents in Denmark and did not return until the tenth century. The published examples are more similar to pottery in a Merovingian than a Carolingian tradition which broadly fits with the dating of the Ribe finds. Excavations at Ribe have revealed well preserved stratigraphical sequences which

42 For example the two sherds of Badorf found at York-Coppergate (Mainman 1990), finds from Norwich (Jennings 1981, 25-27) and Winchester (Dunning 1959).
43 Some examples of Mayen pottery were discovered at York-Fishergate and a single sherd from Whitby (Naylor 2002, 263). For Ipswich see Coutts 1991, 122-125, 131-133 and 138-139.
44 Naylor 2002, 117-118.
45 Brown 2006, 321, table 1.
46 Pilø 2011, 286-292.
47 Pilø/Skre 2011, 26; Pilø 2011, 302-303.
48 Madsen 2004, 223.
49 The pottery contribution was completed in 1991 but in the 13 years between completion and publication additional research showed this group of ceramics to have been produced at at least two sites in Denmark, including Ribe (Madsen 2004, 257; Feveile/Jensen/Rasmussen 1998).

offers opportunities for refining artefact chronologies.[50] Imported ceramics were not particularly common before the middle of the eighth century while the bulk of finds belonged to the period between 760 and 800 AD.[51] Shell-tempered handmade pottery and a light coloured wheel-thrown group believed to have been produced in the Vorgebirge were found most in features belonging to that period. Sherds specifically assigned to Badorf manufacture were common in that period as well, but they made up the majority of sherds from features dated after 800 and from recent features as well. Based on the illustrations and the description of the finds the sherds associated with Badorf belonged to reliefband amphorae, storage and pouring vessels.[52] Only two sherds could probably be identified as Mayen production while 22 fragments of Tating ware were discovered.

Haithabu is thought to have been founded around 800 and occupied up to the middle of the eleventh century.[53] It is likely that globular pots made up only a fraction of the total amount of Rhineland imports at the site.[54] The description of Badorf ware and the illustrations belonging to Badorf pots suggest that storage and pouring vessels were the most common types. However, the manner in which the data on wheel-turned pottery was presented means that it is possible that a portion of the vessels assigned to Badorf ware consisted of globular pots. Vessels in Walberberg and Mayen ware, all globular pots, made up just 1% and 0,3% of the total sherd weight among the imported wares assigned to the Carolingian occupation phase.[55] Vorgebirge ceramics were therefore virtually the only wheel-turned wares present at the site.

Finally, there is not much published data on the pottery found at Birka, but Rhineland ceramics comprised about 1,5% of the total ceramic assemblage and 9% of imported wares.[56] Vorgebirge sherds appear to have been most common among the Rhineland ceramics, only one vessel was assigned to Mayen, and Tating ware was also present.

The Scandinavian sites show a number of similarities. Each of the sites where Rhineland pottery has been discovered in Norway and Sweden is clearly not a rural settlement. In fact Vorgebirge and Mayen pottery has hardly been found on rural sites in northern Europe and similar to English sites Mayen pots have rarely been found at all. The only exception is Haithabu where Mayen made up only a fraction of the wheel-turned pottery, but the number of sherds was (presumably) still considerably higher than at other Scandinavian and English sites. Another characteristic Scandinavian sites all share is the presence of a small, but still relatively substantial amount of Tating ware compared to sites in our research area.

The overview of the distribution of eighth and ninth century Rhineland wares suggests that apart from a few sites in Scandinavia they were not transported in great numbers outside our research area (Fig. 7.1). The areas with higher proportions in neighbouring parts of Belgium can probably be understood as an extension of the distribution patterns in rural areas seen in the research area. In England and Scandinavia the finds are confined to sites with a close link to the coast. Rhineland pottery is not (structurally) part of more inland assemblages in either region. For most

50 Feveile/Jensen 2000, 9-12.
51 Madsen 2004, 253 figure 28.
52 Madsen 2004, 254-255 and figures 31 and 32.
53 Schultze 2005.
54 Janssen 1987.
55 Jansen 1987, 70-75. The proportions will have been somewhat higher for the Carolingian period alone, but because Jansen made no distinction between early and late reliefband amphorae the exact figure cannot be determined. Considering the total weight of Pingsdorf sherds was almost twice as much as that of Badorf it can be expected that a large proportion of the fragments of reliefband amphorae also postdate the Carolingian occupation phase.
56 Bäck 1995, 4-21.

sites in Scandinavia it has been suggested that the Rhineland pots were brought and used by visiting traders.[57] The lack of inland penetration makes it unlikely they were transported to those areas as a commodity. Whatever reasons there were for the distribution of Rhineland pottery in England and Scandinavia, the evidence suggest they differed from the rational of exchange systems at work in the research area. Again, it is highly unlikely Rhineland production was geared towards export beyond the borders of the Carolingian world, either as a commodity in itself or as a container. This raises the question what storage vessels were intended for, if they were not produced for 'export' purposes.

With regard to our research area a few observations can be made with the evidence from surrounding areas in mind (Fig. 7.2). First, the relatively large assemblages of Rhineland pottery on sites along the Rhine, the western coast and south of our research area appear to be largely unmatched elsewhere. Similar figures are only encountered elsewhere on a small number of sites with a specific character, mainly in Scandinavia. Second, the situation that wheel-turned pottery used on sites in the central Dutch river area, the western coast and the south of the research area originated from just two suppliers located at some distance from consumer sites does not appear to be particularly common in neighbouring parts of the Carolingian world as the evidence from Northern France indicates. Third, even though the remainder of the research area may not have consumed Rhineland pottery, this was only due to an increased importance of locally produced handmade wares, not because of the availability of wheel-turned ceramics manufactured at a local or regional level. Fourth, it is remarkable to conclude that eighth and ninth century Mayen pottery hardly travelled beyond the research area to the coast of Belgium and Northern France, England or Scandinavia. It was certainly nowhere near as important as Vorgebirge exports. At the same time there was no apparent break in the distribution of Mayen millstones to the Belgian coast and England.[58] The picture provided by excavations in Mayen itself is that production of pottery was intensified and specialised in the eighth and ninth century.[59]

7.1.2 Characterisation of ceramics in the research area

The observations relating to ceramics can be split up into several themes. First, in terms of the organisation of production the late seventh and eighth century saw changes in the location of production sites relative to rural settlements in our area of research. In some regions the changes were quite dramatic, in others fairly limited (Fig. 7.3a and b, Fig. 7.4a and b). In the central Dutch river area and the western coast a large proportion of ceramics may already have originated in the German Rhineland in the seventh century.[60]

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57 Steuer 1987,135-142; Sindbaek 2007, 121; Pilø 2011, 304.
58 Parkhouse 1997.
59 See chapter 4, section 4.3.
60 There is some disagreement over the exact proportions of regional and Rhineland pottery on sites along the Rhine and the western coast. Some believe virtually all wheel-turned pottery in these areas was produced in the German Rhineland whereas others contest that the lack of production sites in the region does not necessarily imply a lack of regional production. The reason that it is difficult to tell one way or the other is that Rhineland pottery in the seventh century does not always have distinctive characteristics. Mayen pottery has augite inclusions but not every sherd need contain them. Nonetheless, the available evidence from a series of sites indicates that there is usually a proportion of roughly 10 to 25 percent of sherds with augite inclusions on sites along the Rhine and the western coast. In addition, WXIV type vessels are almost exclusively found in this part of the research area implying there were early links with the Vorgebirge. A comparison of sherds from the seventh century site Oegstgeest-Rijnfront with finds from Waldorf indicates a considerable proportion of the Oegstgeest finds were produced in the Vorgebirge.

Fig. 7.1 Indication of the distribution of Vorgebirge ceramics and their relative importance in site assemblages.

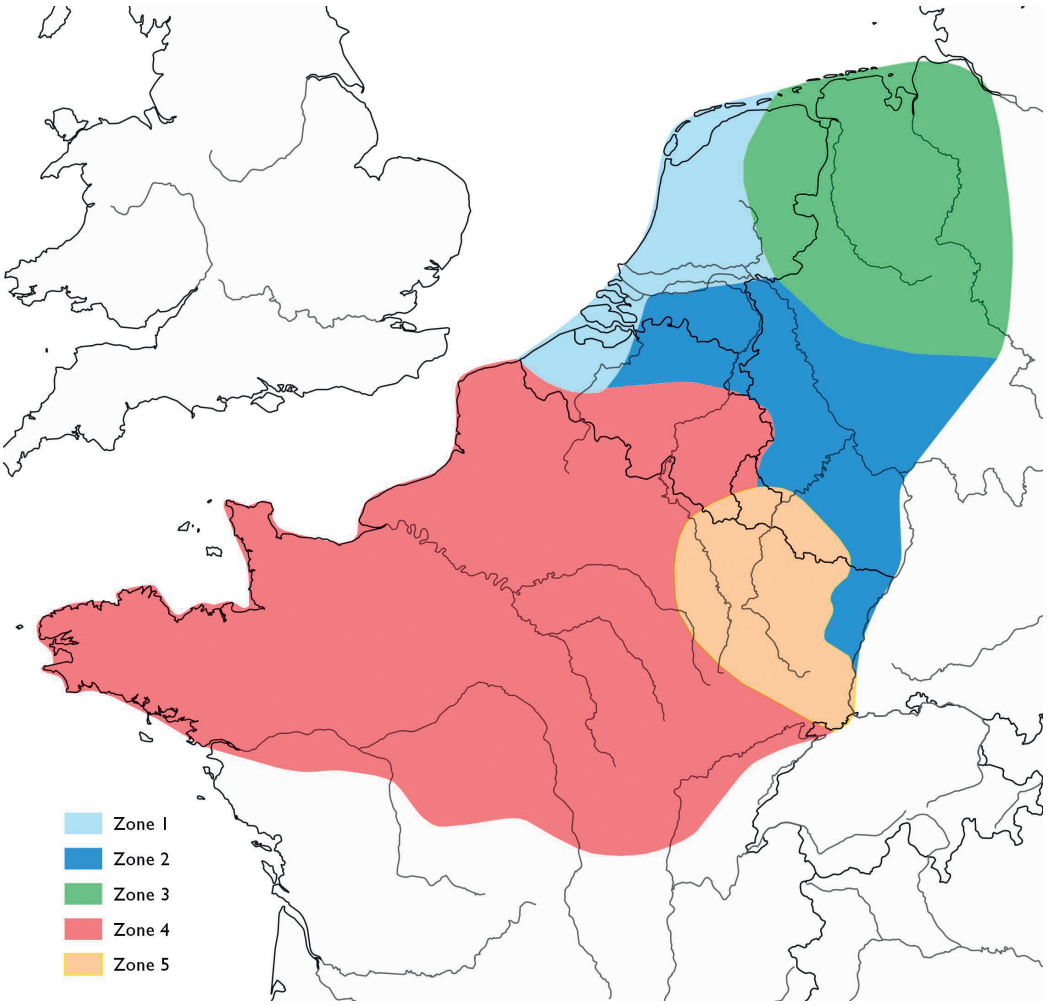


Fig. 7.2 Simplified overview of ceramic zones in and around our research area in the eighth and ninth centuries. In zone 1 handmade ceramics were most common but Rhineland pottery also occurs, zone 2 represents an area where Rhineland ceramics make up the majority of site assemblages, zone 3 and 5 are dominated by handmade pottery, and zone 5 covers the French and Meuse-valley ceramic tradition.

In the same areas it seems that early in the eighth century locally made pots became more important in ceramic assemblages, particularly to the north of the Rhine, but also on the Veluwe (region 4). Sites closest to the Rhine have some of the highest proportions of Rhineland ceramics in the eighth and ninth centuries but the picture differs depending on the specific stretch one looks at. The area between Wijk bij Duurstede and Utrecht contains sites with very high proportions of supra-regionally sourced pottery while the sites around the mouth of the Rhine already have fairly high proportions of locally made products.

Sites along the Rhine between the border with Germany and Wijk bij Duurstede show a different development. In the seventh and early eighth century regional wares still dominate, with production

in this period attested just to the west of Nijmegen.[61] Regional production is replaced by Vorgebirge and Mayen wares in the eighth century, just as in other areas, but the proportion of supra-regional to local wares was more similar to the sites at the mouth of the Rhine than those on the central stretch of the river. In other words, there does not appear to have been a simple fall-off curve with sites further down the Rhine being increasingly more reliant on local products.

In the west of the province of Friesland a similar shift from mainly (supra-) regional to local pottery can be discerned but it took place earlier, in the course of the seventh century. By the late seventh century supra-regionally sourced pottery had become very uncommon at Wijnaldum (18) though the proportion did rise slightly in the eighth and ninth centuries. Similar proportions have been observed at other sites in the area. As a whole, inhabitants of the northern region 1 mainly used locally produced pots in the Carolingian period, with a gradual drop in supra-regional wares from west to east.

Just as in the east of region 1, sites in the neighbouring regions 2 and 3.1 have yielded very few fragments of supra-regionally produced vessels, a situation which essentially remained the same during the entire Early Middle Ages. There was also little change in the proportions of local and supra-regional wares in the south of region 3 but there a small but significant amount of imported pots was always present. In short, the evidence reveals that sites in the northeast of our research area did not systematically incorporate vessels from outside their local area into the household corpus of pots, either before or after becoming part of the Carolingian empire.

In the south of the research area (region 8) seventh century ceramic assemblages were dominated by what were likely regionally produced wheel-turned pots. The evidence from several sites indicates that this regional tradition was replaced within 30 years at the start of the eighth century by supra-regional wares. Some wheel-turned ceramics were still produced in the region, but on current evidence the importance was probably limited. In the ninth century a further development was the increasing prominence of handmade pottery which may have been made locally or at a regional level. This development did not take place at the same time everywhere in the region. In our period it can be seen most clearly in the east while in the west of the region it appears to have taken place in the tenth century.

Finally, developments during our period are difficult to follow in region 7 because most (excavated parts of) sites do not seem to have been established until the ninth century.

Second, the range of specific functions of the pots available to rural dwellers changed in the course of the eighth and ninth century. In the seventh and early eighth century wheel-turned pottery was made in a more varied array of forms than in the later eighth century. Earlier assemblages could consist of jars, used either for cooking or storage, bottles, amphorae, dishes, biconical pots, jugs and mortaria. In the later eighth century pots with a shared function of cooking or storage, amphorae and dishes remained available, but the latter had become less common and biconical pots had virtually disappeared. Vessels designed specifically for pouring were not very frequent during much of eighth century. In the late eighth century however, two new vessel types were developed in the Vorgebirge which most likely had specific functions for storage and pouring. Differences in assemblages at the household level between the seventh and later eighth and ninth century may not have been so great and variability may not have been much reduced either. But the general trend toward a slightly more sober ceramic corpus that has been observed in France seems to apply to our region as well.

61 De Mul 1980.

In chapter 4 wheel-turned globular pots were primarily associated with cooking for analytical purposes, but it is quite possible that a proportion of these pots was used for storage. The same is true for handmade *Kugeltöpfe*. Larger examples in particular could have fulfilled a storage function. At the production site in Beerse, where Vorgebirge vessels were imitated, different sizes of globular pots were produced, some fairly large. In areas where wheel-turned wares make up only a small proportion of total assemblages it is conceivable that wheel-turned globular pots were intended for the storage or preparation of specific substances, for which *Kugeltöpfe* were deemed less suitable.

The third point follows on from the second. What the south and the west of the research area (regions 4, 5, 6 and 8) have in common is that in a relatively brief period at the start of the eighth century rounded pots replaced the existing 'bucket'-shaped pots, or *Wölbwandtöpfe,* as the most common vessel type. However, in some parts the *Wölbwandtopf* was replaced mainly by locally produced *Kugeltöpfe* and in others by supra-regionally manufactured globular pots. This raises the question whether the introduction of the two vessel types, globular pots and *Kugeltöpfe*, was in some way related. Suggesting a link between the introduction of wheel-turned globular pots and *Kugeltöpfe* is not new. Schindler believed the *Kugeltopf* was modelled on vessels from Mayen and Badorf, whereas Hinz thought the reverse was the case.[62] However, the prevailing view has long been that the introduction of the *Kugeltopf* was an internal development that took place in the coastal region of the Netherlands.[63]

Arguing one way or the other has consequences when considering relationships between consumers and producers. For example, if the *Kugeltopf* was an internal development, were Rhenish potters adapting to changing demand from inhabitants of regions 5 and 6? However, if *Kugeltöpfe* were inspired by wheel-turned examples it has to be explained why people in an area that made limited use of handmade pots ended up with household assemblages often dominated by them. Why not just use the wheel-turned globular pots? Furthermore, whatever the exact genealogy of the vessels, a greater reliance on locally produced handmade pottery must have created new relationships between producers and consumers. The production of *Kugeltöpfe* may have been largely a matter of household production and distributed at a village level, fitting into existing exchange relations. However, inhabitants of some sites, such as Bloemendaal, would almost certainly have had to bring them in from other settlements.

Compared to the south though, changes in the distribution channels of pottery may have been relatively limited in regions 5 and 6, considering the already extant supply of wheel-turned pottery from the Rhineland. In the south of the research area regional producers were virtually wiped out in a relatively short period. This could imply rather weak relations between consumers and producers but that still does not explain why the regional producers did not adapt their wares.[64]

62 Hinz 1965, 280; Schindler 1959, 71.
63 Verhoeven 1998, 21-24, 251-252; Dijkstra 2011b, 312.
64 It is possible that this did happen somewhere in region 8 as represented by the three seventh to eighth century regional wares Verhoeven identified (Verhoeven 1993). However, in light of their limited distribution they must be considered anomalous in relation to general trends. The production of Vorgebirge inspired pottery at Beerse is not a good example because no evidence of production in a Merovingian tradition was found at the sites. Furthermore, the site is situated in an area where wheel-turned Merovingian style pottery played no role of significance in household assemblages.

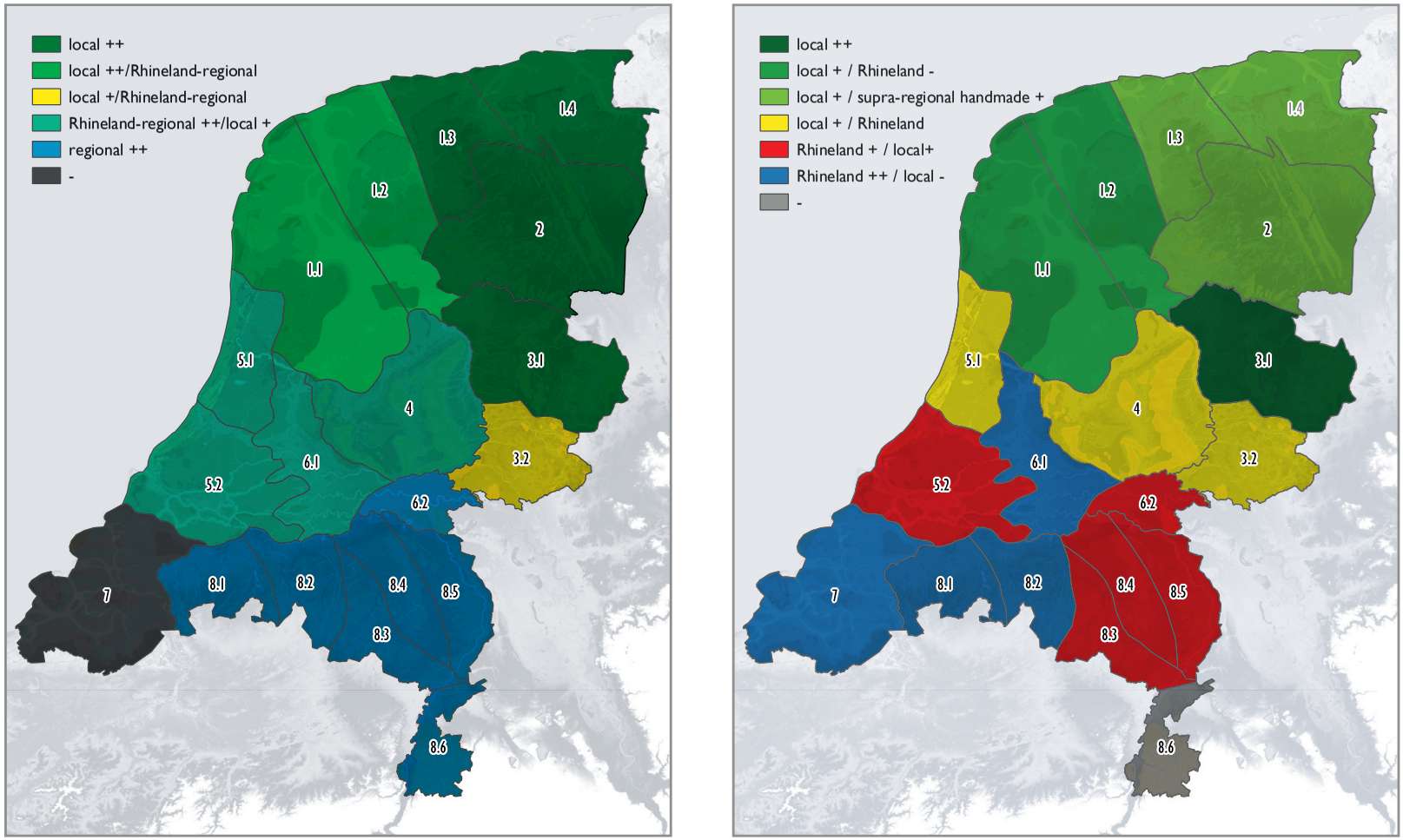


Fig. 7.3a/b Indication of zones that were similar in terms of ceramic profile on sites in the latter part of the seventh and start of the eighth century, and the late eighth and ninth century respectively. The colours used in both maps correspond in terms of the relative importance of wheel-turned and handmade pottery in site assemblages.

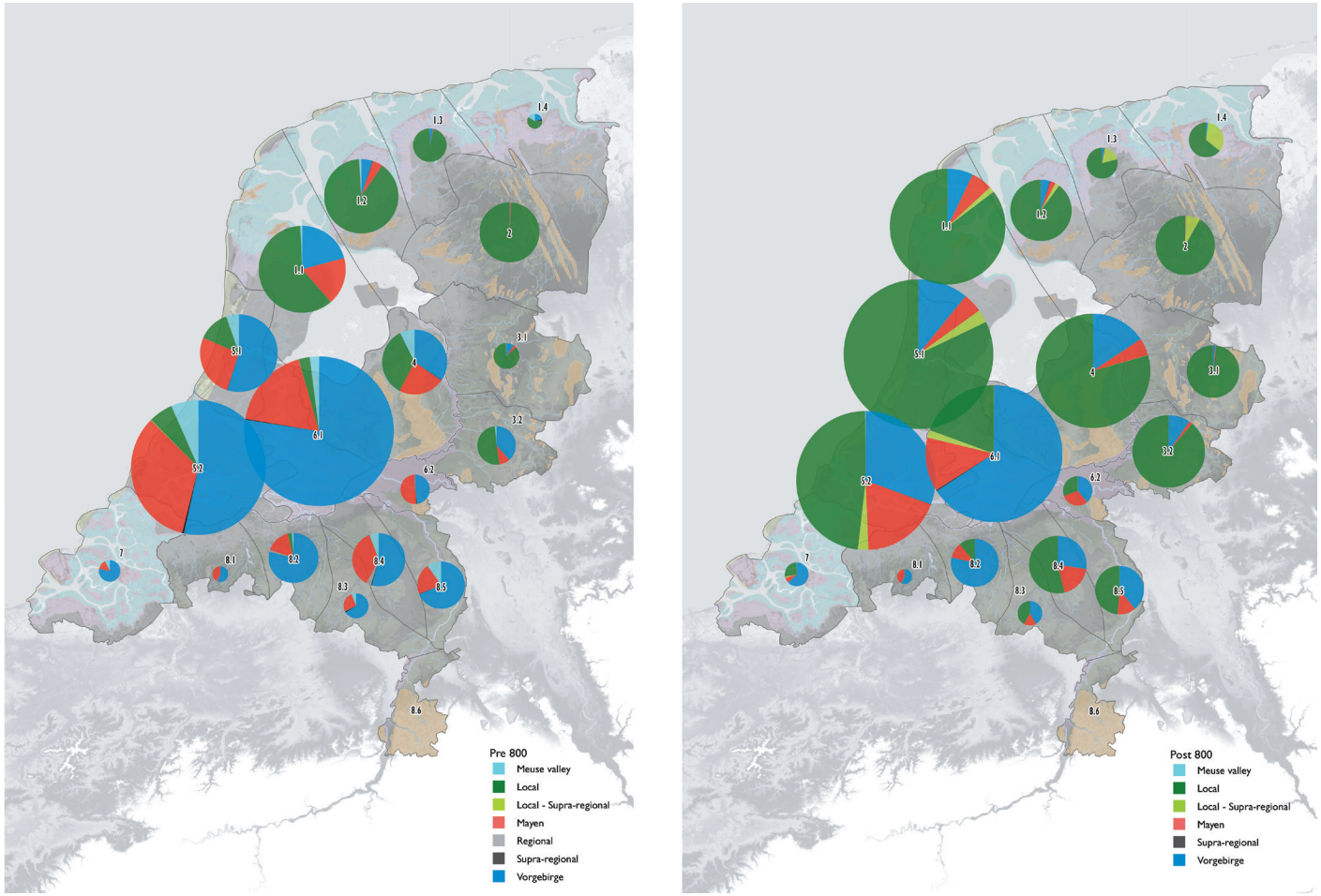


Fig. 7.4a/b Proportion of sherds per source area for each subregion. The size of the charts is relative to the total number of sherds in the analysis. Sherds that could not be assigned to either before or after 800 have been added to both. Therefore the maps show the trends present in the data rather than exact representations of ceramic assemblages in each period.

Perhaps the regional producers were simply unable to match the specific qualities of the Rhinish globular pot, such as its low porosity. Even so, the complete disappearance of a regional pottery tradition in this way is hardly seen elsewhere in northwestern Europe in our period. Some thoughts on how the transition may have taken shape will be presented in the following chapter.

Fourth, the observed changes in vessel morphology also raise the question why they changed in the first place? The shift from the relatively open *Wölbandtopf* to more closed globular vessels must have had some influence on the preparation of food.[65] In this case it is not so important where the globular shaped pot originated because both the wheel-turned and handmade variety can be seen as indicative of broader changes in the use of ceramics. A tendency toward more rounded vessels has also been identified in areas of France even though they often did not actually develop a rounded or lenticular base until the second half of the ninth century.[66] The disappearance of biconical pots can be taken as a sign that changes in ceramics in the late seventh and early eighth century were related to wider developments. The disparity between the presence of biconical pots in cemeteries and settlements has often been observed.[67] They are a common feature of grave furnishings but only make up a fraction of settlement finds. This suggest the vessel type was important in framing the burial rite and it may have had a similar function in other contexts as well.[68] In such situations the pots themselves did not necessarily act as a symbol in the sense of being representational, but provided cues as to the ritual nature of an event. The abandonment of the use of biconical pots, both in burials and households, is an indication that changes in household assemblages in the seventh and eighth century were linked to more general developments in the contexts in which ceramic vessels were used and associated with.

In addition the colour spectrum of wheel-turned vessels changed in the course of the later seventh and early eighth century. Ceramics in a Merovingian tradition were either produced in red or grey tones. Ethnographic research provides evidence that the colour of vessels can be associated with specific contexts, including that of exchange.[69] More generally, the morphological qualities of pots may be associated with (the preparation of) particular foodstuffs. This in turn can be connected to notions of purity and contamination. That ideas about contamination involving containers and cooking vessels existed in the Early Middle Ages, at least amongst the clergy, can be confirmed through textual sources.[70]

Products from the Vorgebirge added white and yellow vessels to household assemblages and these would have to be fitted in to existing categorisations. Mayen pottery was generally either reddish or (dark) grey so they may not have given much issue. For handmade pottery it is more difficult to tell whether an attempt was made to produce separate oxidising and reducing groups. Their firing process would have been difficult to control leading to vessels with both oxidising and reducing patches. For the people using the pots the difference between a red and a grey vessel might have been obvious. Equally it is possible that no distinction was made and all examples were seen as either oxidising or reducing, no matter how patchy the pots were. The perception of colour is not absolute and even the white/yellow wares from the Vorgebirge could have been incorporated into household assemblages without much problem. The point is that changes in the physical qualities of

65 Vroom 2009.
66 See section on French early medieval ceramics above.
67 To a lesser extent this is true for carinated dishes as well.
68 Miller 1985, 133-140, 158, 181.
69 Miller 1985, 142-148.
70 Bonnassie 1989, 1036-1039; Meens 1995, 7-16; Effros 2003b, 221-226.

vessels are more than just a matter of taste or fashion. Especially the kind of developments we can see throughout the seventh to ninth century (and probably the tenth century as well) are connected to and indicative of broader changes in the Carolingian world.

Fifth, Badorf and Mayen became the dominant source of wheel-turned ceramics. As observed above this is a comparatively unique situation in northwestern Europe at the time. Only region 8 may have still had some degree of regional production, but even that seems to have been inspired entirely by Rhineland wares. At Mayen a relatively varied corpus of vessel types was drastically reduced at some point during the eighth century, overwhelmingly replaced by globular pots. The finds from various sites in our research area indicate that the Vorgebirge was quick to follow. However, the Vorgebirge production centres added vessel types with a specific function for storage and pouring in the late eighth or early ninth century. The fact that Vorgebirge wares are often more numerous on sites in our research area can be argued to be related to the introduction of these new vessel types.[71] Some (parts of) regions have relatively high proportions of Vorgebirge pottery in relation to Mayen. On the one hand these may be areas where transport routes offered better access for Vorgebirge wares than Mayen products. On the other hand it could also be an indication that what was mainly acquired by the inhabitants of those areas were storage and pouring vessels rather than wheel-turned cooking pots. Certainly by the start of the tenth century the Vorgebirge kilns were producing mainly storage and pouring vessels and limited amounts of globular pots.[72] The Mayen pottery centre continued to manufacture ceramics almost continually into modern times but it had no significance for the supply of pottery in our region after the middle of the tenth century, probably already by the start of the century. In addition, it is mainly Vorgebirge pottery which is found in England and Scandinavia, eighth and ninth century Mayen wares are extremely uncommon beyond the confines of the Carolingian world. The finds of Vorgebirge ceramics from English and Scandinavian sites are similar to the regions in our research area where wheel-turned pottery is less common, in that they mainly consist of storage and pouring vessels.

The decline in the importance of imported cooking vessels can be seen on sites with a comparatively late assemblage for our period. The sites in region 7 generally have high proportions of storage and pouring vessels and few imported globular pots. The earliest excavated remains from three of the four inventoried sites in the region can be dated to the second half of the ninth century. At Deventer, another site for which most features date from the second half of the ninth century or later, there is still a reasonable proportion of globular pots while at Tiel hardly any have been found. Neither site can be considered a rural settlement and therefore may not be representative for developments on the sites we are interested in. However, the evidence from these sites suggests the availability of wheel-turned globular pots quickly declined at the end of the ninth century.

Finally, there is a number of observations related to specific vessel types or fabrics which highlight possible affiliations between the inhabitants of regions or how and in what areas goods may have travelled. The distribution of handmade shell-tempered ware is a prime example. They occur mostly on sites along the entire coast and the central Dutch river area. However, the fabric also occurs at sites in region 4 in low numbers and in the very north of region 2, adjacent to region 1. It suggests these two areas were connected to the same exchange networks or were to some degree part of the same cultural sphere as the riverine and coastal areas.

71 See chapter 4 section 4.7.4.
72 Sanke 2002, 207-209.

This 'coastal' distribution is countered by an area in the east of the research area where handmade bowls (type HIV) made up considerable proportions of site assemblages. The two areas are not entirely mutually exclusive, but they do indicate that despite the superficial similarity in terms of dominance of locally produced pots, they comprised two different regions as far as ceramic traditions are concerned. These differences are not simply a reflection of divergent tastes, but most likely point to differences in cultural practises regarding the preparation and consumption of food.

In region 8 the differences between the east and west are not only apparent in the timing of the introduction of locally or regionally produced handmade *Kugeltöpfe*, but also in the variability of vessel types and the provenance of pottery. Generally speaking sites in the east of the region have a greater variability of vessel types, in particular the early Rhineland types. Also, Meuse-valley pots have been found more often in the east than the west of the region. These differences may indicate the two areas were supplied via different routes or through other contacts.

7.2 Metal artefacts

It is more difficult to make inferences about how metal artefacts were distributed because we often do not know for certain where they were made. Given the frequent finds related to iron working on rural sites it is likely many iron utensils were made either on site or exchanged over short distances. The iron itself could have largely, if not completely been sourced within the research area, but current evidence suggests that did not happen in all regions. No clear evidence for iron production in the Early Middle Ages has been found in regions along the coast. At the same time sites in that area were found to contain relatively high numbers of iron artefacts, and traces of iron working have been discovered at a number of sites dated between the sixth and ninth century.[73] Clear evidence for iron production and working is lacking in region 2. Therefore, it is possible that part of surplus production in regions 3, 4 and 8 and perhaps 6, was channelled towards areas where production did not take place.

It was difficult to estimate the degree of surplus production of iron in several regions due to the nature of the evidence. Iron production was generally found to take place outside settlements, sometimes on their fringes but also at greater distances near the sources of raw materials. Therefore, it is not easy to get an idea of the extent of production. It may well have been a seasonal activity undertaken by people who had the technological know-how to complete the process successfully, but who mainly saw themselves as farmers. However, the possibility of professional iron producers, by which are meant individuals who mainly relied on the production and perhaps working of iron to make a living, cannot be ruled out. If they existed anywhere in our research area the Veluwe would be the most likely candidate. The manner in which the forest needed to be managed in order to sustain production over several centuries at least implies that the manufacturing of iron was important enough to encourage communal planning. The ice-pushed ridges where production took place were an agriculturally marginal area which nonetheless saw considerable intensification of habitation between the seventh and tenth century. In that sense it does not really matter whether iron production was proportionally the main source of income or not for communities on the Veluwe, because without it habitation would probably not have been sustainable at the level it was at Kootwijk or Uddel. If this was indeed the case it means supplies from outside the region were a necessity and required regular exchanges.

73 For the sixth and seventh century see Dijkstra 2011b, 166.

As far as the wider northwest European context of iron production and working is concerned, evidence from Britain and France suggests very similar circumstances existed there. In Britain there are indications that iron production started to gain pace once more in the seventh century after a long period following the collapse of the Roman state for which no traces of production are available.[74] Iron-working on British settlements of the Early Middle Ages is widespread, both on rural and town sites.[75] The products of blacksmiths are generally thought to have been intended for local use.[76] Similarly, in northern France iron-working on settlements of the Early Middle Ages has been found to be widespread.[77] However, it is less clear what the intended outlet of the various sites was. Production of raw iron is believed to have increased in the ninth and tenth centuries, but was already taking place in the sixth and seventh centuries.[78] In Belgium slags related to production and working of iron have been discovered in two early medieval wells in Nijlen in the province of Antwerp.[79]

There is very little direct evidence for working of copper-alloys in the eighth and ninth century on sites in the research area. Sites in the central Dutch river area, around the mouth of the Rhine and also Wijnaldum in the west of Friesland have provided traces of copper-alloy casting and working of precious metals in the sixth to early eighth century.[80] The same is true for sites in the Middle Meuse valley.[81] However, none of those or neighbouring sites have yielded similar traces dating to the later eighth and ninth century. Research on the composition of copper-alloy brooches suggests our period saw a change in the organisation of production.[82] The composition and manufacture of copper-alloy brooches became more standardised suggesting a stricter control over raw materials through control of supply and more centralised production.

The overall distribution of the eighth and ninth century ansate brooches found on settlements in our research area shows that they were also relatively common in in the west of Belgium and France, England and Scandinavia. The similarities between certain types, particularly those with three-fingered terminals, across these regions indicate a degree of shared visual vocabulary. The first important group of ansate brooches in the research area, Thörle's group XII, is heterogeneous in both shape and distribution (fig. 7.5). They are particularly abundant among the finds from Domburg and the number of variants is considerable there too. In our research area the type has mostly been discovered in the central Dutch river area and along the coast. However, they do occur in inland regions, in Drenthe (regions 2) and the south (region 8) within the research area and outside it also in Belgium and Northern France. A small number of the type has also been found in England, but there a regionally specific type dominated, particularly in Norfolk and Suffolk.[83] This English type, identified as East Harling-type, has thus far not been discovered on the continent.

74 Birch 2011, 6; Fleming 2012, 30. However, Birch believes iron may well have been produced in Britain in the fifth and sixth centuries, but that the production sites were located in areas where excavation rarely take place.
75 Birch 2011, 7-8.
76 Hamerow 2002, 189-190.
77 Peytremann 2003, 349.
78 Leroy et al. 2000, 20; Peytremann 2003, 349.
79 Bourgeois et al. 2015, 20-24.
80 Dijkstra 2011b, 166; Tulp 1997, 53-59; Kerkhoven 2009, 243.
81 Dijkman 2013.
82 Roxburgh/Huisman/Van Os 2014, 26-28; Roxburgh/Huisman/Van Os 2016, 117-132.
83 The East Harling type, Thörle 2001, 187-188.

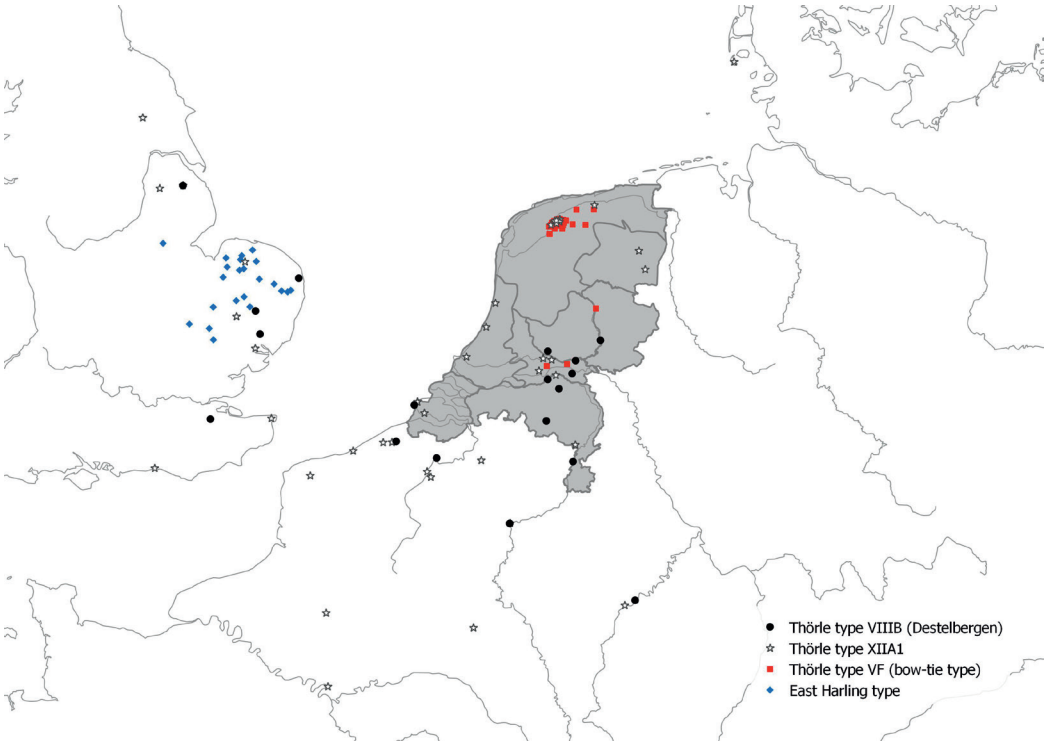


Fig. 7.5 Distribution of selected groups of ansate brooches that were particularly common in the North Sea area in the eighth and ninth centuries.

The ansate brooches in Bos' inventory of finds from the northern coastal area indicate that here something different was happening. The distribution of the brooches in the inventory reveals that two-thirds of findspots with such brooches in Friesland contained a bow-tie brooch and the proportion in Westergo alone is even higher (85%).[84] However, outside Westergo, in the rest of the northern coastal area, a slight majority of sites where ansate brooches have been found does not contain a bow-tie brooch. Furthermore, only three bow-tie brooches have been discovered outside the northern coast. In the Westergo area then, control of production and/or circulation seems a distinct possibility. Nonetheless, the visual style of the bow-tie brooch is very similar to type XII.

The restricted distribution of the East Harling-type in England, suggests that outside Friesland there may have been a similar organisation of production and distribution in the Norfolk/Suffolk area, but that elsewhere on the continent manufacture and/or circulation was arranged more loosely. Whether this is reflected in the composition of the brooches will require more detailed research than is currently available.

The third group of interest, ansate brooches of so-called 'Destelbergen'-type, is homogenous in terms of morphology but without a clear distribution area. To date they are the only eighth and ninth century ansate brooch type besides type XII to have been discovered in the south of the research area. This fits with the overall picture for this type on the continent with distribution limited to the west of the Rhine, a find in Zutphen being the only exception to date. Considering the large number of

84 Bos 2005/2006.

ansate brooches discovered in Friesland, the lack of Destelberg type brooches in the area underlines its predominantly southerly distribution. Two stray finds of Destelbergen type brooches have been discovered along the Rhine in the east of our riverine region (subr. 6.2) underlining the fact that in terms of material culture this area often shows more similarities with neighbouring inland areas than with the central Dutch River area.

Recent work on the composition of ansate and disc brooches, mainly from the northern coast of the Netherlands, has provided new evidence for understanding how production may have been organised and how this changed during the eighth and/or ninth century. It has identified an important shift from the use of leaded bronze and gunmetal for brooches dated to the fifth to eighth century, to leaded brass for brooches dated to the eighth to twelfth century.[85] The evidence also suggests that for the latter brooches the composition of the metal was far more consistent than for previous types. This change in composition has been linked to changes in supply and the case has been made for more controlled production of eighth to twelfth century brooches. Otherwise there may have been more mixing of alloys and consequently a less clear shift.

The other main brooch type in our period was the (enamelled) disc brooch. The interpretation of the distribution of the various types of disc brooch is problematic because it is not certain what their chronologies are. Many types seem to have been introduced toward the end of our period, but some may have been developed earlier, making comparison difficult. Frick's inventory shows that disc brooches are mainly found in Germany, the Netherlands, Britain and Scandinavia, and a small number in Belgium and France. The majority have been discovered north of Mainz and to the north and east of the Rhine. Belgium and France are problematic because of laws strictly forbidding metal detecting, meaning few finds are recorded. Each of Frick's main types and some of the subtypes show their own specific distribution over north-western Europe.

Disc brooches have been discovered more often in inland parts of the research area than ansate brooches but this could be a reflection of developments relevant to the late ninth and particularly the tenth century (fig. 7.6). The most common type of enamelled disc brooch is decorated with a cross motif. Their general distribution differs from ansate brooches, many having been found in northwestern Germany and Denmark (where ansate brooches rarely occur). They are also relatively well represented in the east of England and are in that sense quite unique because other disc brooches of the ninth and tenth century show more regional clustering. The brooch type shows considerable morphological and compositional consistency, implying centralised production and supra regional distribution.[86] This consistency has been interpreted as evidence that the brooches were produced at monastic sites and may have been distributed through reciprocal exchange networks between ecclesiastical institutions and their dependants. Equally they may have functioned in a way analogous to pilgrim badges. However, such an interpretation raises the question why enamelled disc brooches are rarely found in Belgium and northern France, at least as far as Frick's inventory suggests. Although this is difficult to determine without good overviews of finds, visiting French metal detectorists' websites[87] gives the impression that moulded or engraved decoration on disc brooches was more common than enamelled examples. Therefore there appears to have been a different tradition of disc brooch styles in northern France to that which prevailed nearer the Rhine. Whether this variation in styles also translates to a difference in control of production or circulation is impossible to assess at the moment.

85 Roxburgh/Huisman/Van Os 2014, 19-30.
86 Roxburgh/Huisman/Van Os 2016, 128-129.
87 Particularly the website www.fibulae88.net.

At the level of northwest Europe there is a large degree of overlap between the distribution of ansate brooches and disc brooches in general. Both continental ansate brooches and disc brooches with cross decoration have been found in reasonable numbers in Norfolk, Suffolk and Lincolnshire. Examples of ansate brooches three fingered-terminals have been found in the same areas, though mainly in regional variants. On the whole however, disc brooches have a much wider distribution. Particularly in the west and north of Germany far more disc brooches have been found and the same is true for southern Scandinavia.[88] Interestingly, while relatively high amounts of cross decorated brooches and brooches with central cloison have been discovered in Denmark, apparently no saints brooches and very few pseudo coin brooches have been recovered. This may point to a later introduction of disc brooches in these parts, though regional preference may equally be the reason.

Study of early medieval brooches shows great promise for identifying regional variability and how regions might have been connected to other areas. However, in order to do so, research that focusses on more than just cataloguing and categorising is required, such as the investigation conducted on the physical and technical properties of disc brooches in relation to wider social developments.[89] What we can say is that the number of producers of copper-alloy artefacts in the research area declined in the late seventh or eighth century, and combined with the data from compositional analysis this leads to the conclusion that manufacture was more centralised in the ninth century than before. Where manufacture took place and how much more centralised it was is less clear, just as it is not certain if this was a development that took place everywhere in the Carolingian world.[90]

The evidence on coinage presented in chapter 5 suggests that sceattas, particularly the younger types, and Carolingian denarii up to and including those struck during the reign of Charlemagne, mainly circulated in the same specific parts of the research area, the central Dutch river area and western Friesland. Sceattas and denarii struck up till 822 have hardly been discovered outside those two parts of the research area. The picture changes somewhat with the introduction of Louis the Pious' *Christiana religio* issue. These have been found in every region including parts that have yielded very few coin finds from the Middle Ages in general. However, comparison with the distribution of coins from other periods also indicates the dispersal of coinage remained quite limited, especially further away from the Rhine and coast. A similar level of dispersal may have been maintained to an extent after 840 but there seems to have been a reduction to some degree and a shift in importance from the Oude Rijn to the Waal river.

The observed developments are broadly comparable to what can be concluded on the basis of Carolingian single coin finds from the continent as a whole.[91] They suggest there was a steady increase in Carolingian coinage from Pippin III up to Louis the Pious' reign. After a peak between roughly 820 and 840 there is a decline in coins struck after 840, but there are still more finds than before 820. As Coupland indicates, it is important to investigate how the availability of coinage developed at a regional level, but the overall picture helps qualify the one observed in our research area. As was explained in section 5.3.4 the figures represent rate of loss and are only an indirect

88 See as an example Frick 1992, 427, Karte 1; Baastrup 2009, 517-528.
89 Roxburgh/Huisman/Van Os 2016. Both Frick and Thörle offer some thoughts on the cultural context of the brooches they studied, mainly in relation to how they were worn, but in neither case was it the primary aim of the study.
90 Outside our research area disc brooches with enamelled cross are mainly distributed in northwest Germany and Denmark (see Frick 1992 and Baastrup 2013). Not very many have been discovered in more southerly regions although this may be related to more restrictive laws on metal detecting. A few examples discovered at Domburg were found to have a composition more similar to that used for brooches in a Merovingian tradition, implying there was more than one mode of sourcing raw materials in the Carolingian world (Huisman/Os/Roxburgh 2016, 125).
91 Coupland 2010, 287-317; Coupland 2014b, 273-275.

measure of circulation and by extension the level of monetisation. There is a longstanding debate on how monetised the Carolingian economy was and there is no point reproducing it in detail here.[92] As one might imagine there are extreme views either arguing for high or low levels of coin circulation and monetisation of exchange. Coupland concludes that it depends on the chronological period and geographical area that is under investigation how monetised the economy will have been in the Carolingian period.

Even within a specific area and time frame the role of coin in exchange could have varied depending on the context. Exchanges within an international framework may have had a higher frequency of transactions involving coin than exchanges at regional fairs and transactions between inhabitants of neighbouring settlements. In the international sphere coin would have been used as currency. In the regional or local exchanges coinage may also have played a role, only now as a measure of value. Skre points out that communities can use several commodities as unit of measure to facilitate exchange of goods without recourse to coins, either as currency or a measure of value.[93] Moreover, several commodities can act as money simultaneously. It seems highly unlikely that coinage was the only currency or measure of value in rural areas of our research area considering the limited distribution even of Louis the Pious' *Christiana religio* issue. Therefore, a more interesting question than the degree to which coinage was used (as the level of monetisation would generally be defined) is to what extent rural dwellers in various regions were part of exchange networks in which coinage played a role? A related question is to what extent the range of transactions they were part of were monetised, in other words exchanges in which the object of the transaction was to simply acquire goods rather than establish and reproduce social ties, and for which a measure of value (money) was necessary?

7.3 Stone artefacts

The raw material for most stone tools on rural sites such as sharpening tools will likely have been sourced locally. The main exception is millstones which virtually without exception came from quarries near Mayen in the German Eifel region. Analysis of the distribution of millstone fragments, taking into account limitations posed by excavation and publication conditions, shows that every identified Carolingian rural settlement in the research area had access to Eifel millstones. Evidence from sixth and seventh century sites indicate this was nothing new, and millstones from the Eifel continued to be imported for centuries after our period. Perhaps the most striking aspect of their distribution-pattern is that it is much wider than that of Mayen ceramics. This is true for our research area, but also for Northern Germany, England and Denmark.[94] In each of those areas millstone fragments are discovered regularly but eighth and ninth century Mayen pottery is uncommon, if not absent.

92 For a brief overview see Coupland 2014b, 259-262.
93 Skre 2013, 75-84.
94 For overviews of Mayen millstones in northwestern Europe see Steuer 1987, 144; Parkhouse 1997, 101.

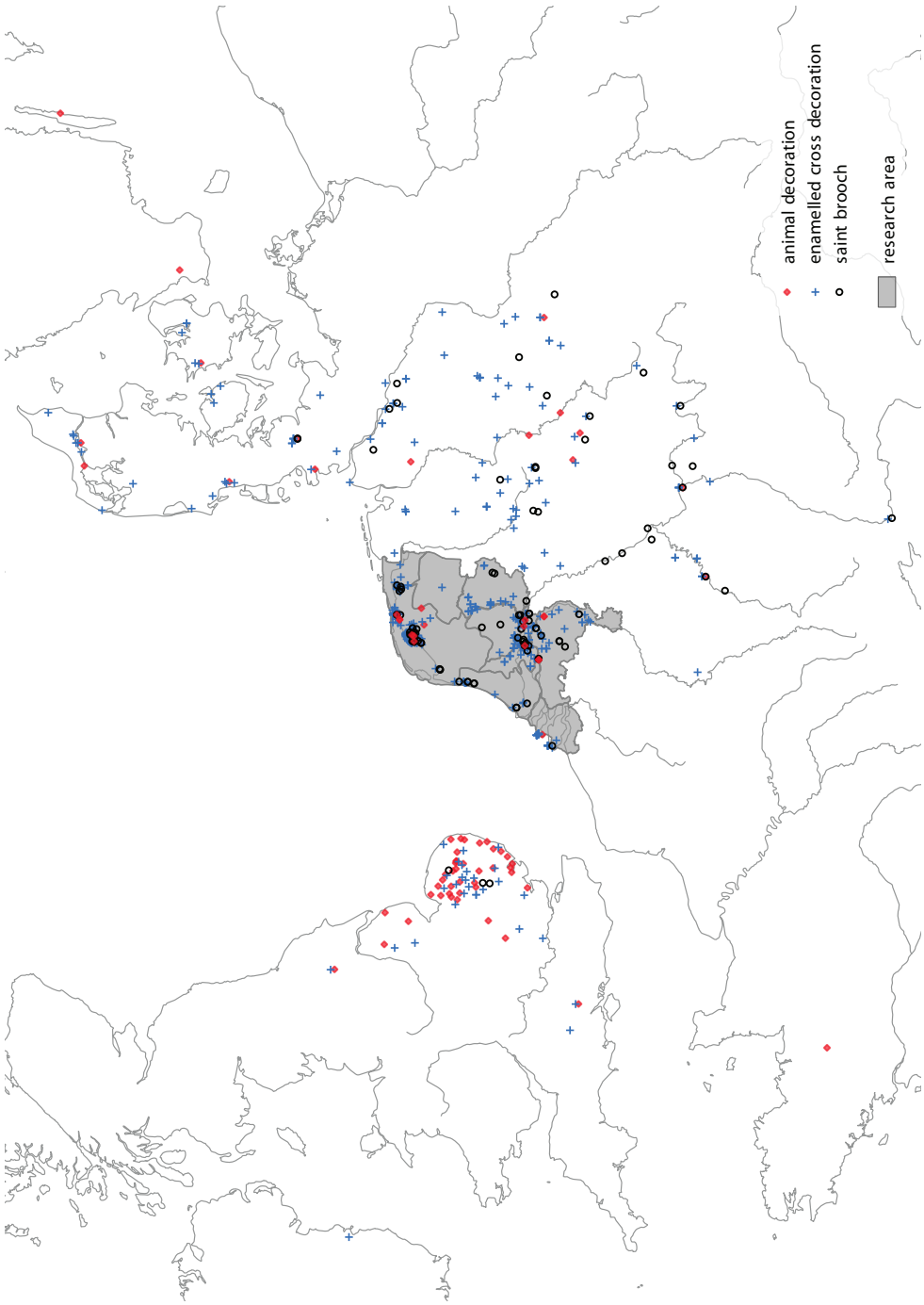


Fig. 7.6 Distributions of enamelled cross, saint and animal decorated disc-brooches.

7.4 Conclusion

The main point this chapter illustrates is that distinct groups of imported artefacts have differing distributions to one another, both within our research area and also in neighbouring areas. Developments in ceramics share broad similarities throughout the northwest of the Carolingian world in the seventh to ninth centuries but there remained significant regional variability. Sites in the north, west, south and east of our research area each have their own characteristics in terms of pottery, but all share the presence of millstones. Some brooch types are limited to specific regions while the distribution of others transcend political and to an extent cultural boundaries. Use of coinage appears to have been limited in rural areas in our parts but they occur relatively often in some areas where other imports are rare. Overall the evidence implies it is not possible to extrapolate the functioning of exchange systems from any single group of material culture. Equally, the nature of the differences between regions suggests it is unlikely they were generated through a single dominant mechanism. What mechanisms may have been at play is considered in the following chapter.



Interpreting the circulation of goods

Introduction

In this chapter the aim is to bring together the evidence provided by each find category discussed in the previous part of the research and consider what it implies in terms of the distribution and consumption of goods in the various regions of the research area. The goal is not necessarily to deduce how goods circulated in a practical sense, their exact route from producer to consumer, although the issue is addressed. The emphasis lies on considering various factors and actors that may have influenced and shaped exchange systems in the late seventh to ninth century, and the extent to which they may have been responsible for the archaeologically identified distributions of ceramic, metal and stone artefacts.

8.1 Physical barriers and routes

The physical landscape always plays a role in the transport of goods from producer to consumer. What needs to be established is whether it had a decisive influence on the dispersal of the artefacts examined in this study throughout our research area. To what extent did the landscape form opportunities and limitations to the movement of people and products, and therefore shape the distribution patterns? The patterns observed in chapters 4, 5 and 6 are to a degree indicative of the routes by which goods were transported. The Meuse and Rhine river systems are important entry points to the research area, in the south near Maastricht, in the east close to Nijmegen, and along the western coast near the modern towns of Katwijk and Rotterdam. Another important entry point over water was situated in the north passing the west of the modern province of Friesland. It is possible that this northern route connected to the Rhine system via the Utrechtse Vecht which flowed into the Almere near the current town of Muiden. We know very little archaeologically about settlement around the southern and eastern shores of the Almere but the presence of small quantities of shell-tempered ware on sites in region 4 suggests there were routes connecting them with the northern coast. There is some debate over when the IJssel river became fully navigable but this must have been the case by the middle of the ninth century given the growing importance of Deventer and evidence for habitation in and around Zwolle, near the mouth of the IJssel.

The Rhine would have been the main artery through which goods flowed into the research area in our period. This is underlined by dendroarchaeological examination of wood-samples from early medieval sites situated along the Rhine in the Netherlands.[1] They provide a provenance and accurate (*terminus post quem*) date, for example for wine barrels. A recent study examined wood-samples from sites in the central Dutch river area, the western coast and along the IJssel river dated from the Roman period to around 1050 AD.[2] It revealed that in the Early Middle Ages, from the sixth to the ninth century, wood exclusively originated from the Rhineland, but in the tenth and eleventh century all samples came from the Ardennes, undoubtedly over the Meuse. There are a few caveats in the research, most notably that no samples from sites in the south of the Netherlands were available. This means that the possibility to make inferences about transport over the Meuse is somewhat limited. Nonetheless, it is clear that wood did not reach the central Dutch river area or the coast via the Meuse throughout the Early Middle Ages.[3] The fact that few artefacts dated to the eighth and ninth century can definitively be associated with the Meuse valley in our research area

1 Van Lanen/Jansma/Van Doesburg/Groenewoudt 2016.
2 Van Lanen/Jansma/Van Doesburg/Groenewoudt 2016, 125; Jansma/Van Lanen/Pierik 2017, 38.
3 At least not in significant quantities.

seems to confirm the results of the timber analysis. Perhaps this is related to the apparent collapse of craft activities and the limited availability of archaeological evidence for the eighth century in Meuse valley towns.[4] On the other hand, the distribution of goods produced in the sixth and seventh century in workshops in those towns also appears to have been relatively limited.[5] Therefore it can be questioned whether, notwithstanding the presence of active artisan communities, many goods were making their way from the middle Meuse valley to our regions at that time either.

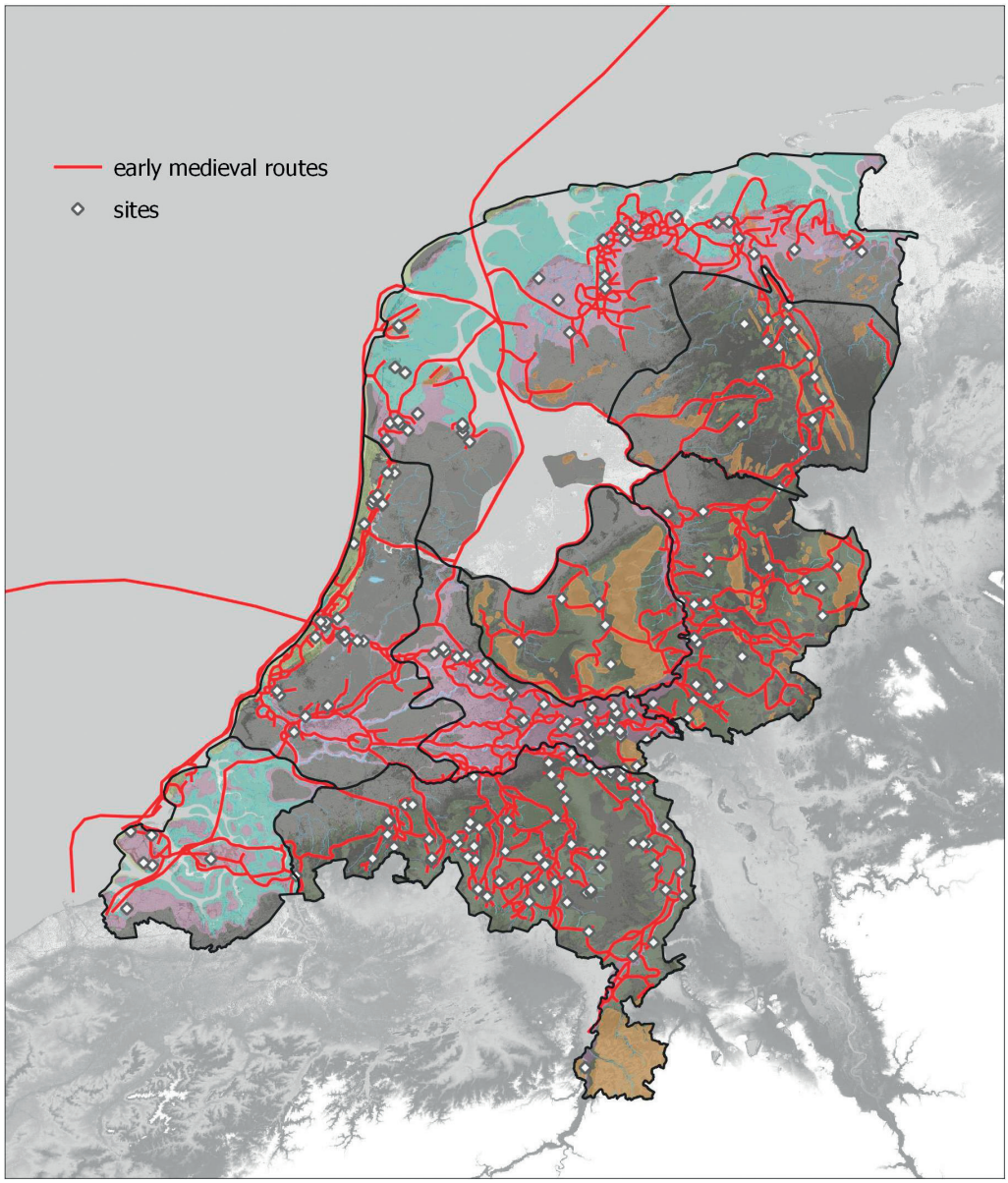


Fig. 8.1 Possible routes throughout the research area in the Early Middle Ages (based on Van Lanen/Groenewoudt/Spek/Jansma 2016, 1040, fig. 1).

4 Theuws 2007; Theuws/Dijkstra 2017, 104.
5 Van Wersch, 2011, 432.

The main routes were only directly accessible by those who lived in their immediate vicinity, so how were other areas within the research area connected to them? Recent research has modelled the level of accessibility throughout the Netherlands in the time around 800 in great detail, mainly from a physical landscape point of view (fig. 8.1).[6] The model is based on a combination of the palaeographical reconstruction for 800 AD[7] and data concerning geomorphology, soils and groundwater tables. By combining the model with archaeological data it was possible to propose the most likely routes taken through the landscape. For some areas the reconstruction of routes can be considered a maximum scenario, for others limited archaeological data means more routes may have been present (for example in region 4) and sections may differ in detail. In addition, the model cannot tell us about the intensity of traffic. Nonetheless, it is a good starting point to consider the influence of the landscape and probable travel routes on the distribution of goods.

Some areas were clearly very inaccessible, generally due to extensive peat cover. It made large parts of region 5 unsuitable for habitation, although there are indications in the north of the region that settlement was perhaps possible within the peat covered areas.[8] A route from the mouth of the Rhine north along the entire western coast was modelled but seems less likely given the option over the Oer-IJ which leads toward the cluster of sites in the north of region 5, roughly between Wijk aan Zee and Limmen. One site has been found a little to the south of that route, namely Bloemendaal, but it still would have been a lot closer to the Oer-IJ than the Rhine. Places identified in the Utrecht property list suggest routes did exist leading north from the mouth of the Rhine, but only up to roughly 25 kilometres inland (Fig. 8.3).[9] The next larger cluster of property to the north is situated around Velsen and Beverwijk, again adjacent to the Oer-IJ.

The landscape in Drenthe (region 2) created bottlenecks for the distribution of goods in the southern and northern end of the ice pushed ridge known as the Hondsrug. This may be part of the reason why imported goods are so scarce on sites in the region. However, possible routes penetrating into the area to the north of the Rhine along the western coast (subregion 5.1) are also limited, but even so imports are much more common than for example in Drenthe. The modelled routes show that sites along the northern coast in region 1 were theoretically well connected but only those in the west have reasonably high percentages of imported ceramics. It is interesting that sites in the north of region 2 systematically contain shell-tempered ware while those in the south never do. The northern half is also where most coins have been discovered. This could mean that rural dwellers in the north of the region were in more regular contact with the communities of the northern coast and the exchange networks of that area than inhabitants of the south of region 2.

Peat formed a barrier between sites along the Meuse in subregion 8.5 and those in subregion 8.4 which meant that the corridors allowing contact between those areas would have been limited. The finds from the Hambach site in Germany and the abbey of Susteren (see previous chapter) suggest Vorgebirge ceramics travelled over land towards the Meuse. They could then have been moved downstream toward sites in the south of the research area. The reconstructed route-model suggests there were two main corridors passing from the Meuse and around the extensive peat area in the

6 Van Lanen/Kosian/Groenewoudt/Jansma 2015; Van Lanen/Kosian/Groenewoudt/Spek/Jansma 2015; Van Lanen/Jansma/Van Doesburg/Groenewoudt 2016; Van Lanen/Groenewoudt/Spek/Jansma 2016.

7 De Vries/Vos 2013.

8 The sites Barsingerhorn-Waardpolder (176), Schagen-Bonkelaarsdijk (49), Warmenhuizen-Wulpendorp (196) and Wervershoof-Kromme Leek (109) have provided evidence for Carolingian settlement on peat but the finds are often ambiguous as to the nature of occupation and how long it lasted.

9 The observed gap in the distribution of property may be in part due to problems with identifying some of the places mentioned in the property list. However, the sequence of places suggests not many of the unidentified property lay in that area.

east of region 8. Perhaps such a transport route for Rhineland ceramics (and other unidentified goods) which went partly over land explains some of the differences between the west and east of region 8 in terms of ceramic assemblages. The greater variability of Rhineland vessel types in the east of the region might be related to differences in the range of pots distributed through the overland/Meuse route compared to the Rhine route. Likewise the higher proportion of Meuse-valley wares in the east of region 8 might be explained by the existence of alternative supply channels to those that existed for the west of region 8. Furthermore, it could explain the apparent earlier adoption of handmade pottery on sites in the east if it were assumed that the land route from the Vorgebirge to the Meuse became less important toward the end of the eighth or during the ninth century. This could have been caused by a greater focus on the production of storage and pouring vessels intended for exchange networks focussed on the Rhine, and ultimately areas beyond the borders of the Carolingian world. This last scenario will be elaborated on in section 8.5.

In sum, there will have been areas that had relatively easy access to busy routes, while rural dwellers in other areas would have to travel some distance to reach them, or wait for goods to be transported further inland by intermediaries. This might explain some of the smaller differences between neighbouring areas. However, overall the reconstructed route network gives the impression that the landscape did not form barriers to such an extent that it was decisive for whether or not goods reached rural settlements. For instance, the number of internal routes and connections to major rivers is fairly similar for regions 3 and 8, but the material culture profile of both differs significantly.

8.2 New rulers

The eighth century saw the successive incorporation of parts of the research area to the north of the Rhine into the Frankish world. This has been viewed as a reason for changes in archaeological phenomena of the eighth and ninth century in parts of those areas, chiefly regarding settlement patterns, settlement structure and land use.[10] The main characteristic of the new regime that is believed to have been responsible for change was the introduction of the manorial estate system.

Whether the increasing importance of estates in rural production in the eighth and ninth century can be considered a result of the nature of the Carolingian state is a matter of debate, but it is generally considered one of the characteristics of the Carolingian world. Areas that were included into the Carolingian sphere of influence will inevitably have been exposed to some extent to practises, norms and values prevalent in established parts of the Frankish world, including those relating to how land was managed. It is difficult to hypothesise in what way the distribution of goods was affected by the introduction of a manorial organisation of production without reverting to assumptions about the form estate management took. We know little of how estates were managed or how common they were in various parts of our research area in the eighth and ninth century except that the evidence for bipartite manors is limited.[11]

Nonetheless, if we work for a moment from the assumption that manorial estates were a widespread phenomenon, how might their establishment have influenced the connections inhabitants of settlements that were part of those estates had with the outside world? A pessimistic view might predict that inhabitants would have become more subjugated and isolated in the process of

10 Spek/Van Exter 2007, 524; Van Beek 2009, 95; Van der Velde 2011a, 187.
11 Verhulst 2002, 55-56, regarding the area to the east of the Rhine. Also see Alberts/Jansen 1964, 62-66.

manorialisation and therefore would have had more restricted access to externally sourced goods.[12] On the other hand a newly formed relationship with a landlord, who had connections that may extend far beyond what households in a rural settlement were familiar with, could have given access to a wider range of imported wares. It is true that imported ceramics became increasingly less important in household assemblages in the course of the eighth and ninth century throughout the research area, an argument in favour of the pessimistic view. At the same time on settlements in the south of the research area for example, mostly imported wheel-turned pottery was used, which might point to more constructive relations between landlords and tenants.

In both these scenarios landlords, which are to an important degree religious institutions,[13] play a crucial role, either actively or passively discouraging rural dwellers to participate in the exchange of goods sourced outside the estate, or in some way enabling access to goods. In the former case, restriction on the movement of tenants seems the most likely scenario because it is hard to see what interest landlords would have had in the restriction of the movement of goods intended for daily use in rural households. There is some research on the mobility of inhabitants of estates but this is focussed on transport duties and long-term migration rather than the occasional independent journey to and from a market.[14] Given the nature of the written sources of our period, it is questionable whether the travels of estate dwellers that were not of immediate interest to landlords would be recorded and preserved. So, what can the distribution of material culture tell us about the impact of the introduction of manorial estates on rural communities access to goods?

When we consider the characterisation of ceramic distributions set out in the previous chapter, the way estates were managed would have to have been responsible on the one hand for limited change in some regions but substantial developments in others from the seventh to the eighth and ninth century. It should also account for notable distinctions between regions in material culture profile. There is an apparent paradox between the introduction of Frankish rule on the one hand and the decline of imported wheel-turned wares on the other. Surely areas north of the Rhine would have had gained easier access to goods imported from the Rhineland once they were part of the same political entity, so why the persistent, and in some cases increased importance of local wares?[15]

The archaeological evidence presented in this study suggests the (presumed) introduction of manorial estates in a Carolingian vein had the least observable impact in the most recently acquired regions. It is possible that there were differences in the relationship between landlord and dependant between areas, mainly the south, that were already part of the Frankish world in the seventh and early eighth century and those that were incorporated during the later eighth and ninth century, in particular the north and east. Areas incorporated under Carolingian rule, as opposed to those that were already part of the Frankish world, were in some cases more directly administered and exploited by royal appointees than in areas that had long been under Frankish rule.[16] It is possible that inhabitants of manors in the east of the research area fell under more

12 Though an explicit link between the level of aristocratic dominance and access to goods is not made by Wickham, he does argue that the ninth century in particular saw a "caging of the peasantry" (Wickham 2010, 529-551). This process involved an increasing isolation and impoverishment of peasants. The idea that inland rural communities had limited access to imported goods due to hierarchically organised systems of distribution is argued by Loveluck and Tys (Loveluck 2013, 73, 211; Loveluck/Tys 2006, 153).
13 Wood 2018.
14 Devroey 2006b, 281-286.
15 To an extent the paradox arises from an assumption that wheel-turned wares were of superior quality and therefore more desirable. This need not necessarily have been the case.
16 Innes 2009, 42-46. Wickham 2010, 515.

restrictive control than those in other areas and that the access to imported wares was stifled due to limitations on the movement of rural dwellers. However, this is difficult to gauge because imported pots were hardly present on sites in the east in previous centuries either. At best one can say that the new situation did not lead to an increase in imports in regions 2 and 3, but that does not tell us whether manorial estate management was responsible for limiting access to imported goods in the eighth and ninth centuries.

If the introduction of manorial estates is assumed to be a key factor in the distribution of goods, the considerable differences in household's ceramic assemblages between sites in the south (region 8) and the east (region 2 and 3) that have been identified in chapter 4 would have to be the result of very different ways of managing estates even though both would have been part of the same political unit. In the south of the research area wheel-turned ceramics remained the main constituent from the seventh to ninth century (though with important changes in the relationship between producer and consumer), in the northeast wheel-turned pottery remained very uncommon and in the south of region 3 a minority of assemblages was wheel-turned, just as it had been in the seventh century. These enduring preferences from the seventh through to the ninth century seem to be more consistent with internal consumption patterns than external influence. In parts of the north (region 1) the switch from supra-regionally produced pottery to local manufacture took place in the seventh century, before Frankish political control would have played any significant role.

In these examples it is the internal consistency of developments within (sub)regions and simultaneous divergence between regions that stand out. It is possible that the experience of Carolingian rule differed per region. However, even if we assume that it was bespoke forms of estate management specific to certain regions which generated the observed patterns it can be questioned whether the actions of individual lay aristocrats were ultimately responsible for the specific consumption patterns of each region. If any group in society could have played a role as a conduit in the flow of goods at a regional scale it would be ecclesiastical institutions.

8.3 Ecclesiastical institutions

Several authors have suggested that as important landholders ecclesiastical institutions, may have played a role in the distribution of goods to rural areas where they held property.[17] In particular this has been suggested for the dissemination of ceramics, both from the Vorgebirge and Mayen. There are two main strands of thought. Abbeys either encouraged the dispersal of pots through the systems of transport duties between abbey property, or they supplied dependents with goods in some form of reciprocal exchange. In this section I will only examine the possible role of ecclesiastical institutions in the distribution of goods toward rural settlements in our research area. The role of these institutions in stimulating exchange is discussed in section 8.4.

In the first case the idea is based on two observations. On the one hand a perceived overlap between the distribution of property belonging to the abbey of Prüm and that of Mayen ceramics and on the other a connection between the diocese of Cologne and Vorgebirge ware circulation.[18] The correlation between Prüm property and Mayen ware distribution was observed in the German Rhineland, where the Necker joins the Rhine.[19] Records show transport duties existed between

17 For example Heidinga/Verhoeven 1992, 3; Verhoeven 1998, 275-276; McCormick 2001, 7-8; Devroey 2006b, 556-558; Innes 2009, 54; Costambeys/Innes/MacLean 2011, 331-337.
18 Verhulst 2002, 80; Mittendorff 2007, 234-236; Gross 2009.
19 Gross 2004, 269-271.

Prüm and a property in Altrip, and a further collection of holdings in its surroundings.[20] A cluster of finds of Mayen pottery has been identified roughly in the same area. The pottery is considered to have been used as packaging material rather than as a commodity in itself. The connection between ecclesiastical institutions in Cologne and the Vorgebirge potters is based on property which the St. Pantaleon *stift* held in several of the pottery producing towns, and holdings which the bishop of Cologne controlled in Walberberg. Furthermore, Otto II confirmed use-rights in tracts of forest in the Vorgebirge to the church of Cologne in 973 AD.[21] None of the sources in which the property in the Vorgebirge is mentioned contains a reference to pottery production but it is assumed that potters will have been among the dependants. They were perhaps obliged to deliver a proportion of their wares to their lord, and were free to exchange whatever remained.[22] A portion of the vessels received by the episcopate could have been intended for its own use and another part distributed in a similar manner as the example of Prüm above. However, it has also been proposed that the pots could have been a return gift toward tenants for the dues they owed. Reciprocity in this vein is recorded in a few cases and has been suggested as the primary way through which rural dwellers in our research area acquired imported pottery.[23]

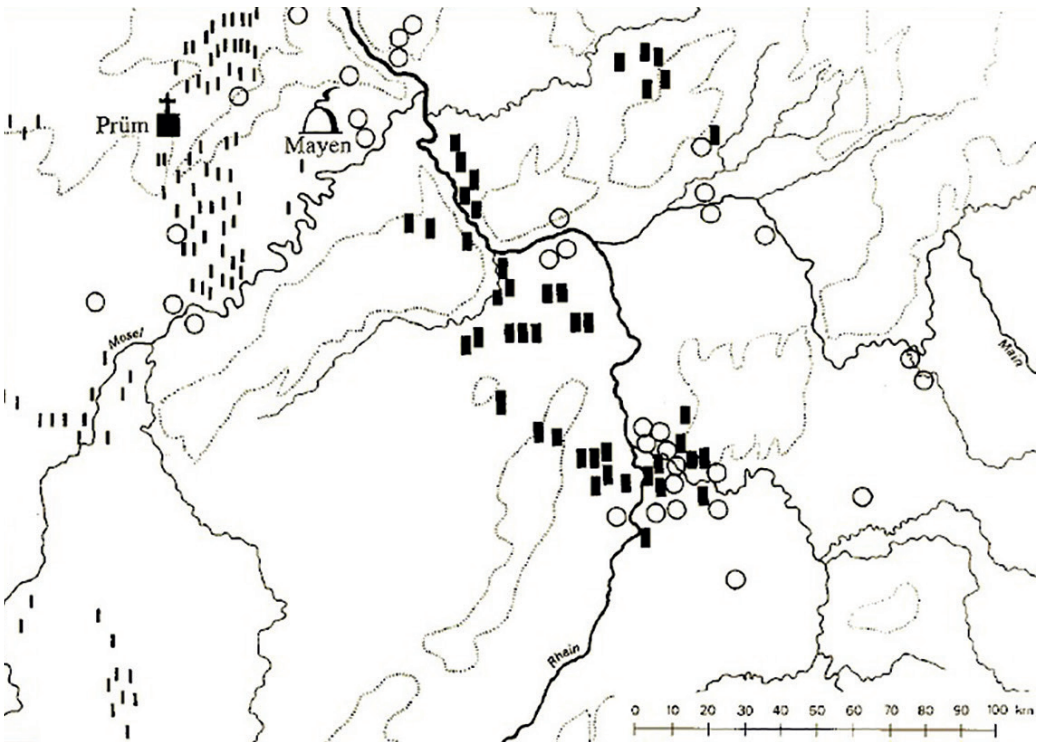


Fig. 8.2 Correlation between property of Prüm and finds of Mayen ceramics (property indicated by bars, pottery by circles) (Gross 2004, 270, abb. 11).

20 Devroey 1979.
21 Wessling 1973. The Louis mentioned as the original donator in the document is believed to have been Louis the Child, indicating the use-rights were first granted at the beginning of the 10th century (Wessling 1973, 100).
22 Mittendorff 2007, 235.
23 Verhoeven 1998, 276.

The apparent clustering of Mayen sherds[24] around the mouth of the Neckar where Prüm had an estate centre is certainly intriguing (fig. 8.2). However, it is not evident that such correlations can be identified elsewhere. Prüm had a relatively limited number of holdings in our research area, concentrated mainly in the central Dutch river area and along the IJssel. There is little positive correlation between Prüm's property in the research area and the presence of Mayen pottery on excavated sites in the vicinity, while there are many sites that are not near Prüm property that do have considerable proportions of Mayen ware among their assemblages. A further problem is that Prüm's property in our research area can only be traced back with certainty to the late ninth century, though it could be older.[25] Given the lack of clear spatial and temporal correlation it appears unlikely Prüm estates could have functioned as important points through which imported ceramics were disseminated throughout large parts of the research area. The problem of chronology is also applicable to other monasteries that held property in our regions in the eighth and ninth century. Most were established later than the introduction of Rhineland globular pots, let alone the WXIV type vessels, in several of our regions.[26]

An exception is Echternach which was founded at the end of the seventh century. Records of several early eighth century donations of property in the south of the research area survive as well as scattered holdings in the central Dutch river area and the coastal region.[27] As Willibrord was central to the establishment of both Echternach and the diocese of Utrecht it might be argued that the property of both combined could have formed a network through which goods were distributed. The early medieval property associated with Utrecht includes a considerable number of places along the western coast and a few on the fringes of region 4, in the centre of the research area (Fig 8.3).[28] This distribution of property shows similarities to the areas where imported pottery forms an important part of ceramic assemblages from an early stage. Furthermore, given that the abbey of Susteren was also closely associated with Willibrord it could have played a role as regional re-distribution centre for ceramics coming overland from the Vorgebirge.[29] A small pocket of possessions around Antwerp associated with Echternach might explain why sites in that part of Belgium consistently have a sizeable proportion of Vorgebirge wares.

Interestingly, the part of the research area where imported pottery rarely occurs is also where written evidence for eighth and ninth century property of ecclesiastical institutions is conspicuously lacking.[30] The lack of recorded property in region 2 and the north of region 3 could be seen as further

24 Apparent because for example we have no idea of the number of sherds that each findspot Gross shows on his distribution map represents and it is not clear whether neighbouring areas have been investigated with the same intensity.

25 It has been suggested that the Dutch property of Prüm only came into its possession at the end of the ninth century and may have been part of the reason for compiling the Urbar. Van Vliet points to the coincidence that the abbey of Susteren, of which we do not know where it held property, came into the possession of Prüm in 891 AD while the Urbar was created in 893 AD. He suggests that the property of Prüm located in the Netherlands may have initially been part of the holdings of Susteren (Van Vliet 2002, 73).

26 Fulda in 744 AD, Lorsch 764 AD and Werden 799 AD. Prüm could theoretically be possible considering its establishment in 720 AD but its role seems limited for reasons already mentioned.

27 Bijsterveld/Thissen/Noomen 1999.

28 The early medieval property of the church of Utrecht is derived from a property list which is believed to contain the property the church held before circa 860 (although there is some debate over the dating of both the property list itself and its contents. See Henderikx 1986, 543-550) . In most cases it is not possible to determine with certainty when the church of Utrecht acquired the holdings mentioned in the list.

29 Perhaps Waalre and Rindern also played such a role though written evidence for their function as collection centre date to the 11th century at the earliest (Bijsterveld/Noomen/Thissen 1999, 228).

30 Based on an inventory conducted by Erik Goosmann in the context of the Charlemagne's Backyard project.

evidence supporting an important role for ecclesiastical institutions in the distribution of ceramics.[31] The absence of such institutions in these areas may have limited the access rural inhabitants had to imported wares. However, it needs to be taken into account that, except for the central Dutch river area, there is little overlap in the spatial distribution of the various institutions property, and that the loss of records for a single abbey or diocese may be to blame for much of the void.

The idea of ecclesiastical institutions playing a central role in the distribution of goods in rural areas thus shows promise, but there are also some issues. Apart from the fact that the suggested network is itself highly hypothetical and leaves much to be explained in terms of its mechanics, it does not make clear why sites in the east of the research area did not start to receive imported pottery when the region became part of the diocese of Utrecht in the late eighth century. The lack of imported wares in much of the east of the research area might be explained by proposing that the network had disintegrated before they became part of Utrecht's sphere of influence. It could be hypothesised that the network of property associated with Willibrord only facilitated the distribution of goods for a relatively short period, perhaps already in decline before the middle of the eighth century. This would also explain why sites in the south and west of the research area developed such divergent assemblages.

However, in the event a network like this did function for a time it cannot explain all the variability encountered in vessel types and proportions of local to imported wares between and within regions, even in the early eighth century alone. For example, it cannot explain why inhabitants of the western coast started to develop the *Kugeltopf* in the first third of the eighth century, or why there appear to be differences in assemblages between the east and west of region 8. From a long term perspective it seems that the incorporation of Rhineland ceramics in household assemblages was already long underway by the time ecclesiastical institutions came into the picture, at least in the west. Other dynamics must have been at play. This is even more true for the later eighth and ninth century when differences within regions 5 and 8 became increasingly marked. The composition of imports in region 1 and the south of region 3 also have their own distinct character which in terms of chronology and the nature of assemblages is difficult to rhyme with the notion that a limited number of large landholders was responsible for all the variability observed, without any input from rural communities.

It might be argued that in the later eighth and ninth century more institutions were becoming involved in distribution networks through newly acquired holdings, leading to the kind of variation we see between regions. But if that were the case it might be expected that for example in the northern coastal area, where most property of Fulda that we know of in our research area was located, assemblages across the region would be similar.[32] However, there are considerable differences between areas along the northern coast in terms of ceramics, not only in the proportion of imported wares but also in the proportion of shell-tempered ware among the handmade pottery. The differences between the sub-regions of the northern coast seem to hold true throughout the seventh, eighth and ninth centuries. Again, even if ecclesiastical institutions played a role in the distribution of pottery, they were not the only factor in determining the composition of household assemblages.

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31 Verhoeven 1998, 275.

32 Fulda's holdings are the most common and widespread collection of ecclesiastical property we know of for the Early Middle Ages in the northern coastal area (Based on an inventory conducted by Erik Goosmann in the context of the Charlemagne's Backyard project). Werden had a concentration of holdings to the north of the modern town of Groningen and in the west of Friesland, and some other dispersed property. We also know of scattered holdings associated with Lorsch and Echternach.

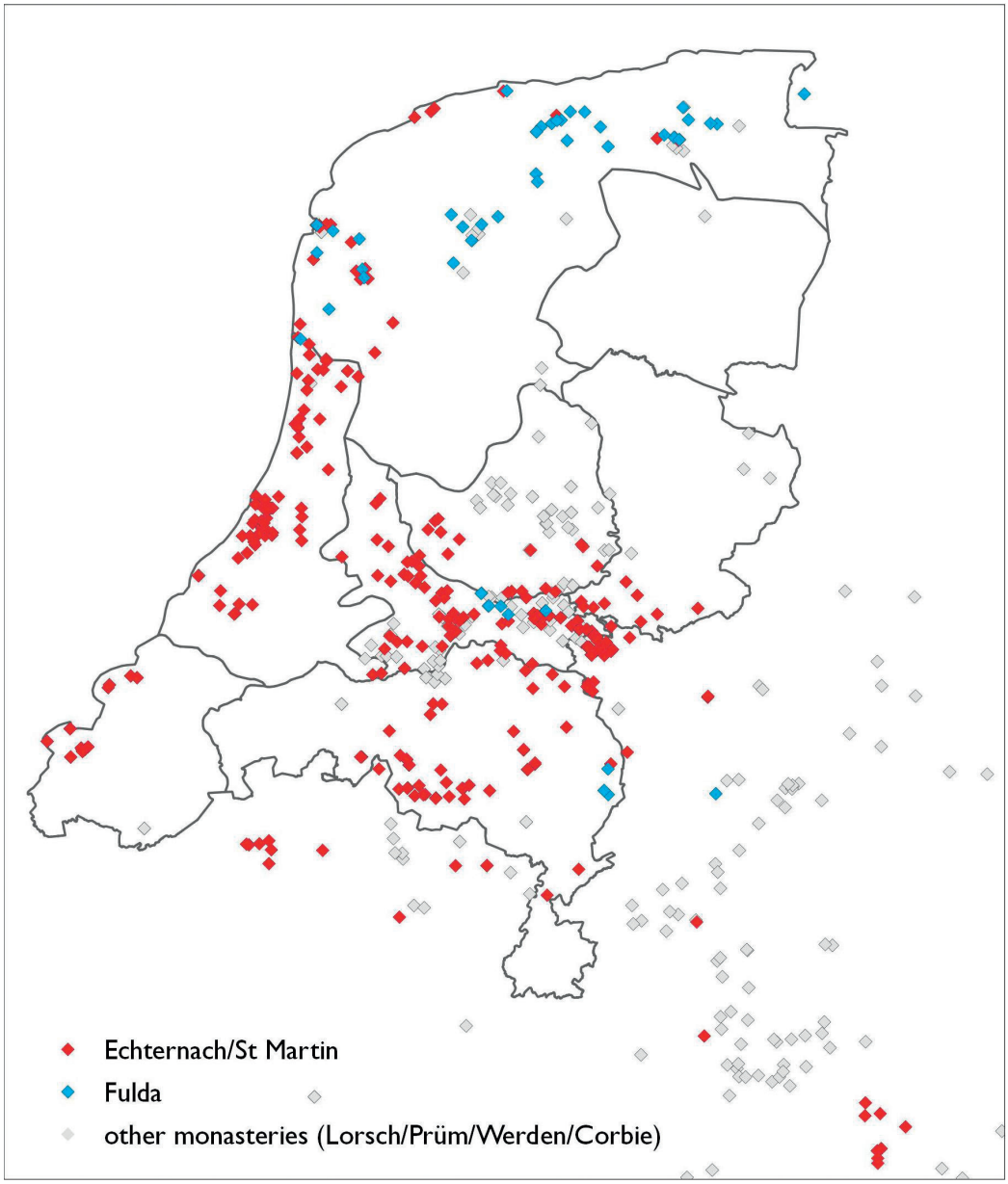


Fig. 8.3 Location of the property of various monasteries in the research area in the Early Middle Ages, in particular that of Echternach/church of St. Martin and Fulda.

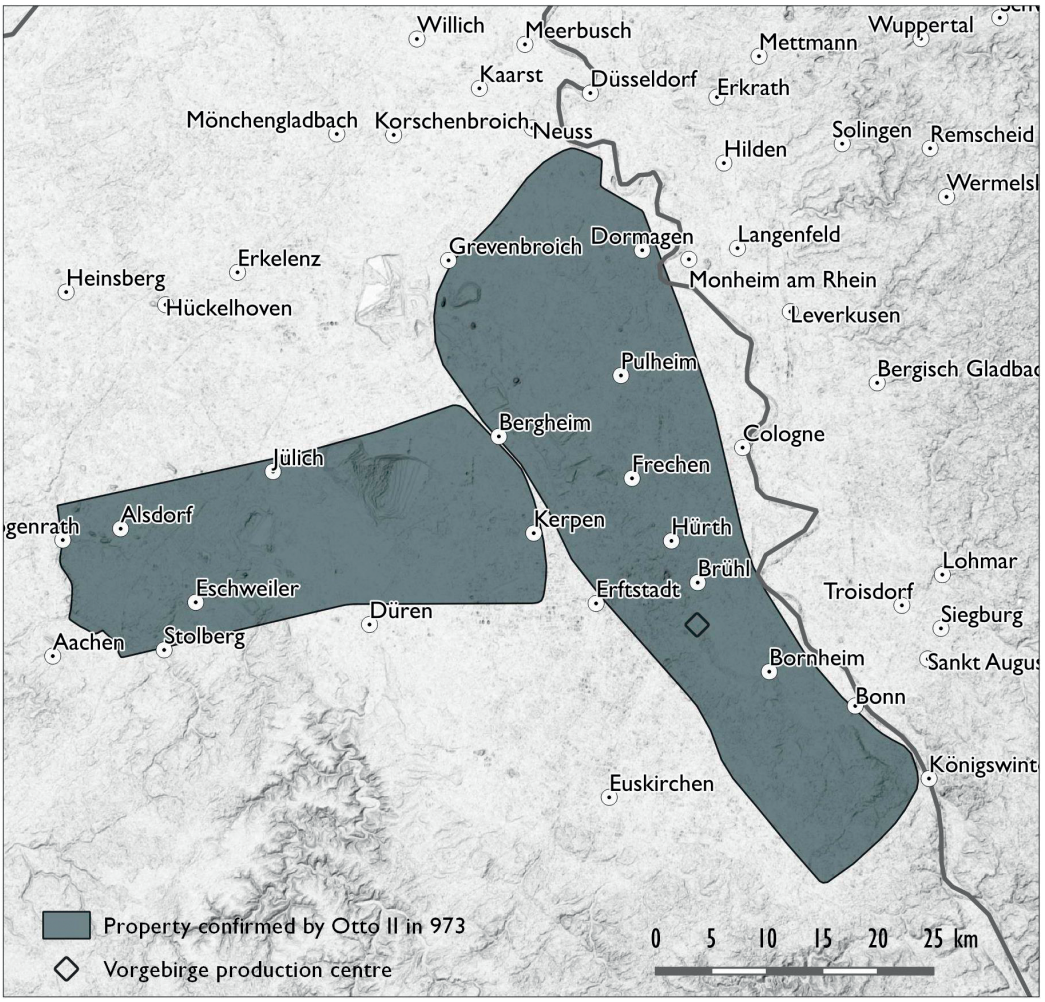


Fig. 8.4 Areas concerned in the grant of hunting rights to the church of Cologne that was confirmed by Otto II in 973.

The idea of ecclesiastical institutions as conduits of goods into rural areas can be further questioned by pointing out that there is no clear evidence from written sources that these institutions or the crown were involved in ceramic production or distribution, even though sources do exhibit interest in a wide range of other goods.[33] The kind of reciprocal giving between landlord and dependants encountered in texts refer to feasts, not objects.[34] It can be argued that production of ceramic vessels was not deemed important enough to be mentioned in contemporary documents. This may apply to the presumed role of the diocese of Cologne in facilitating the distribution of Vorgebirge ceramics discussed above.

The idea relies on circumstantial evidence linking property associated with the diocese to Vorgebirge pottery production (fig. 8.4). The property confirmed by emperor Otto II to the church of Cologne in the tenth century, located in the Vorgebirge, as well as the holdings of St. Pantaleon in Pingsdorf make no mention of pots or potters. The content of the charter issued by Otto II, granting

33 For example the range of goods mentioned in the *Brevium Exempla (*Boretius 1883, 250-256) and *Capitulare de Villis* (Boretius 1883, 82-91).
34 Devroey 2006b, 505.

use-rights in forest to the west of Cologne appears to be related primarily to hunting privileges for the provision of meat and fish.[35] There is for example no mention that the forest was to be exploited as a source of timber for use as fuel in the pottery industry, although that may have been part of the usufruct. Instead of an indication for episcopal involvement in pottery production the charter can be read simply as a ruler donating use-rights to an important institutions based in the vicinity of the tracts of forest in question. That it happened to be close to a pottery production centre could be a mere coincidence.

The same logic can be applied to the property of St. Pantaleon and the diocese of Cologne in the areas where pottery production took place. The fact that they had holdings in villages relatively close to Cologne is in itself not surprising. It is possible that the presence of these large landholders had an influence on the day-to-day practise of the potters, for example on their ability to source raw materials. It is also possible that some or all of the potters indeed were in some dependant role. But none of that should automatically lead to the conclusion that the institutions made any attempt to influence the production or dissemination of the potter's wares.[36] Perhaps more detailed examination of the sources in question in relation to their wider context might show that something very specific was going on that can indeed be related to the ceramic industry of the Vorgebirge. But for the moment it seems best to be cautious in reading too much into these sources as regards the production, and more importantly for us, the distribution of pottery, and certainly be wary of transposing a tenth century situation back towards the eighth and ninth centuries.

The suggestion that ecclesiastical institutions were responsible for bringing imported pottery to rural areas partly stems from a need to explain how rural communities could have such high proportions of wheel-turned, imported ceramics when it is presumed that a market system did not yet exist.[37] A second common presumption is that artisans were generally in a dependant position. The second assumption is difficult to demonstrate because, just as is the case for agrarian producers, the nature of our sources is such that, when artisans are mentioned it can be expected that they will generally appear in a dependant position.[38] For the existence of independent craftspeople it might be a case of absence of evidence, rather than evidence of absence. Bruand argues that the same may be true for the first assumption.[39] Rural markets are only mentioned in sources where the institution in question had an interest in them, usually where they had been granted the right to collect taxes.[40]

Part of the problem is the lack of visible markets, not just in written sources, but especially archaeologically. There are few concrete indications for markets in the archaeological record outside the sites identified as emporia, and it is not obvious what archaeological corollaries of local or regional markets should be at this time.[41] Early medieval market places have tended to be related to towns, but market-places can also be ephemeral in terms of their physical presence.[42] Markets might be held temporarily at beach sites, on riverbanks, in fields or in towns, without requiring enduring architecture. All that is needed is an agreed time and place which is known throughout

35 Wessling 1973, 98-109.
36 Henning 2007, 20-21.
37 Verhoeven 1998, 274; Mittendorff 2007, 234.
38 Henning 2007, 8-9.
39 Bruand 2002, 144-149.
40 In addition, it can be questioned whether the absence of market systems such as those which are known from later centuries necessarily precludes the existence of regularly, though less frequently, held markets.
41 Baker/Brooks 2015, 3. The authors discuss assembly sites in general, but market exchange was one of the various activities undertaken at places of assembly.
42 Shaw 1981, 38-41.

the markets' catchment area. Although these kinds of occasions may be spatially ephemeral they can be temporally well established. Markets of this nature are difficult to identify, because of the lack of structures and because they may not be located in the direct vicinity of a settlement, often the focal point of archaeological research. The most likely locations for such markets are at the convergence of regions with differing natural environments leading to complementary specialisations in output of agricultural and mineral resources.[43] The palaeographic reconstruction for circa 800 AD suggests there was no shortage of contrasting environments adjacent to one another in our research area. In addition, in the context of our rural settlements there would probably have been little need for frequent markets. A few occasions each year would likely suffice to supply rural households with the necessary utilitarian goods that were not available in their immediate surroundings. Furthermore, most parts of the research area lay within a day or two travel from settlements along major transport routes where imported or locally manufactured items could be acquired.[44]

Archaeologically, inferring an important role for ecclesiastical institutions raises the question why virtually every site in the research area had access to millstones but not to imported pottery. Surely if the ability of rural dwellers to acquire goods, and by extension the range of imported items in households, depended largely on outside forces, there would have been more similarities in the goods present in households. In other words, if millstones from the Rhineland were being provided to rural dwellers in the east of the research area, then why not pots from the same source? Once more, differences in the relations between landholders and dependants in various regions, or in the form of management applied to dwellers in different regions could have played a role. Some monasteries might have demanded transport duties and others not. Some may have engaged in forms of reciprocal gift-exchange with tenants and others not. But the data has to be wrangled in complicated knots in order to conform completely or even largely to such models. At the same time, as demonstrated in the previous chapter, exchange networks involving ceramics and millstones were evidently already in place in the seventh century, before ecclesiastical institutions can be expected to have played a role. This shows exchange systems did not necessarily need large institutions to thrive and therefore there is no intrinsic need to assume a role for ecclesiastical institutions in the eighth and ninth century either. That does not mean they played no role in shaping exchange networks, just that they are not the prerequisite they have sometimes been made out to be.

8.4 Elite demand

Some aspects of the role of elites were discussed above, but this was in the context of the impact of new institutions on rural communities. Here elite demand itself is considered as a causative factor for the distribution of goods. As explained in chapter 2, elite demand is widely thought to have been responsible for a range of developments in the Carolingian period, both among archaeologists and historians. Many believe the introduction of the bipartite estate led to higher productivity which gave elites the incentive to engage in exchange more actively. Whether the bipartite manor indeed led to growth in agricultural production or was merely a means for landholders to extract more

43 De Langen provides an example of complementarity between items produced by coastal terp dwellers of Oostergo (roughly subregion 1.2) and the inhabitants of settlements in more inland areas (De Langen 1992, 295-298). He believes these differences formed the basis of a market system which developed from the late ninth/tenth century onwards.
44 Theuws 2012, 34-35; Also Van Es 1990, 169-172 on the possibility of regional distribution networks in our research area.

income from their holdings is a matter of debate.[45] For argument's sake we will simply assume that large landholders, the elite, had access to a greater amount of agricultural produce in the eighth and ninth century than before. The next question is then whether the increase in exchange associated with growth in agricultural production was, to put it simply, an unintended consequence or actively pursued. Most historians follow the former line of reasoning in one way or another.

Though it may no longer be believed that manors were geared strictly towards self-sufficiency, the reasons for engaging in exchange are often still viewed in a predominantly conservative light: monasteries used their surpluses to obtain goods that were not produced within their own holdings and lay elites employed them in order to acquire items necessary in patronage networks and to signal their status.[46] This could take a wide range of forms, such as items of clothing, jewellery and weaponry to demonstrate elite status and to use as gifts within patronage networks, but also food and drink required for conspicuous consumption, building materials for the construction of dwellings and churches, or the provisioning of the army. It is possible that elite engagement with exchange evolved during eighth and ninth century, for example from initial relatively passive involvement to an active pursuit of growth in surpluses geared toward sale.[47] Whatever the case, if elite groups in society were responsible for the development of exchange systems as many historians and archaeologists believe, it was because they required various goods to furnish their lifestyle and maintain networks. Ultimately, exchange related to elite demand is believed to have provided the impetus for the development of exchange systems on which transactions involving more mundane items could build.

This idea is based on a number of assumptions. It assumes groups of consumers for the goods and commodities of which large landowners were producing a surplus. The mechanisms through which agricultural produce was converted to luxury items or particular goods exchanged in bulk often remain oblique in existing models. Wickham assumes aristocrats were the only group in society wealthy enough to create consistent demand for non-agrarian goods allowing artisanal specialisation.[48] The best indicator of the degree of artisanal specialisation and consequently complexity of exchange systems, are deemed to be ceramics. For Innes, what drove the economy were the demands of patronage networks necessitating the sale of agricultural surplus in order to acquire suitable items for exchange and conspicuous consumption.[49] However, it is not explained how that transformation from agricultural produce to luxury items took place in practise and it seems convenient that the sphere which drove the economy is visible in textual sources while the sphere that it is supposed to have encouraged is not.

As mentioned above, many historians who have written on the subject see the internal circulation of goods from one part of landlords' property to another as an important motor for exchange in general. It created the necessity for the development of a transport infrastructure and the establishment of centres where goods could be collected. These centres may have become the focus of exchange, becoming places that allowed landowners to acquire luxury and utilitarian goods. Tenants that were assigned transport duties would have come in to contact with these locations when transporting items to and from estates, giving them the opportunity to participate in transactions

45 See chapter 2.
46 Verhulst 2002, 95; Devroey 2006b, 581-582; Costambeys/Innes/MacLean 2011, 335.
47 Costambeys/Innes/MacLean 2011, 352-353.
48 Wickham 2005, 706-707.
49 Innes 2009, 46-47.

for their own benefit.[50] In this way exchange networks centred on elite demand could have been extended into rural areas.

Which items might large landholders have been selling in order to obtain the goods they ultimately desired, and that simultaneously could generate exchange systems in which items such as pots and millstones circulated across wide geographical regions? The demand for items such as weaponry and dress accessories may have driven aristocrats to create a surplus that could be exchanged, but are unlikely to directly form the functional basis of an exchange system through which ceramics were transported over large distances to rural settlements. This is not to say that exchange of 'luxury' items cannot be conducted over large distances in elaborate networks, as is attested by Merovingian grave contents.[51] However, it seems unlikely mundane items piggybacked on such networks in a manner consistent enough to produce the observed distributions of ceramics and millstones. That would almost certainly have required the exchange of commodities that could be produced and exchanged in larger quantities.[52]

Verhulst considers three commodities produced in the north of the Carolingian empire which may have been transported over large distances in bulk, namely wine, grain and salt.[53] Perhaps livestock can be added to the list as well as fish sauce, madder and oil or wax for lighting.[54] These are the kind of goods which could be produced in bulk within a manorial setting and were not quick to spoil. Wine was certainly moved over large distances and bought and sold at fairs and other markets.[55] It was also a commodity of which production was restricted to certain areas and was likely one of the items elites that did not own vineyards were after. Furthermore, textual sources indicate that monasteries that already owned vineyards bought high quality wines from further afield to supplement the 'tablewines' their own estates produced.[56] It is easy to imagine lay aristocrats did the same. Cereals could have been moved to areas such as the modern day Dutch coast where large scale production was not possible.[57] Salt is another commodity that was in high demand and could be exchanged in bulk. The research area was almost certainly one of the areas where salt was extracted. Salt, together with wine and grain (and perhaps a few other commodities) that were produced on large landholders estates would have led to transport of goods to and from the research area and the movement of items such as pots and millstones could have taken place along the same currents of goods.

All the same, it is important to remember that transportation of wine over large distances over the Rhine was probably already underway in the seventh century.[58] It therefore seems likely that the exchange systems involving wine were initially developed without the kind of estate management inferred from Carolingian documentary evidence. It is certainly unlikely monasteries and their internal distribution systems played a large part in the exchange of wine at this early stage. Regarding the supposed need for importing cereals in coastal regions, this would not have been a

50 Innes 2009, 54.
51 Theuws 2012, 35; Theuws 2014, 7-8.
52 In that sense I agree with Wickham. Where I disagree is that exchange networks involving luxury items cannot be complex and conducted over large distances.
53 Verhulst 2002, 98-102.
54 Lebecq 1997, 68; McCormick 2001, 651; Wickham 2005, 799-800.
55 McCormick 2001, 647-653; Bruand 2002, 220-232; Verhulst 2002, 101-102.
56 Bruand 2002, 224-225.
57 Verhulst 2002, 100-101; Loveluck/Tys 2006, 157.
58 McCormick 2001, 648; Doeve 2015, 80-81, 88.

necessity per se. There is ample evidence that agriculture was practised in the dune landscape of the Dutch coast in the Early Middle Ages.[59]

An increase in population in the central Dutch river area and coastal zone may have led to the need for more imported food, but in that case it seems likely that demand developed before inland elites started producing surpluses to accommodate it. An increase in population density would presumably have been caused by internal developments in the region, not by an externally generated increase in supply of food. It seems the initial impetus for exchange of cereals to our research area would have been regional patterns of consumption, to which outside producers might have reacted. This raises the question whether the development of exchange systems can truly be attributed primarily to a single group of actors and their consumptive needs or whether we should think in terms of the interaction of the demands of multiple groups.

The uncertainties and ambiguities in existing models regarding the exact functioning of elite driven exchange mechanisms makes it difficult to determine what the archaeological correlates of elite demand ought to be. What archaeological evidence is there to conclude that the distribution patterns of pots and millstones, and metalwork for that matter depended on the circulation of agricultural surplus from large landholders? If we look at our research area there is an overlap between the areas where pots and millstones originated and where wine and grain may have been transported from, namely the German Rhineland. The transport and exchange of the latter two commodities could have allowed the more utilitarian items to be moved over similarly large distances. However, again, this was not a new feature of the eighth or ninth century, but something that was already happening in the seventh century. Was this already related to the sale of agricultural surpluses by inland elites? Or were groups around the North Sea stimulating exchange of goods sourced in the German Rhineland?

The vessels produced in the German Rhineland which are found on sites in the research area consist almost exclusively of cooking pots. They were already being transported from Mayen and the Vorgebirge in some quantities in the late seventh century, before the development of Carolingian style estates. This too points to a demand for these pots that was present in the research area. Millstones appear to have been transported from the Eifel over large distances from the sixth century, following a hiatus after the Roman period, and making their way into rural areas as well. All this suggests rural consumption could stimulate exchange over long distances without the need for elite driven demand. It raises the question whether elites were always necessary to generate exchange over long distances even in bulk goods.

One suggested proxy for elite driven exchange is an increased specialisation of craft production which might manifest itself in greater standardisation of finished products, centralising of the production process and an increased area of distribution. These are the criteria used by Wickham to assess scale and complexity of exchange systems.[60] In his view, greater buying power of elites led to increased productive complexity. Ceramics indeed did become more standardised in our research area in the course of the eighth and ninth centuries, and there seems to have been a decrease in the number of producers overall in the north of the Carolingian empire. A similar development has been observed for copper-alloy brooches. But outside of the Rhineland changes in the organisation of production were far more gradual and may have been related to aspects that had more to do with changes in peoples use of ceramics than in elite driven exchange systems. The overview of ceramic production and distribution presented in chapter 7 points to strong regional variation in

59 De Langen 1992, 273-310; Dijkstra 2011b, 47-48; De Koning 2015b, 437-439.
60 Wickham 2005, 706-707.

developments which need to be understood in their regional context. The dispersal of Rhineland ceramics can be shown to be unique for northwest Europe in the seventh to ninth century and not necessarily representative of exchange systems in general in the Carolingian west. This is underlined by considering other artefact groups such as brooches and millstones which each have their own distinct distribution patterns that do not align well with those of ceramics.

The internal movement of goods between estates of large landholders was certainly one of the mechanisms through which goods circulated in rural parts of our research area, although there is little direct evidence for it from the eighth and ninth century. Equally, consumptive demand of secular elites and ecclesiastical institutions will have led to the circulation of goods, among which utilitarian items. However, their needs are unlikely to account for all the complex variations encountered in material culture profiles between (sub)regions. The archaeological evidence does contain clues indicating large landowners played an important role in the circulation of goods in the ninth century in particular. In this century we see an increase in the use of storage and pouring vessels in our research area which toward the end of the century had come to dominate production in the Vorgebirge. At the same time wheel-turned vessels intended for cooking were increasingly replaced by locally produced handmade examples. It seems likely that by this time the production and distribution of ceramics in the Vorgebirge had become centred on a demand related to the storage of large quantities of goods which were perhaps intended for elite households.

8.5 The role of those involved in transport

Transport of goods in our period could be conducted by a variety of actors. Their role in exchange systems can be discussed from two perspectives. First, with regard to the way in which goods were disseminated from production centres to rural settlements and second, by examining the extent to which transport itself generated a specific demand for certain goods.

So, who were transporting goods? From historical sources it is clear that professional merchants existed in our period, individuals who made a living primarily, if not wholly, from the exchange of items.[61] Sources indicate merchants could operate independently as well as on behalf of large landholders.[62] A proportion of the first group could perhaps be better described as brokers who negotiated transactions on behalf of kings and abbeys and perhaps lay aristocrats at exchange centres. It is also clear from written sources that tenants at times had to perform transport duties. The divide between the roles of rural dweller and merchant could start to blur at this point if the same tenants sent to buy or sell items at markets for their lord also carried out transactions for their own benefit. A further possibility is that both free and dependant rural dwellers exchanged goods which they produced in the household such as wooden or metal implements, at regular markets or fairs as discussed above. This may have given direction to, for example a portion of the iron produced in rural areas. Particularly in riverine areas households may have derived part of their income from exchanging goods directly with people sailing the rivers on boats containing goods intended primarily for markets.[63] In this context it can be pointed out that producers themselves may have been involved in the transport of wares. Specifically, regarding ceramics there is the well-known

61 Lebecq 1983; McCormick 2001, 644-647.
62 Verhulst 2002, 88-89.
63 Theuws in press a.

mention in the *Miracles of St Goar* of the transportation of pots, and according to the source, it was the potters themselves that were aboard the ship and intent on selling the cargo.[64]

Therefore, in theory, there were several ways through which goods were transported, exchanged and distributed throughout the research area in our period. These included producers of goods transporting to, and selling their wares at markets to merchants and non-merchants, but also exchanges that took place outside a formal market place, at markets where exchange mainly took place between rural inhabitants, and exchange including merchants who operated primarily on long-distance exchange routes. Another scenario is that merchants took goods inland to sell to households directly. It is impossible to estimate the relative importance of any of the various possibilities within the overall transport of goods. All the above-mentioned mechanisms could have functioned throughout much of the Early Middle Ages in the research area, though transport duties may not have been very important in the sixth, seventh and perhaps even much of the eighth century.

As was discussed briefly above in section 8.3, engagement with markets is not thought to have been an important aspect of rural communities' livelihoods. In historiography, the existence of local markets serving the needs of rural households at least in some parts of the Carolingian world is generally accepted, but there is always a sense that those markets only existed due to some form of aristocratic involvement.[65] The most comprehensive consideration of the early medieval peasantry is provided by Wickham who believes peasants intrinsically had little interest in markets due to the social configuration of their communities.[66] The simple fact that the involvement of rural communities with markets is not detailed in historical sources undoubtedly partly helps to explains why they are assigned such a limited role in matters of exchange.[67] The few detailed considerations of the economy of rural communities are based to a considerable degree on sociological and anthropological research.[68] It is therefore worth examining more closely the debate on peasant household economics in these two influential disciplines.[69]

Although there is no agreed definition of what constitutes a peasant exactly among those investigating peasant economies, several key aspects are that the family farm forms the basic

64 McCormick 2001, 658. There is always a danger in taking the contents of a single source as evidence for a widespread practise, but at least in this case there seems to be little reason for the author to have embellished the story by specifying the crew were potters rather than professional merchants.

65 For the existence of local markets among others Claude 1985, 48; Bruand 2002, 144-149; Verhulst 2002, 97. The necessity for aristocratic or state involvement in exchange networks takes several forms. It is most clear in Wickham's work as will be discussed (Wickham 2005, 804-805, also chapter 9). Implicitly at least Devroey appears to follow Wickham in seeing a limited role for exchange in peasant communities that have little dealings with aristocratic groups (Devroey 1998; Devroey/Nissen Jaubert 2012, 25-26). When those communities in western Europe came under increasing domination by landed elites after 700 they also increasingly became tied up in exchange networks and monetary transactions. Another approach describes exchange in a rural context as essentially embedded, market-type interactions being just one of the activities that took place at public meetings (Costambeys/Innes/MacLean 2011, 259-260). This is clearly contrasted with the kind of exchange mechanisms that generated commercial transactions which required state and aristocratic involvement. Loveluck argues that rural inland dwellers would have been partially dependent on pedlars travelling inland and selling their wares at individual settlements and fairs (Loveluck 2013, 209-210).

66 Wickham 2005, 537.

67 Devroey 2006b, 373.

68 Wickham 2005, 519-588; Devroey 2006b, 359-375.

69 I use the word peasant here because this is the term used to denote rural agrarian producers in the relevant historiographical studies and the anthropological works from which they borrow. The problematic nature of the term in the context of early medieval archaeology has already been discussed in chapter 1 and will be touched upon again later in this section.

unit of social organisation, agriculture and animal husbandry are the main source of livelihood, there is a specific traditional culture linked with the way of life of small rural communities and multidirectional subjection to powerful outsiders.[70] With regard to peasant involvement in markets, studies on peasants often consider each of these aspects to generally form a disincentive to exchange. Much of the arguments provided to support this idea are framed in the context of risk-management.

First, a peasant household is considered to be always on the edge of subsistence so there is little room for investments, for example by aiming a proportion of production towards exchange.[71] In terms of survival of the family there is little need for peasants to engage with markets, except when they require goods which they cannot produce themselves.

Second, the traditional culture which peasants are part of, mainly conceived of at the village level, are thought to provide a form of insurance against hard times. Households will assist each other when necessary and these mutual obligations make it less attractive for any one household to significantly improve their situation, because they may be excluded from aid in the future. Some, perhaps most notably Chayanov, have interpreted the traditionalist tendencies of peasants as an inherent aspect of their way of life.[72] Others however see it as a consequence of risk averse behaviour, peasants only abandoning tried and tested methods when the rewards of innovation are deemed considerably higher than the risk involved.[73]

Third, the obligations peasants owe to their lord are seen as part of multistranded relations in which lords are thought to provide assistance for peasants that experience poor years.[74] Those same obligations either leave little surplus to exchange at markets or leave less time to tend to holdings, in turn leading to smaller yields and again a lack of exchangeable surplus.[75] When lords demand rents payed in coin this forces peasants to engage in exchange and therefore can be seen as an incentive for peasants to take part in markets. However, where this happens it is often argued that the dependence peasants develop towards markets as a means of acquiring the necessary rents in coin, can undermine the largely self-sufficient nature of their subsistence.[76] They may have to borrow from merchants in order to obtain the necessary coinage at the time it is demanded. Debts are established on unfavourable terms where they are required to be repaid around harvest time when prices are low, leaving insufficient means to sustain the minimum needs of the peasant household throughout the year, leading to further loans and a cycle of debt.[77] Markets themselves are therefore seen as inherently detrimental to the peasant way of life and it is believed that peasants are generally wary of them for this reason.

The definition of peasants' relationship with markets sketched above can be seen as the substantivist approach. It has also been called the moral economy approach because much of the assumptions underlying it are predicated on the notion that peasants act mainly according to norms, values and rules represented in social relations within the family, the community they belong to and with their lord. Peasant livelihoods are always potentially at risk and the social bonds they maintain act as a

70 Shanin 1973, 64; De Janvry 1987, 391-392. On the problems involved in defining peasants see for example Magagna 1991, 1-24.
71 Scott 1976, 2-3.
72 Chayanov 1966, 5-7.
73 Shanin 1973, 71-72.
74 Wolf 1969, 9; Scott 1976, 16-17.
75 Wolf 1966, 15.
76 Wolf 1966, 42-49; Alavi 1987, 188-189.
77 Harriss 1987, 210-211; Nadan 2007.

kind of insurance to cover periods of hardship. This view of peasants coincides with that encountered in the more substantial works on the peasantry in the Early Middle Ages.[78]

There are also approaches to describing peasant economies that fall more within the formalist school. Of particular note is the political economy approach advocated by Samuel Popkin. He attempted to systematically refute many of the most important assumptions of the substantivist approach.[79] He stresses the motives and actions of individual peasant households and argues that a family will always attempt to maximise outcomes to their benefit in relation to their preferences and values. Those preferences and values may or may not at any one time coincide with those of the wider community they belong to.

Perhaps not surprisingly, where Popkin's political economy approach differs most clearly from the moral economy approach lies in how the relationship between peasants families and their neighbouring community is perceived. Popkin argues that the kind of social insurance envisioned by moral economists does not actually exist in most cases. Families do have reciprocal relationships with other members of the surrounding community, but they are often only with their closest neighbours and kin and are based on quite specific terms, usually limited to reciprocal labour services, not material goods.[80] Community level aid often cannot be shown to exist in any organised form and, he argues, cannot be relied upon by individual households as a safety net in the long-term.

It is important to mention that Popkin's views do not differ significantly from moral economists with regard to the essential elements of peasant society; the family as the basic unit of production, a primary reliance on agriculture for subsistence, the importance of relations with the wider community and relations with lords. The crucial difference is the emphasis on individual choice as opposed to decisions being made based on shared values among peasant communities. If peasants do not necessarily limit their actions in accordance with short term planning, and reciprocal relationships with their neighbours are not as limiting as sometimes believed, it is, theoretically, more likely that they will act in order to improve their material and societal position.

The difference between Popkin's rational peasant model and models which are more readily labelled substantivist are often not so great in practice. There is clear divergence between the more extreme versions of moral economic and rational choice theories which either propose a distinct peasant mentality which distinguishes them in an absolute sense from other modes of production, or presents peasants as perfectly rational economic agents. However, the crucial distinction, between choices being predicated on individual or collective motives, often becomes arbitrary when individual preferences are heavily influenced by community values. A substantial body of ethnographic research indicates there is considerable variety of possible relations between individual peasant households and the wider community.

Several examples of riverine communities being involved in a variety of economic activities have been published for South America, along the Amazon and in Guyana.[81] Those activities include small scale agricultural production and animal husbandry, the manufacture of goods to sell to passing travellers along the river and opportunistic buying and selling to various communities along the river. Although agriculture and animal husbandry can form a part of households' income it need not be the main constituent. These riverine dwellers can also be a conduit between the main arteries of commercial exchange and communities settled further inland. The existence of such communities

78 In particular the 'peasant mode of production' defined by Wickham.
79 Popkin 1980, 411-471.
80 Popkin 1980, 441-442.
81 Cleary 1993; Nugent 1993; Roopnaraine 2001.

in our research area in the Early Middle Ages has been argued for by Loveluck and Tys regarding coastal communities around the North Sea, and by Theuws for riverine communities.[82]

However, it is not just inhabitants of areas along important exchange arteries that can be shown to actively engage with markets when they believe it is to their advantage. A range of recent studies in various parts of the world show sedentary farmers that can be characterised as peasants employing a variety of income sources.[83] The main source of income remains the produce of the farm but production is diversified and includes both crops and livestock. Much of the farms production is intended for auto-consumption, either by the inhabitants or as feed for livestock, so to a large extent they are self-sufficient. However, some of the produce is sold at a market, either directly or worked. Moreover, part of a farm's agrarian production may be exclusively intended for market sale according to opportunities the market provides and whether it is feasible within the constraints of the overall productive unit. Other important sources of income are wage labour and non-agrarian craft production.

There is evidence for agrarian producers adapting their activities in order to interact better with commodity markets, such as altering the crops they grow, relocating to areas which allow better access to markets or re-arranging the configuration of property at a village level.[84] In some cases the necessary changes mean breaking with traditions, but traditions may also be incorporated in ways that are amenable to the new situation. There is also testimony for exchange at regional markets between peasants that had no identifiable relations outside the market context and where prices were set by the interaction between buyers that did not have sufficient buying power to set prices, and sellers that did not control enough supply to affect the price.[85] In this specific case the accumulation of wealth by any one household was apparently controlled within village communities by levelling mechanisms, such as higher contributions to ceremonies and obligations to hold office within village councils for more well off households. This example indicates that communal practices aimed at dampening differences in wealth, and fully commercial exchange are not mutually exclusive.

Regarding the presumed risk-averse nature of peasants, more recent discourse in peasant studies has moved towards an understanding of risk assessment in peasant households as a function of a desire to maintain an independent way of life rather than avoidance of subsistence crises.[86] Peasants often appear to be wary of the kind of relation they build up with markets, rather than market interaction per se. They attempt to limit market interactions to those where they generate income (market output), and avoid interactions which would lead to an over-reliance on markets for the functioning of the family productive unit (market input). This approach includes taking material risks if there is a reasonable expectation of a return, such as acquiring more land, investing in technological advancements, changing agricultural practises and engaging in commercial exchange.[87] For example, a study of potters in an Indian village showed that each was also involved to some degree in agriculture, either directly or indirectly.[88] Some saw themselves primarily as farmers, while others viewed themselves more as potters. Apart from working the land and producing pottery they may also be involved in speculation with commodities, borrowing and lending, and commercial sale of produce. Risk was not necessarily viewed as problematic. At the same time

82 Loveluck/Tys 2006, 152-153; Theuws 2014.
83 Kearney 1996; Schüren 2003; Lerman/Serova/Zvyagintsev 2008; Schneider/Niederle 2010; Van der Ploeg 2010; Walsh-Dilley 2013.
84 Ranger 1987; Svensson 2006; Walsh-Dilley 2013.
85 Nash 1967, 87-102.
86 Schneider/Niederle 2010, 400; Van der Ploeg 2010, 22.
87 Walsh-Dilley 2013, 669-672.
88 Miller 1985, 75-93.

part of their production and income was derived through non-commercial exchanges tied up in communal practises.

The point of these examples is first and foremost to demonstrate that there is no inherent opposition between peasant household economy and innovation or active market participation. Using them as a template for interpreting the early medieval situation is another matter entirely. It is important to remember that peasant studies have always been conducted to some degree with reference to capitalism and nation states as the antithesis to the peasant way of life.[89] For example, the recent identification of a return towards peasant modalities in many parts of the world in reaction to the expansion of industrial agriculture may be related to the observation that modern peasants primarily aspire towards autonomy, rather than purely subsistence.[90] On the one hand this highlights the existence of cycles of peasantisation, de-peasantisation and re-peasantisation.[91] On the other there is the need to see peasant mentalities, in our case particularly with regard to markets, as context specific. For early medieval agriculturalists being able to achieve the basic requirements of the family in terms of caloric minimum and costs for the replacement of goods[92] may have been the primary objective, perhaps leading to a different assessment of risk and investment. Our ideas of how early medieval agriculturalists interacted with markets can therefore not be reduced to assumptions based on an ideal type constructed from anthropological and sociological studies.

Another way of thinking about attitudes toward risk that is more generally applicable is the suggestion that we should think in terms of incentives and disincentives towards investment and innovation. The rigidity, traditionalism and passivity observed among some peasant communities might be explained not by inherent mentalities towards risk, but by a lack of opportunity and incentive to be more innovative due to living under extractive conditions.[93] As soon as peasants perceive that they themselves will be the main beneficiary of the fruits of their labour they will be more inclined to invest and innovate. Acemoglu and Robinson have presented this relationship between incentives and innovation on the one hand and disincentives and inertia on the other in relation to the rise and fall of states.[94] They propose that in order for innovation and investment to occur there need to be inclusive institutions in place which allow a wide section of the population to participate. Where extractive institutions dominate there is limited incentive for investment because the proceeds will inevitably be appropriated by a ruling elite.

If this idea is accepted it has important implications for our period. In this section the discussion has been about peasants, but as stated in chapter 1 the term has largely been avoided in this research because we do not know whether the inhabitants of individual settlements and households were dependants of a lord or not.[95] To this can be added criticisms voiced by Kearney who points out that the analytical construct of the peasant does not do justice to the variety that exists among communities labelled as such. Yet Kearney does believe the category 'peasant' can be used to denote "more or less autonomous small-scale producers who produce sufficient value for their own

89 Kearney argues that post-war peasant studies have not actually investigated peasants at all, but societies which show superficial similarities to peasantries, yet differ in important respects (Kearney 1996, 55-59). In Kearney's definition peasants in their pure form occur in societies where peasant agriculture is the primary form of agriculture such as feudal Europe. These societies hardly existed any more in the second half of the twentieth century.
90 Van der Ploeg 2010, 6-7.
91 Shanin 1973, 64.
92 Wolf 1966, 4-9.
93 Popkin 1980, 412; Ortiz 1987, 300-303; Svensson 2006, 419-420.
94 Acemoglu/Robinson 2012, 70-83.
95 Kearney 1996, 59-66.

reproduction plus some surplus that is extracted and transferred to non-peasant types".[96] This remains a rather vague definition and is mainly aimed at describing communities that existed before the twentieth century interest in studying peasants developed. Though perhaps not intentional, the suggestion that in the past there existed some pristine form of peasanthood gives the impression of reducing the variability of livelihoods among what are classified as peasants in the past in a manner similar, though not equal, to how Kearney identifies peasants in modern anthropological research.[97]

Written documents show that a proportion of the population might indeed be considered peasants in the sense of the analytical construct discussed above, but we do not know how large that proportion was exactly during our period. A considerable section of society may have had no ties to a landlord and moreover, the role of the state in the lives of these inhabitants was probably limited. These are the communities which Wickham identifies as purveyors of a peasant mode of production which amounts to a relatively extreme form of peasant moral economy.[98] However, if we accept the mechanisms of either inclusive or extractive conditions as a guiding principle there seems to be little to support the passive, inward-looking view of these rural communities. In a way the situation they were in does not fully correspond to what Acemoglu and Robinson contend, in the sense that they were neither subject to overtly extractive or to inclusive institutions. Nonetheless, the apparent lack of institutional barriers to innovation would appear to favour a more dynamic view of the independent section of the rural population than Wickham proposes. Depending on the specific context (such as the moment in the life-cycle of the household, configuration of political institutions, currents of exchange, environmental conditions, time of the year) the economic role of rural dwellers as consumers and producers may have taken on various guises, such as farmer, fisherman, artisan or trader. Active initiative of the non-elite is exactly what Henning suggests was characteristic for the pre- and post-Carolingian periods, leading to among other things a surge in craft production.[99] An inclusive environment for rural communities is what Theuws believes played an important role in the development of the widespread practise of interring the dead with lavish burial furnishings throughout northwest Europe during the fifth to seventh century.[100] This example also reminds us that although an inclusive environment may lead to increases in the material wealth of broad sections of society, that wealth may be expended primarily according to communal values rather than individual needs.

The archaeological evidence does not allow us to determine exactly which groups in society were actively involved in exchange in the eighth and ninth century, or the degree to which they were engaged. The kind of imported items that are found in rural, inland areas are mostly utilitarian in nature in our period. This implies markets were only important as far as they allowed for the provision of those items. However, there is an important caveat to keep in mind, namely that we would have a similar image for the sixth and seventh century were it not for cemetery finds. The material culture found on Merovingian settlement sites differ little from what is known from Carolingian sites, in the sense that variability is relatively limited. Yet Merovingian graves often contain a wide array of items, some of which were sourced through networks that spanned a considerable geographical area. With this in mind, the material culture of Carolingian rural dwellers may have been more varied than it now appears.

96 Kearney 1996, 58.
97 Schüren 2003, 49-50.
98 Wickham 2005, 536-539.
99 Henning 2008, 52-53.
100 Theuws 2014, 5-10.

Important questions are whether rural dwellers travelled to markets themselves or were supplied by intermediaries? If rural dwellers did engage in markets, what kind of market system existed? And were there regional systems of local markets or were dwellers dependant on travelling to locations along the main arteries of transport? An analytical problem lies in the fact that most identifiable imports were the same for sites in every region. Therefore, the scope for interpretation is limited largely to the relative frequency of imports between regions and what they may say about the importance of markets and the involvement of inhabitants of those regions in market exchange. There is the problem of determining what could be indicators for the existence of local markets, and if they did exist, how they were connected to regional markets. This is compounded by the fact that it is virtually impossible to say with any certainty whether goods moved towards inland areas through transport by intermediaries or rural inhabitants travelling towards the main arteries of transport. Nonetheless, it is possible to make some observations on these issues.

To some extent, the distance to the main arteries of exchange seems to matter with regard to the amount of imported goods on sites. For this we are mostly dependant on the information provided by ceramics. In the central and eastern part of the research area as well as the western coast (regions 3, 4, 6 and 5 respectively) the rate of decline throughout the eighth and ninth century in the presence of wheel-turned wares (either regionally or supra-regionally produced) in favour of local pottery on sites increases the further one moves away from the Rhine. This does not necessarily imply physical distance itself was the main determining factor, although it most likely played a part. For instance, although developments in the east (region 3) and west (region 5) in the percentage of wheel-turned wares in assemblages is relatively similar, in absolute terms they are quite different. The absolute amount of wheel-turned pottery on sites in region 5 is considerable, while on sites in region 3 it is limited. For the south of region 3 it might be argued that better access to the Rhine than parts further north was key to acquiring more imported pottery and that they were therefore tapping directly into the main transport route. As imported ceramics were not distributed further inland a coherent system of local markets does not appear to have existed in the region. Of course, we can only see a limited array of goods, and the existence of internal local markets cannot be ruled out entirely. Nonetheless, even if they did they were not well integrated into wider exchange systems. If merchants were responsible for bringing commodities into the region, wheel-turned pots were not something they felt they could exchange. The fact that millstones were almost certainly present on every site indicates that rural communities in region 3 were able to acquire imported goods if they wished. This means that whether merchants were travelling inland or rural dwellers moving toward transport routes, local demand gave direction to the goods being imported, not the fervour of merchants.

In contrast to region 3, imported pottery is present in considerable amounts on a large number of sites in region 5. Although settlements in the north of the region clearly show lower percentages of imported pottery than those in the south, the absolute amount of pottery present in the north is still much higher than in most other regions. The increasingly higher proportion of handmade pottery in the north may be something of a red herring in this case. The access to imported goods may have remained relatively stable throughout the eighth and ninth century. Up to the eighth century ceramic assemblages in both parts of the region were relatively similar in terms of imported wares. However, the slight delay in access to imports that must have existed may have encouraged a more comprehensive adoption of the new *Kugeltopf* in the north than in the south where access to transport routes was much more direct. In this case the logistics of transport and changing consumptive preferences might be considered to have been mutually constitutive.

One thing that cannot be determined for settlements in the north of region 5 is whether people travelled toward the Rhine or if merchants (or others such as relatives living near the Rhine) brought goods to more inland settlements. In the latter case, the question is whether exchange took place through local markets or directly with travelling merchants. The relatively high quantities of imported vessels distributed over the entire region could be taken to mean there was a dependable system of internal distribution through local (temporary) markets, that were supplied through secondary access to transport routes over the Rhine. At the same time the presumably limited number of vessels needed per household per annum means transport by individuals cannot be ruled out as the main mechanism through which imports were distributed.[101] It might be argued that given the long-standing contacts between consumers in the west of the research area and producers in the German Rhineland, as evidenced for example by the finds in fifth century contexts at Uitgeest-Dorregeest[102] and Bloemendaal-Groot Olmen[103], inhabitants were familiar with making the journey towards the Rhine.[104]

The distribution of shell-tempered ware in small quantities in regions 2 and 4, outside the main area of diffusion along the northern coast, points to people from those two regions travelling towards places where they could exchange with inhabitants of region 1. The composition of ninth century hoards in region 2, discussed in the next section, also points to exchange taking place between communities of that area and those of the northern coast. A distinction was also observed between sites in the north and the south of region 2, indicating it was mainly those communities closest to the northern coast that were involved in such exchanges. Perhaps dwellers from the south of the region relied on contacts with people in the north of the region to acquire imported goods. Whether there were actually venues with a (partly) market character in the north is doubtful, but if they did exist they were probably located along the coast. The volume of imported goods on sites throughout the eastern part of the northern coast (including parts of northern Germany) and in region 2 do not suggest an important role for market exchange, but rather incidental exchanges between passing travellers (merchants?), coastal dwellers and inhabitants of more inland areas.

That a simple fall-off curve is insufficient to explain the differences in proportions of imported pottery within regions is revealed by the situation in the south of the research area. Here imported ceramics reached settlements relatively far inland, at some distance from the central Dutch river area, on the edge of our research area and further to the south. In the eighth and early ninth century every household used predominantly imported pots from the Rhineland, and otherwise from the Meuse valley. In this region the consistent, and almost exclusive presence of imported wares suggests the existence of an exchange system that relied on networks that exceeded the scope of individual household or settlement activity, or traveling merchants for that matter. Earlier the networks of ecclesiastical institutions were considered as a viable option to explain distribution patterns in the south. However, there may also have been a better developed regional network of markets which dwellers could visit relatively regularly, than existed for example in the east. A seventh century system that had allowed the regional distribution of ceramics in a Merovingian tradition could have formed the basis for such a network.

A similar situation can be postulated for northern France in the Early Middle Ages. There appears to have been a comparatively dense network of ceramic producers, and settlements were supplied

101 Dijkstra 2011b, 312-313.
102 De Koning 2016, 271-280.
103 De Koning 2015b, 251-271.
104 The existence of regular markets at this early stage seems very unlikely in light of the sparse population density at the time.

by several production centres. This may be a reflection of relatively strongly developed networks of local and regional markets, as Bruand also suggests based on written sources.[105] The situation in most of our regions differs considerably from that in northern France. The lack of regionally produced and distributed ceramics in the sixth and seventh century in most areas is perhaps an indication in itself that local markets were not well developed at that time.

Secondly, another approach to the problem of the relative importance of exchange for rural communities is to consider the extent to which they aimed a proportion of their productive capacity towards exchange. There is little concrete archaeological evidence rural dwellers were indeed doing so. There are exceptions however where we have indications for widespread non-agricultural production, or exceptional concentrations of coinage (see next section). However even in these cases it is unlikely non-agricultural production and the income from exchange formed the most substantial part of rural dwellers' livelihoods.

The situation may have been different in riverine and coastal areas. As was discussed earlier in this section it has been argued that the environmental conditions and proximity to transport routes made inhabitants of these areas more inclined to engage in non-agrarian activities, such as craft production and commercial exchange. These activities in some cases may have formed a significant, if not the principal component of household incomes.[106] The relatively large absolute number of sherds of imported ceramics and metal artefacts on sites in regions 5 and 6, attest to the higher level of integration with transport networks in these areas compared to other regions. However, the importance of craft production and exchange for rural households in these regions is less evident for the later eighth and ninth century than for the sixth, seventh and early eighth century. On many coastal and riverine sites the evidence for craft activities such as the working of various metals or the production of glass artefacts dates mainly to the sixth and seventh century.[107] The only clear evidence for crafts on sites along rivers and the coast in the eighth and ninth century are iron working and bone and antler working. This hardly sets these sites apart from settlements in more inland areas. Iron working can be observed on sites throughout the research area and finding evidence for bone and antler working is heavily dependent on preservation conditions which are favourable in riverine and coastal areas but much less so elsewhere. The role of riverine and coastal communities as petty commodity traders in the eighth and ninth century is difficult to glean from the archaeological evidence. The decline of craft production might be related to a similar decline in exchange activities, though a role for example in distributing imported goods to more inland areas cannot be ruled out.

Thirdly, the distribution of coinage is often taken as a proxy for exchange intensity. The area along the Rhine and parts of the coastal zone do stand out in this respect compared to more inland areas. In chapter 5 it was demonstrated that it is difficult to interpret the distribution of coins in these parts of the research area, specifically whether it is mainly the result of past activity or post-depositional factors. Moreover, in chapter 7 it was argued that coin finds cannot be immediately taken as an indication for intensity of exchange activity.

What we can say is that the overall rate of coin loss for sceattas of the late seventh and first half of the eighth century is much higher than that of later Carolingian issues. This at least suggests

105 Ibid. 39.
106 Loveluck/Tys 2006; Theuws 2014.
107 Around the mouth of the Rhine: Dijkstra 2011b, 166-167. Central Dutch river area: Aarts/Nokkert/Wynia, 366-367. Meuse valley: Plumier-Torfs/Plumier-Torfs/Regnard/Dijkman 1999; Theuws 2007.

coinage did not become more important than before in exchange during the later eighth and ninth century along the major transport routes. However, it can also be interpreted as another indication that the importance of the contribution to exchange networks of individual households as petty commodity producers and traders, spread over numerous settlements, diminished in the course of the eighth and ninth centuries. This development is equally detectable in the overall distribution of settlements along the Rhine which is strongly reduced in the same period with no sign of recovery in the tenth century.[108] That does not mean the overall number of inhabitants of the areas in question involved in exchange also declined. Their activities may have shifted along with the concentration of exchange at a more limited number of sites.

A final point with regard to rural dwellers connections with markets is that although there were clearly developments from the seventh to ninth centuries in how they acquired goods and took part in exchange networks, the basic structures through which goods were distributed show a degree of continuity in most regions. In regions 5 and 6 households were connected with long-distance networks, acquiring relatively large quantities of imported wares throughout the period (and even before). In the east imports were limited to a small amount of utilitarian items. In the south a regional exchange network may have persisted throughout the period. This suggests developments were contingent on existing structures (and mentalities) within regions.

To conclude, the situation in the various regions indicates that the relations between those offering goods and those receiving them differed per area. The observed variation suggests there were specific demands in each region and that they helped form the mechanisms of exchange systems. Moreover, the fact that in several areas imported ceramics are absent, but other imports such as millstones are consistently present, suggests rural dwellers were making use of wider exchange networks according to their consumptive needs rather than those networks branching out to rural areas. Professional merchants, in as far as they were involved in the provisioning of rural households, appear to have been relatively passive in marketing their goods.

The second aspect of the mechanisms of transport and exchange is the extent to which they generated a specific demand. It was observed in chapter 4 that in the course of the late eighth and ninth century storage and pouring vessels became more important in assemblages in the research area. The highest percentages of these vessel types were encountered at Dorestad, both in the harbour area and the settlement. The reason for the increased importance of storage and pouring vessels has often been related to the trade in wine.[109] If the wine trade was principally conducted for the benefit of large landholders they could be said to be ultimately responsible for the development of the vessel types intended for storage. The idea of wine being transported in ceramic vessels raises several practical issues, primarily that the Vorgebirge storage vessels are often not fired very hard and were therefore relatively porous. We also know wine was transported in wooden barrels which raises the question why ceramics containers were needed?

There is another possible reason for the development of dedicated storage vessels. Merchants working for kings, laymen or abbeys may have been stationed at ports or other places where exchange took place in order to acquire items for their clients. Middleton argues that key attributes of toll and tax systems at ports remained the same from antiquity into the Central Middle Ages.[110] They included the right of pre-emption, hosting rules and the payment of scavage. Middleton believes that forms of

108 This may in part be due to the growing importance of the Waal route to the detriment of the Rhine.
109 Steuer 1987, 134; Van Es/Verwers 1993, 229.
110 Middleton 2005, 352-353.

pre-emption, scavage and hosting rules were being practised by the eighth century in English ports, and that the same may have been true on the continent. Rulers held the right of pre-emption first and foremost, but those acting as host to foreign merchants at ports and ecclesiastical institutions may also have held that right. Later sources give an idea of how pre-emption was organised.[111] In effect, for a short period after ships had docked they were not allowed to engage with local merchants. In that time royal officials were entitled to survey the ship's content and buy a set amount of cargo at reduced prices. The amount appears to have been roughly ten percent of the cargo. Subsequently, other merchants stationed at the port were allowed to buy the remainder of the cargo according to a pre-defined hierarchy. Younger sources imply that the king had pre-emption rights on a particular set of goods, most notably wine, but other, luxury items as well. Goods were likely unloaded and displayed on the shore and after they had been bought were perhaps stored in warehouses waiting for transport to royal estates or ecclesiastical institutions.

Late antique and central medieval sources indicate that foreign merchants were required to take up lodgings in hostels situated in ports for the duration of their stay. They were bound by a set of hosting rules which on the one hand determined visitors' rights and obligations, and on the other put them under protection of the ruler. In practise it was often the hostel proprietors who were responsible for their foreign lodgers, both for their protection and if they committed crimes against others, for which they received pre-emption rights in return. It is not entirely certain what scavage entailed but it may have been a payment by visiting merchants to their hosts in return for lodgings and protection during their stay. It may also have been a payment for the right to avoid pre-emption at one port and trade further inland. Hostels would have had warehouses to store merchant's wares and the goods acquired by hosts. They also acted as market places for further transactions, following the exchanges that were conducted on the shore.

All these activities at ports required storage facilities and perhaps this helps explain the development of vessels aimed specifically at storage and their increased importance both in terms of the output of Vorgebirge kilns and on sites in our research area. In this scenario the demand for storage vessels can be argued to have been generated by exchange itself, or better the merchants and institutional brokers involved in exchange. If potters and millstone miners were active in transporting and selling their own wares downstream along the Rhine it opens up the possibility that they were in direct contact with merchants acting as brokers for institutions and port hosts. Through those contacts the potters could have become aware of specific requirements regarding the storage of goods waiting to be transported to, and arriving from manorial estates. An important part of the reason for the increase in storage vessels, and the particularly large numbers on sites with an exchange character therefore lie not in their application for the transportation of goods, but in their storage capacity. In this context it is important to note the physical changes the most iconic of these vessels underwent, namely the reliefband amphora.[112] Archaeologically complete vessels from Dorestad dating to the eighth and early ninth century measure between 40 and 50 centimetres whereas the later tenth to twelfth century examples could reach up to between 80 and 90 centimetres. The volume of reliefband amphora thus increased considerably during the ninth and tenth centuries.

Storage vessels could be used for transport of goods beyond the borders of the Carolingian empire, but that was not their primary purpose. It helps explain why storage vessels are more frequent in non-rural settlements such as Dorestad and Deventer and why the percentage of storage vessels in the settlement area of Dorestad was as high, if not higher than in the harbour zone. Had

111 Middleton 2005, 333-349.
112 Giertz 2000.

the pots been mainly intended for transport they might have been expected to be found more in the harbour area. It also helps explain why storage vessels are not very common on rural sites in England and Scandinavia. That the vessels could be used as containers during transport is likely evidenced by the finds on Scandinavian sites. The total number of sherds of Vorgebirge pottery at Kaupang and Haithabu in particular is relatively high, compared to sites in some parts of our research area, even if they comprise a minority of the total assemblages. But these are exceptions and the distinct lack of globular pots and Mayen ware beyond the borders of the Carolingian empire is an indication that vessels were not being exported for household use, though it is possible some storage vessels were being used to store goods by groups of foreign merchants in English and Scandinavian ports.

A final issue to be discussed in this context is, whether an increase in the demand for storage capacity in the late eighth and ninth century in places like Dorestad necessarily implies growth in the volume of exchange. And if goods were being stored awaiting transport to abbeys and the court, was the increase ultimately dependant on greater elite demand? It cannot be ruled out that there was indeed an increase in the volume of exchange, primarily instigated by elite demand, but perhaps it was not state-wide. These processes may only apply to a specific group of towns. In order for royal pre-emption rights and toll-collection to work effectively it was convenient to have foreign merchants concentrated at a limited number of ports. The increase in storage vessels may be an indication that the effectiveness of the mechanisms involved in toll-collection, pre-emption and hosting rights was enhanced (just as the control of minting for example) under Carolingian rule, helping create the kind of towns we call *emporia*.[113] The impetus for a demand for vessels specifically intended for storage might be related to the concentration of activity at a limited number of locations rather than a state-wide increase in the volume of exchange and exchanged goods.

8.6 Production in a rural context

Many of the goods used in rural households will likely have been produced within the household, within the village community or in neighbouring villages. Other items came from beyond this sphere, such as wheel-turned ceramics and millstones. But which goods were produced in a rural context in our research area and then distributed at a regional or supra-regional level? This might be the case for some agricultural commodities, in our regions probably mainly animal based products such as hides and wool. Salt could also have been produced in coastal areas, as well as cured fish. Unfortunately, many of the goods potentially produced in a rural context leave little archaeological traces, both of the production process and the finished products. The main exception is iron production and working, evidence of which has been found in parts of the centre, east and south of the research area. However, the north and west show no signs of iron production, though there is evidence for iron working and the use of iron tools. At Wijnaldum several iron bars were found in seventh to ninth century contexts indicating raw materials were imported in this case rather than finished products.[114] How iron implements were acquired in other parts along the coast is not clear but iron was almost certainly imported in some form, either as raw iron or as finished products.

113 This does not deny the role of Dorestad as a place where different systems of value could articulate as suggested by Theuws (Theuws 2004, 134), but merely another aspect of it. It is in line with Kalmring's suggestion of seeing early medieval trading towns as special economic zones (Kalmring 2016, 17). These are today defined as delimited areas where business and trade laws differ from the rest of the country it is situated in.

114 Tulp 2003, 225-227. Tulp indicates southern Sweden as a likely source of the iron bars found at Wijnaldum. However, why that should be the case is not explained.

The nature of archaeological remains of iron production means that it is generally difficult to assess the scale of production and the intended consumers. There were certainly different ways in which production was organised and this may be indicative of the relative scale of production. Production close to settlements, where all the stages of manufacture are represented in the excavated waste might have been intended for local needs, while a process in which the various stages were physically separated could imply production geared toward demand exceeding local requirements. However, even in the first instance, a concentration of small-scale producers may have produced partly for consumers beyond the immediate locality. The sites where traces of iron production have been discovered in the south (region 8) lie within a relatively limited area to the west of extensive moorland, which is known to have been exploited for bog-iron ore on a considerable scale in the nineteenth century. The collective surplus produced by the communities of individual settlements in that area may have been more substantial than the archaeology of any one site suggests by itself.

Exchange of iron beyond the local or even regional sphere could explain why sites in the south of region 3 have relatively large and varied assemblages of imported pottery compared to other parts of the east of the research area.[115] Similarly, the greater variability in artefact assemblages in the eastern part of region 8 compared to the western half might be (partly) a consequence of surplus iron production. The situation in region 4 is more difficult to assess due to the limited number of sites and the fact that not all finds from Kootwijk have been published in detail. The area was perhaps slightly different to other parts of the research area because the evidence for iron production indicates it was conducted more systematically than elsewhere during our period. Partly it is suggested by the physical separation of stages of the production process. However, what really sets the area apart in terms of the production process is the observation that in order to sustain the level of iron production practises on the Veluwe it would have been necessary to manage the forest.[116] In other parts of the research area where charcoal and/or iron was produced the process does not appear to have been accompanied by a similar degree of forest management.[117] The Veluwe region was undoubtedly producing a surplus of iron, the question is whether rural dwellers themselves were the main beneficiaries of its exchange or if elites took a substantial part of surpluses. Although this cannot be answered with certainty, the degree of organisation required to maintain production in the long-term on the Veluwe does not necessarily point to elite control. Research into iron production in medieval and pre-modern Sweden shows that the development of a regional specialisation does not require top-down organisation.[118]

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115 Which, if indeed the case, would be another argument against distance to transport routes necessarily being the decisive factor in the level of rural communities' engagement with exchange systems.

116 Joosten 2004, 91-92.

117 Groothedde 2016, 74; Ball/Van der Linde/Tebbens 2018, 558. There may in fact be a link between iron production, deforestation and reclamation, timber being required to produce iron tools and those in turn being necessary in order to make forested areas suitable for agriculture (Ball/Van der Linde/Tebbens 2018, 558).

118 Florén 1993, 31; Lagerstedt 2007; Svensson 2007; Svensson/Bodin/Hulling/Pettersson 2009. There are historical and archaeological indications for control of iron production by elites on the Veluwe and in Montferland dating to the tenth and eleventh centuries. In Montferland there is an apparent connection between the family of the Wichmanni and the area where iron ore was sourced (Van Nie 1995). For the Veluwe the evidence consists mainly of earthworks, one at Appel near Nijkerk and the Duno in Heveadorp, dating to the tenth or eleventh century where traces of metal working have been found inside the enclosure (Van Doesburg/De Kort/Schut 2011, 106-107) Perhaps there is a link between the erecting of a palisade, dated to the second half of the ninth century in the settlement discovered at Uddel and the establishment of the Hunneschans which on current evidence took place at the end of the 9th century at the earliest. This may be an early example of the phenomena observed at the Duno and Appel. However, the fact that by the tenth century elites had a measure of control over the iron production process does not necessarily mean that was the case in earlier centuries. Some degree of control was inferred by Heidinga from ninth century donations of forest in iron producing areas on the Veluwe, but the connection between these sources and iron production is uncertain.

As stated, aside from iron production there is little archaeological evidence for products explicitly being produced for exchange beyond the local or regional level. However, we can see the result of such exchange in the imported goods found on sites. Region 2 is a part of the research area that stands out for its overall lack of imported goods. Imported pottery is virtually absent in household assemblages. At first glance imports seem to be restricted to utilitarian goods that could not be produced in the region such as iron and millstones. This may be seen to indicate that exchange beyond the regional level was limited and that there was not a focussed attempt to produce a surplus intended for exchange. However, this interpretation is called into question by the evidence provided by coin finds, because region 2 is characterised by a relatively large number of single coin finds and coin hoards dating to the ninth and early tenth century.

Many of the finds in the area were discovered in the nineteenth century, presumably when extensive turf cutting took place in Drenthe. This may partly explain the relatively large number of coin finds compared to other rural inland areas, but does not account for the peak in ninth century finds in region 2. Only a handful of single coin finds and hoards can be dated to the seventh, eighth and later tenth century in the parts of Drenthe where Carolingian issues were recovered. Therefore, the circumstances through which the coins were recovered cannot be the only factor in creating the observed distribution patterns. The relative abundance of coins may be the result of the inhabitants of the region selling a surplus of goods and, in contrast to inhabitants of other rural areas, converting their surplus (in part) into a stock of silver. What might have been the circumstances that led to the observed increase of silver coinage in the area and what does this say about rural production for exchange purposes? These questions cannot be readily answered on archaeological grounds alone, but it is possible to offer some suggestions.

An increase in the amount of hoards dated to the second half of the ninth century compared to the first half is not unique to region 2, but can be observed throughout the north of our research area and also in other parts of the Carolingian world.[119] For the north of the research area this increase has been correlated with Viking activity on the grounds that their dating (mostly in the second half, if not last quarter, of the ninth century and early tenth century) coincides with historical mentions of Viking incursions in Frisia.[120] Hoarding is therefore usually seen as a reaction to the perceived threat of raiding.

The connection between hoarding and Viking raids may or may not be valid but it certainly does not explain the relatively large number of single coin finds in the region also dating to the ninth century. As mentioned, hardly any coins struck in the eighth century have been discovered as single find in region 2 and the same is true for all except very early tenth century coinage. For the eighth century the lack of sceattas is particularly remarkable considering their wide dissemination in the northern coastal area. The use of coinage in region 2 therefore appears to be a specific feature of the ninth and early tenth centuries. The combined evidence from the recovered single finds and hoards suggests the increase of coinage in the ninth century was not just a symptom of uncertain times. In addition, recent work has provided a more nuanced perspective on the relationship between inhabitants of the northern coast of the Netherlands and people originating from Scandinavia in the Early Middle Ages.[121] In any case, for the purposes of this research it is not so much the connection between hoards and Viking raids which is of interest but rather the evidence for Scandinavian influence they provide. To be clear, the hoards are not typically Scandinavian, but neither are they typical for other, contemporary continental hoards. The influence implied here lies mainly in the

119 Coupland 2014b, 262, table 12.1.
120 Knol 2005, 123-124; Coupland 2006, 243-250.
121 IJssennagger 2017.

mixed character of some hoards, the fact that several of the hoards are so-called savings hoards, and that Arabic coins appear in hoards and as single finds in the north of the research area.

The contents of four out of a total of nine hoards containing Carolingian issues discovered in region 2 included several items produced in precious metals other than coins.[122] To put that into context, such mixed hoards are relatively uncommon within the borders of the Carolingian empire, comprising just 18 out of a total of 195 hoards dated up to the beginning of the tenth century (Fig. 8.5).[123] Of those 18, ten have been discovered in the north of our research area. While mixed hoards are generally uncommon on the continent, ninth century hoards discovered in Scandinavia and England regularly contain a variety of objects made of precious metals, though they sometimes lack coins.[124]

Savings hoards consist of a relatively wide chronological range of issues and are believed to have been collected over a longer period of time. Most Carolingian hoards represent a much shorter period in which they were assembled.[125] A study of developments in the circulation of Arabic coin in early medieval Scandinavia has revealed that dirhems could remain in circulation for a very long period. Again, the northern Dutch hoards of the ninth and early tenth centuries show more similarities with Scandinavian hoards than other continental examples.

Arabic dirhems distributed through a network spanning the Caucasus, eastern Europe (mainly Russia) and the Baltic were an important source of silver in Scandinavia in the Early Middle Ages. They seem to have become prevalent in parts of Scandinavia adjacent to our research area in the course of the ninth century. At the same time Arabic coins have rarely been discovered within the borders of the Carolingian empire indicating they were systematically reminted before the silver entered circulation. Therefore it is significant that Arabic coins start to appear in hoards and as single finds in the north of the research area in the course of the ninth century, including in region 2.

Again, these three factors make the circulation of coinage in the north stand out from the rest of the Carolingian world. In particular, it suggests that for inhabitants of regions 1 and 2, in the ninth century, it did not matter what form the silver took, or that the accumulation of silver bullion in the form of coin was not as self-evident as in other parts of the empire. At the same time the contents of hoards in the northern Netherlands are also markedly different from contemporary hoards from Scandinavia and the Danelaw. The only two hoards from the northern Netherlands that can be considered Scandinavian in character, Westerklief I and II, were found in the area we know from historical sources was held in benefice by a series of Danes between the 850's and early 880's. The ninth century mixed hoards from regions 1 and 2 mostly contain only a limited amount of non-numismatic silver, almost all off which was produced in the Carolingian empire.[126] In addition, almost all the coins in the hoards are Carolingian issues and there is no evidence for hack-silver, ingots or rings, all common components of Scandinavian hoards.

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122 Based on a checklist compiled by Coupland (Coupland 2011a). Other hoards have been recorded in the region but these were not included in Coupland's checklist because it is uncertain whether they are actually hoards or collections of single finds. Here only the hoards dated up to the very beginning of the tenth century have been included, specifically all hoards up to and including number 211 in Coupland's list. This means the Dalen hoard was not included. The Borne hoard is also not included as one of the mixed hoards because it concerns items buried in a grave and is probably not relevant for the present discussion.

123 Based on the checklist published in 2011 and a 2014 supplement (Coupland 2011a;2014a).

124 Kilger 2007, 207; Kershaw 2014, 151.

125 Coupland 2006, 260.

126 Coupland 2011b, 120.

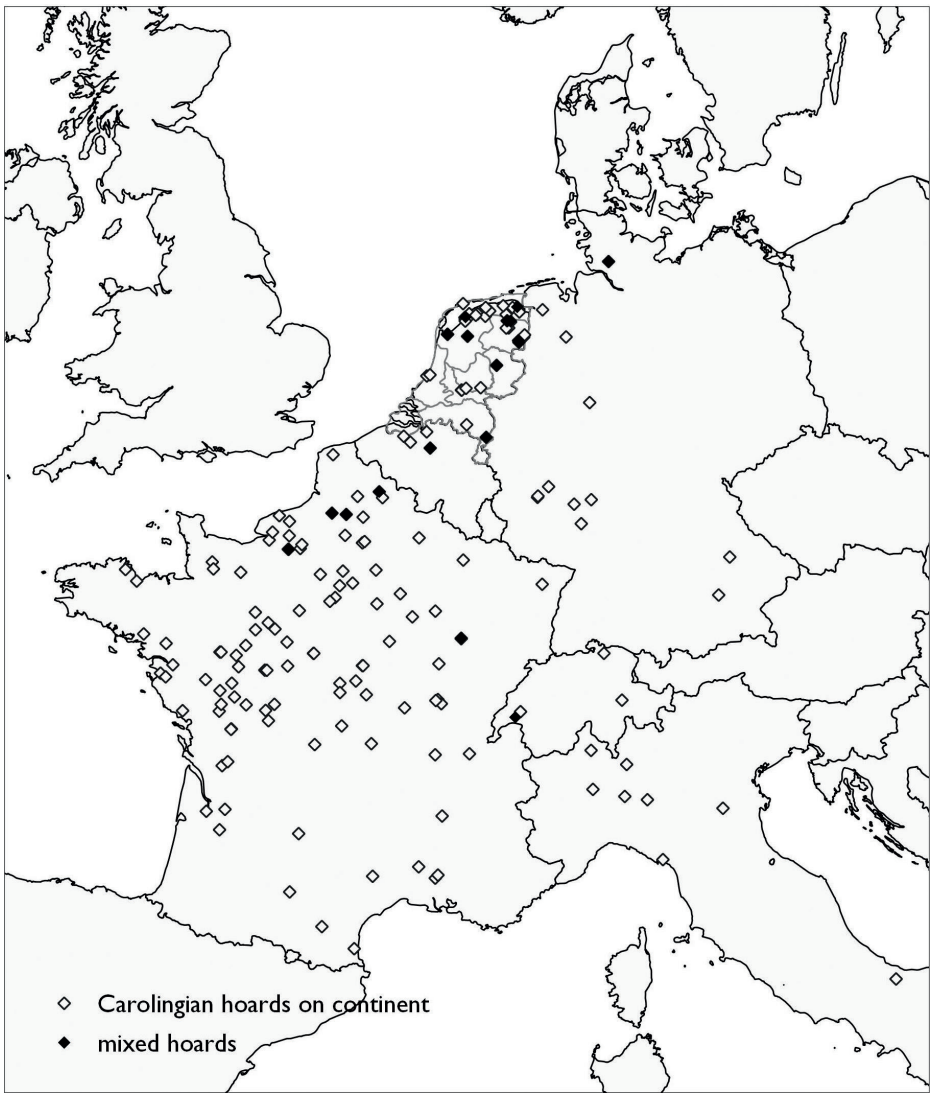


Fig. 8.5 Carolingian coin hoards on the continent (based on Coupland 2014a).

Therefore, a Scandinavian influence on exchange in the northern Netherlands should not be overstated, but the different use of silver compared to the rest of the continent might be a clue as to the upsurge in coin finds for the ninth and early tenth centuries in Drenthe.

Given the lack of (silver) coinage in the area in previous centuries, it seems likely that inhabitants of region 2 were either taking advantage of new possibilities for exchanging surplus or that in the exchange systems in which they were involved silver had increasingly become the medium through which transactions were conducted. Another option is that inhabitants of the area only first became

interested in precious metals as a means of storing value during the ninth century.[127] There are indications that there may have been an increase in the amount of silver in circulation in the north of the research area, at least for a time, in the ninth century. It has been observed that there is an apparent anomaly in the distribution of Carolingian coins in Scandinavia. Historical sources of the second half of the ninth century mention payments of ransom in silver by Carolingian rulers to Viking raiders, but Carolingian coins struck after Louis the Pious' reign have rarely been discovered in Scandinavia.[128] Coupland's explanation is that the Carolingian silver acquired by the Vikings mainly stayed in areas where they established a foothold along the Atlantic and North Sea coast, both on the Continent and in England. One of these areas was part of the western coast of the Netherlands (roughly region 5). This Viking presence therefore may have led to an increase in the amount of silver in circulation along the western and northern coast of the research area.[129]

As IJssennagger demonstrates, based on literary evidence and the distributions of selected artefacts, the northern Dutch coast formed a conduit between the British Isles and Scandinavia, particularly in the later ninth century and after.[130] The contacts between inhabitants of the northern coast and Vikings is characterised as more than simply trading or raiding, but rather multifaceted, with Vikings using the Dutch coast as a stop-over when traveling between the Danelaw and Scandinavia, but also a destination in itself. Moreover, the distribution of finds indicates contact was not concentrated at nodal points but relatively small-scale and freely organised.[131] The inhabitants of region 2 could have recognised an opportunity to direct a portion of their production to acquiring some of the silver which was circulating along the coast. For example, wool and hides are good candidates for commodities that could have been produced beyond local needs and exchanged within an international framework, but equally they may simply have been providing food to passing travellers.

Another possibility is that the desire for silver in region 2, or more broadly precious metals, could have been generated through developments within this particular region. The end of the eighth and first half of the ninth century saw the gradual disappearance of furnished burials in cemeteries in Drenthe.[132] The material wealth represented in burials of the later phases of cemeteries in the region appears limited, but we do not know how much expenditure was being directed to ceremonies surrounding the burial rite. Just as in the south, the re-location of cemeteries and the demise of the practise of furnished burial in particular may only be the archaeologically visible part of wider changes in how ceremonial funds were apportioned.[133] In these circumstances other forms of material culture, such as precious metals perhaps became more suitable for use in ceremonial

127 A further possibility is that tenants on manorial estates were required to pay rents in coin leading to increased exposure of inhabitants of the region to coinage (as suggested for example by Devroey 1993). However, there is no definitive evidence that such estates were a widespread phenomenon in region 2 in the ninth century. In addition, when in the tenth century we do have more concrete textual evidence for ecclesiastical property in the area, coin finds show a drop in the rate of loss of single coins and a reduction in the number of hoards.

128 Coupland 2011b, 113-119.

129 In another article Coupland argues that there was actually a shortage of silver in the northern Netherlands in the second half of the ninth century (Coupland 2006, 254). This is mainly based on the fact that there appears to have been a break in circulation between the West-Frankish kingdom and Frisia. Whereas pre-reform coinage of Charles the Bald, dated before 864, is found regularly in our research area, the *Gratia Dei Rex* type struck after 864 is rarely present. Although the evidence for this break in circulation between the two kingdoms is clear, Coupland makes the error of conflating a decrease in coinage entering the north with a decrease in the availability of silver in general in the area.

130 IJssennagger 2017, 253-256.

131 IJssennagger 2017, 248.

132 Van Es 1967, 518; Van Es/Schoen 2008, 859-861. More generally see Kleemann 2002 for developments in the deposition of grave good in regions to the east of the Rhine from the late seventh to the late ninth century.

133 Theuws 2014, 9.

contexts. Sindbaek points to the advantages of bullion over many other commodities for storage of ceremonial funds.[134] It is portable, measurable, divisible and durable, qualities that allow it to be accumulated over a long period and used on socially significant occasions such as marriage.[135]

These explanations are not mutually exclusive and it is conceivable that a combination of factors is responsible for the observed pattern of distribution. Changes in how ceremonial funds were used may have made precious metals a convenient means of storing value around the same time that silver became more easily available in the north. Exchanges between inhabitants of region 2 and the northern coast may therefore more often have involved the use of silver as a unit of value and means of exchange, perhaps even leading to more formal exchange relations. At the same time, within region 2 silver was perhaps primarily employed in non-commercial exchanges among (members of) communities.

A final point in this context is that the relatively abundant presence of coinage in the region indicates that rural dwellers were engaged in networks where coin circulated, but that this apparently did not lead to them acquiring imported pottery. Once more this suggests that ceramics may not always be a good indicator for the nature of exchange systems as a whole. It also suggests inhabitants of region 2 made choices as to the goods they brought from outside rather than them being limited in their choices by poor access to exchange and transport networks or whether or not they were part of a manorial system.

8. 7 Rural demand

Overall, the strongest indication for rural communities consumptive preferences giving direction to production and dissemination of goods, lies in the combination of data from ceramics and millstones. The disparity between the spread of Mayen millstones and ceramics is marked. Millstones were almost certainly present on every site in the research area whereas Mayen pottery was very uncommon on sites in the east, but a staple of assemblages in the west and south. As far as the central Dutch River area and coast are concerned, this pattern is to a large extent similar to that of the seventh and perhaps even sixth century. However, in other areas, such as the south, Mayen pottery was a minor constituent of assemblages in the sixth and seventh century. It is conceivable that pottery piggy-backed as a minor interest alongside the transport of millstones at that time and was mainly acquired along the main transport routes. There is no reason to assume pottery production in Mayen was expressly geared towards rural demand at that time. The production centre made the same range of vessels produced at other contemporary kiln sites with a more regional outlook, the main difference being that millstone transport allowed Mayen wares to be distributed over a wider area.

The introduction of the globular pot appears to have been a catalyst for developments in production in Mayen. The archaeology suggests that at some point the organisation of the kilns was overhauled and became heavily concentrated on the production of globular pots. Not only that, but the volume of production also seems to have been increased substantially. What led to these developments and where was the demand for these pots? Undoubtedly a portion stayed in the vicinity of the production centre, though with a lack of well published sites in the area around Mayen it is difficult to say how much. What we can say is that globular pots made in Mayen were rarely exported to England, Scandinavia or even the Flemish coast. In fact, they are very rare overall in Belgium

134 Sindbaek 2011, 47-48.
135 Sindbaek 2011, 52-57.

except perhaps in the middle Meuse valley. Mayen millstones on the other hand have been discovered repeatedly on sites in England, Northern Germany, Denmark and Belgium.

As mentioned Mayen globular pots are common on virtually all sites in the west and south of our research area. In these regions they seem to have been adopted early and completely displaced a Merovingian ceramic tradition within half a century, probably even quicker. It is important to stress that at the beginning of the eighth century the west and south differed in many other respects in terms of material culture profiles, political and institutional histories and organisation of production of goods. To a large extent this did not change much during the eighth and ninth century either. It also must be emphasised that if the interpretation of the data regarding the dating of the transition from a Merovingian to a Carolingian pottery tradition from region 8 is accurate, the adoption of the globular pot in rural areas took place before royal interest in estate management is thought to have become important. It is also questionable whether the estates of ecclesiastical institutions were already organised in the way that is known from later polyptychs when the vessel type was introduced. Many important monasteries that held land in our research area in the eighth and ninth century had not been established yet. This, combined with the aspects discussed above (intensification of production at Mayen, large transformations of assemblages in rural households, lack of Mayen pottery beyond the research area) I believe is strong evidence that demand for these pots was generated to a large degree by rural communities in the west and south of our research area. For some reason(s) this new vessel type became popular in a relatively short space of time. It can be argued that its popularity led Vorgebirge potters to concentrate largely on the production of globular pots, in turn leading to the abandonment of some of the types included under type WXIV of the Dorestad typology.

In order to make the case for the importance of rural communities for creating demand for the globular pot an attempt needs to be made to explain why it became so popular. In the previous chapter a number of aspects of pottery were discussed that ought to be taken into account when considering what changes in assemblages imply. It was argued that such changes cannot be put down simply to developments in taste or fashion. When a vessel is introduced into household assemblages, thereby replacing a pot with the same function, but differing in important ways in terms of physical properties, it can point to a simultaneous adoption of new ways of preparing or storing food and liquids. New foodways can in turn be indicative of changes in modalities that are tied up with wider developments in cultural practises. In addition, when vessels are sourced through new channels, that implies changes in the relationship between producers and consumers and the networks which connected both.

The most important physical differences between wheel-turned cooking pots in a Carolingian tradition and those in a Merovingian tradition are that the former were far more rounded in shape, more closed, less porous and, depending on where they were made, a different colour. The development towards more rounded vessels seems to be a feature of the seventh to ninth century throughout the northwest of the continent (and perhaps more southerly as well, but this was not studied). Therefore, it appears to be a feature which can be linked to changes throughout the Frankish world. Whether the changes were related to developments in food preparation or practises surrounding the storage or cooking of (particular kinds of) food is a question that requires a dedicated research programme and cannot be answered with any confidence here. As far as the primarily ecclesiastical sources on practices surrounding food preparation and contamination can inform us on the matter, attitudes appear to have changed little throughout the Early Middle Ages.[136]

136 Meens 1995.

It is possible to see a rough correlation between the period when globular shaped pots were introduced in the various parts of our research area and the consolidation of Frankish rule. Both can be placed in the first third of the eighth century for the western coast, and in the east *Kugeltöpfe* start to appear toward the end of the eighth century around the same time territories in the east of the research area were annexed. However, the rough nature of the correlation must be emphasised. Each region saw its own developments in terms of the proportion of imported and local globular pots and the transition from an older handmade tradition in the east to the dominance of *Kugeltöpfe* took a considerable amount of time to complete. The overall picture suggests the developments in cooking pots were specific to individual regions and generated within them from the bottom up. There may have been something of a homogenising effect of being part of the same cultural sphere with increasingly shared values, but it was the inhabitants of rural households that were interpreting those values in a way that made sense to them.

In the previous chapter a link between the introduction of wheel-turned globular pots and *Kugeltöpfe* was suggested. Both probably became a part of household assemblages in region 5 in the first third of the eighth century. The chronological resolution of archaeological finds may never be fine enough to determine with certainty which was introduced first, but finds from Katwijk and Bloemendaal-Groot Olmen in particular suggest it was the wheel-turned variety. In that case the *Kugeltopf* can reasonably be argued to be an imitation. However, imitation of form does not necessarily imply imitation of use and related cultural concepts. In fact, it was perhaps exactly the fact that the wheel-turned globular pot performed differently to what people were used to that encouraged the development of a locally manufactured variety. The lower porosity of globular pots compared to the portion of Merovingian vessels that were fired less hard may have been problematic in terms of how food could be prepared.[137] *Kugeltöpfe* at this time were generally much softer fired than their wheel-turned counterparts. Another possibility is that the colour of the imported pots was deemed unsuitable, particularly the Vorgebirge variety. *Kugeltöpfe* were usually either a brownish tint or grey to black. Although the nature of the manufacturing process did not allow for consistent firings, even on a single vessel, they may have been similar enough to Merovingian style vessels in order to replace them. Again, it is impossible to determine which of these processes, if any, occurred without dedicated research, but whatever caused the initial manufacture of *Kugeltöpfe* in region 5, it followed the introduction of wheel-turned globular pots so quickly that it is hard to see it as anything other than a process generated by internal demand, rather than the result of outside forces, such as a shortage of imports.

In the south of the research area wheel-turned ceramics from the Rhineland replaced regional producers in a relatively short space of time. In the previous chapter it was suggested that the regional producers perhaps were unable to match the specific characteristics of the globular pot from the Eifel or Vorgebirge. The archaeological evidence does not indicate the transition was problematic in terms of the incorporation of the vessels in to household assemblages, prompting local initiative such as in region 5. But the dramatic transition from regional to supra-regional producers that can be observed does require some elaboration. It is likely that not all regional production sites of Merovingian pottery in the south have been archaeologically identified. Several have been discovered along the Meuse, but other production sites, including manufacturers located more inland must have

137 Merovingian vessels, particularly those produced in the Vorgebirge in the seventh century could also be fired very hard, but there is always a considerable portion of Merovingian assemblages that was fired much less hard. Mayen globular pots on the other hand are invariably fired hard to very hard (stoneware-like).

been present considering the variability in fabrics observed on excavated sites.[138] Dwellers that were either required to travel some distance to a producer, or to whom pots were transported may not have had a particularly strong relationship with manufacturers. However, in cases where the two parties were in close proximity to each other, socially and culturally embedded ties are more likely to have existed.[139] This may have been the situation in much of the south in the seventh and early eighth century, which makes the transition that took place in the first half of the eighth century all the more significant.

There is no clear explanation for the transition from a Merovingian to a Carolingian ceramic tradition in our regions but it is clear that similar developments were happening throughout northern France and Belgium as well. The pace and exact character of those developments differed in detail but they encapsulated a wider range of vessels than just cooking pots. Biconical pots and bowls or dishes were frequently used in the burial ritual and perhaps in other ritual contexts as well. It is conceivable that the provisioning of such vessels for use in a ritual context was not possible through commercial exchange and that it required a socially embedded relationship between producer and consumer.[140] In that case, changes in the enacting and framing of rituals such as can be observed in burial practises in the late seventh and early eighth century could have led to a period in which established relations between producers and consumers became more fluid and negotiable. This would make it easier for inhabitants of the south to adopt a vessel which was made by producers with which they had no direct contact, but who made a pot that was appreciated for its physical qualities. The difference between the south of our research area and other parts of the Frankish world was that it was close to a long-distance exchange network through which high quality wheel-turned pottery was transported. This proximity to a well-established long-distance transport route provided an opportunity to change supplier in a way that was not possible in many parts of northern France.

The south had virtually no tradition of handmade pottery in the seventh century except on the very southern fringes. Handmade globular pots were introduced relatively late compared to other regions in the research area and this gives the impression that it might not have been an entirely voluntary choice to do so. It is tempting to see a connection between an increased focus on the production of storage and pouring vessels in the Vorgebirge, to the detriment of globular pots, and the introduction of handmade pottery in region 8. In the central Dutch river area and the western coastal region it also appears that *Kugeltöpfe* became increasingly important in assemblages throughout the eighth to tenth century. Whether this was purely a case of Vorgebirge potters realigning production to a different group of consumers or rural dwellers gradually choosing their local handmade versions of globular pots over the imported examples is difficult to determine. The situation in the east of region 8 certainly points to the former explanation, but in general the process could have been more intricate. For example, it could have become less interesting for the Vorgebirge potters to produce globular pots when on the one hand consumers in the west were using local wares more frequently and on the other there was a growing demand for other vessels types for storage and pouring. In that case, the consequence of a decline in Vorgebirge production of cooking pots for people in the south

138 Verhoeven 2015, 507.

139 Skre 2012, 50-51. Ultimately it is not the physical distance between producer and consumer which is relevant but the social distance, whether both parties were part of a close or loose social network.

140 An example is provided by the Indian village studied by Miller mentioned in section 8.5. The provision of certain vessels that were integral components of ritual occasions was governed by customary practises of reciprocal exchange between a potter's household and their clients. It was not deemed appropriate for clients attached to a particular potter's household to source those vessels from another potter (although in practise it did happen). At the same time pots intended for secular use could be purchased from any potter, although the relations based on the provisioning of ritual vessels had a strong influence at the village level (Miller 1985, 83-93).

was likely that they were forced to make their own. Equally it would have required inhabitants of the western coast and the central Dutch River area to rely increasingly on local production. If changing rural demand is not taken into account as an element in the decline in the importance of imported globular pots it is hard to understand the disappearance of Mayen pottery from our research area, especially as Mayen millstones continued to be used. Even if the Vorgebirge potters indeed chose to largely abandon production of globular pots, if demand had been high enough for the vessel type, Mayen could have continued to supply them, but this clearly did not happen.

In much of the east of the research area imported wares seem to be restricted to utilitarian items made of raw materials not present in the region. This characterisation is most applicable to the north of region 3 (subregion 3.1) where imports of any kind are scant. Some sites in the south of region 3 (subregion 3.2) contain imported vessels which are deemed to be early, suggesting that exchange relations between inhabitants of the area and the Rhineland transport network were already established by the first half of the eighth century. Throughout the eighth and ninth century the proportion of imported wares seems to have remained relatively stable. The long-term development of household assemblages in the area therefore suggests the distribution of imported goods cannot be directly related to the establishment of Carolingian institutions. Given the proximity to the Rhine of subregion 3.2 the archaeological evidence might be expected to show higher proportions of Rhineland wares, for example similar to the north of region 5. At the same time the relatively small amount of imported wares is less pronounced when it is compared to sites along the section of the Rhine to the east of Wijk bij Duurstede, adjacent to subregion 3.2, instead of sites around the mouth of the Rhine. It is possible that the exchange networks allowing the distribution of Rhineland ceramics throughout the research area to an extent by-passed the area between the Dutch boarder and Wijk bij Duurstede.

This might be expected in particular for storage vessels, which it was argued above are less likely to have been developed with rural communities in mind. Nonetheless they were used in rural households throughout the east, south and west of the research area. The combination of data on function categories and fabric groups of wheel-turned pottery in subregion 3.2 in fact provides tentative evidence that what was mainly imported in that area were storage vessels. It may even be the case that imported globular pots were also mainly used as containers rather than for cooking in that part of the region, though to establish this with more certainty requires dedicated research.

As already noted, region 2 was involved in exchange networks in which coin circulated and inhabitants were able to acquire millstones when needed. At the same time, imported ceramics were not used systematically in rural households. It cannot be ruled out that the existing transport routes of ceramics made it difficult to acquire such goods, but if there had been a significant demand they could have reached areas inland in the east as evidenced by the distribution in the south of the research area. There wheel-turned pots have been found on sites at least as far inland as many sites in regions 2 and 3. The gradual adoption, over a long period of time of the *Kugeltopf* and disc-brooches indicates that there was certainly no explicit rejection of Frankish material culture in these areas. Apparently new forms of material culture were incorporated according to preference relevant for communities in these regions.

Such intra-regionally specific preferences are also visible in the north. The west of the province of Friesland (subregion 1.2) stands out because of the specific nature of the imported vessels found on sites there. Imported pouring vessels and tableware were relatively common while cooking and storage vessels were not. The assemblages give a strong impression that specific choices were being

made by inhabitants of this area with regard to the pots they imported. Such local preferences can perhaps be traced back to the seventh century when the proportion of wheel-turned ceramics at Wijnaldum dropped dramatically, earlier than along the western coast. The nature of the distribution of ansate brooches along the northern coast emphasises the particular material culture profile of the subregion. It is also reflected in the distribution of Tating ware. Whereas very few sherds of Tating ware have been found in the research area in general, three out of four sites in the west of Friesland where ceramics have been recorded contained examples. When the wider distribution of Tating is considered it becomes apparent that it is particularly common on sites in England and Scandinavia. Although the location of Tating production has not yet been identified, it is clear that demand was mainly concentrated outside the Carolingian world. The distribution of Tating ware in the northwest of the research area is another indication for the close links between that area and England and Scandinavia.[141]

Further east along the northern coast, wheel-turned pottery hardly occurs and it can be argued that this is related to limited availability compared to other regions, at least in the eighth century. We saw that Mayen pottery rarely travelled beyond the research area, and the west of Friesland was the most northerly area where it occurred systematically in household assemblages when the pots became available in the research area. The output from early medieval production centres in the Rhineland simply may not have been large enough to supply such a wide catchment area. At the same time, the distribution of Mayen millstones in England and the coastal areas of modernday northern Germany and the Jutland peninsula shows that the transport routes existed. Furthermore, Vorgebirge wares were the largest imported group of wheel-turned ceramics at Ribe and later Haithabu. Globular pots did sometimes make their way to households further east along the northern coast as their presence in cemeteries attests to.[142] It also seems unlikely that sites in subregion 1.1 and 1.2 could be supplied regularly but settlements slightly further east could not. Therefore, perhaps ultimately demand for imported wheel-turned vessels in the northeast was simply lacking, just as in much of the remainder of the east of the research area.

In conclusion: there is ample evidence to suggest the consumptive preferences of rural communities played a role in shaping exchange systems. For parts of the east of the research area local demand may have had little effect on wider exchange systems. Inhabitants there seem to have been interested only in a limited number of items that were not available within the region. However, demand for cooking pots in the west and south is likely to have led to increased scale and intensity of production

141 See section 8.6. The observed distribution of Tating ware over northern Europe begs the question whether the search for its presumed area of production, now believed to lie somewhere between the Rhineland and the French coast, is hampered by presuppositions. A distribution map of Tating finds produced by Stilke (Stilke 2001, 269) mainly shows sites in England and Scandinavia with only a few sites on the continent, all located either along or to the north of the Rhine. The results of chemical analyses of samples of Tating ware have as yet not proved comparable to samples of known Rhineland production (Stilke/Hein/Mommsen 1999, 418). If production had taken place in northern France and travelled north some finds on sites along the Flemish coast might be expected, especially considering pottery from northern France is a regular feature on sites in that area. However, as yet, to my knowledge no Tating fragments have been identified. I am tempted to think that the production site of Tating may have been located in England or Scandinavia. We know that some wheel-turned pottery was produced at Ipswich. Up till a few years ago the idea of the existence of early medieval wheel-turned pottery production in Scandinavia would be unthinkable, but the evidence from Ribe no longer makes it such a leap. Obviously there is as much hard evidence for a northern European origin of Tating ware as there is for anywhere else, and areas of distribution do not necessarily coincide with the location of production. However, the notion that Tating must have been made on the continent at least deserves some reconsideration.

142 Kleemann 2002, 161.

at centres located relatively far away, first in the German Eifel and then the Vorgebirge. Here rural demand did create the impetus for changes in the organisation of production and helped shape exchange networks.

8.8 Discussion: the nature of exchange

A final factor to consider when interpreting the distributions of goods in the research area is the nature of the transactions through which they were exchanged. Were transactions impersonal interactions between two parties for which the act entailed no further obligations, or were they regulated through socially and culturally binding arrangements? Both Grierson and Duby were early proponents of a model in which transactions mainly took place within a system of reciprocal gift-exchange and commercial transactions played virtually no role at all. They took inspiration from anthropological work, that suggested an opposition between 'primitive' societies where exchange was embedded in social structures and modern society in which the economy is a distinct sphere of interaction without ties to other forms of social relations.[143]

Such a binary opposition between, in our case, exchange in early medieval society and exchange in later periods is now hard to find in academic discourse. It has been pointed out by several authors that the opposition of 'primitive' or past and modern is not so straightforward.[144] However, the search for the kernel of the transition from one state to the other, and for a definition of early medieval exchange systems as either mainly embedded or disembedded, can still be identified in much work on the subject. In several of the current models both gift and commodity exchange are believed to occur side by side, but questions now often centre on which of the two was dominant at any one time during the (Early) Middle Ages, and on trying to define the distinction between gifts and commodities and how the spheres in which they were exchanged interacted.

In chapter 1 we saw that several archaeologists who have based their models largely on the situation in coastal areas and emporia believe a transition from embedded to more disembedded exchange took place in the course of the seventh to ninth centuries. For Hodges there was a gradual development toward commercialisation and monetisation that started in the seventh century. Emporia are supposed to have played a crucial role in this development and paved the way toward the medieval town which was characterised by the presence of markets and exchange rather than being primarily consumption sites.[145] Loveluck and Tys argue that the shift from embedded to disembedded exchange was mainly a characteristic of inland communities in the seventh to ninth centuries, because maritime communities were already familiar with commercial exchange. The lack of specific resources in coastal areas is thought to have encouraged exchange in which a large proportion of the communities in those areas were involved. Inland there is supposed to have been a more hierarchical distribution of goods such as pottery.[146] Increasing contacts between inland dwellers and coastal and riverine communities is believed to have transformed rural exchange towards more formal transactions.

Others, mainly historians, also see a growing importance of commercial exchange during the Carolingian period, but for them the transformation was generated through increases in agricultural

143 Mainly Polanyi 1957.
144 Moreland 2000; Theuws 2004; Skre 2007. Taking inspiration from among others Mauss 1967, Appadurai 1988, Bloch and Parry 1989, Bourdieu 1990, Lie 1991/1992/1997, Weiner 1992, Godelier 1996.
145 Hodges 2012, 137.
146 Loveluck/Tys 2006, 153; Loveluck 2013, 191-197.

production. As discussed previously in this chapter, for some gift-exchange between the landed elite was what ultimately structured the system of exchange as a whole. However, to acquire the items intended as gifts they needed to engage in commercial exchange and this eventually led to such a volume of transactions that it encouraged the creation of a dense network of regional markets from the ninth century onward.

What most of these models have in common is that they seek to identify what was ultimately *the* defining characteristic of exchange systems at various points during the Early Middle Ages.

Skre bypasses the debate on the degree of embeddedness of early medieval exchange and the distinction between commodities and gifts.[147] He argues that exchange always carries both a degree of purely economic and social motives, and that the exact form exchange takes depends on context, actors and their relations, and the objects being exchanged. In his model economic agency increased in northern Europe when long distance trade became more common, because the distance between trading partners became greater and it became easier and more convenient to engage in exchanges without the need for establishing social bonds. In a similar vein Theuws, following Bloch and Parry, argues that the difference between gifts and commodities lies in the nature of the transaction, not in the objects themselves. An object can be transferred from one sphere (that of the gift and that of the commodity) to the other but this involves rituals and procedures which help uphold the values and norms of society. The exchange of gifts and commodities are both part of the total sphere of exchange along with the aspect of keeping of objects. The crucial point is that they were not separate spheres in an absolute sense but were bounded and defined by the same essential values and norms of society, in the case of the Carolingian world mainly values defined in relation to Christianity.[148]

As will have become clear from the previous sections, the examined archaeological data contains considerable ambiguities in terms of whether the mechanisms through which rural dwellers acquired or received goods were based on forms of exchange that can be viewed as transactions in the short or the long term, to use Bloch and Parry's vocabulary.[149] For example, if ecclesiastical institutions played a role in stimulating the exchange of items like ceramics and millstones, was it in the form of patron-client relations or the result of more indirect action in which these items ultimately reached rural areas through commercial transactions? Most of the goods examined in this research were imported into the various regions, which makes it less likely there were direct relations between producers and consumers. For example, the Mayen millstones are unlikely to have changed hands between these two groups through gift exchanges. The distance between where they were produced and the sites in our research area is too large and the area of diffusion of the millstones too great to make this a viable option. A lack of such relations means that for the acquisition of imported goods only relations between intermediaries and producers and consumers might potentially be characterised by strongly socially or culturally embedded types of exchange. The possibility that lords were responsible for the provisioning of rural households was examined and, except for ecclesiastical institutions, found to be unlikely for a substantial part of the observed variability in material culture profiles. The role (if any) of abbeys and diocese in ceramic production cannot be determined exactly. A case can be made for a role of such institutions in the provisioning of households in certain parts of the research area, but again it cannot easily explain all the variability observed in the archaeological record. Equally, it cannot be ruled out that elite groups stimulated exchange by demanding transport duties from their dependants, making market interactions more common among the rural population. However, the evidence from ceramic and millstone distributions indicates that networks providing

147 Skre 2007, 333-335.
148 Theuws 2004, 124-127.
149 Bloch/Parry 1989, 24.

rural communities with Rhineland goods were already established in the seventh and early eighth centuries century, before manors are thought to have played an important role.

Goods may have reached rural settlements through hierarchically organised networks of exchange, but if this were the case it did not lead to important differences in the availability of imports within regions. In fact, within regions the imports present on sites are actually remarkably similar. The differences that can be observed between for example the east and west of region 1, the north and south of region 3 or the east and west of region 8, are more likely related to a combination of variable physical access to and interaction with particular transport routes, and consumptive preferences. They manifest themselves as variations in the amount of shell-tempered ware or the proportion of Meuse-valley compared to Rhineland ceramics. These intra-regional differences are generally much less pronounced than inter-regional variations. It is possible inter-regional variations in the nature of hierarchical structures at work explains some of the variability in artefact assemblages between different parts of the research area.

Besides institutions acting as intermediaries there are also individuals that played a role in the circulation of goods. Merchants as intermediaries at first glance seem more likely to have relatively formal exchange relation with rural communities. But not all independent parties that facilitated exchange of goods between producers and consumers should necessarily be categorised as merchants. For example, tenants performing transport duties may have brought goods from markets to exchange with neighbours. Alternatively, certain untied members of rural communities (either situated in riverine areas or more inland) could have acted as conduit between the main arteries of exchange and rural households as a supplement to their income. It is possible the transactions between these individuals and other households came in the form of socially embedded exchange mechanisms. Nonetheless, in these scenarios at least some members of rural communities were engaged in commercial exchange.

The fact that relatively commercial transactions were conducted in reference to sets of shared rules, norms and values is illustrated by evidence for the functioning of exchange at ports. It shows a considerable level of customary practises involved in transactions. The sets of rights and privileges utilised at ports throughout the Middle Ages as described by Middleton can hardly be considered hallmarks of commercial exchange relations where prices are set solely according to supply and demand.[150] Perhaps shared practises in long distance exchange networks can also be recognised in the exchange system functioning between the middle Rhine in the area around Mainz and Frankfurt, and the central Dutch river area and sites around the mouth of the Rhine. It has been noted several times in the previous sections that this route already functioned in the seventh and perhaps also in the sixth century. However, it is not until the end of the seventh century that coinage in the form of sceattas start to appear in large quantities along the Dutch stretch of the Rhine. Even then, there is little evidence for a comparative increase in the use of coinage further upstream, except at Mainz. Moreover, the use of sceattas may well have been initiated primarily in order to facilitate exchange between England and the continent rather than transactions on the continent itself.[151]

With regard to the early ceramic vessel types of the Dorestad typology, these have mainly been found in our research area along the Rhine, roughly in the area between Wijk bij Duurstede and the mouth of the Rhine. Sites situated more easterly generally contain few early types, and assemblages containing later types are usually much smaller than on more westerly sites. The evidence suggests that along the eastern stretch of the Rhine local or regional production remained dominant into the

150 Middleton 2005.
151 Theuws in press b.

early eighth century if not later.[152] Finds of Carolingian coinage between Mainz and the lower Rhine area are not particularly numerous. For example, no hoards containing Carolingian coins have been discovered in areas along the Rhine between Koblenz and Arnhem, but three have been discovered around Koblenz and also three in an area between Mainz, Frankfurt and Worms.[153] The Dutch stretch of the Rhine has also yielded several hoards. In addition, relatively few mints producing Carolingian issues are known along the Rhine, certainly compared to other parts of the empire. This suggests a large section of the Rhine was not as familiar with transactions involving coin as the Frankfurt/Mainz area and the central Dutch river area in the eighth and ninth century.

What coinage and pottery distributions appear to indicate is that the link between the middle Rhine and the westerly stretch of the lower Rhine in our research area was relatively direct; in other words, sites along the intermediary section may not have taken part in this connection. This in turn indicates that the inhabitants living near the Rhine in the middle and west of our research area that were involved in transport and exchange may have been more familiar with individuals and their practises in the middle Rhine area than those in parts of the south and east of the research area. Up until the later seventh century exchange between these two areas must have been organised in a way that did not require coinage, although other units of value may have existed that are difficult to recognise archaeologically today. When, from the late seventh century onward coin became increasingly important in transactions in both areas, they still seem to have been more directly connected with each other than with any part of the intermediate stretch of the Rhine. Therefore, even if transactions were relatively commercialised, for example in terms of the manner in which prices were set, inhabitants of the two areas may have shared a common understanding regarding norms and values inherent in exchange which they did not share with people in other regions.

The discussion of coinage and silver in the north of the research area highlights that an increase in the use of coinage does not necessarily point to a general shift in the nature of economic relations. In the ninth century silver seemingly became more common in transactions in which inhabitants of region 2 were involved. It was not possible to determine with certainty what factors caused this development. Silver may have become more important in transactions taking place along the northern coast, requiring inhabitants of region 2 to acquire a stock. It was also suggested that within the region silver may have played a part in ceremonial exchanges. Whatever scenario did unfold, coin distributions imply that the importance of coin had dissipated after the beginning of the tenth century. This should act as a caution against seeing an increase in the use of coinage as the start of a gradual but unstoppable transition towards monetised exchange taking place in the Carolingian period and later. For much of the research area it took until the thirteenth century before the volume of coin loss surpassed that of Carolingian issues.

In general, the artefacts investigated in this study are perhaps not ideally suited to determining exactly how socially embedded exchange and more commercialised exchange interacted. To do this it would be necessary to include a wider range of artefacts, particularly more non-utilitarian objects. However, the focus that can be identified in several studies on determining which of the two poles was hegemonic at any time during the Early Middle Ages is, I believe, not helpful, because in doing so invariably one of the poles is marginalised. In our period, there is evidence in the archaeology of our research area for both transactions that can be characterised as strongly socially embedded, and those that are mostly commercial. At a regional level the variety in the relationship between these two poles is such that *generalisations* pertaining, for example, to the entire Carolingian world,

152 See for example the assemblages of Oosterhout-'t Klumke (Ball 2007) and Lent (Den Braven 2009).
153 Coupland 2010.

or to differences between rural and coastal dwellers become largely futile. To be sure, there were clear divergences in consumptive patterns between those living in coastal areas, along rivers and more inland. These may well have been related to associated differences in mentalities.[154] However, none of these zones were monolithic in terms of consumption patterns or mentalities. As we have seen, some inland, rural regions were more similar to adjacent coastal regions (for example region 2 and the east of region 1) in their material culture profile than they were to other parts of the same zones. In terms of variation within the zones, people living in the east and the south of the research area were both agriculturalists and lived at some distance from the main arteries of exchange, but their exchange relations with people outside those regions almost certainly differed considerably from one another.

Closely related to these issues is the search for *the* motor of exchange mechanisms in the Carolingian period. This has led to an over-emphasis on the importance of elite driven demand, effectively reducing the economic activities of the vast majority of the population to happenstance rather than crediting it with having its own dynamics and consequences. This chapter contains examples of demand being generated by the consumption of a variety of actors, and with each playing a part in creating exchange systems in the seventh to ninth centuries (as well as before and after). Is it not more interesting to examine how the consumptive preferences of various groups were articulated than to ask which of them was ultimately dominant in exchange systems? This study has shown that the kind of bulk, regional exchange which historians of the period ascribe to the emergence of manorial estates was underway before those kind of estates had come to fruition. The mechanisms which underlay this exchange may well have been further developed under conditions where elites played an important part, in particular during the ninth century.

Such an approach, taking into account the actions of all the participants in economic systems and viewed from the bottom up is in line with current ideas encapsulated by complexity science. Since the 1980's complexity science has had an impact on a wide range of fields of study among which archaeology and economics.[155] In economics this has led to important developments in the understanding of how economic systems function; these new perspectives are fundamentally different from the established economic models still found in many textbooks.[156] Since the very beginning of the discipline, traditional economic approaches have made the crucial assumption that economic systems always move towards a state of equilibrium in which there is a perfect balance between supply and demand, time plays no role and economic actors are perfectly rational with a complete knowledge of all possible permutations.[157] One consequence of this assumption is that any evidence of disequilibrium and change in economic systems must be the result of exogenous inputs.

In contrast, complexity economics argues that economic systems emerge from the continuous interactions of agents with each other and their environment and are therefore never in equilibrium.[158] Exogenous inputs can have an effect on economic systems but they are not necessary to generate change because systems are already in a constant state of flux, due to the reactions of agents to the actions of others and changes in the environment. The environment here is understood as the physical, political, institutional, cultural and societal circumstances that set limits and provide opportunities for actors to act upon and be influenced by. However, the environment is also

154 Loveluck/Tys 2006, 162.
155 For an historiographical account of the use of method and theory related to complexity systems in archaeology see Kohler 2012.
156 Arthur 2013.
157 For an overview see Beinhocker 2006, 21-43.
158 Beinhocker 2006; Arthur 2013.

susceptible to change resulting from those actions. In complexity economics there is no need for, in fact there is no place for, the idea of a single motor that drives an economic system. The economic system is generated from the bottom up through the collective actions of individuals. However, the system cannot be understood merely as the result of adding up the actions of each individual actor; instead their actions create a reality which is more than the sum of its parts. This quality is now generally referred to as 'emergence': its main characteristic is that events can have considerable consequences that are unforeseen.[159] In other words, the outcomes of interactions between agents at the micro-level can have unpredictable consequences at the macro-level. How this happens can broadly be explained by two mechanisms. One is through small events which cause chain-reactions or cascades throughout a system as a whole due to the complex interdependencies between the variables in a system.[160] A second possibility is that gradual developments in the trajectories of individual variables at some point converge or bifurcate, in such a way that sudden, large-scale change occurs, leading to a comprehensive re-organisation of the system. In both cases change is primarily prompted through developments which are endogenous to the system. Also, in both cases the variables in a system will have different geographical and temporal scales. Developments in some variables may play out over longer periods or larger areas than others. Temporality is also reflected in the contingent nature of changes. What happened before has an effect on what can happen next. Another important aspect of emergence is the open character of the outcomes of interactions between agents and between agents and their environment. In principle there is no directionality in the process and therefore outcomes cannot be predicted *à priori*.[161]

This is a very brief outline of what complexity approaches entail. As mentioned above, in many respects, complexity science is an umbrella term for various approaches which share basic characteristics, namely an understanding of the relationship between agents and their environment as complex, open-ended, unpredictable, contingent and emergent (in the sense that macro-level phenomena emerge from micro-level behaviour in a non-linear way). It is these aspects that are of interest here as a framework for interpretation. The previous sections contain examples of interrelated developments which, although perhaps not detailed enough to be a full description of a complex system, are at least analogous.[162] Some of the aspects of early medieval exchange discussed in this chapter provide examples of interactions between variables with differing geographical and temporal scales, some of which appear to have had unintentional and unexpected consequences from the point of view of those involved.

An example of such dynamics provided in this research are the changes in production, distribution and consumption of ceramics during the period from the seventh to the ninth century. Some of the variables which influenced these changes had trajectories which started long before our period and happened on various geographical scales. One instance of this is the contacts between millstone

159 Bentley/Maschner 2009, 246-252.
160 Hodder 2012, 163-167.
161 Hodder argues that despite this theoretical lack of directionality, the nature of relations between humans and things is such that direction can be identified, but only as a consequence of the contingency of those relations (Hodder 2012, 168-171). Humans and things become entangled in elaborate webs of dependency to such an extent that when a problem arises in one strand it is more costly to go back to a previous state than to change the single component that is causing a problem. To go back would mean making changes to a far larger number of interlinked components than just the one that is problematic. This mechanism leads to an increase in human-thing entanglements over time. The idea is similar to that of path-dependency.
162 Bentley and Maschner warn of the danger that emergence becomes just another important sounding term to mask a lack of understanding of the underlying processes at work (Bentley/Maschner 2009, 247).

and pottery producers in the German Eifel and communities living in riverine and coastal areas of our research area which certainly date back to the fifth and early sixth centuries.[163] As suggested above, initially Mayen pottery was probably secondary to millstones in terms of its importance in maintaining transport routes between the two areas. We do not know exactly why producers in Mayen started making globular shaped vessels, yet it is conceivable that demand was generated locally. Within several decades (or less) the introduction of this pot type led to a complete overhaul of the organisation of production at Mayen. The reasons for this change were probably not situated locally but were likely the result of developments in a wide geographical area, including our research area. Here the globular vessel gained relatively quick acceptance, again for reasons we cannot determine for certain. However, what we do know is that a major change in ceramic tradition was taking place across much of present day northern France, Belgium, The Netherlands and the German Rhineland.

As suggested earlier, these developments in the appearance of ceramics may at least in part have been due to changes in ceremonial practises, among which burial rites. The church grew as an institution in the centuries preceding our period. Wood argues that the Christian church had become an important social and economic force in the course of the fourth to early eighth century in western Europe, in no small part due to its sizeable endowments of land.[164] Though as an institution it will not have had a direct impact on the transition from a Merovingian to a Carolingian ceramic tradition, through its interaction with agents and other institutions it could have played a role. It has been proposed that by the late seventh or early eighth century practices surrounding burial, and perhaps feasting too, had to a large extent been brought into the sphere of influence of the church.[165] This growing influence does not necessarily bear a direct relation to the abandonment of furnished burial, which was also a gradual development with its own dynamics. However, in a previous section it was proposed that there may be a link between the changes in the framing of rituals that took place in the seventh and eighth centuries, the use of objects in those rituals, and important developments in ceramic assemblages. Hodder argues that it is possible for long-standing entanglements between humans and things to be temporarily loosened when they come under stress, allowing for new configurations to occur.[166] Perhaps the otherwise largely separate developments in the influence of the church on communities and their ceremonial practises in western Europe on the one hand, and in the framing of rites among those communities on the other hand, converged to some extent around the end of the seventh century or beginning of the eighth century. This convergence may have created room for more drastic reconfigurations of relations between producers and consumers of ceramics, as was suggested in section 8.7.

In the specific case of the south of our research area, the transition from a Merovingian to a Carolingian tradition can also be related to the developments sketched out above involving transport routes over the Rhine, and the introduction of new vessel types, including *Kugeltöpfe*. The dependence on Rhineland wares in the south may have led to unintended and unexpected consequences when production in the Rhineland changed in character in the course of the ninth century under influence of a concentration of exchange at a more limited number of sites. The evidence for the research area as a whole indicates a degree of continuity in

163 The link between the Eifel region and our research area with regards to tephrite grindstones goes much further back to the Bronze Age. Ceramics from the Eifel had Late Roman antecedents.
164 Wood 2013; Wood 2018.
165 Effros 2003a; Effros 2003b, 171-173.
166 Hodder 2012, 166.

exchange mechanisms from the seventh through to the ninth century which in turn points to the contingent nature of change.

Another example of convergence discussed in this chapter, of what at first would seem disparate sets of developments, is in relation to the sudden increase in silver in region 2 in the ninth century. These scenarios are hypothetical in terms of the interactions between variables. Many other complex interactions could be suggested on the basis of the evidence from this and other research regarding the nature of exchange in the Early Middle Ages. What is important is that a complex systems approach negates the necessity to privilege one group or one event as the determining agent of change. Applied to early medieval exchange systems, a complex systems approach makes it necessary to consider the role of each group of individuals that played a part in shaping the systems. It also requires investigating the limitations and opportunities of, and interactions with for example the physical landscape, political structures, technology, and systems of value. Moreover, these elements need to be approached with an aim to uncover at least a rough outline of how they interacted dynamically through time.

This study, with its primary focus on rural communities can only go so far in examining the relevant interactions in the economy of the Early Middle Ages. However, it does show that it is important to be specific about the trajectories through space and time of each variable in order to grasp the complexities involved, rather than generalising based on evidence compiled from across several centuries and collected from sources throughout the Carolingian world. The previous sections and chapters have provided ample motive to give variations between relatively small geographical units serious attention. It has also highlighted the importance of being as specific as possible in terms of chronology. Furthermore, in order to understand the dynamics in the smaller regions defined here it is also necessary to take into account wider developments, including those that have long temporal trajectories and at first may not seem to have been directly related to the specific object of study. Finally, what this chapter certainly offers is a more complete impression of the role of rural communities in early medieval exchange than has previously been attempted.

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Summary

The importance of exchange in the Carolingian period, and its specific character, has been a subject of academic debate since the beginning of the twentieth century. There has been much discussion on the relative importance of local, regional and international exchange, the role of landed elites, merchants and craftspeople, and to what extent exchange in the Early Middle Ages was either characterised by socially embedded relationships or impersonal transactions. What is largely lacking is a consideration of non-elite rural dwellers as constitutive elements in the economy. The *Charlemagne's Backyard?* project, of which the present study represents one part, was initiated in order to examine just this caveat in the debate. The present study focusses on the role of rural communities in the development of exchange systems during the Carolingian period. To what extent did the consumptive preferences of rural communities influence the flow of goods at a regional and interregional level?

The project set out to better understand rural inhabitants' role in shaping economic systems of the eighth and ninth century, through the study of archaeological evidence. Investigation of the rural economy of the Carolingian period has up till now predominantly been conducted by historians. Archaeologists interested in economic issues regarding this period of the Early Middle Ages have tended to concentrate their efforts on the kind of exchange relations that existed in long-distance transactions, and the archaeology of towns. Exchange relations in a rural contexts have seldom been examined.

The archaeological data employed in this study consists of finds recovered from Carolingian sites discovered within the current borders of the Netherlands. Although all finds from these sites were compiled in the context of the research, not all find categories proved useful as a basis for further enquiry. This is partly due to considerable variability in the preservation conditions between different parts of the Netherlands. For this reason artefacts made of organic materials in particular are unevenly distributed over the research area. Other important factors that influence the comparability of assemblages between sites and regions are the variable nature of excavation methods and publication practices. Though the effects of these aspects cannot be mitigated entirely, an attempt was made to reduce their impact during the analysis of find distributions.

Ultimately, three find categories, namely ceramic, metal and stone artefacts, were deemed appropriate for further analysis. Analysis mainly consisted of comparing the distribution of artefact categories and types between regions of the research area. However, in order to make meaningful comparisons it was necessary to first establish the current state of research regarding the various find categories. For example, understanding temporal aspects of the distribution of finds requires detailed assessment of the chronology of artefact types. Such literature studies were conducted for ceramic vessels, iron production and working, metal brooches, coins and millstones.

The analysis of ceramics reveals five important points. First, the late seventh and eighth century saw changes in the location of production sites relative to rural settlements in our area of research. In some regions the changes were quite dramatic, with a complete replacement of regional production by either supra-regional or local manufacture, while in other regions change was fairly limited. Second, the range of functions represented by the pots available to rural dwellers changed in the course of the eighth and ninth century. Third, the beginning of the eighth century saw the introduction of both a wheel-turned globular shaped vessel originating in the Rhineland, and a similarly shaped vessel which was produced locally. The introduction of these two vessel types in a short space of time can be informative of the relationship between pottery producers and the

rural inhabitants that consumed their goods. The changes in appearance of the pots in household assemblages is a fourth significant development during our period. It is argued that these changes in the physical qualities of vessels are more than just a matter of taste or fashion and may be indicative of broader changes in the Carolingian world. Finally, the dominance of pots manufactured at two production sites in the German Rhineland among wheel-turned vessels in the research area is remarkable, especially when the wider dispersal of their products is taken into account. Outside the research area, in neighbouring areas, Rhineland ceramics do occur, but often in small quantities.

Iron is one of the few commodities that was produced in large quantities in the research area during our period. It took place in several regions and the evidence suggests that there was more than one way of organising production. In the Veluwe area the different stages of production were mostly physically separated, while in the Monteferland/Liemers area and the south of the research area most stages of manufacture were conducted in and around the settlements. With regard to iron artefacts themselves it appears likely they were common on rural sites, but mainly consisted of utilitarian items for which iron is better suited than other materials, particularly tools intended for cutting.

Brooches form an important group of artefacts for identifying regional variability. In particular, three of the more common ansate brooch types of the eighth and ninth centuries each have a fairly distinct distribution, with little overlap. Variants of the other main brooch type, the disc brooch, are less clearly regionally differentiated within the research area. Disc brooches appear later than ansate brooches, though there is some chronological overlap, and the wider dispersal and greater morphological and compositional consistency of the former type suggests that over time a degree of homogenisation occurred in the use of brooches as dress accessory in the research area.

Coins are quintessentially associated with exchange but in our period may not be a suitably proxy for the relative importance of exchange in rural areas, both diachronically and spatially. There are methodological issues in interpreting patterns of recovery of coins, but more importantly, coinage may be more indicative of the nature of exchange than its volume or intensity. Furthermore, it is argued that in at least one part of the research area a sudden increase in coin finds in our period may well be related more to internal, social and cultural developments, than engagement with wider exchange networks per se.

Millstones quarried in the German Eifel were almost certainly present on every site in our research area throughout the eighth and ninth century. This offers an interesting contrast to Mayen ceramic vessels, which were manufactured in the same locality as the millstones, but have a much more regionally specific distribution in our research area.

The analysis of (the distribution of) find categories does not allow the establishment of a single model of how rural dwellers participated in exchange networks of the eighth and ninth centuries. In fact, with all the uncertainties surrounding the distribution of artefacts, both methodologically and interpretatively it is virtually impossible to isolate the role of rural dwellers in exchange networks of the eighth and ninth centuries. Moreover, I contend that there is little meaning in attempting to achieve this. Furthermore, it is unhelpful to try to determine the relative importance of different groups in society for the establishment and maintenance of exchange networks at any one time. However, by investigating the analysed finds in relation several themes relevant to the Carolingian period to it is possible to paint a fuller picture of the role of rural dwellers in exchange than was previously available.

Comparing the find distributions to reconstructed route networks suggests that physical barriers do not in principle explain variations in the presence of imported Rheinish pottery between regions. Equally, the establishment of Carolingian rule in parts of the research area that had not previously belonged to the Frankish world explains little in terms of interregional variability in artefact assemblages. The growing importance of ecclesiastical institutions as large landholders from the later seventh century onward shows more promise in explaining interregional variability. The vast holdings of some Carolingian institutes could conceivably have generated internal redistribution networks through which rural dwellers might acquire, among other things, imported pottery. However, if such a network did function for a time it still cannot explain all the variability encountered in vessel types and proportions of local to imported wares between and within regions. Among other things the composition of imports and the introduction of handmade pottery in certain regions have their own distinct characteristics which in terms of chronology and the nature of assemblages are difficult to rhyme with the notion that a limited number of large landholders was responsible for all the variability observed, without any input from rural communities. Furthermore, exchange networks involving ceramics and millstones already functioned in the seventh century, before ecclesiastical institutions can be expected to have played a role. This demonstrates that exchange systems did not necessarily require large institutions to thrive, and therefore there is no intrinsic need to assume a role for ecclesiastical institutions in the eighth and ninth century either.

Regarding elite demand itself as a causative factor for the distribution of goods, many historians see the internal circulation of goods from one part of landlords' property to another as an important motor for exchange in general. Exchange related to elite demand is believed to have provided the impetus for the development of exchange systems on which transactions involving more mundane items could build. Although the internal movement of goods between estates of large landholders was certainly one of the mechanisms through which goods circulated in rural parts of our research area, there is little direct evidence for it from the eighth and ninth century. Moreover, the demands of elites are unlikely to account for all the complex variations encountered in material culture profiles between (sub)regions. The archaeological evidence does contain clues indicating large landowners played an important role in the circulation of goods in the ninth century in particular. In this century we see an increase in the use of storage and pouring vessels in our research area which toward the end of the century had come to dominate production in the Vorgebirge. At the same time wheel-turned vessels intended for cooking were increasingly replaced by locally produced handmade examples. It seems likely that by this time the production and distribution of ceramics in the Vorgebirge had become centred on a demand related to the storage of large quantities of goods which were perhaps intended for elite households.

From historical sources it is clear that professional merchants existed in our period. These sources also demonstrate that tenants at times were required to perform transport duties. The divide between the roles of rural dweller and merchant could start to blur at this point if the same tenants sent to buy or sell items at markets for their lord also carried out transactions for their own benefit.

Early medieval rural dwellers' engagement with markets, in as far as it is considered at all in archaeological and historical discourse, is considered limited. This is in line with a strand of peasant studies which sees peasants as essentially averse to markets. However, examination of anthropological and sociological studies based on observations conducted among an array of past and modern agricultural communities indicates there is no such intrinsic aversion among rural societies. It may be more helpful to think in terms of incentives and disincentives when considering peasants willingness to engage with markets. Depending on the specific context (such as the moment in the life-cycle of the household, configuration of political institutions, currents of exchange,

environmental conditions, time of the year) the economic role of rural dwellers as consumers and producers may have taken on various guises, such as farmer, fisherman, artisan or trader.

The archaeological evidence does not allow us to determine exactly which groups in society were actively involved in exchange in the eighth and ninth century, or the degree to which they were engaged. The situation in the various regions of the research area indicates that the relations between those offering goods and those receiving them differed per area. Specific artefact distributions suggest rural dwellers were making use of wider exchange networks according to their consumptive needs rather than those networks branching out to rural areas. Professional merchants, in as far as they were involved in the provisioning of rural households, appear to have been relatively passive in marketing their goods.

Overall, the strongest indication for rural communities consumptive preferences giving direction to the production and dissemination of goods, lies in the combination of data from ceramics and millstones. The disparity between the spread of Mayen millstones and ceramic globular pots is marked. Millstones were almost certainly present on every site in the research area. Inhabitants of the northeast of the research area were involved in exchange networks in which coin circulated, and they were able to acquire millstones when needed. At the same time, imported ceramics were practically absent in households in this area.

On the other hand, communities in the west and south replaced wheel-turned ceramics in a Merovingian tradition for globular pots from Mayen. In the west a local handmade variety of the globular pot was introduced around the same time as the arrival of the Mayen vessels. These developments took place within a relatively short space of time in the first half of the eighth century.

At the production site itself the introduction of the globular pot appears to have been a catalyst for a specialisation in this one specific vessel and a substantial overall increase in the volume of production. This increase in production is not reflected in find assemblages outside our research area. Globular pots made in Mayen were rarely exported to England, Scandinavia or even the Flemish coast, while Mayen millstones have been discovered repeatedly on sites in England, Northern Germany, Denmark and Belgium.

The combination of evidence, namely disparity in the distributions of ceramics and millstone manufactured in Mayen, signs of intensification of pottery production at Mayen, large transformations of ceramic assemblages in rural households in the research area, and lack of Mayen pottery beyond the research area is strong evidence that demand for globular pots was generated to a large degree by rural communities in the west and south of our research area. As noted this was not the case for the east of the research area. The gradual adoption, over a long period of time of the handmade globular pot and disc-brooches indicates that there was no explicit rejection of Frankish material culture in these parts. Apparently new forms of material culture were incorporated according to preference relevant for communities in these regions.

In conclusion, there is ample evidence to suggest the consumptive preferences of rural communities played a role in shaping exchange systems. For parts of the east of the research area local demand may have had little effect on wider exchange systems. Inhabitants there seem to have been interested only in a limited number of items that were not available within the region. However, demand for globular pots in the west and south is likely to have led to increased scale and intensity of production at centres located relatively far away, first in the German Eifel and later the Vorgebirge. Here rural demand did create the impetus for changes in the organisation of production and helped shape exchange networks.

A final aspect to consider is the nature of the transactions through which goods were exchanged. Were transactions impersonal interactions between two parties for which the act entailed no further obligations, or were they regulated through socially and culturally binding arrangements? The archaeological and historical debate on this aspect of early medieval exchange exhibits a tendency for seeking to identify what was ultimately the defining characteristic of exchange systems at various points during the Early Middle Ages. Was exchange at any one time essentially embedded or disembedded? The focus that can be identified in several studies on determining which of the two poles was hegemonic at any time during the Early Middle Ages is, I believe, not helpful, because in doing so invariably one of the poles is marginalised.

Closely related is a reoccurring search for the motor of exchange mechanisms in the Carolingian period. This has led to an over-emphasis on the importance of elite driven demand, effectively disregarding the economic activities of the vast majority of the population rather than crediting it its own dynamics and consequences. This study contains examples of demand being generated by the consumption of a variety of actors, each playing a part in creating exchange systems in the seventh to ninth centuries.

Such an approach is in line with ideas encapsulated by complexity science, an umbrella term for various approaches which share basic characteristics, namely an understanding of the relationship between agents and their environment as complex, open-ended, unpredictable, contingent and emergent. The current study contains examples of interactions with emergent and contingent properties, between variables with differing geographical and temporal scales, some of which appear to have had unintentional and unexpected consequences from the point of view of those involved. They show that it is important to be specific about the trajectories through space and time of each variable in order to grasp the complexities involved, rather than generalising based on evidence compiled from across several centuries and collected from sources throughout the Carolingian world. Finally, what this study offers is a more complete impression of the role of rural communities in early medieval exchange than has previously been attempted.

Samenvatting

Sinds het begin van de twintigste eeuw is het belang, en specifieke karakter van uitwisseling in de Karolingische tijd onderwerp van wetenschappelijk debat. Discussie omvat onder meer het relatieve belang van lokale, regionale en internationale uitwisseling, de rol van elites, handelaren en ambachtslieden, en de mate waarin uitwisseling gekarakteriseerd werd door sociale relaties of onpersoonlijke transacties. Wat grotendeels ontbreekt in het debat is een typering van de rol die rurale gemeenschappen, die niet tot de elite behoorden, speelden in uitwisselingssystemen. Het project *Charlemagne's Backyard?*, waar onderhavig onderzoek onderdeel van uitmaakt, is geïnitieerd om hier verandering in te brengen. Het doel is om op basis van archeologische gegevens een beter beeld te krijgen van de rol van rurale bewoners in het creëren van economische systemen in de achtste en negende eeuw.

Het onderhavige deel van het project heeft als doel de rol van rurale gemeenschappen in de ontwikkeling van uitwisselingssystemen in de Karolingische periode te onderzoeken. In hoeverre gaven de consumptieve voorkeuren van rurale gemeenschappen richting aan goederenstromen op regionaal en bovenregionaal niveau? Onderzoek naar de rurale economie van de Karolingische periode is tot nog toe voornamelijk verricht door historici. Archeologen die zich in economische vraagstukken van deze periode hebben verdiept zijn vooral gericht geweest op handelsplaatsen en op transacties gerelateerd aan lange-afstandhandel. Uitwisseling in een rurale context is vooralsnog nauwelijks bestudeerd.

De archeologische gegevens die in dit onderzoek zijn gebruikt bestaan uit vondsten afkomstig van Karolingische sites die binnen de huidige grenzen van Nederland zijn gevonden. Hoewel alle gepubliceerde vondsten van deze sites zijn geïnventariseerd bleken niet alle vondstcategorieën bruikbaar voor verdere analyse. Dit wordt deels veroorzaakt door grote verschillen in de bewaarcondities tussen regio's in Nederland. Met name objecten van organische materialen zijn om die reden ongelijk verdeeld over het studiegebied. Twee andere belangrijke factoren die van invloed zijn op de vergelijkbaarheid van assemblages zijn onderzoeksmethoden en de kwaliteit van publicaties. Hoewel het effect van deze factoren niet volledig kan worden weggenomen is er een poging gedaan om het effect ervan op verdere analyses zoveel mogelijk te beperken.

Na inachtneming van de effecten van formatieprocessen en onderzoeksmethodieken blijken drie vondstcategorieën geschikt voor nadere analyse, namelijk objecten van aardewerk, metaal en steen. De analyses bestaan voornamelijk uit het vergelijken van verspreidingspatronen van groepen objecten en objecttypen tussen de verschillende regio's in het onderzoeksgebied. Het bleek echter voor meerdere groepen artefacten nodig om eerst de staat van onderzoek vast te stellen, onder meer om een gedetailleerd beeld te krijgen van chronologische ontwikkelingen in de verspreiding van objecten. Zulke literatuurstudies zijn verricht voor het aardewerk, de productie en het bewerken van ijzer, metalen mantelspelden, munten en maalstenen.

De analyse van het aardewerk brengt vijf belangrijke aspecten aan het licht. Ten eerste veranderde in de zevende en achtste eeuw de locatie van producenten ten opzicht van rurale nederzettingen. In een aantal regio's waren deze veranderingen vrij ingrijpend, waarbij regionale productie volledig werd vervangen door bovenregionale of juist lokale potten. In andere regio's veranderde er betrekkelijk weinig. Ten tweede wijzigde het spectrum aan functies die de potten die rurale bewoners tot hun beschikking hadden gedurende de achtste en negende eeuw. Ten derde deed aan het begin van de achtste eeuw zowel een gedraaide als een handgevormde variant van een bolvormige pot zijn intrede, waarvan de gedraaide soort werd geproduceerd in het Duitse Rijnland en de handgevormde

grotendeels lokaal. Het feit dat deze twee potten beide binnen korte tijd werden geïntroduceerd is opvallend en veelzeggend over de relatie tussen pottenbakkers en de rurale gemeenschappen die de potten gebruikten. Een vierde opvallende ontwikkeling in de onderzoeksperiode zijn veranderingen in het uiterlijk van de potten in assemblages uit huishoudens. Deze fysieke veranderingen van potten zijn meer dan alleen een kwestie van smaak of mode en kunnen duiden op bredere veranderingen in de Karolingische wereld. Het laatste aspect is de opmerkelijke dominantie voor wat betreft het gedraaide aardewerk, van vaatwerk afkomstig van twee productiecentra in het Duitse Rijnland. Deze dominantie is des te opvallender als er gekeken wordt naar de verspreiding van de Rijnlandse producten buiten het onderzoeksgebied. In aangrenzende gebieden komt Rijnlandse keramiek slechts in kleine hoeveelheden voor.

IJzer is een van de weinige goederen die in onze periode in grote hoeveelheden werd geproduceerd in het onderzoeksgebied. Productie vond plaats in verschillende regio's en er zijn aanwijzingen dat er meer dan één manier was om de productie te organiseren. Op de Veluwe werden de verschillende stappen in het productieproces op afzonderlijke plekken uitgevoerd, terwijl in het gebied Monteferland / Liemers en het zuiden van het onderzoeksgebied de meeste productiefasen in en rond de nederzettingen plaatsvonden. Wat betreft ijzeren artefacten zelf lijkt het waarschijnlijk dat ze allerminst schaars waren in rurale nederzettingen. Het ging wel voornamelijk om functionele objecten waarvoor ijzer meer geschikt was dan andere materialen, met name snijgereedschappen.

Mantelspelden vormen een belangrijke groep objecten voor het identificeren van regionale variabiliteit. Drie van de meer gebruikelijke typen gelijkarmige fibulae uit de achtste en negende eeuw hebben elk een tamelijk karakteristieke verspreiding, met weinig overlap. Varianten van de andere belangrijke soort fibulae uit onze periode, de schijffibula, zijn minder duidelijk regionaal gedifferentieerd binnen het onderzoeksgebied. Schijffibulae verschijnen later dan gelijkarmige fibulae, hoewel er enige chronologische overlap is. Samen met de ruimere verspreiding, grotere morfologische éénheid en meer consistentie van legeringen van schijffibulae suggereert dit dat in de loop van de tijd een zekere homogenisering optrad in het gebruik van mantelspelden als kledingaccessoire.

Munten worden bij uitstek geassocieerd met handel, maar voor de onderzocht periode zijn ze waarschijnlijk geen goede indicator voor het relatieve belang van uitwisseling in rurale gebieden. Dit komt door de methodologische problemen bij het interpreteren van patronen van verlies van munten. Daarnaast zijn munten in onze periode wellicht een betere aanwijzing voor de aard van uitwisseling dan voor het volume of de intensiteit ervan. In ten minste een deel van het onderzoeksgebied lijkt een plotselinge toename van muntvondsten eerder verband houden met interne, sociale en culturele ontwikkelingen dan met een toegenomen betrokkenheid in grotere uitwisselingsnetwerken.

In de Duitse Eifel gewonnen maalstenen van tefriet waren in de achtste en negende eeuw vrijwel zeker in het gehele onderzoeksgebied aanwezig. Dit vormt een opvallend contrast met de verspreiding van aardewerk uit Mayen, immers dezelfde plek waar de maalstenen gewonnen werden. Het aardewerk blijkt een veel meer regionaal specifieke verspreiding te hebben dan maalstenen, zowel binnen als buiten het onderzoeksgebied.

De analyse van (de verspreiding van) vondstcategorieën laat niet toe om een eenduidig model te construeren hoe rurale bewoners deelnamen aan uitwisselingsnetwerken in de achtste en negende eeuw. Met alle onzekerheden rond de distributie van objecten, zowel methodologisch als interpretatief, is het vrijwel onmogelijk om de rol van plattelandsbewoners in deze uitwisselingsnetwerken te isoleren. Bovendien is het niet zinvol om te proberen het relatieve belang vast te stelen van verschillende groepen in de samenleving (waaronder rurale bewoners) voor het ontwikkelen en

onderhouden van uitwisselingsnetwerken in verschillende perioden. Maar, door de analyse van de vondsten te behandelen in relatie tot verschillende relevante thema's voor de Karolingische periode, kan wel een beeld worden geschetst van de rol van rurale bewoners in uitwisseling.

Een vergelijking van vondstverspreidingen met gereconstrueerde routenetwerken laat zien dat fysieke barrières geen verklaring zijn voor verschillen tussen regio's in de aanwezigheid van geïmporteerd Rijnlands aardewerk. Ook de vestiging van Karolingische gezag in delen van het onderzoeksgebied die voorheen niet tot de Frankische wereld behoorden verklaart de interregionale variabiliteit in artefactassemblages niet voldoende. Het groeiende belang van kerkelijke instellingen als grootgrondbezitters vanaf de latere zevende eeuw lijkt interregionale variabiliteit beter te kunnen verklaren. Het uitgestrekte karakter van de bezittingen van sommige Karolingische kloosters kunnen hebben geleid tot interne redistributienetwerken, die er onder meer voor zorgden dat plattelandsbewoners geïmporteerd aardewerk konden verkrijgen. Echter, als een dergelijk netwerk een tijdlang heeft bestaan, verklaart het nog altijd niet alle variabiliteit in pottypen en de verhoudingen tussen lokale en geïmporteerde waren tussen en binnen de regio's. Onder andere de samenstelling van assemblages importwaren en de introductie van handgemaakt aardewerk in bepaalde regio's hebben hun eigen onderscheidende kenmerken die wat betreft de chronologie en de aard van assemblages moeilijk zijn te rijmen met het idee dat een beperkt aantal grootgrondbezitters verantwoordelijk was voor alle waargenomen diversiteit, zonder enige bijdrage van plattelandsgemeenschappen. Bovendien functioneerden uitwisselingsnetwerken met keramiek en maalstenen al in de zevende eeuw, voordat kerkelijke instellingen een rol speelden. Dit toont aan dat grote instellingen niet per definitie noodzakelijk zijn om uitwisselingssystemen tot stand te brengen of te onderhouden, en daarom is er ook voor de achtste en negende eeuw geen noodzaak om een rol voor kerkelijke instellingen te veronderstellen.

Veel historici beschouwen het interne verkeer van goederen tussen de landgoederen van elites als een belangrijke aanjager van uitwisseling in het algemeen. De materiële behoeften van elites zouden de aanleiding hebben gegeven voor de ontwikkeling van uitwisselingssystemen die vervolgens ook transacties van alledaagse goederen faciliteerden. Hoewel het interne goederenverkeer tussen landgoederen van grootgrondbezitters zeker één van de manieren was waardoor goederen terechtkwamen in rurale delen van het onderzoeksgebied, is er weinig direct bewijs voor zulke mechanismen uit de achtste en negende eeuw. Bovendien is het onwaarschijnlijk dat de vraag van elites een verklaring is voor alle complexe variaties in materiële cultuur tussen (sub) regio's.

Het archeologische bewijs bevat wel aanwijzingen dat grootgrondbezitters met name in de negende eeuw een belangrijke rol speelden in het goederenverkeer. In deze eeuw zien we een toename in het gebruik van opslagvaten en schenkgerei in het onderzoeksgebied. Deze vormen domineerden tegen het einde van de eeuw de productie in het Vorgebirge. Tegelijkertijd werden gedraaide kookpotten in toenemende mate vervangen door lokaal vervaardigde handgemaakte exemplaren. Het lijkt waarschijnlijk dat tegen die tijd de productie en distributie van keramiek in het Vorgebirge was toegespitst op een marktvraag die verband hield met de opslag van grote hoeveelheden goederen, mogelijk voor elitehuishoudens.

Uit historische bronnen blijkt dat er in onze periode professionele kooplieden bestonden. Uit deze bronnen blijkt ook dat horigen soms transportwerkzaamheden moesten verrichten. Het onderscheid tussen de rollen van plattelandsbewoner en handelaar zou op dit punt kunnen vervagen als dezelfde horigen die naar markten werden gestuurd om goederen te verhandelen voor hun heer, ook eigen ook eigen aankopen en verkopen zouden doen.

In het archeologische en historische discours wordt de betrokkenheid van vroegmiddeleeuwse plattelandsbewoners met markten als beperkt beschouwd. Dit is in overeenstemming met een tak van *peasant studies waarin* een afkeer van markten als een kenmerk van *peasant* gemeenschappen wordt beschouwd. Meerdere antropologische en sociologische studies van vroegere en moderne landbouwgemeenschappen laten echter zien dat er onder plattelandsgemeenschappen geen intrinsieke afkeer van markten bestaat.

Als het gaat om de bereidheid van boeren om gebruik te maken van markten is het wellicht beter om te denken in termen van prikkels en ontmoediging. Als rurale bewoners de indruk hadden dat zijzelf de vruchten zouden plukken van hun investeringen waren ze waarschijnlijk meer geneigd een surplus te creëren voor de markt dan wanneer ze wisten dat een surplus grotendeels als afdracht bij hun heer terecht zou komen. Afhankelijk van de specifieke context (zoals het moment in de levenscyclus van het huishouden, de configuratie van politieke instellingen, uitwisselingsstromen, landschap, tijd van het jaar) kende de economische rol van plattelandsbewoners als consumenten en producenten mogelijk verschillende gedaanten, zoals boer, visser, ambachtsman of handelaar.

De beschikbare archeologische gegevens laten het niet toe precies vast te stellen welke groepen in de samenleving actief betrokken waren bij uitwisseling in de achtste en negende eeuw, of de mate waarin ze betrokken waren. De situatie in de verschillende regio's van het onderzoeksgebied geeft aan dat de verhoudingen tussen aanbieders en ontvangers van goederen per gebied verschilden. Het feit dat in verschillende gebieden geïmporteerd aardewerk ontbreekt, maar dat andere importen, zoals maalstenen, consistent aanwezig zijn, suggereert dat plattelandsbewoners naar gelang hun behoeften grotere uitwisselingsnetwerken opzochten. Met andere woorden: die netwerken werden niet actief uitgebreid naar rurale gebieden. Professionele kooplieden, voor zover zij betrokken waren bij de bevoorrading van rurale huishoudens, lijken relatief passief te zijn geweest bij het aanbieden van hun goederen.

Het beste bewijs dat de consumptievoorkeuren van rurale gemeenschappen richting gaven aan de productie en verspreiding van goederen, wordt gevormd door de gegevens die betrekking hebben op aardewerk en maalstenen. Het verschil tussen de verspreiding van maalstenen en bolpotten uit Mayen is onmiskenbaar. Maalstenen waren vrijwel zeker aanwezig op elke vindplaats in het onderzoeksgebied, terwijl de verspreiding van bolpotten veel meer regionaal gebonden is. Inwoners van het noordoosten van het onderzoeksgebied waren betrokken bij uitwisselingsnetwerken waarin munten circuleerden, en waren in staat naar behoefte maalstenen te verkrijgen. Tegelijkertijd was geïmporteerd aardewerk praktisch afwezig in huishoudens in hetzelfde gebied. Gemeenschappen in het westen en zuiden van het onderzoeksgebied daarentegen verruilden massaal, in een relatief korte tijd, regionaal geproduceerd, gedraaid aardewerk in een Merovingische traditie voor bolvormige potten uit Mayen. In het westen werd rond dezelfde tijd een lokale, handgemaakte variant van de bolpot geïntroduceerd: de kogelpot.

Op de productiesite in Mayen zelf blijkt de introductie van de bolpot een katalysator te zijn geweest voor een aanzienlijke toename van productie en een specialisatie in deze ene specifieke potvorm. Deze groei in productie komt buiten ons onderzoeksgebied niet tot uiting in vondstassemblages. Bolvormige potten gemaakt in Mayen werden zelden geëxporteerd naar Engeland, Scandinavië of zelfs de Vlaamse kust, terwijl Mayen-maalstenen herhaaldelijk zijn ontdekt op sites in Engeland, Noord-Duitsland, Denemarken en België.

Deze gegevens, namelijk verschillen in de verspreiding van aardewerk en maalstenen vervaardigd in Mayen; aanwijzingen voor een intensivering van aardewerkproductie in Mayen; grote veranderingen in aardewerkassemblages in rurale huishoudens in het onderzoeksgebied; en

een gebrek aan Mayen-aardewerk buiten het onderzoeksgebied, vormen samen sterk bewijs dat de vraag naar bolpotten in hoge mate werd gegenereerd door rurale gemeenschappen in het westen en zuiden van het onderzoeksgebied. Het noorden en oosten van het onderzoeksgebied speelden geen rol in deze ontwikkeling, maar dat betekent niet dat we hierin een expliciete afwijzing van Frankische materiële cultuur moeten zien. De geleidelijke acceptatie van de kogelpot en schijffibulae door de gemeenschappen in deze regio's geeft aan dat nieuwe vormen van materiële cultuur geïncorporeerd werden in zoverre ze relevant werden bevonden.

Concluderend is er voldoende bewijs dat de consumptievoorkeuren van rurale gemeenschappen een rol hebben gespeeld bij het vormgeven van uitwisselingssystemen. De vraag naar bolvormige potten in het westen en zuiden van het onderzoeksgebied heeft waarschijnlijk geleid tot een grotere omvang en intensiteit van de aardewerkproductie in centra die relatief ver weg liggen, eerst in de Duitse Eifel en later in het Vorgebirge. In deze regio's van het onderzoeksgebied leidde de vraag die door rurale gemeenschappen werd gegenereerd tot veranderingen in de organisatie van de aardewerkproductie en tot het vormen van uitwisselingsnetwerken. De behoeften in het oosten van het onderzoeksgebied hebben waarschijnlijk weinig effect gehad op bredere uitwisselingssystemen. Bewoners in die omgeving lijken voor wat betreft importgoederen hoofdzakelijk geïnteresseerd te zijn geweest in een beperkt aantal objecten die niet in de regio verkrijgbaar waren.

Het laatste relevante aspect van vroegmiddeleeuwse uitwisseling is de aard van de transacties. Bestonden deze uit onpersoonlijke interacties tussen twee partijen waarvoor de handeling geen verdere verplichtingen met zich meebracht, of werden ze gereguleerd door middel van sociaal en cultureel bindende normen? In het archeologische en historische debat over deze vraag bestaat de neiging om vast te willen stellen wat hét bepalende karakter was van uitwisselingssystemen gedurende de vroege middeleeuwen. Deze pogingen om te bepalen welk van de twee uitersten op verschillende momenten tijdens de vroege middeleeuwen de bovenhand voerde zijn echter problematisch, omdat vervolgens één van de uitersten wordt gemarginaliseerd.

Een nauw verwant probleem zijn de pogingen om te identificeren welke groep in de Karolingische samenleving verantwoordelijk was voor het tot stand brengen en in stand houden van uitwisselingssystemen. De conclusie is doorgaans dat zulke systemen voortkwamen uit een door de elite aangestuurde vraag. Daarmee wordt genegeerd dat de economische activiteiten van de overgrote meerderheid van de bevolking een eigen dynamiek en gevolgen had. Dit onderzoek bevat voorbeelden van behoeften die voortkomen uit de consumptie van verschillende actoren, die elk een rol hebben gespeeld bij het creëren van uitwisselingssystemen in de zevende tot negende eeuw.

Een dergelijke zienswijze komt overeen met benaderingen die worden omvat binnen de complexiteitswetenschap, een overkoepelende term voor verschillende benaderingswijzen die een aantal basiskenmerken delen. Deze kunnen worden samengevat als een begrip van de relatie tussen individuen en hun omgeving als complex, open, onvoorspelbaar, toevallig en emergent (het systeem is meer dan de som der delen). De huidige studie bevat voorbeelden van interacties met emergente en contingente eigenschappen, tussen variabelen op verschillende geografische en temporele schalen, waarvan sommige onbedoelde en onverwachte gevolgen hebben gehad vanuit het oogpunt van de betrokkenen. Ze laten zien dat het belangrijk is om specifiek te zijn over de trajecten door ruimte en tijd van elke variabele om de complexiteit ervan te begrijpen, in plaats van te generaliseren op basis van gegevens afkomstig uit verschillende eeuwen en verzameld uit bronnen die de hele Karolingische wereld bestrijken. Ten slotte biedt dit onderzoek een completer beeld van de rol van vroegmiddeleeuwse rurale gemeenschappen in uitwisseling dan momenteel voorhanden is.

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Curriculum Vitae

Wim Kemme was born on the 21st of October 1981 in Cork, Ireland and moved with his family to the Netherlands in 1987. In 2000 he finished his secondary education at 'De Werkplaats Kindergemeenschap' in Bilthoven and subsequently graduated with a BA degree in Archaeology and Prehistory at the University of Amsterdam in 2003. In 2007 he obtained his MA degree with a thesis on the Merovingian cemetery of the Boschsstraat in Maastricht at the University of Amsterdam. After graduating he started work as a field archaeologist, from June 2008 as an employee of BAAC. During his first stint working for BAAC he participated in many excavations and produced several archaeological reports. In 2013 he traded his job at BAAC for a position as PhD researcher in the *Charlemgane's Backyard?* project at the University Leiden. At the start of 2018 he returned to BAAC to work as senior field archaeologist and specialist in early medieval pottery.

Appendices

Legend appendix I and II

Each plate contains a map on the left that indicates on which sites the specific type or fabric has been found. It also displays where the fabric or type has not been found. In the case of vessel types, whether a site is indicated as lacking a specific types depends on the nature of the assemblage. For example, if the map represents the distribution of a wheel-turned vessel type, only sites containing at least one wheel-turned vessel type are displayed. If only handmade types are present on a site it is not indicated as lacking wheel-turned types and vice versa.

The map on the right shows the relative amount of sherds of the type or fabric per site. The size is relative to the total amount of the type or fragment found on sites in the research area. Therefore the charts cannot be compared directly between types and fabrics. When only the presence or absence of the fabric or type could be recorded the sites are indicated by a diamond-symbol.

Abbreviations fabrics

BAD (Badorf)	Badorf
WALB (Walberberg)	Walberberg
RBA (reliefband amphora)	reliefband amphora
LBAD	Late-Badorf
BP	Badorf/Pingsdorf
HU	Hunneschans
MAY (Mayen)	Mayen
W13	w13 fabric
W14	w14 fabric
CSM	Carolingian smoothwalled
TAT	Tating
W11	w11 fabric
CR	Carolingian regional wheel-turned
WALR	Walsum rough-walled
WALG	Walsum smooth-walled
HS	Hessens-Schortens
KP	Kugeltopf

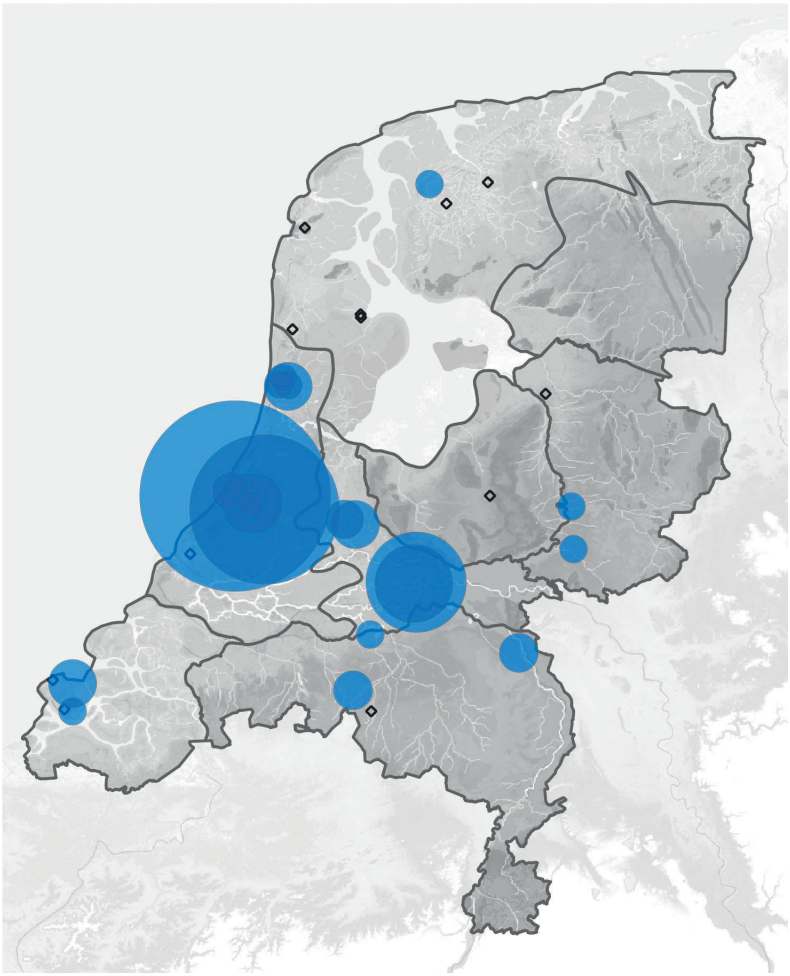
Appendix I

Distribution maps of vessel types

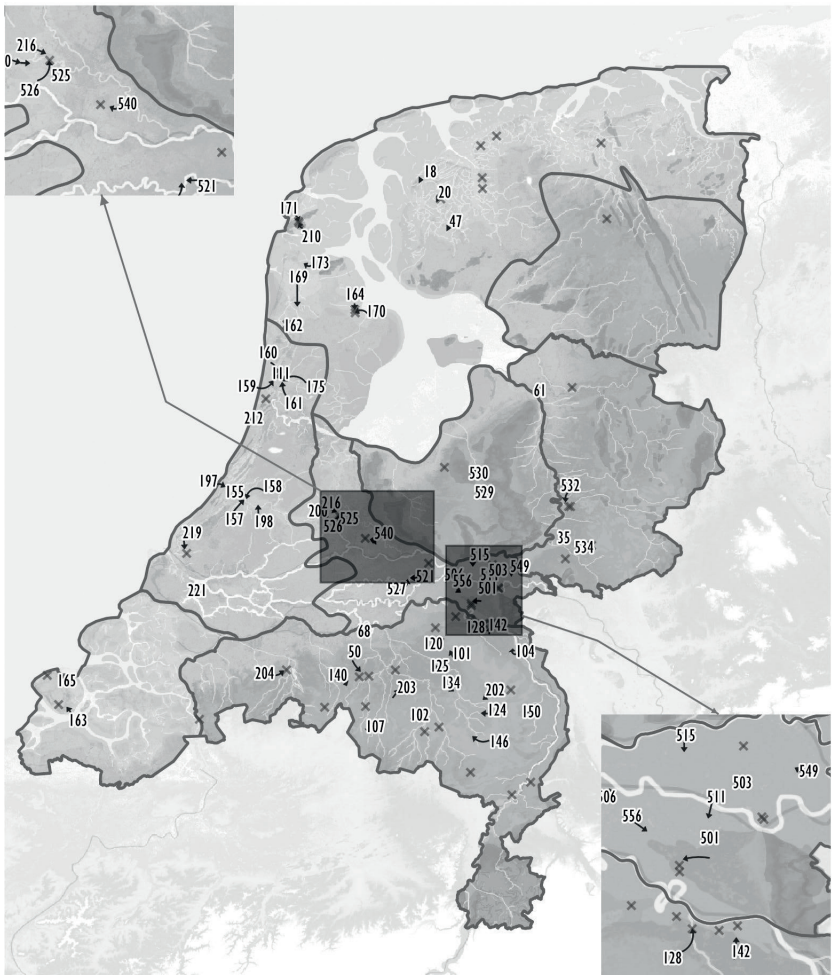
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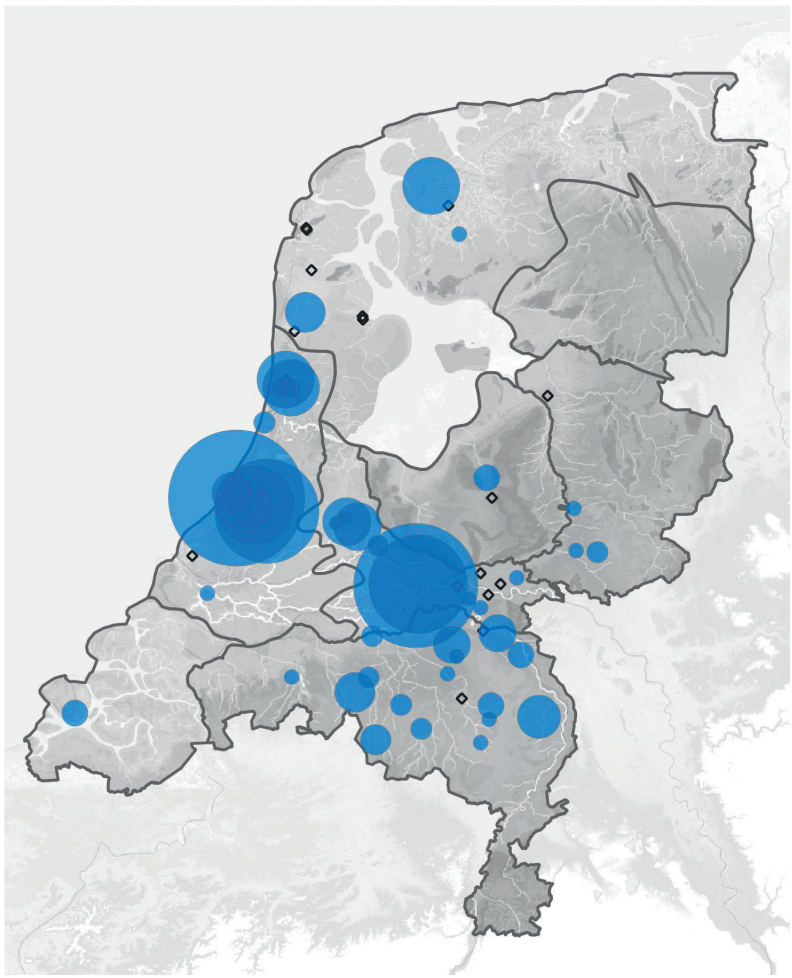
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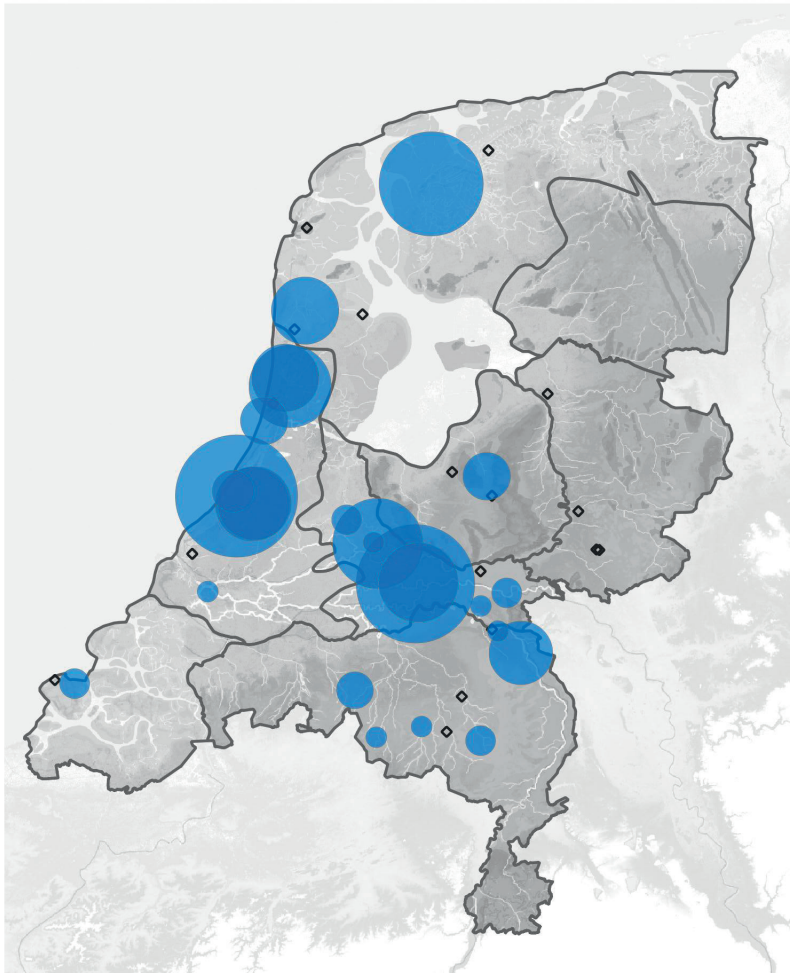
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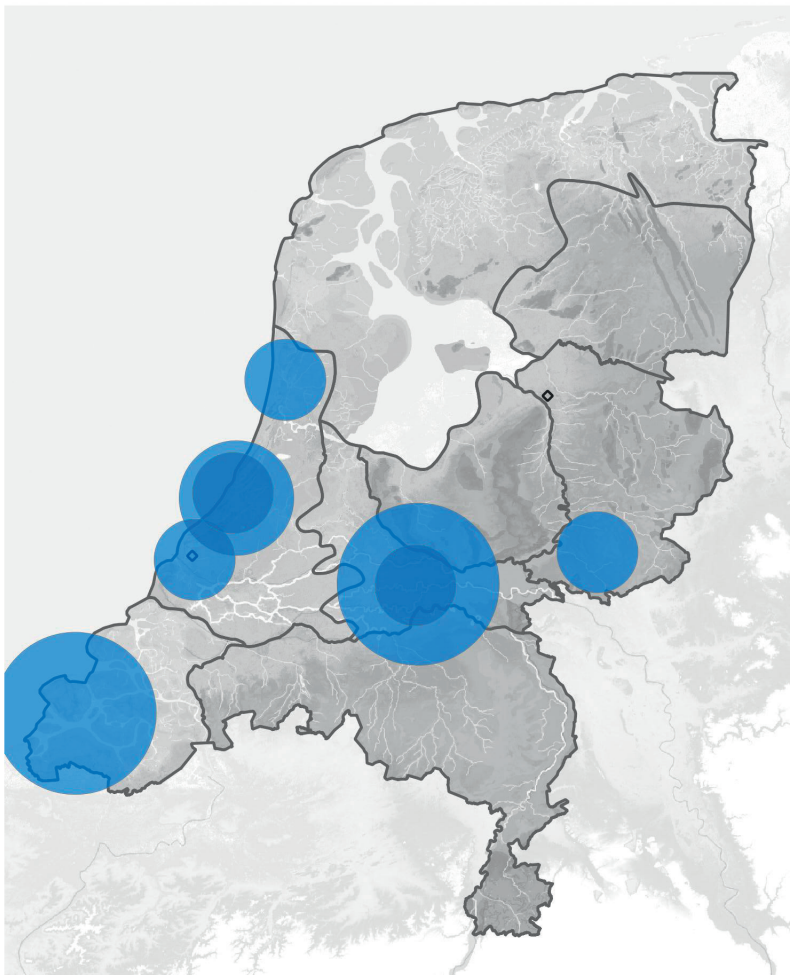
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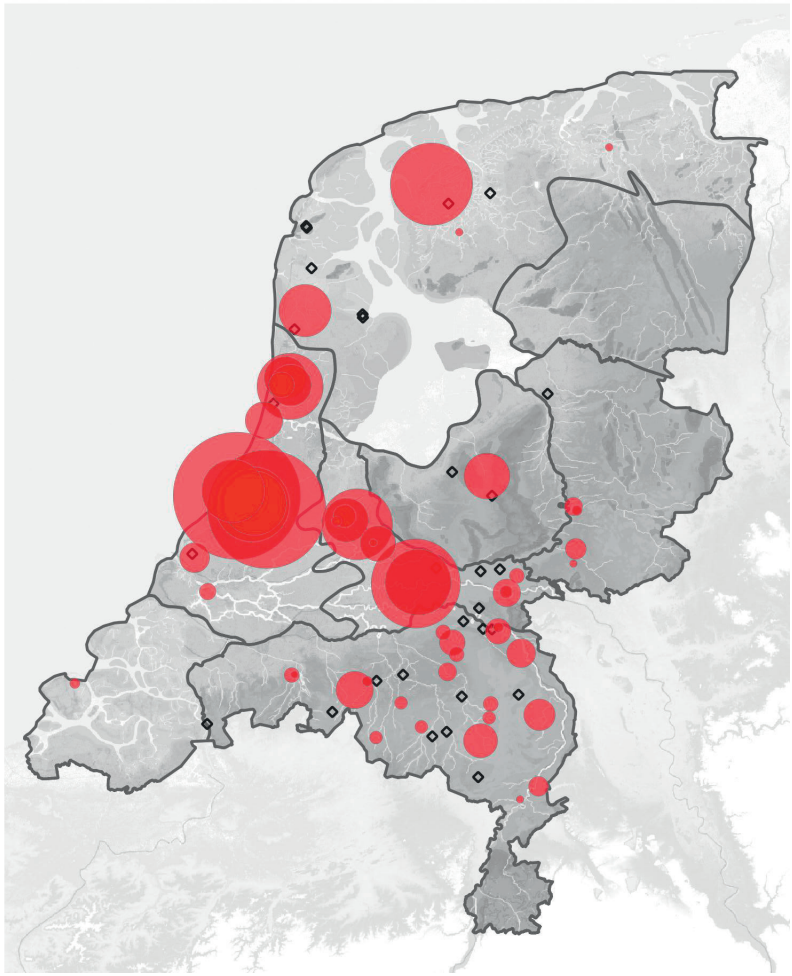
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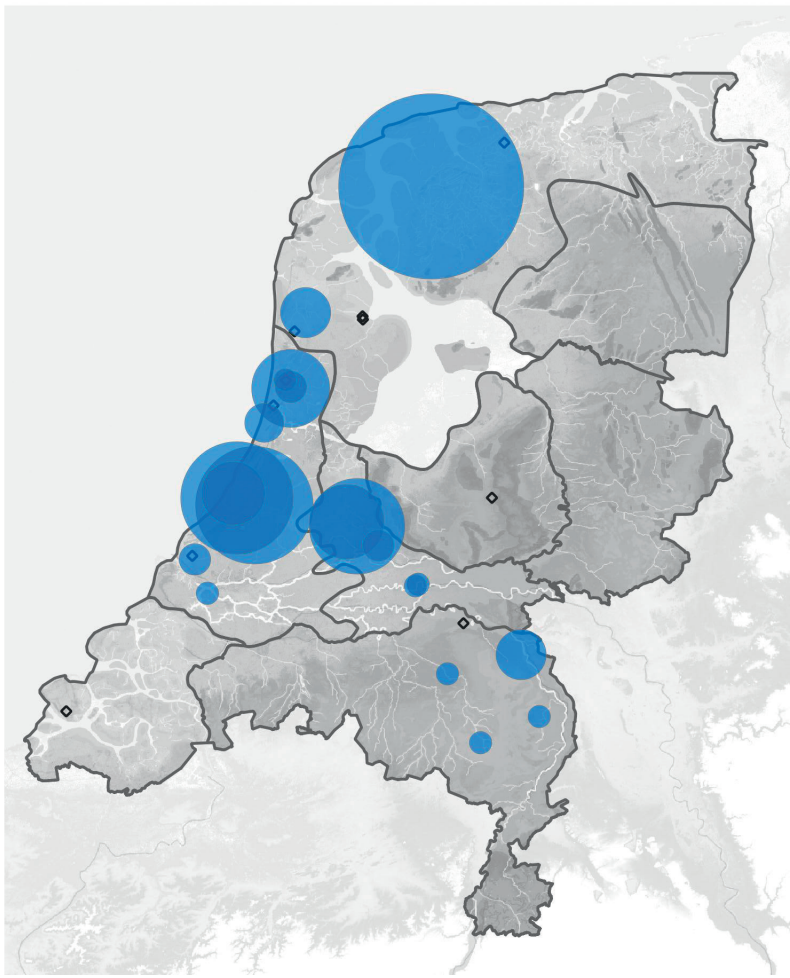
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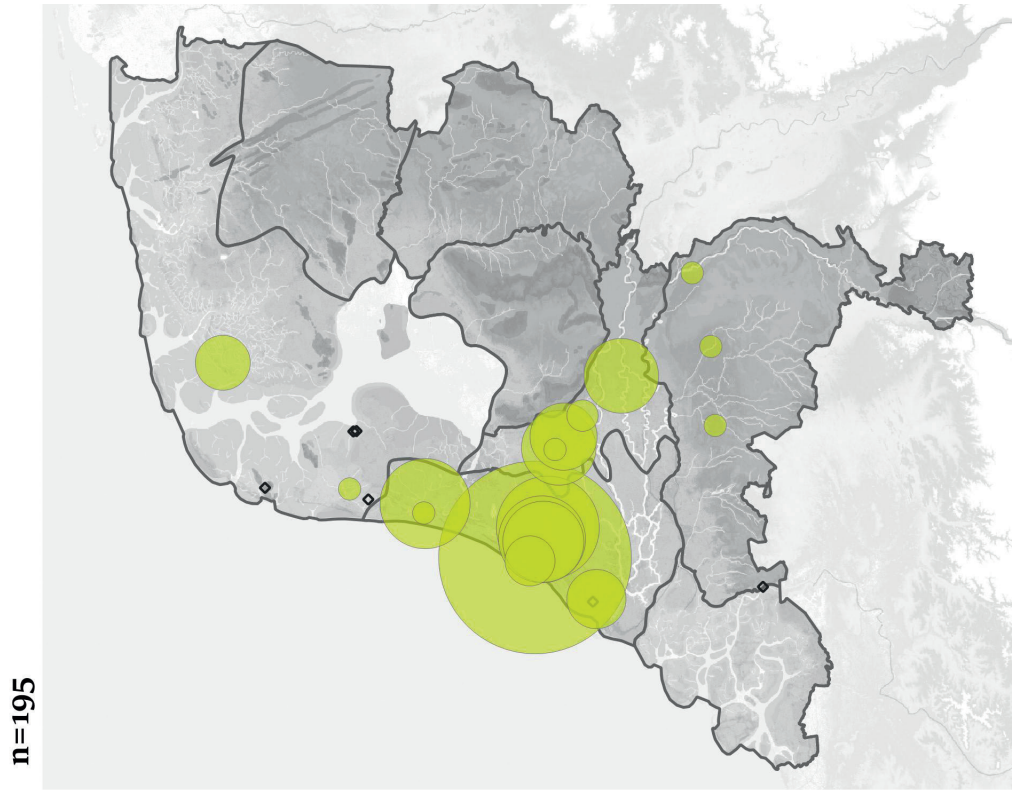


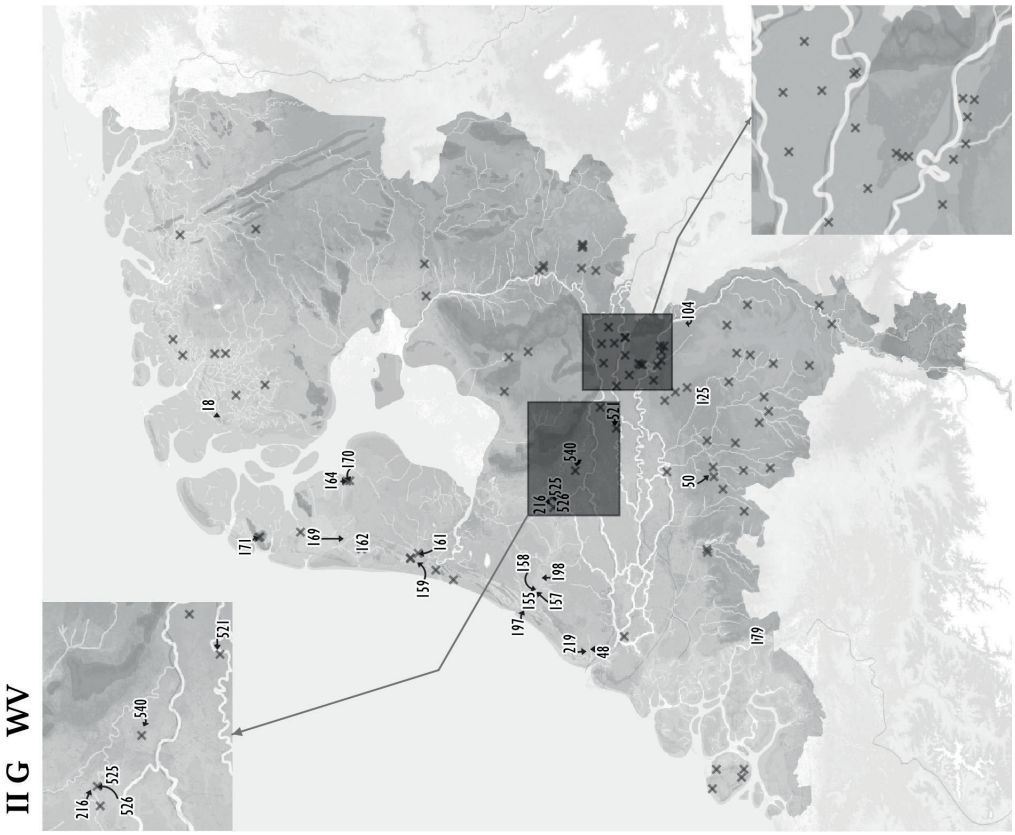
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521
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540
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146
108

n=194



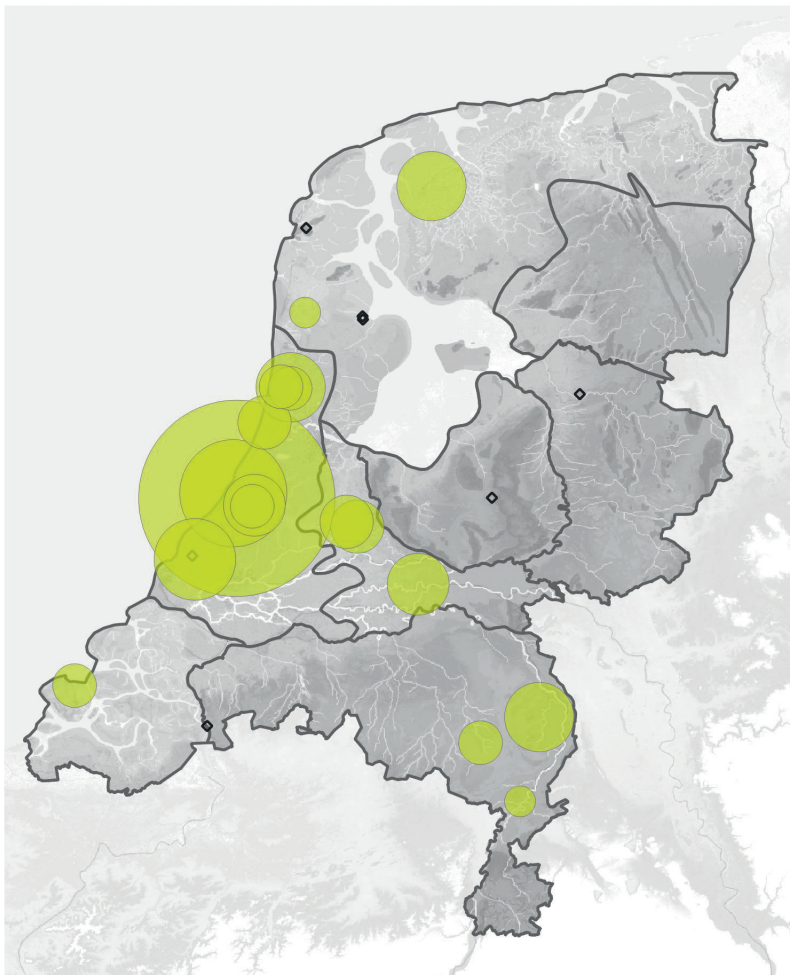

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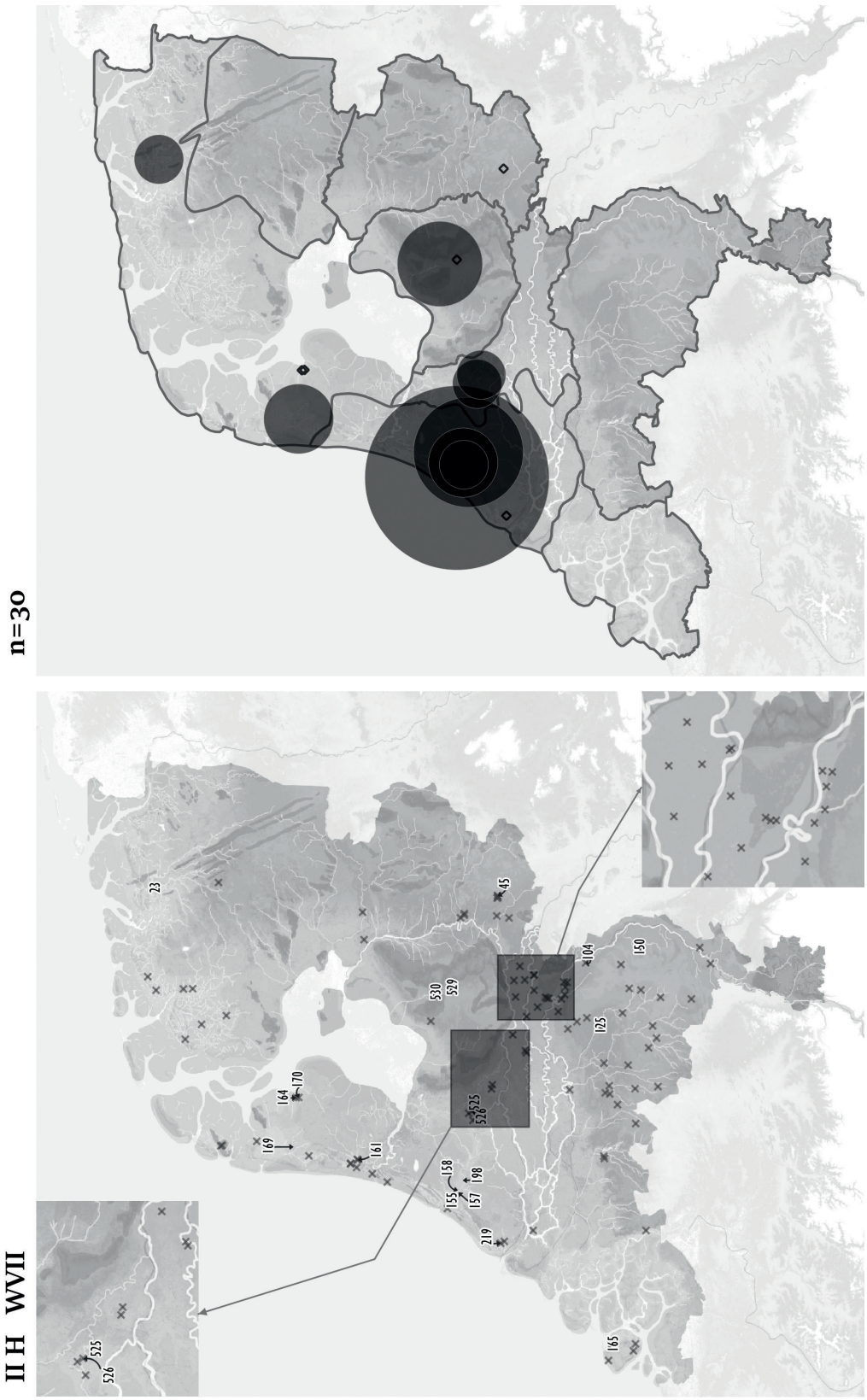

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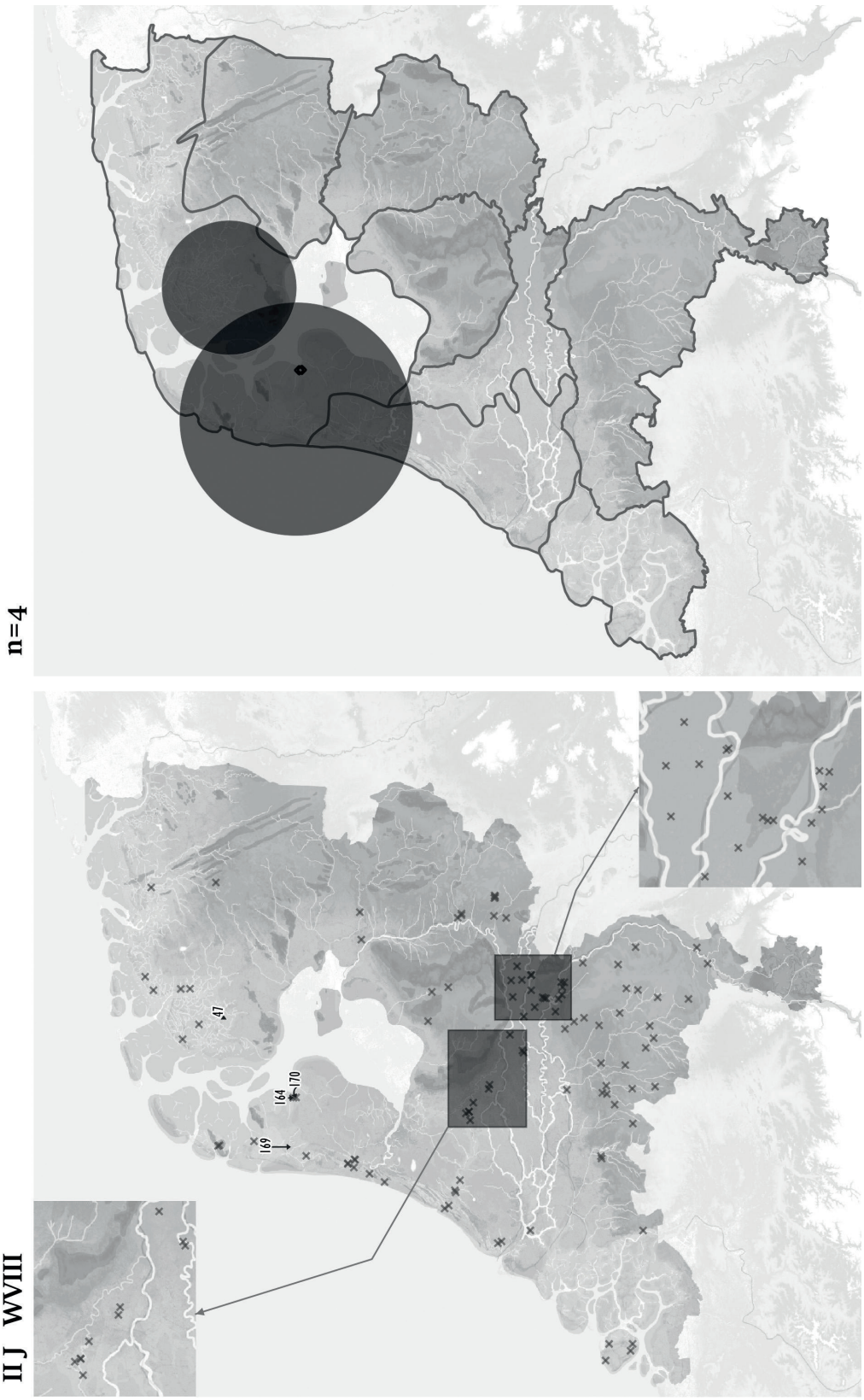
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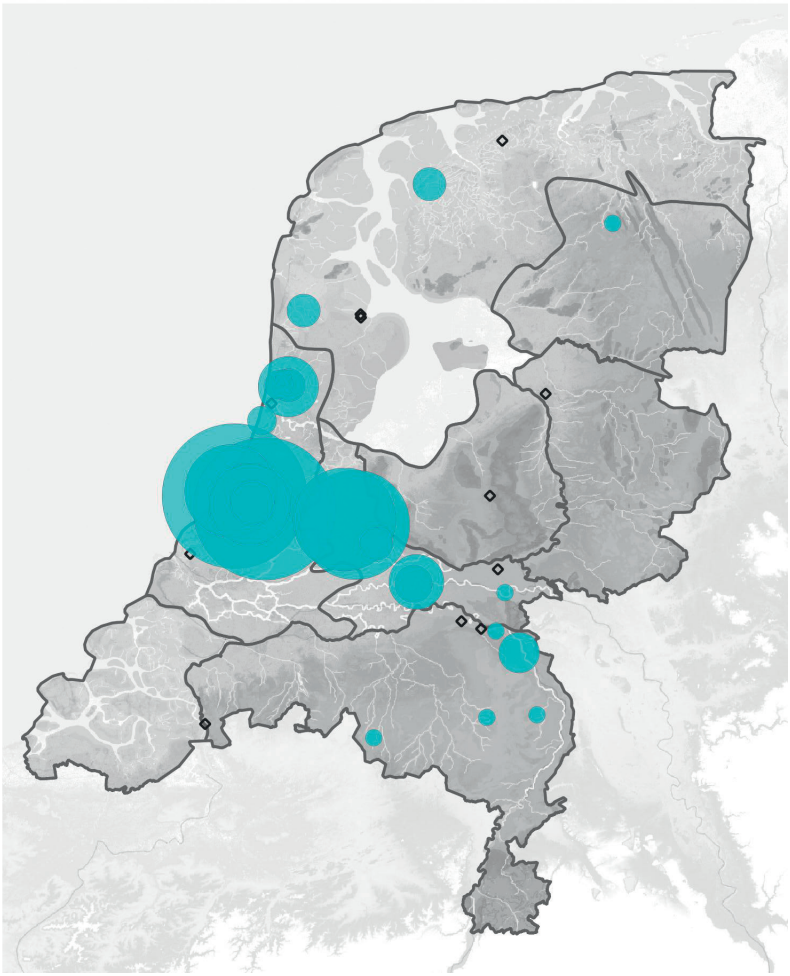

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525
526


n=4
II J WVIII
47
164
170
169

II K WIX


525
526
540
521
36
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66
169
164
170
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111
159
175
172
161
212
61
197
155
158
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198
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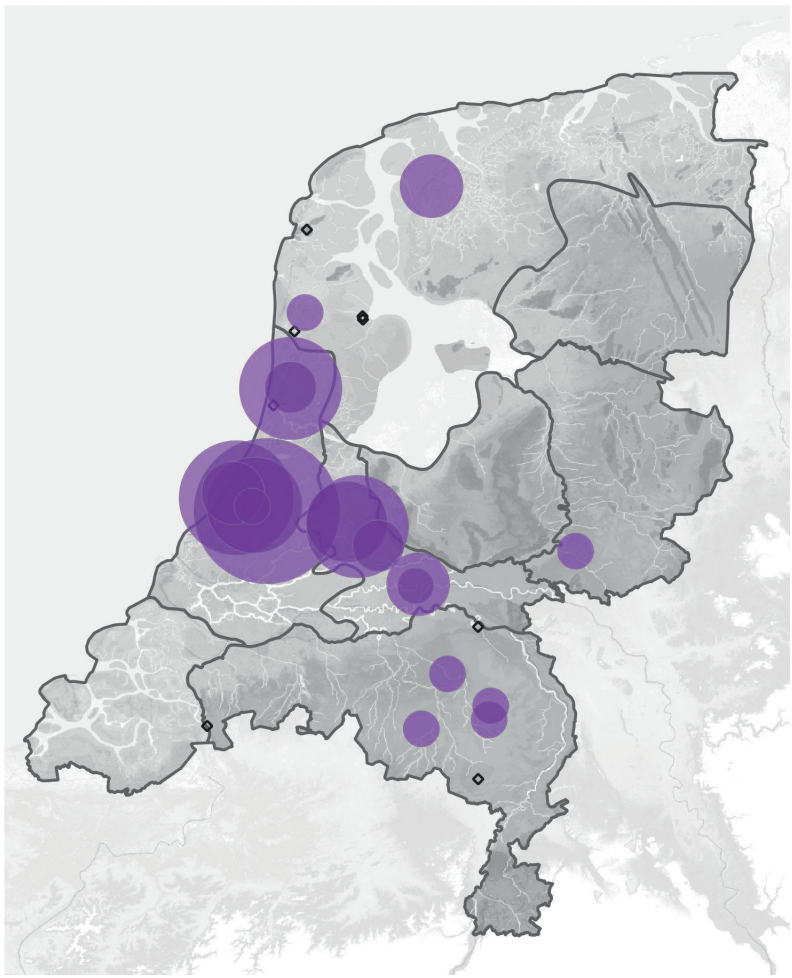
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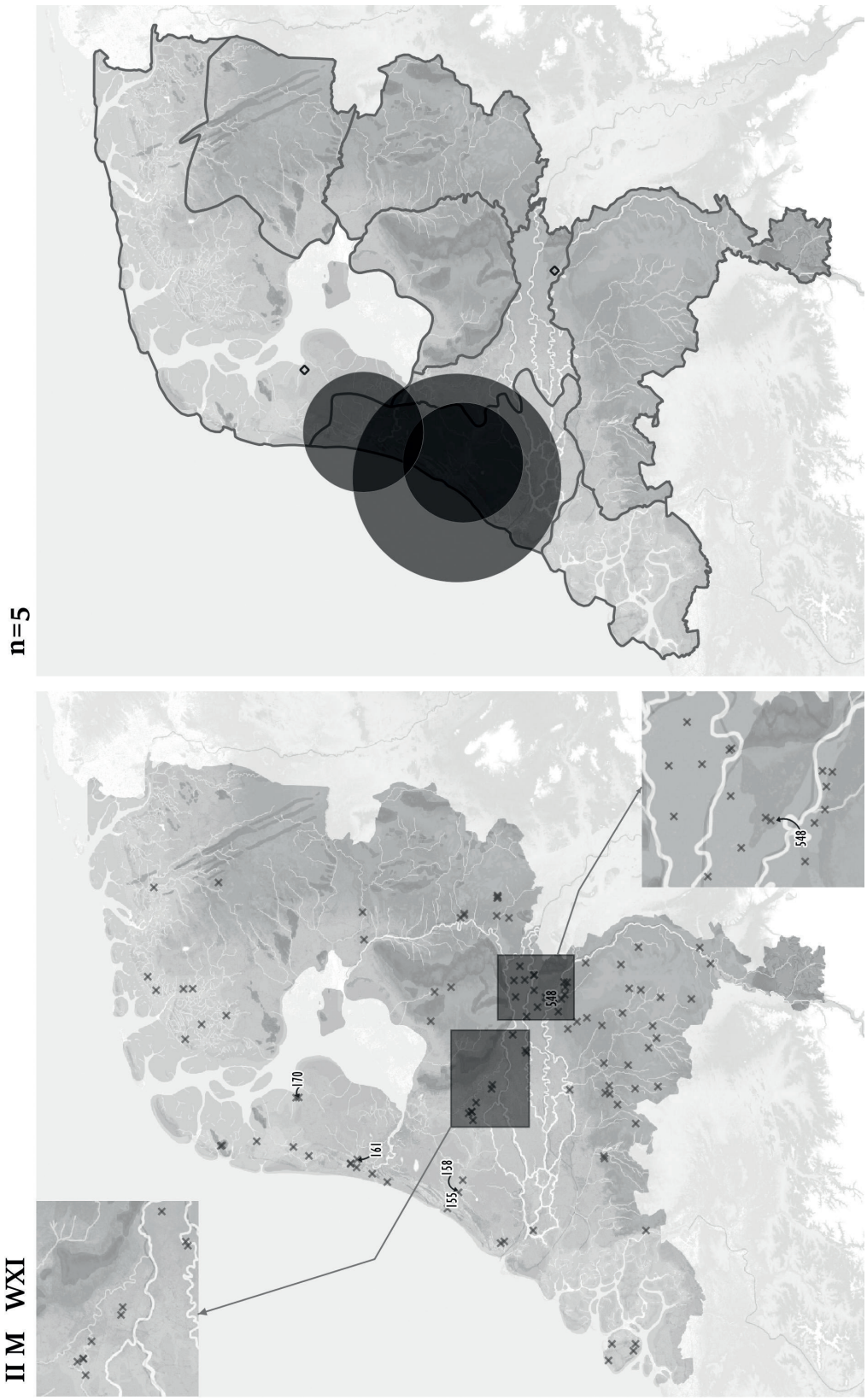


II L WX


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164
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147
119

n=75

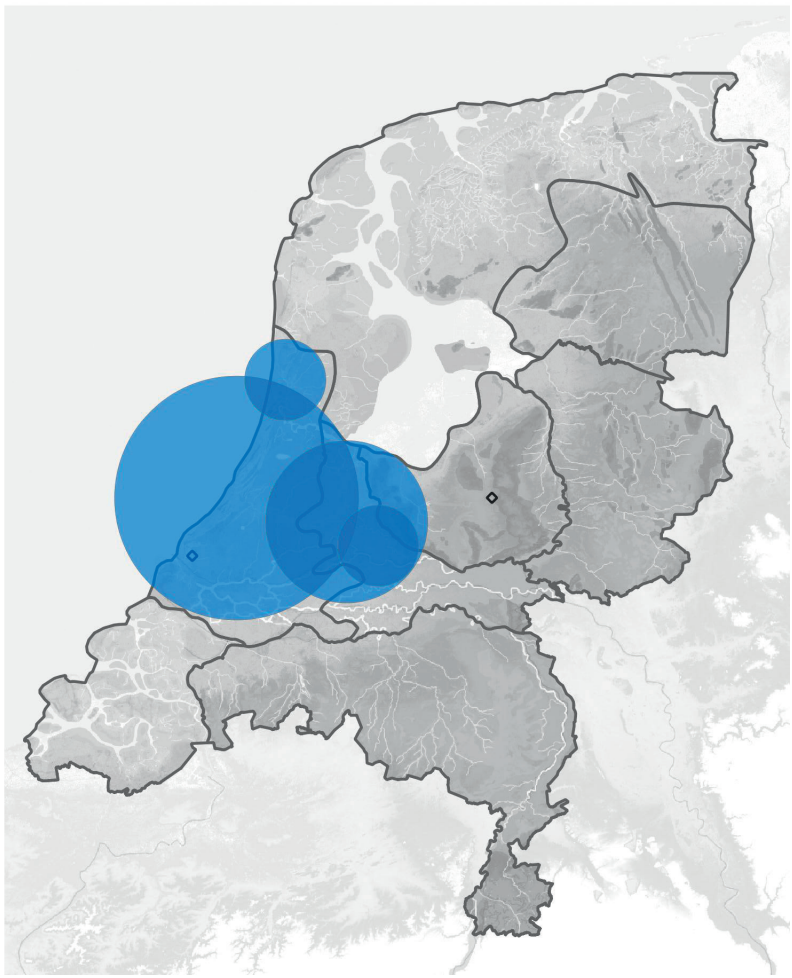



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II N WXII



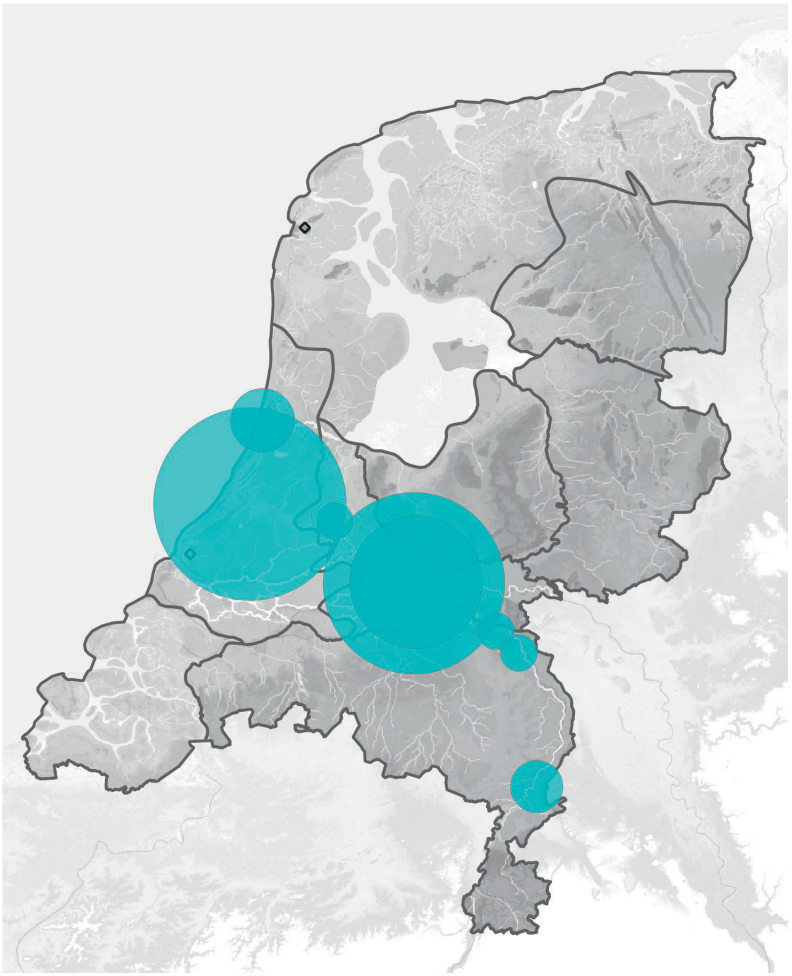
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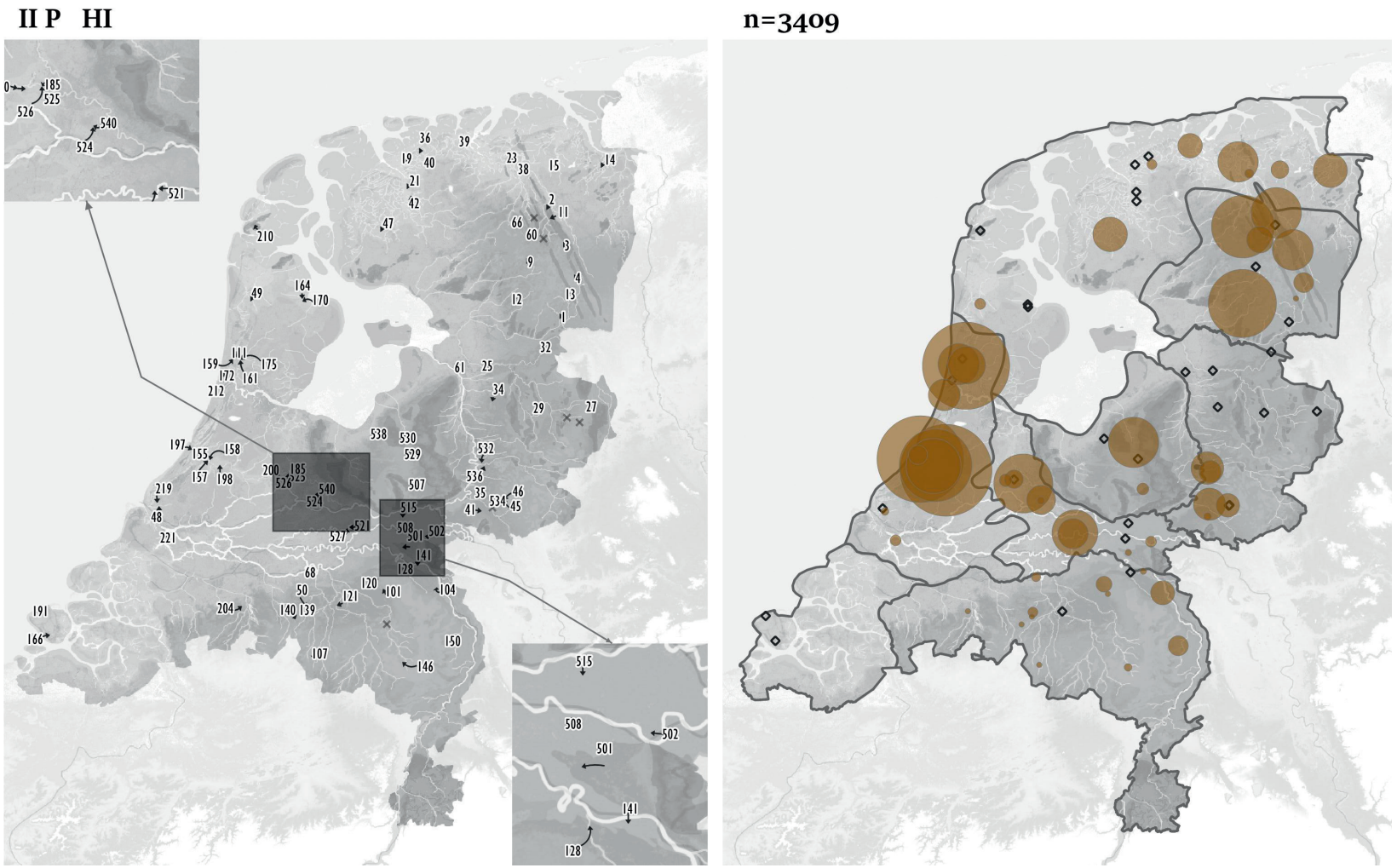


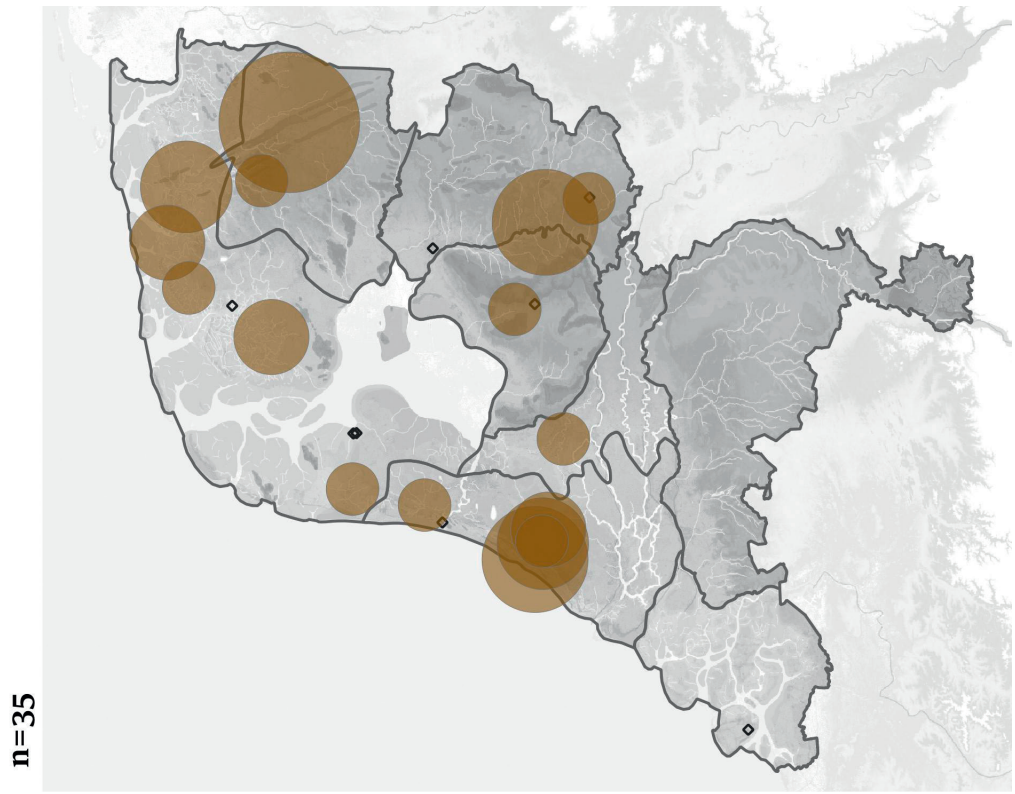
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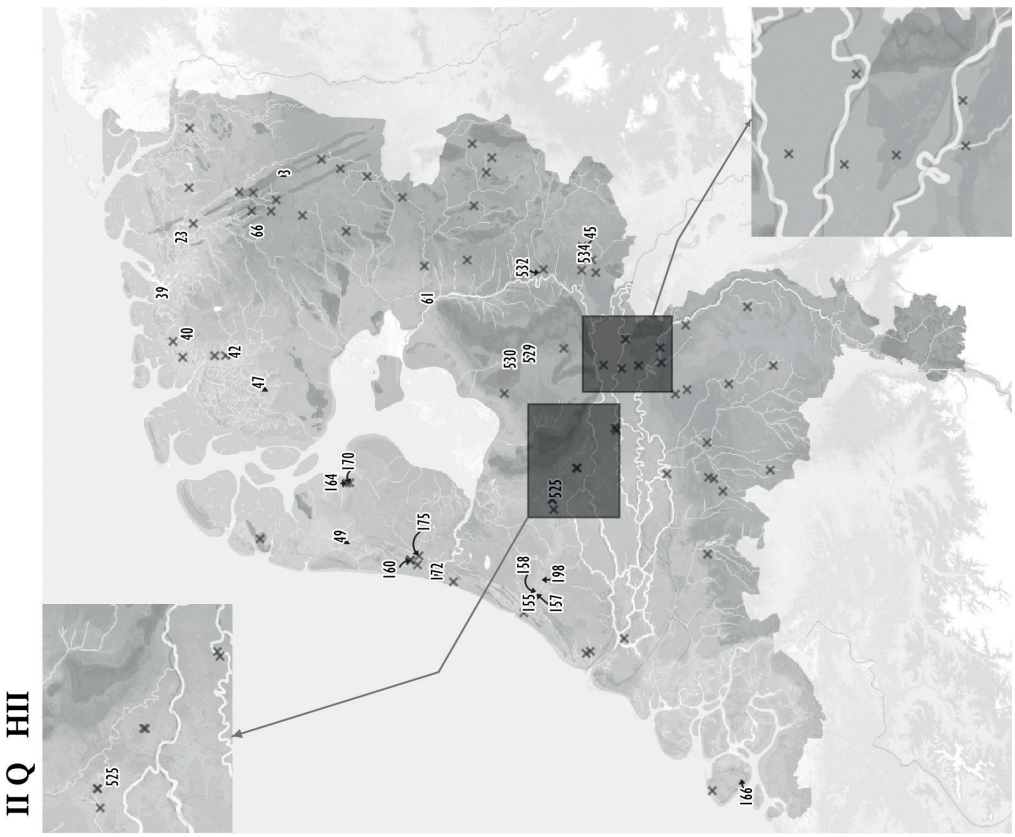


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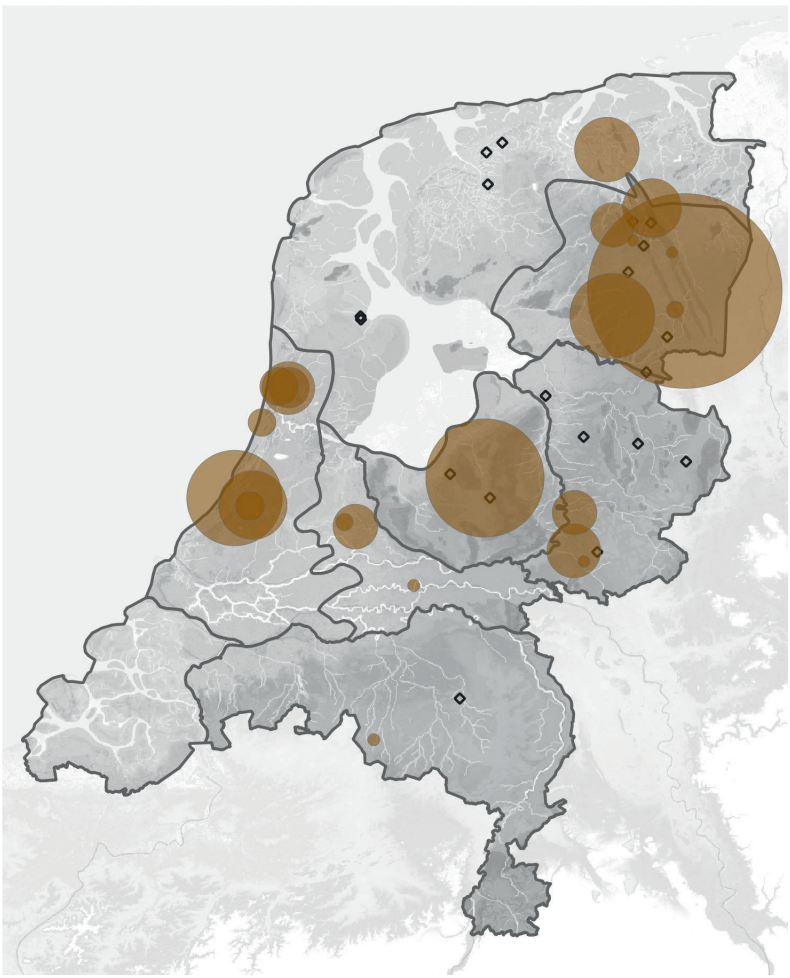

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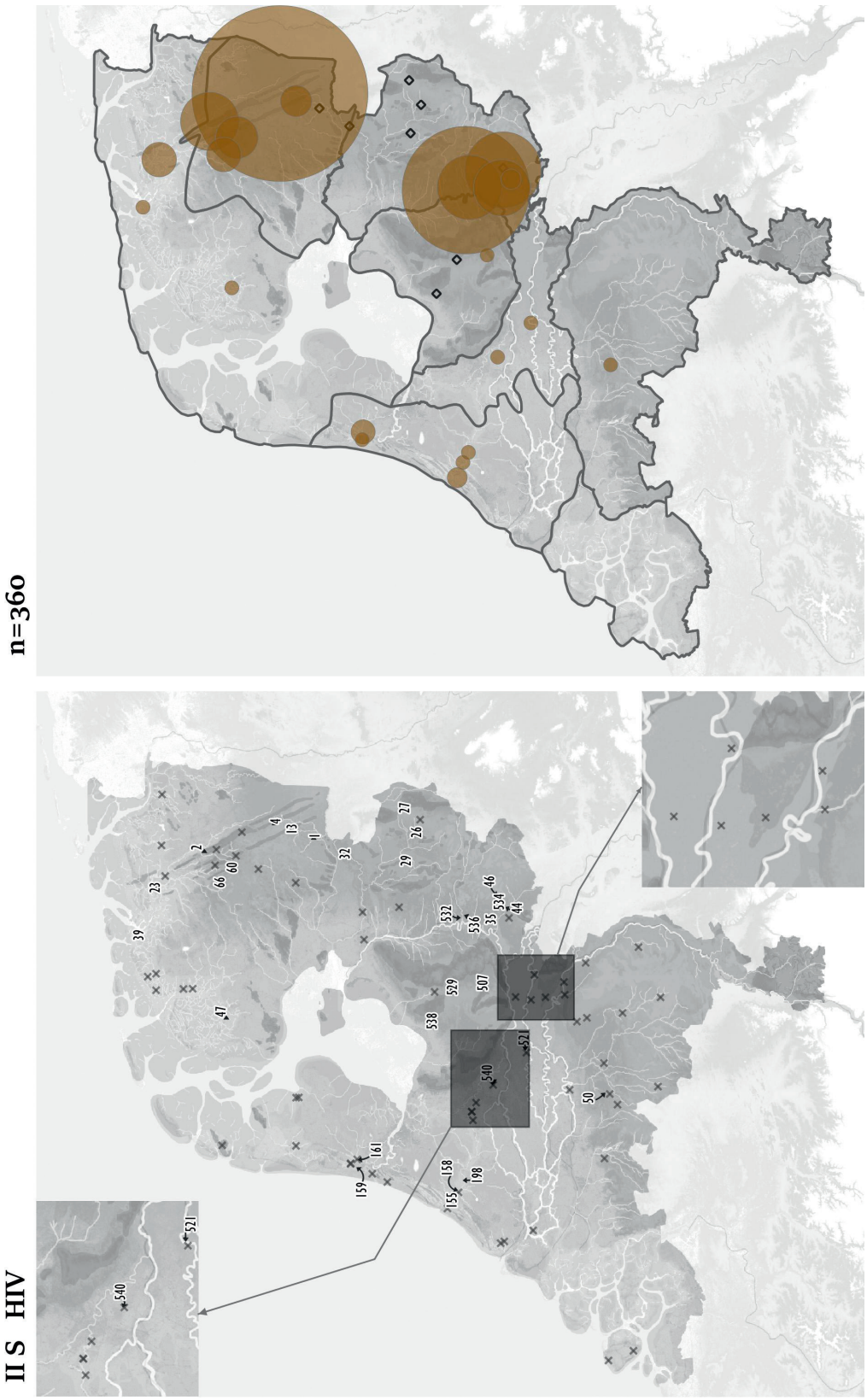

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529
525
166

II R HIII



n=640




n=360
II S HIV
521
540
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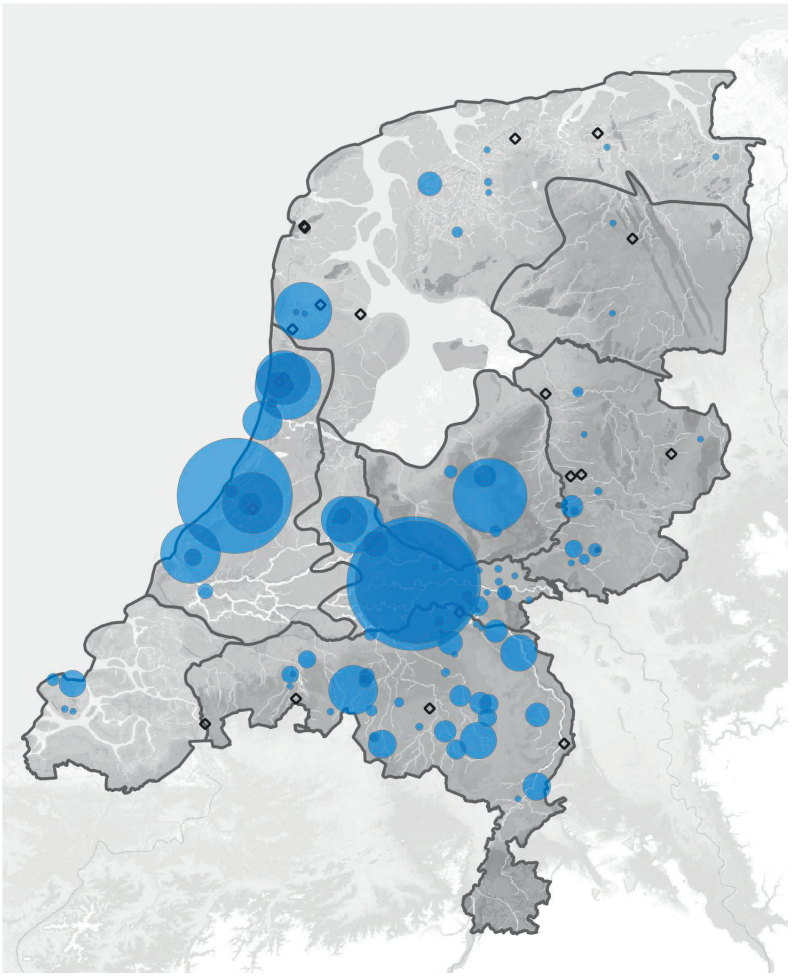
Appendix II

Distribution maps of fabric groups

IIIA BAD



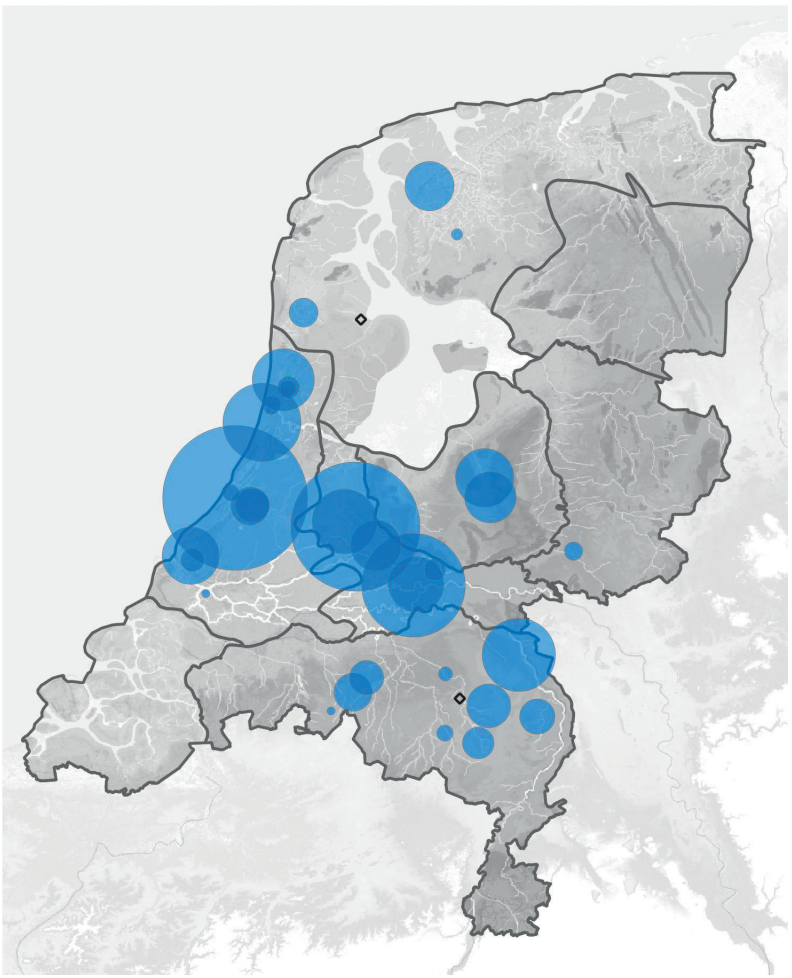
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IIIB WALB



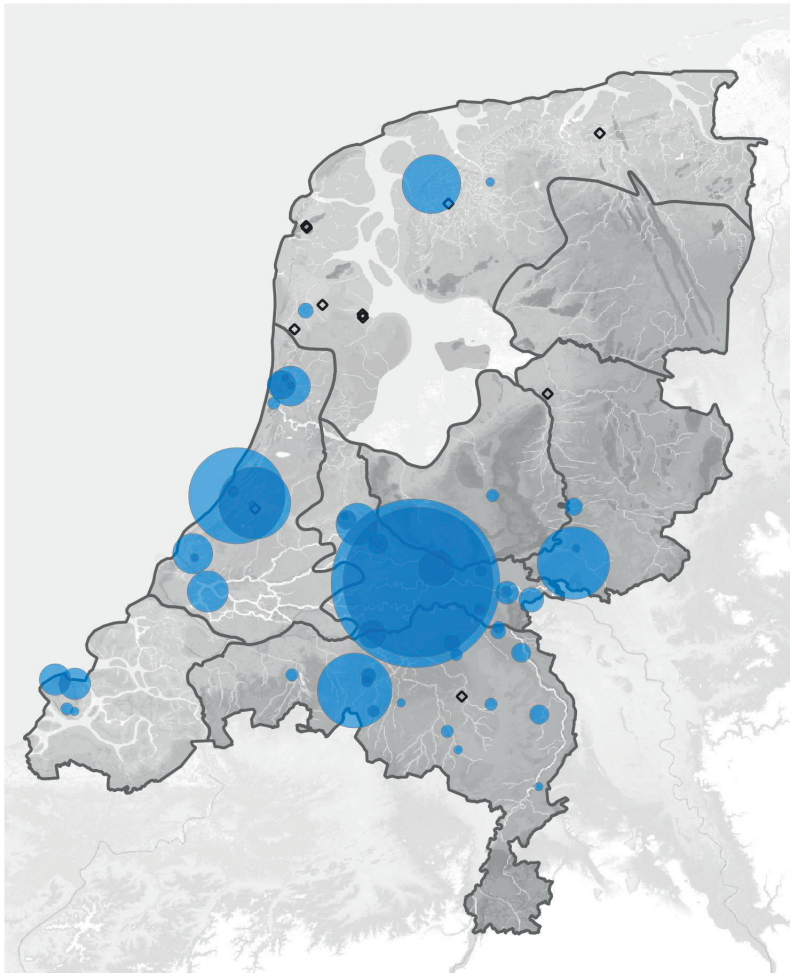
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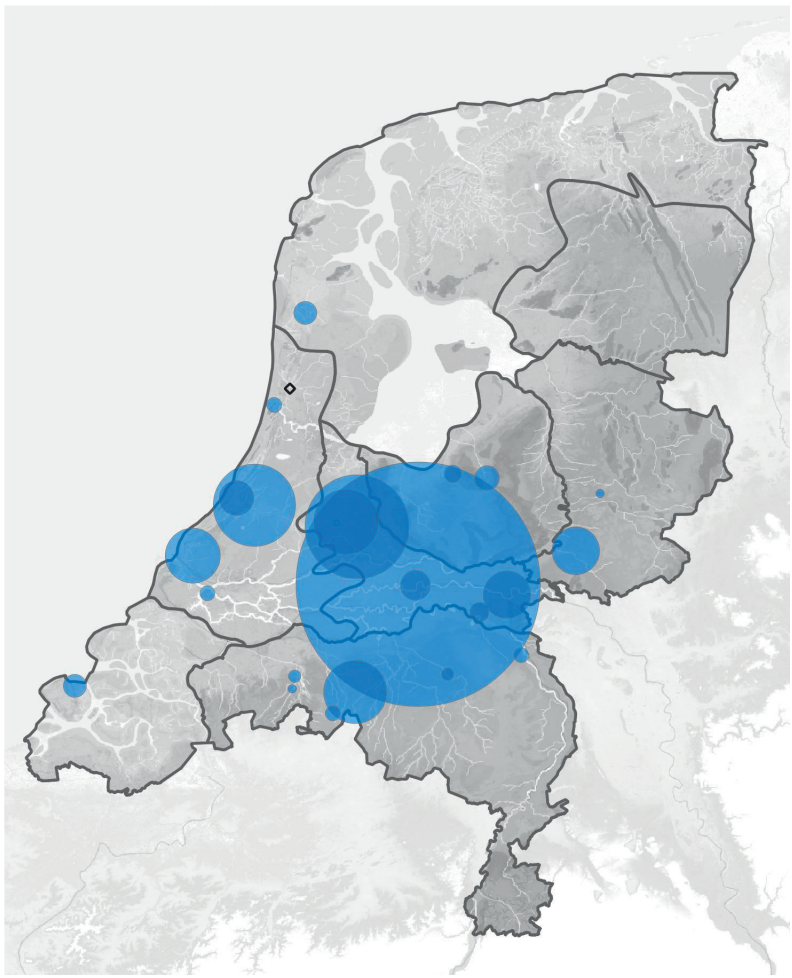
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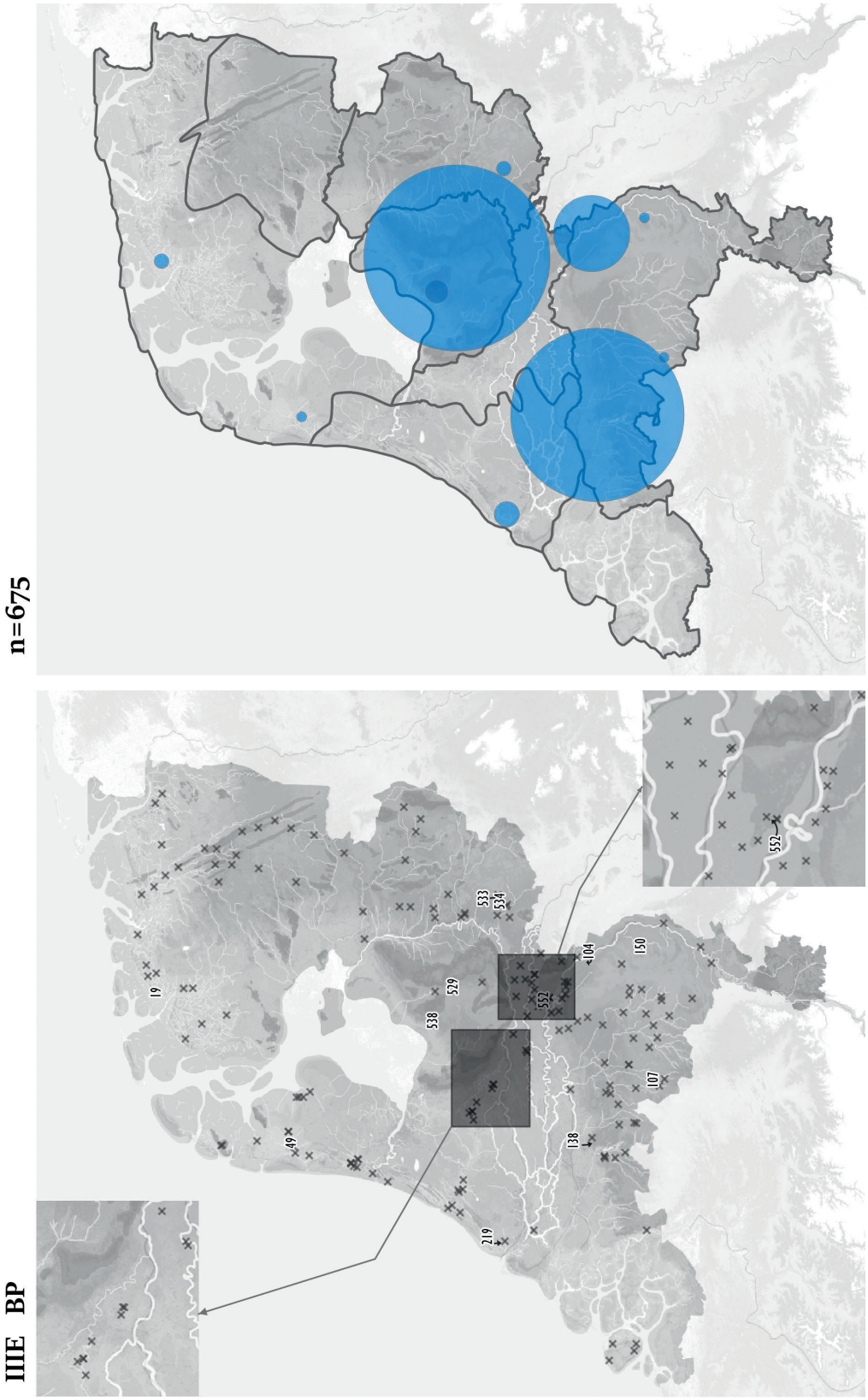


IIID LBAD



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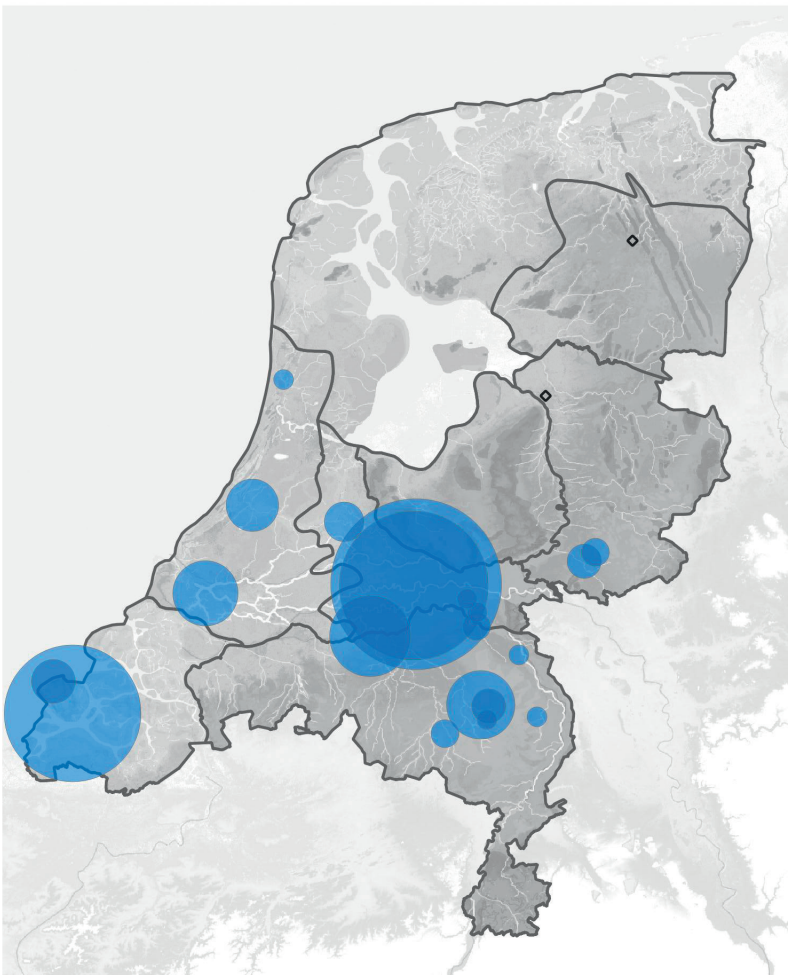



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IIIF HU


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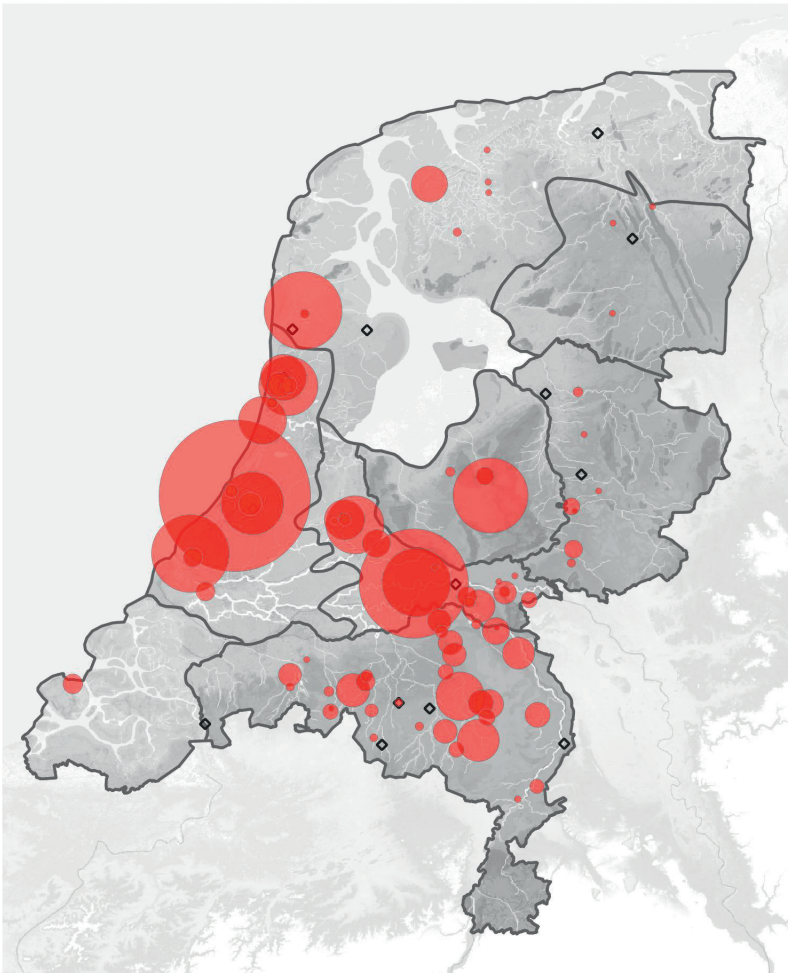
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IIIG MAY



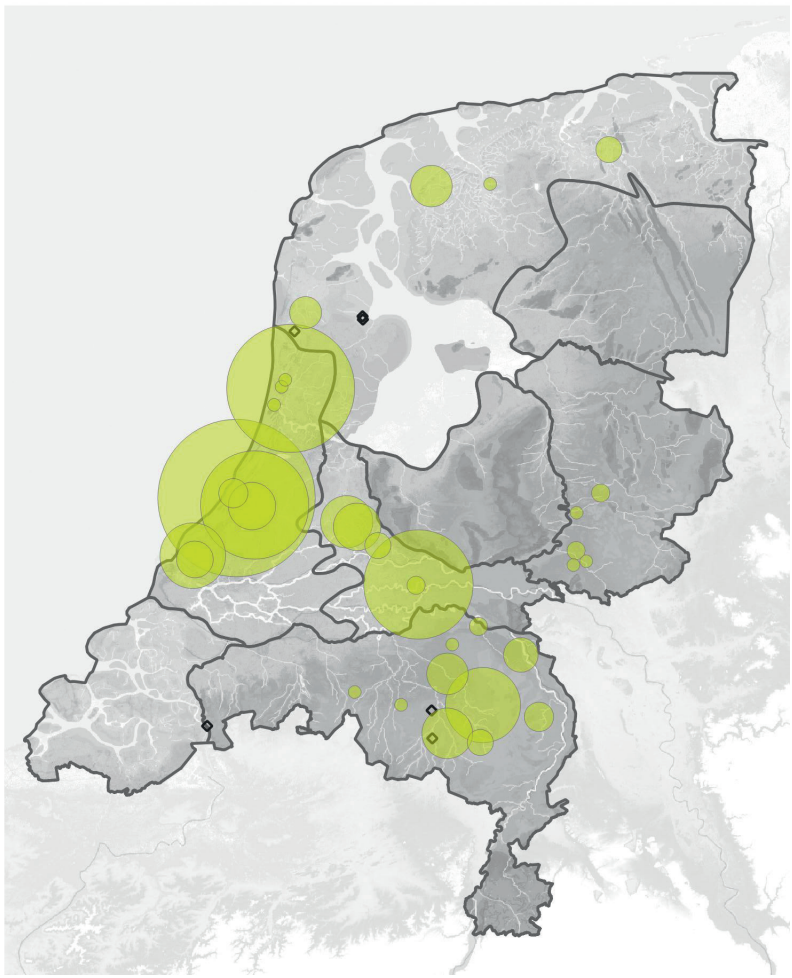
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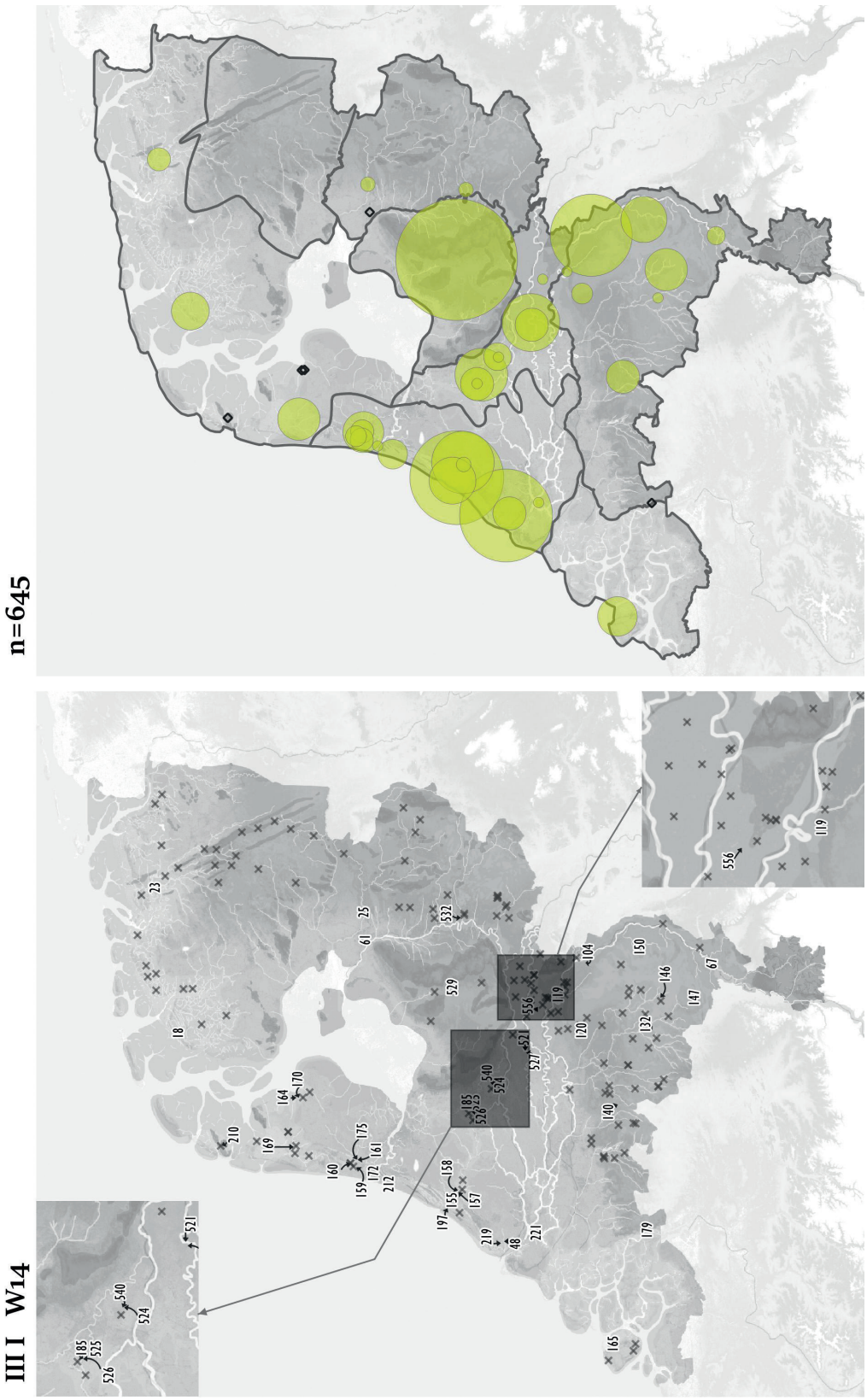


IIIH W13



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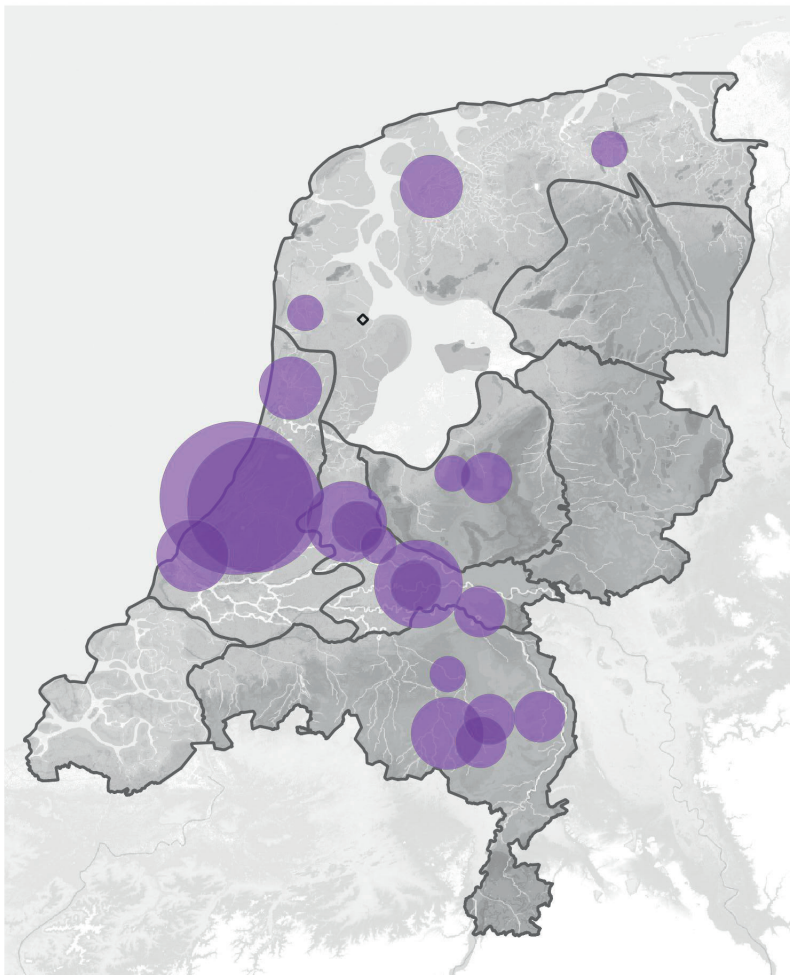



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157
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179
165

III J CSM


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526
540
521
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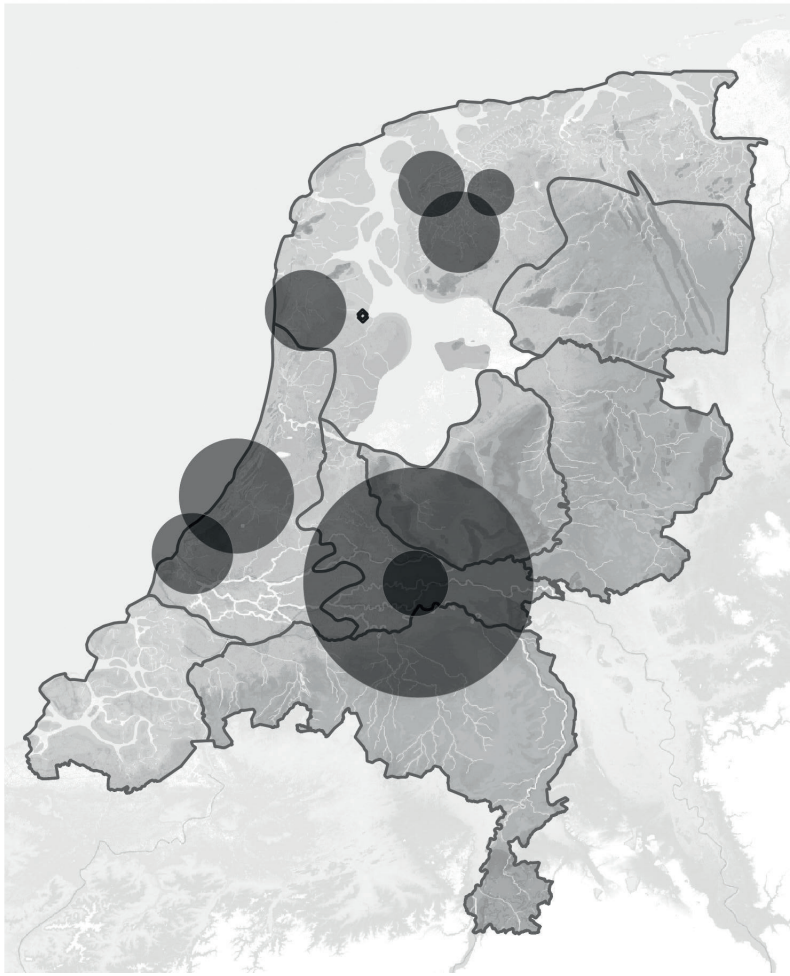
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III K TAT



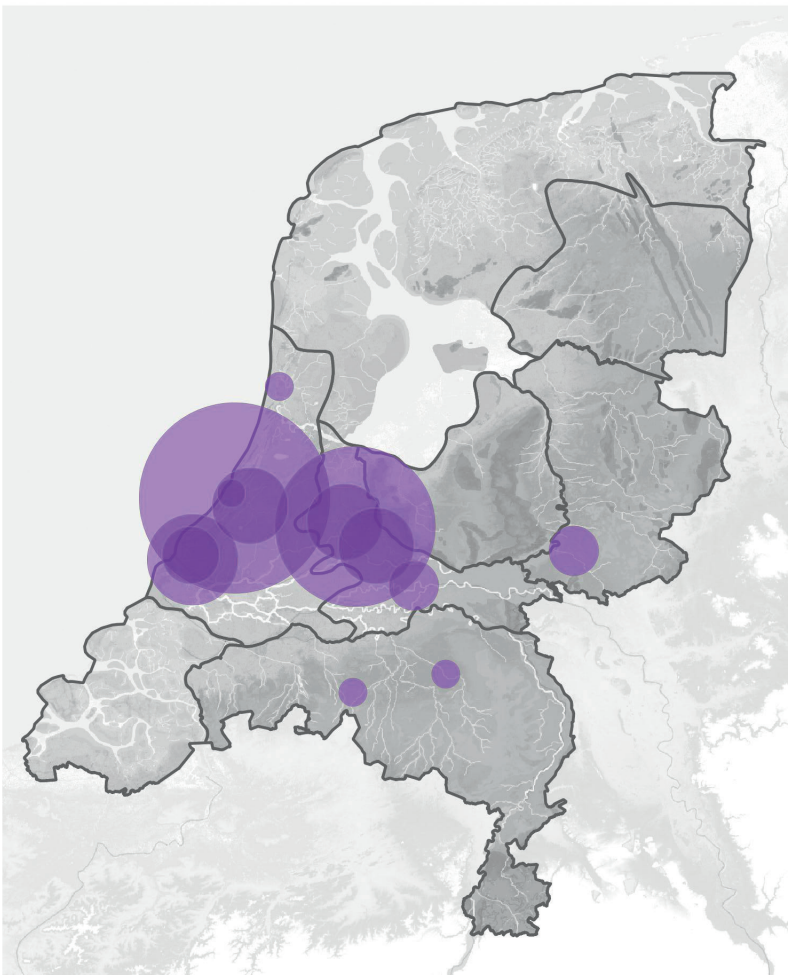
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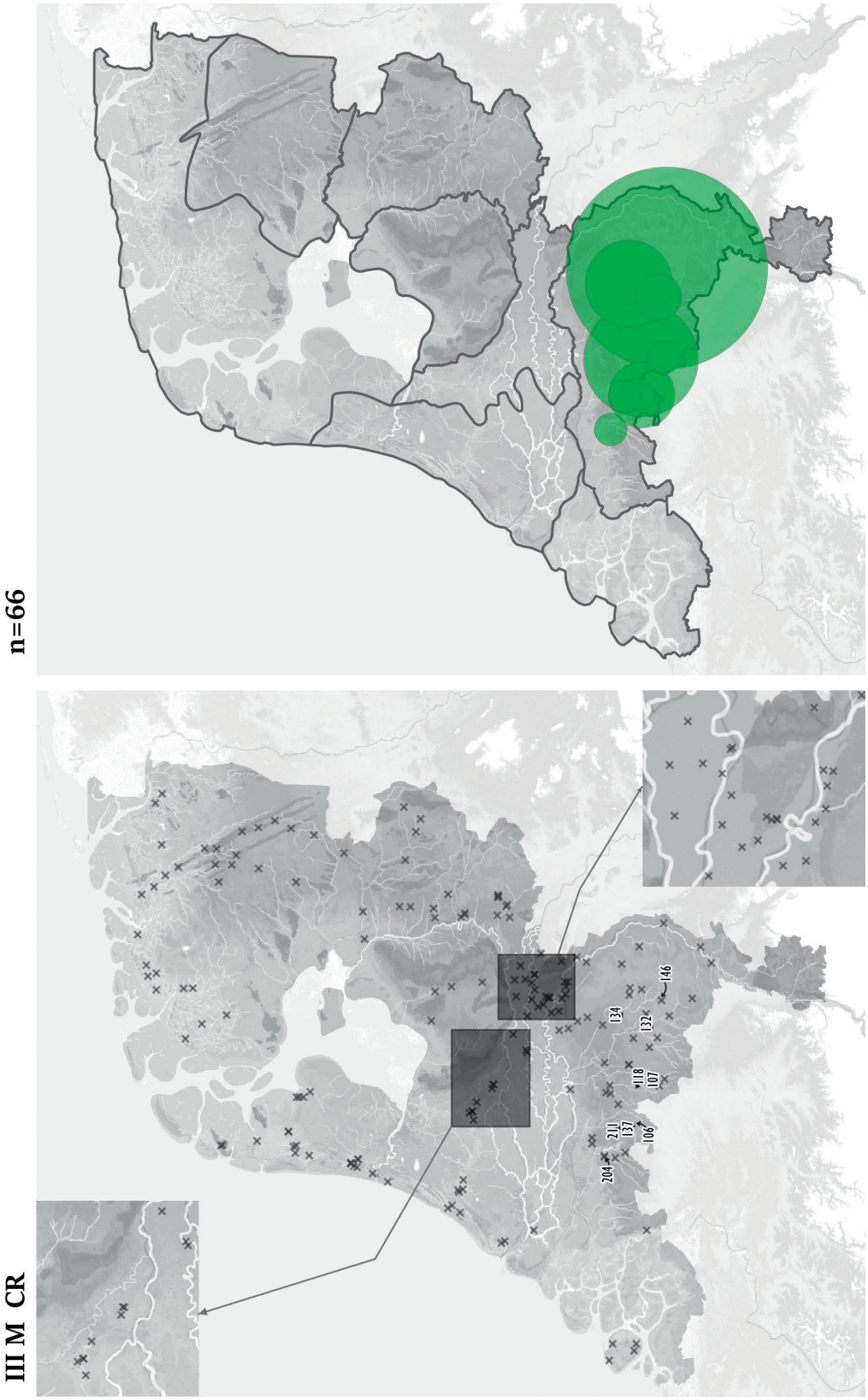


III L W11



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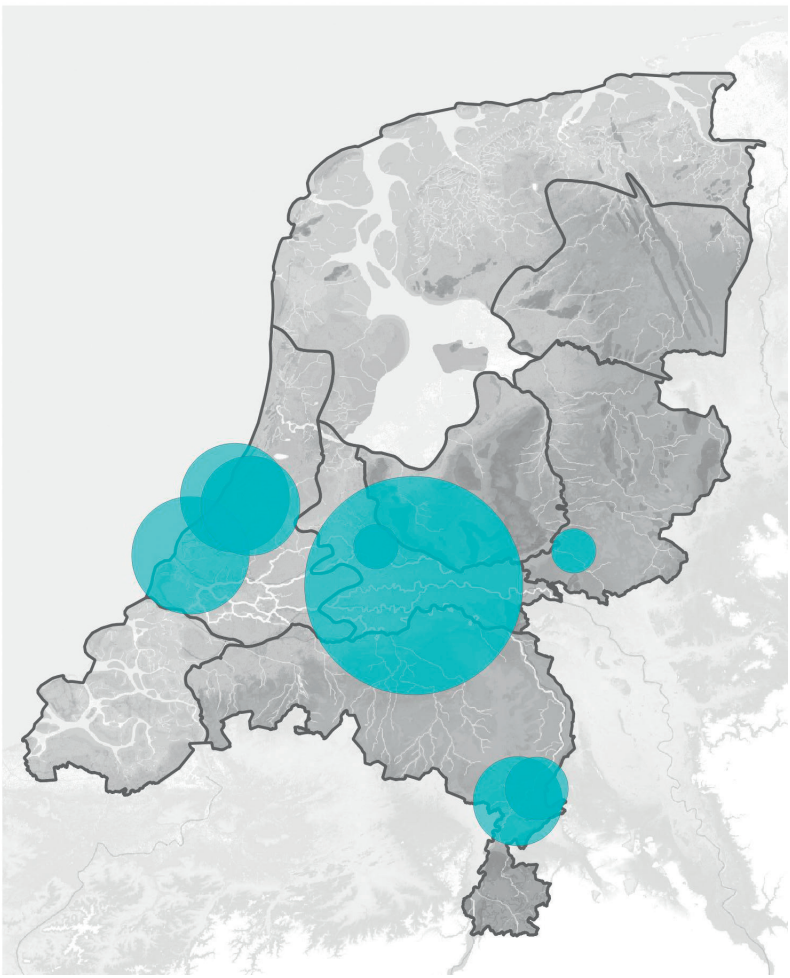



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134
132
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211
137
106
204

III N WALR



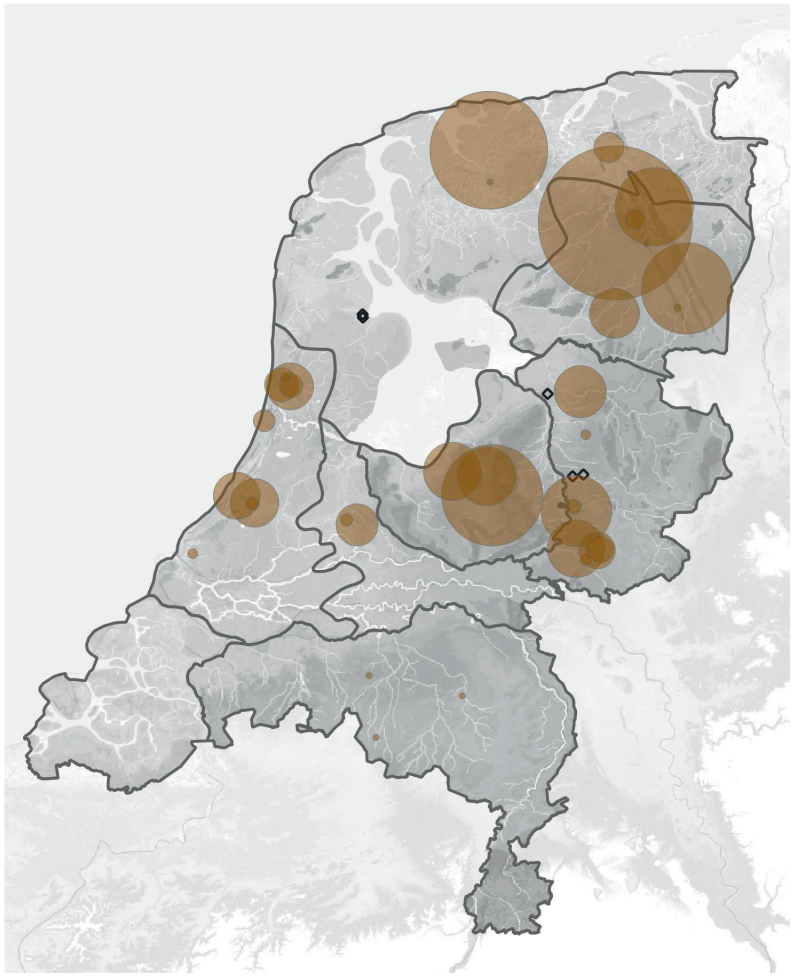
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III O HS



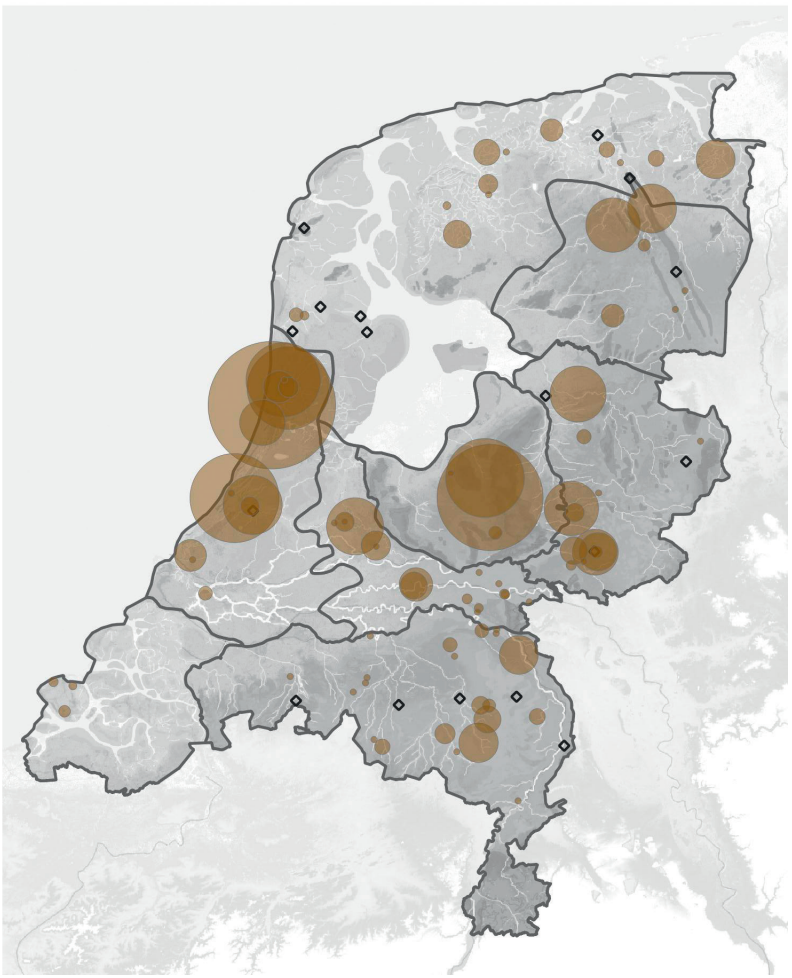
n=2895



III P KP



n=40210



Appendix IV

Coins discovered at Carolingian sites in the research area

Authority	Type	Start date	End date	Total
Roman				3
Merovingian	tremissus	625	625	1
Merovingian	denarius	675	750	9
Total Merovingian				10
	sceatta	680	800	24
	sceatta	680	c.715	98
	sceatta	c.715	800	39
Total sceatta				161
Pippin the Short	denarius	751	768	31
Charlemagne pre-reform	denarius	768	794	26
Charlemagne monogram	denarius	793	814	43
Charlemagne	obolus	793	814	1
Charlemagne	denarius	768	814	7
Louis the Pious Class 2	denarius	816	823	29
Louis the Pious XR	denarius	822	840	82
Louis the Pious	denarius	814	840	7
Louis the Pious	obolus	814	840	3
Louis the Pious	obolus	816	823	1
Louis the Pious	obolus	822	840	2
imitation Louis the Pious	denarius	814	840	1
Unknown/unspecified	solidus	814	840	1
Pippin II of Aquitane	obolus	838	852	1
Lothar I	denarius	840	855	16
imitation Lothar I	denarius	840	855	11

Authority	Type	Start date	End date	Total
Charles the Bald	denarius	843	847	1
Charles the Bald	denarius	843	877	3
Charles the Bald	denarius	848	877	1
Charles the Bald	obolus	843	877	2
Charlemagne/Charles the Bald	denarius	793	877	3
Charlemagne/Charles the Bald	obolus	768	877	1
Charlemagne/Charles the Bald/Charles the Simple	obolus	793	923	2
Louis the Pious/Lothar I/Charles the Bald	denarius	814	877	1
Louis the Pious/Lothar I/Charles the Bald	denarius	822	864	1
Louis III	denarius	899	911	2
Louis the Child/Charles the Simple	denarius	899	923	1
indeterminate	denarius	700	900	6
indeterminate	obolus			1
Total Carolingian				287
Arab	dirhem	791	792	1
Eadberth	styca	737	758	1
Offa	penny	757	796	3
Cuthred	penny	805	807	1
Eanred	styca	810	854	1
Aethelred II	styca	841	858	1
Redwulf	styca	844	858	1
Total English				8
Godfried	penny	1156	1178	1
Total				471

Appendix V

Variables recorded in find database

Finds were recorded in relation to the structures or features in which they were discovered. Each find category was then recorded in a separate table containing variables relevant to the individual category. Not all finds could be assigned to an individual structure or feature. These finds were recorded per feature type and if that was not possible either, as stray find.

Structures/features table

Field name	Description
Site	Site number assigned during inventory of finds
Structure id	Identifier allotted to structures (buildings, wells, features etc.) as they appear in excavation report
Rural/Town	Rough indication of whether the site can be considered either a rural settlement or a town
Stray Y/N	Whether the finds in the record can be considered stray finds, according to the definition used in this study, or not.
Individual structure/feature	Whether the record represents finds from a single structure or feature, or a collection of structures or features
Complex type	Nature of the site
Structure type	The type of structure
Feature type	The type of feature
Region	The region in which the site is situated
Subregion	The subregion in which the site is situated
Start date	The start date assigned to the structure or feature in the excavation report
End date	The end date assigned to the structure or feature in the excavation report
Dendrochronologically dated	Whether the structure or feature has been dendrochronologically dated

Ceramics table

Field name	Description
Site id	Together with 'Structure id' forms the link with Structure/feature table
Structure id	Together with 'Site id' forms the link with Structure/feature table
W/H	Whether ceramics are either wheel-turned or handmade
Provenance	Provenance of fabric group
Category	Initial grouping of ceramics in to broad categories (fe Carolingian wheel-turned, Roman, Prehistoric)
Fabric group	Detailed recording of fabric groups (fe Badorf, Mayen, Carolingian handmade with shell-temper, Hessens-Schortens with chaff temper). Carolingian wheel-turned ceramics mostly according to Dorestad-fabric system, handmade as recorded in excavation report.
Fabric Hand simplified	A simplification of the wide array of recorded handmade fabrics into manageable groups. Added after completion of inventory.
Category basic	Combination of Category and Fabric groups in order to create groups that are suitable for analysis. Added after completion of inventory.
Type	Vessel type, mostly according to Dorestad-typology. With subtypes for rim-variants
Type simplified	Only the main vessel type, without rim-variants
Number	Number of sherds
ENV	Estimated number of vessels, based on rim-sherds.
Start date	Start date of ceramic fabric/type as recorded in the excavation report
End date	End date of ceramics fabric/type as recorded in the excavation report

Field name	Description
E/M/L	Grouping of fabrics/types in to date-categories. Can be Early, Early/Middle, Middle, Middle/Late or Late. Added after completion of inventory.
Diagnostic	Whether the record contains sherds that have diagnostic features such as rim-sherds, spouts, handles or decoration
Vessel type	The presumed function (jar, jug, amphora etc.) of the vessel. Only recorded for diagnostic sherds
Function category	The presumed function category (cooking, storage, pouring etc.) of the vessel. Only recorded for diagnostic sherds
Remarks	Additional information relevant to the research

Metals table

Field name	Description
Site id	Together with 'Structure id' forms the link with Structure/feature table
Structure id	Together with 'Site id' forms the link with Structure/feature table
Metal	The type of metal or alloy
Function category	The presumed function category of the artefact
Object type	Basic group of objects the artefact belongs to
Type	More specific groupings, for example denarii, sceattas, obols for coinage. For slag the metal that was produced or worked was recorded here (iron, copper-alloy)
Specific type	Further specification of artefact, for example wodan/monster or porcupine for sceattas. For slag the phase of production or working it provided evidence for was recorded here (tap slag, furnace lining, smithing slag)
Enamel	Whether an artefacts (mainly brooches) was enameled
Type identifier	Specific identifier used to denote a type, as recorded in publication
Bos	Brooch type according to Bos
Van Bellingen	Brooch type according to Van Bellingen
Thörle	Brooch type according to Thörle
HF_type	Specific brooch type according to Heeren/Van der Feijst
HF_type basic	Basic brooch group (ansate, disc etc.)
Authority	Authority by which a coin was struck
Provenance	Provenance of artefact, mainly concerns coins
Number	Count of artefacts
Weight	Weight of artefacts
Artisanal activity	Indicated whether an artefact is considered evidence for artisanal activity. Either Yes or No
Start date	Start date according to publication
End date	End date according to publication
Remarks	Additional information relevant to the research

Stone table

Field name	Description
Site id	Together with 'Structure id' forms the link with Structure/feature table
Structure id	Together with 'Site id' forms the link with Structure/feature table
Stone type	The type of stone
Function category	The presumed function category of the artefact
Object type	Basic group of objects the artefact belongs to
Specific type	Further specification of artefact, for example handstone, quernstone or roughout for millstones
Provenance	Provenance of artefact, mainly concerns millstones
Number	Count of artefacts
Weight	Weight of artefacts
Artisanal activity	Indicated whether an artefact is considered evidence for artisanal activity. Either Yes or No
Start date	Start date according to publication
End date	End date according to publication
Remarks	Additional information relevant to the research

Glass table

Field name	Description
Site id	Together with 'Structure id' forms the link with Structure/feature table
Structure id	Together with 'Site id' forms the link with Structure/feature table
Glass type	The type of glass (translucent, opaque)
Function category	The presumed function category of the artefact
Object type	Basic group of objects the artefact belongs to
Specific type	Further specification of artefact, for example the shape of beads or the type of vessel
Colour	Colour of the artefact
Provenance	Provenance of artefact
Number	Count of artefacts
Artisanal activity	Indicated whether an artefact is considered evidence for artisanal activity. Either Yes or No
Start date	Start date according to publication
End date	End date according to publication
Remarks	Additional information relevant to the research

Animal based materials table

Field name	Description
Site id	Together with 'Structure id' forms the link with Structure/feature table
Structure id	Together with 'Site id' forms the link with Structure/feature table
Bone type	The type of bone
Function category	The presumed function category of the artefact
Object type	Basic group of objects the artefact belongs to
Specific type	Further specification of artefact, for example the type of comb
Provenance	Provenance of artefact
Number	Count of artefacts
Artisanal activity	Indicated whether an artefact is considered evidence for artisanal activity. Either Yes or No
Start date	Start date according to publication
End date	End date according to publication
Remarks	Additional information relevant to the research

Plant based materials table

Field name	Description
Site id	Together with 'Structure id' forms the link with Structure/feature table
Structure id	Together with 'Site id' forms the link with Structure/feature table
Organic material	The type of organic material
Function category	The presumed function category of the artefact
Object type	Basic group of objects the artefact belongs to
Specific type	Further specification of artefact
Provenance	Provenance of artefact
Number	Count of artefacts
Artisanal activity	Indicated whether an artefact is considered evidence for artisanal activity. Either Yes or No
Start date	Start date according to publication
End date	End date according to publication
Remarks	Additional information relevant to the research

Fired clay (other than ceramics) table

Field name	Description
Site id	Together with 'Structure id' forms the link with Structure/feature table
Structure id	Together with 'Site id' forms the link with Structure/feature table
Brick type	The type of fired clay, for example tile, burnt loam, loom weight
Use	The presumed function the artefact was used for
Specific feature	Specific features of the artefact
Provenance	Provenance of artefact
Number	Count of artefacts
Weight	Weight of artefacts
Artisanal activity	Indicated whether an artefact is considered evidence for artisanal activity. Either Yes or No
Start date	Start date according to publication
End date	End date according to publication
Remarks	Additional information relevant to the research

Appendix III Number of dated contexts per context type for Frick's disc-broach types

Main type nr	Main type	Subtype	Start dat	End date	Settlement	Settl 8-9th	Settl 10-11th	Burial	Bur 8-9th	Bur 10-11th	Hoard	Hoard 8-9th	Hoard 10-11th	Chorologically dated	Total dated	Total stray	Total settl	Total bur	Tot hoard	Grand total
1	cross (enamel)	1.1	850	1000	9	1	8	3	3	0	0	0	0	3	12	59	39	4	0	102
1	cross (enamel)	1.2	850	1000	2	0	2	3	3	0	0	0	0	3	5	11	11	3	0	25
1	cross (enamel)	1.3	850	1000	2	0	2	2	2	0	0	0	0	2	4	14	4	3	0	21
1	cross (enamel)	1.4	800	1000	1	0	1	5	5	0	0	0	0	4	6	10	4	8	0	22
1	cross (enamel)	1.5	875	1000	1	0	1	0	0	0	0	0	0	0	1	4	6	1	0	11
1	cross (enamel)	1.6	850	900	0	0	0	1	1	0	0	0	0	1	1	5	1	1	0	7
1	cross (enamel)	1.7	850	900	0	0	0	1	1	0	0	0	0	1	1	2	1	1	0	4
1	cross (enamel)	1.8	825	875	0	0	0	1	1	0	0	0	0	1	1	2	0	1	0	3
1	cross (enamel)	1.9	775	900	0	0	0	2	2	0	0	0	0	2	2	3	0	2	0	5
2	cross	2.1	775	900	0	0	0	3	3	0	0	0	0	3	3	1	0	3	0	4
2	cross	2.2	875	925	0	0	0	0	0	0	0	0	0	0	0	1	6	0	0	7
2	cross	2.3	875	1000	4	1	3	2	0	2	0	0	0	2	6	3	15	2	0	20
2	cross	2.4	900	1050	3	0	3	0	0	0	0	0	0	0	3	1	7	0	0	8
3	plateau	3.1	775	1100	1	1	0	1	0	1	0	0	0	1	2	5	1	1	0	7
3	plateau	3.2	800	1100	2	1	1	0	0	0	0	0	0	0	2	7	5	0	0	12
3	plateau	3.3	875	925	1	0	1	0	0	0	0	0	0	0	1	1	1	0	0	2
4	pelta	4.1.1	700	825	1	1	0	0	0	0	0	0	0	1	1	3	1	0	0	4
4	pelta	4.1.2	700	900	0	0	0	1	1	0	0	0	0	1	1	4	0	1	0	5
4	pelta	4.1.3	900	1000	3	0	3	0	0	0	0	0	0	0	3	3	7	0	0	10
4	pelta	4.2.1	800	900	1	1	0	1	1	0	0	0	0	1	2	4	2	1	0	7
4	pelta	4.2.2	850	925	2	0	2	0	0	0	0	0	0	0	2	2	3	0	1	6
4	pelta	4.2.3	875	1000	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
5	rectangular	5.1.1	800	850	0	0	0	0	0	0	0	0	0	0	0	7	6	0	0	13
5	rectangular	5.1.2	800	850	0	0	0	2	2	0	0	0	0	1	2	7	4	6	0	17
5	rectangular	5.2.1	750	900	2	1	1	8	8	0	0	0	0	7	10	10	12	12	0	34
5	rectangular	5.2.2	800	900	1	1	0	0	0	0	0	1	0	0	2	1	4	2	1	8
5	rectangular	5.2.3	800	850	0	0	0	1	1	0	0	0	0	1	1	5	0	1	0	6
6	saint	6.1	750	850	1	1	0	1	1	0	0	0	0	1	2	9	7	2	1	19
6	saint	6.2.1-4	750	850	0	0	0	0	0	0	0	0	0	0	0	24	14	2	0	40
7	animal	7.1.1.1	800	925	4	0	4	0	0	0	0	0	0	0	4	23	8	0	0	31
7	animal	7.1.1.2	900	1000	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
7	animal	7.1.1.3	950	1100	1	0	1	0	0	0	0	0	0	0	1	1	1	0	0	2
7	animal	7.1.2	800	900	1	1	0	0	0	0	0	0	0	0	1	8	3	0	0	11
7	animal	7.1.3	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5
7	animal	7.2.1	950	1100	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	4
7	animal	7.2.2	950	1100	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	4
7	animal	7.3.1	850	925	1	0	1	0	0	0	0	0	0	0	1	0	3	0	0	3
7	animal	7.3.2	900	1100	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3
8	hubcap	8	900	1100	5	0	5	0	0	0	0	0	0	0	5	7	6	0	0	13
9	(pseudo-) coin	9.1.1	800	900	0	0	0	0	0	0	0	0	0	0	0	3	5	0	1	9
9	(pseudo-) coin	9.1.2	850	900	1	1	0	0	0	0	0	0	0	0	1	13	10	1	0	24
9	(pseudo-) coin	9.1.2	850	900	0	0	0	2	2	0	0	0	0	2	2	9	15	2	0	26
9	(pseudo-) coin	9.1.4	850	900	0	0	0	1	1	0	0	0	0	1	1	1	2	1	0	4
9	(pseudo-) coin	9.2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	1	0	6
9	(pseudo-) coin	9.3	850	1000	0	0	0	0	0	0	0	0	0	0	0	5	2	0	0	7
9	(pseudo-) coin	9.4	875	1100	0	0	0	0	0	0	0	0	0	0	0	5	7	0	0	12
9	(pseudo-) coin	9.5	900	1100	0	0	0	0	0	0	0	0	0	0	0	1	6	0	0	7
9	(pseudo-) coin	9.6	850	1100	0	0	0	1	1	0	2	0	2	1	3	5	2	1	2	10
10	buckle	10.1	900	1050	1	0	1	1	0	1	0	0	0	1	2	0	19	1	0	20
10	buckle	10.2	950	1100	1	0	1	0	0	0	7	0	7	0	8	1	0	0	16	17
11	central cloison	11.1	1000	1100	0	0	0	0	0	0	0	0	0	0	0	7	5	0	0	12
11	central cloison	11.2	800	1200	1	0	1	0	0	0	0	0	0	0	1	6	4	0	0	10
11	central cloison	11.3	800	1000	1	0	1	1	1	0	0	0	0	1	2	0	3	1	0	4
11	central cloison	11.4	875	925	0	0	0	2	2	0	0	0	0	2	2	0	0	2	21	23
12	rosette	12.1	875	925	0	0	0	0	0	0	1	1	0	0	1	1	0	0	6	7
12	rosette	12.2	800	950	1	0	1	1	1	0	0	0	0	1	2	2	3	1	0	6
13	star	13	875	1000	1	0	1	0	0	0	0	0	0	0	1	0	1	0	0	1

Appendix I Site information

Site	1
Site type	settlement
Province	Drenthe
Municipality	Coevorden
Place	Dalen
Toponym	Westakkers
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	sand
Start date	600
End date	900
Description	The excavation at the Westakkers started in 1989. In previous years several finds had been reported on the site, therefore a larger-scale excavation was carried out. The excavation yielded settlement traces from the early bronze age to the middle ages. Three houses, dated between the seventh and ninth century were uncovered, with several outbuildings. Only one well was found that could be dated in this period, possibly a nearby lake provided the required water. The pottery was almost exclusively handmade, with the exception of one sherd. According to the excavators this was not a nucleated settlement with defined yards, as seen in Odoorn. The concentration of features would have been much higher should this have been the case.
Literature	-Kooi, P.B., 1994: Een opgraving op de Westakkers te Dalen, in *Nieuwe Drentse Volksalmanak* 111, Assen, 39-54.

Site	2
Site type	settlement
Province	Drenthe
Municipality	Tynaarlo
Place	Midlaren
Toponym	De Bloemert
Completeness	part of site (not delimited)
Excavated area in ha	4.8
Soil type	sand
Start date	690
End date	870
Description	The site was excavated during several excavations that took place at various times between 1969 and 2005. The most comprehensive of these was conducted between September 2003 and August 2004 by the GIA and ARC. Finds range in date from prehistory to the late middle ages. Three yards have been dated to the Carolingian period. Twelve dendrochronologically dated wells also belong to the Carolingian occupation phase, suggesting habitation was more extensive than the identified remains of yards indicate.
Literature	-Harsema, O.H., 1971: Kroniek van opgravingen en vondsten in Drenthe, Romeinese tijd–middeleeuwen, in *Nieuwe Drentse Volksalmanak* 89, 178-179. -De Wit, M.J.M / J.B. Hielkema, 2003: *Een archeologisch inventariserend veldonderzoek (IVO) door middel van proefsleuven en -putten op recreatiepark 'De Bloemert' te Midlaren, gemeente Tynaarlo (Dr.),* ARC-publicatie 90, Groningen. -Nicolay, J.A.W. (red.), 2008: *Opgravingen bij Midlaren, 5000 jaar wonen tussen Hondsrug en Hunzedal,* Groningen Archaeological Studies vol. 7.

Site	3
Site type	settlement
Province	Drenthe
Municipality	Aa en Hunze
Place	Gasselte
Toponym	Galgeakkers
Completeness	part of site (delimited)
Excavated area in ha	-
Soil type	sand
Start date	800
End date	900
Description	Excavations in Gasselte in 1975 and 1976 revealed habitation from the ninth to twelfth century with 10 parallel, long, narrow plots. After an initial period when they were perhaps grouped together rather loosely, there soon developed a rigid, somewhat curved row, with each farmstead extending over a plot of almost equal width (ca. 40m). Within the plots renovating and new building activities took place according to strict rules. The farmsteads seem to have been renewed at the same spot at least three times. Finally the whole area seems to have been suddenly abandoned and reclaimed as arable land. The farmstead plots were enclosed by shallow ditches, by foundation trenches of palisades and by rows of posts. The house is in the centre, near the western end of the building there are several small outbuildings. The other buildings are almost always situated along the periphery of the plot. Between the plots there were E-W running trackways. The finds mainly consist of *Kugeltopf* pottery and in addition many fragments of quernstones made out of basalt lava and some, usually unidentifiable iron objects. Among the pottery imported wheel-thrown ware is scarce. There is only one sherd of Badorf ware. Pingsdorf ware was present slightly more present.
Literature	-Harsema, O.H., 1978: Kroniek van opgravingen en vondsten in Drenthe in 1976, in *Nieuwe Drentse Volksalmanak* 95, Groningen, 125. -Harsema, O.H., 1977: Kroniek van opgravingen en vondsten in Drenthe in 1975, in *Nieuwe Drentse Volksalmanak* 94, Groningen, 83-84. -Waterbolk, H.T./ O.H. Harsema, 1979: Medieval farmsteads in Gasselte, in *Palaeohistoria* 21, Groningen, 228-265.

Site	4
Site type	settlement
Province	Drenthe
Municipality	Borger-Odoorn
Place	Odoorn
Toponym	Sportveld
Completeness	part of site (delimited)
Excavated area in ha	1.7
Soil type	sand
Start date	700
End date	900
Description	The settlement consisted of no more than six farmyards at one time, consisting of a house and outbuildings. Before the eighth century the yards were built on nearly the same location, after this habitation shifts to the north and east. The houses were similar, instead of the wooden enclosed wells, water pits with sod walls were found outside the settlement. Not many sunken huts have been found, but a lot of small buildings of different shapes. In this phase many fenced enclosures were build, making the separate yards clearly distinguishable. Also the street pattern changed in this period. The finds consist mostly of locally produced pottery from the fifth-ninth or tenth century. Also loom weights, spindles, grindstones, wall plaster, 8 beads and some glass shards were found. Metal finds are completely absent.
Literature	-Van der Waals, J.D. (red.), 1968: Sporen van een nederzetting uit de Vroege Middeleeuwen te Odoorn, in *Nieuwe Drentse Volksalmanak* 86, Groningen, 196-198. -Van Es, W.A., 1979: Odoorn: fruhmittelalterlicheSiedung, das Fundmaterial der Grabung 1966, in *Palaeohistoria* 21, Groningen, 205-227. -Waterbolk, H.T., 1973: Odoorn im fruhen Mittelalter, Bericht der Grabung 1966, in *Neue Ausgrabungen und Forschungen in Niedersachsen* 8, 25-89.

Site	5
Site type	settlement
Province	Drenthe
Municipality	Midden-Drenthe
Place	Eursinge
Toponym	-
Completeness	part of site (delimited)
Excavated area in ha	0.4
Soil type	sand
Start date	600
End date	800
Description	The site is located on the Pesser es. Work on broadening and adapting the road offered the possibility of archaeological research. This research was carried out in several phases, between 1972 and 1975. During the excavations habitation in two separate periods was found, the early iron age and early middle ages. The building plans are mostly dated based on typology, since very little datable finds were found in the features belonging to the structures. early medieval farmyards from the fifth/sixth and seventh/eighth centuries were found. Besides houses, barns, granaries, a sunken-featured building and a well was located on the yards. Also a ‘furnace pit’ was found.
Literature	-Lanting, J.N., 1977: Bewoningssporen uit de IJzertijd en de vroege Middeleeuwen nabij Eursinge, gem. Ruinen, in *Nieuwe Drentse Volksalmanak* 94, 41-79.

Site	6
Site type	other/unknown
Province	Drenthe
Municipality	Aa en Hunze
Place	Anloo
Toponym	Bosweg
Completeness	uncertain
Excavated area in ha	-
Soil type	sand
Start date	700
End date	900
Description	Several pits filled with charcoal were found, which are partly dated in the eighth and ninth century. These pits are probably the remains of burning wood for the production of charcoal.
Literature	-Groenewoudt, B.J., 2005: Sporen van houtskoolproductie en landschapsdynamiek in een verdwenen bos bij Anloo, in *Nieuwe Drentse Volksalmanak* 122, 152-162.

Site	7
Site type	settlement
Province	Drenthe
Municipality	Aa en Hunze
Place	Balloo
Toponym	Balloo 20
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	sand
Start date	500
End date	1000
Description	A large pit has been found, which can probably be identified as a water pit. In this pit pottery, stone and worked wood. Most of the pottery is Hessens-Schortens which can be dated between 500 and 800 AD. The other pottery is dated in the ninth or tenth century.
Literature	-Hielkema, J.B., 2009*: Plangebied Balloo 20 te Balloo, gemeente Aa en Hunze; een archeologische Begeleiding*, RAAP-rapport 1892, Weesp.

Site	8
Site type	settlement
Province	Drenthe
Municipality	Borger-Odoorn
Place	Ees
Toponym	Noordes
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	sand
Start date	700
End date	1000
Description	Excavations in advance of road construction yielded part of a main building, two outbuildings and a well. The dating is unclear, somewhere between the eighth and eleventh century, based on pottery and typological characteristics.
Literature	-Molema, J., 1992: *Dwars door Drenthe: archeologisch onderzoek in het tracé van een gasleiding tussen Ommelanderwijk (gem. Veendam) en Witteveen (gem. Westerbork)*, Groningen.

Site	9
Site type	settlement
Province	Drenthe
Municipality	Midden-Drenthe
Place	Hooghalen
Toponym	Holtesch
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	sand
Start date	700
End date	900
Description	The earliest excavations at this site date from the 1920's. No structures could be reconstructed from these plans. The pottery was mostly dated to Carolingian period. In 1991 another excavation took place at roughly the same spot. A sunken hut was dated in the eighth/ninth century based on pottery finds. The dating of two partly uncovered houseplans is uncertain.
Literature	-Van Giffen, A.E., 1946: Vroeg-middeleeuwse gebouwsporen bij Hooghalen, gem. Beilen, in *Nieuwe Drentse Volksalmanak* 64, 84-88. -Dijkstra, Y., 1993: Middeleeuwse bewoningssporen bij Hooghalen (Dr.), in *Paleoaktueel* 4, 132-136. -Dijkstra, Y./J. Jelsma, 1992: *Ruilverkavelingsgebied Laaghalen en dubbel eenheidsoefenterrein De Haar. Een aanvullende archeologische kartering, inventarisatie en waardering*, Groningen.

Site	10
Site type	settlement
Province	Drenthe
Municipality	Tynaarlo
Place	Vries
Toponym	Holtenweg
Completeness	part of site (not delimited)
Excavated area in ha	0.15
Soil type	sand
Start date	600
End date	900
Description	During building works a large pit filled with early medieval pottery was found. Other than this pit and another small pit, no settlement traces were detected. A settlement in the direct vicinity can be expected.
Literature	-Harsema, O.H., 1973: Vroeg-middeleeuws aardewerk uit Vries, gem. Vries, in *Nieuwe Drentse Volksalmanak* 90, 21-26.

Site	11
Site type	settlement
Province	Drenthe
Municipality	Aa en Hunze
Place	Schipborg
Toponym	-
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	sand
Start date	700
End date	900
Description	The site consists of a sunken hut containing Carolingian pottery.
Literature	-Van Giffen, A.E., 1936: Een inheemsch-Karolingische hutkom te Schipborg, gem. Anloo, in *Nieuwe Drentse Volksalmanak* 54, 130-133.

Site	12
Site type	settlement
Province	Drenthe
Municipality	Hoogeveen
Place	Pesse
Toponym	Oostereng-Sportveld
Completeness	part of site (not delimited)
Excavated area in ha	0.25
Soil type	sand
Start date	800
End date	900
Description	Excavation on this site took place in several periods, 1972/1973 and 1981/1982 and also a small excavation in 2001. Between 1981 and 1982 0,8 ha was excavated on the location of a sports ground. Here habitation from the ninth to the twelfth century was uncovered. In total 26 houses and 22 barns were found, of which 8 houses were ninth century. Also wells, granaries and sunken-featured buildings that have not been dated specifically are found on the site. Also large circles (9 to 10m in diameter) of pits were found, of which the function is unknown. Possibly 6 yards were occupied at the same time . In the vicinity (de zandafgraving) two wells dated in the seventh or eighth century have been found.
Literature	-Harsema, O., 1983: Kroniek van vondsten en opgravingen in Drenthe in 1980 en 1981: Pesse, gem. Ruinen, in *Nieuwe Drentse Volksalmanak* 104-105. -Van Zeist, W./G.J. de Roller/R.M. Palfenier-Vegter/ O.H. Harsema/H. During, 1986. Plant remains of medieval sites in Drenthe (NL), in *Helinium* 26, 226-274. -Reinders, H.R./H.T. Waterbolk, 2009: De archeologie en geschiedenis van Pesse. De marke van Pesse en de opgravingen in het middeleeuwse oude centrum, in *Nieuwe Drentse Volksalmanak* 126, 169-202.

Site	13
Site type	settlement
Province	Drenthe
Municipality	Coevorden
Place	Sleen
Toponym	Grasweg
Completeness	part of site (not delimited)
Excavated area in ha	0.03
Soil type	sand
Start date	450
End date	900
Description	South of the village of Noordsleen excavation took place in two phases, in 1955 and 1958. During the excavations several settlement traces were found which were dated in the early medieval period. They consisted of one incomplete houseplan and two sunken huts. The finds were unable to provide an accurate dating.
Literature	-Bruin, A./W.A. van Es, 1967. early-medieval settlement near Sleen (Drenthe), in *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 17, 129-139.

Site	14
Site type	settlement
Province	Groningen
Municipality	Delfzijl
Place	Woldendorp
Toponym	Burg. Garreltsweg
Completeness	part of site (not delimited)
Excavated area in ha	2
Soil type	clay
Start date	750
End date	950
Description	During the excavation several pits were uncovered, some of which can be dated in the Carolingian period. No buildings were recognised. The location of a hearth may indicate the location of a houseplan.
Literature	-Tuinstra, S.J., 2006: *Middeleeuwse bewoningssporen op de wierde van Woldendorp: een archeologische opgraving aan de Burgemeester Garreltsweg te Woldendorp, gemeente Delfzijl (Gr.)*, ARC-publicatie 151, Groningen.

Site	15
Site type	settlement
Province	Groningen
Municipality	Ten Boer
Place	Ten Boer
Toponym	Fivelhorn
Completeness	part of site (not delimited)
Excavated area in ha	0.1
Soil type	clay
Start date	800
End date	1200
Description	During digging works several archaeological features were uncovered. The site was interpreted as an elevated house place. No buildings could be reconstructed, the well is possibly from a later (not Carolingian) phase. Half of the pottery is dated in the ninth/tenth century. The settlement was inhabited from the ninth century and probably continued until the twelfth century.
Literature	-Dijkstra, Y., 1998: *Archeologisch onderzoek van Middeleeuwse bewoningssporen bij AZC Fivelhorn, gem. Ten Boer*, ARC-publicatie 19, Groningen.

Site	16
Site type	settlement
Province	Groningen
Municipality	Delfzijl
Place	Farmsum
Toponym	Heveskesklooster
Completeness	part of site (delimited)
Excavated area in ha	-
Soil type	clay
Start date	800
End date	1300
Description	The habitation of this terp started in de second half of the first century. This first settlement phase lasted until the start of the fifth century. The early medieval habitation started around 800, based on the pottery finds and several fibulae. On the terp in this period the remains of two sod-walled houses were uncovered, probably belonging to different phases.
Literature	-Boersma, J.W., 1988: Een voorlopig overzicht van het archeologisch onderzoek van de wierde Heveskesklooster (Gr.), in M. Bierma et al. (ed.), *Terpen en wierden in het Fries-Groningse kustgebied*, Groningen, 61-87.

Site	17
Site type	settlement
Province	Friesland
Municipality	Dongeradeel
Place	Foudgum
Toponym	Foudgum
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	clay
Start date	700
End date	950
Description	This terp was partly destroyed at the beginning of the twentieth century. During the excavations fourteen levels were documented. Habitation on the site was divided into five phases, of which the fourth was the Carolingian phase. To this phase belonged a house of which the stable section was uncovered, a barn and a well.
Literature	-De Langen, G.J., 1992: *Middeleeuws Friesland. De economische ontwikkeling van het gewest Oostergo in de vroege en volle middeleeuwen*, Groningen (PhD-thesis Rijksuniversiteit Groningen).

Site	18
Site type	settlement
Province	Friesland
Municipality	Harlingen
Place	Wijnaldum
Toponym	Terp Tjitsma
Completeness	part of site (delimited)
Excavated area in ha	-
Soil type	clay
Start date	750
End date	950
Description	The terp was continuously inhabited between 100 and 1100 AD. In this period there was always one farmyard, with one main building. Between 750 and 950 three different habitation phases are distinguished, with three corresponding main buildings. In the sixth phase (750-800) a three-aisled longhouse can be reconstructed, although this is not clear. The building would have been a combination between sod-walls and a wooden framework. The seventh and eighth phases (800-850 and 850-950) have for a large part disappeared due to erosion. The main building now consisted of a sod building with poles on stones. Sunken huts can be assigned to each phase. A total of 18 wells have been dated in this period. A few coins from the second half of the ninth/beginning of the tenth century mark the end of the habitation at the terp.
Literature	-Gerrets, D.A./ J. de Koning, 1999: Settlement development on the Wijnaldum-Tjitsma terp, in J.M. Besteman et al. (eds.), The excavations at Wijnaldum. Reports on Frisia in Roman and medieval times 1, Rotterdam, 73-125. -Besteman, J.C./J.M. Bos/H.A. Heidinga, 1992: *Graven naar Friese koningen. De opgraving in Wijnaldum*, Franeker. -Schoneveld, J., 1991: Het archeologisch onderzoek van de terp van Wijnaldum (gem. Harlingen); een eerste impressie, in *Westerheem* 40, 198-201. -Zijlstra, J., 1991: Fins Fibula? Belangwekkende vroeg-middeleeuwse vondsten te Wijnaldum,in *Westerheem* 40, 51-62. -Tulp, C., 1997: early Medieval Metal-working at the Terp Tjitsma (Frisia, The Netherlands), in G. de Boe/F. Verhaeghe (eds.), *Material Culture in Medieval Europe. Papers of the 'Medieval Europe Brugge 1997' Conference*, volume 7, 53-59. -Bos, J.M., 1991: Hernieuwd Fries terpenonderzoek: de opgraving bij Wijnaldum (Fr.), in *Bulletin van de (Koninklijke) Nederlandse Oudheidkundige Bond* 90, 143-144.

Site	19
Site type	settlement
Province	Friesland
Municipality	Ferwerderadiel
Place	Hallum
Toponym	Hof van Hallum
Completeness	part of site (delimited)
Excavated area in ha	0.25
Soil type	clay
Start date	650
End date	950
Description	Habitation at this site started in the second/third century. In the Carolingian period the terp was extended. Four different yards can be distinguished. For the whole period a total of 7 houses, 3 barns, 1 sunken hut and 1 well have been found.
Literature	-Nicolay, J.A.W. & S.J. Tuinstra & J.R. Veldhuis 2009: *Hallum, een welvarend dorp aan de monding van de Middelzee. Een archeologische oppgraving te Hallum, gem. Ferwerderadeel (Fr.),* ARC-Publicaties 205, Groningen.

Site	20
Site type	settlement
Province	Friesland
Municipality	Franekeradeel
Place	Tzum
Toponym	Tritsum
Completeness	part of site (delimited)
Excavated area in ha	0.45
Soil type	clay
Start date	700
End date	900
Description	The terp was inhabited from the iron age. In the Carolingian period the settlement moved toward the north of the terp. This is mainly based on the distribution of the pottery. In total, 30 wells, 300 pits and 60 sunken huts have been found. No buildings have been reconstructed so far. Only one of the sunken huts was specifically dated to the Carolingian period. Of all the pottery 33 sherds were from the Carolingian period.
Literature	-Taayke, E./E. Knol, 1992: Het vroeg-middeleeuwse aardewerk van Tritsum, gem. Franekeradeel (Fr.), in *Paleo-aktueel* 3, 84-88. -Waterbolk, H.T., 1961: Beschouwingen naar aanleiding van de opgravingen te Tristum, gem. Franekeradeel, in *It Beaken* 23, 216-226. -Knol, E., 1993: *De Noordnederlandse kustlanden in de Vroege Middeleeuwen*, Groningen (PhD-thesis Vrije Universiteit Amsterdam), 121-123.

Site	21
Site type	settlement
Province	Friesland
Municipality	Leeuwarden
Place	Leeuwarden
Toponym	Oldehoofsterkerkhof
Completeness	part of site (delimited)
Excavated area in ha	-
Soil type	clay
Start date	725
End date	900
Description	Habitation at the terp started in the first century AD. A number of well-preserved houseplans from the Roman period have been found, which is exceptional for Frisia. In the fourth century the site is abandoned and reoccupied in de fifth century. Strikingly, at the start of the Carolingian period, the whole terp was raised at once by 60 to 80 centimetres. The terp was also extended towards the north and east. There were probably three to four farms simultaneously at the site.
Literature	-Dijkstra, J./J.A.W. Nicolay (eds.), 2008: *Een terp op de schop. Archeologisch onderzoek op het Oldehoofsterkerkhof te Leeuwarden,* ADC Monografie 3, Amersfoort.

Site	22
Site type	settlement
Province	Groningen
Municipality	De Marne
Place	Leens
Toponym	Tuinsterwierde
Completeness	part of site (delimited)
Excavated area in ha	0.17
Soil type	clay
Start date	575
End date	850
Description	The terp was excavated by Van Giffen in 1939 in seven layers. Few finds were collected. In total 11 phases could be distinguished, dating from the late sixth to the early ninth centuries. Precise dating of the different phases was not possible, although the last two have been dated in the ninth century by Van Giffen based on surface finds. The stllements configuration during each of the different phases shows that houses were consistently built on the same spot.
Literature	-Van Giffen, A.E., 1940: Een systematisch onderzoek in een der Tuinsterwierden te Leens, in *Jaarverslag van de Vereniging voor Terpenonderzoek* 20-24 (1935-1939), 26-117. -Knol, E., 1993: *De Noordnederlandse kustlanden in de Vroege Middeleeuwen*, Groningen (PhD-thesis Vrije Universitiet Amsterdam).

Site	23
Site type	settlement
Province	Groningen
Municipality	Winsum
Place	Ezinge
Toponym	-
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	clay
Start date	675
End date	900
Description	The site was excavated between 1925 and 1934 by Van Giffen, and has only been partially published. Occupation of the site started in the early iron age. Many houses dated to the second and third century were found. Merovingian and Carolingian finds were located only at the north side of the site. Here some sunken huts have also been dated in the 'early middle ages'. The terp was probably extended in the Merovingian or Carolingian period.
Literature	-De Langen, G.J./H.T. Waterbolk, 1989: De archeologie van Ezinge. De nederzettings- en onderzoeksgeschiedenis van een Gronings terpdorp, in *Jaarverslagen van de Vereniging voor Terpenonderzoek* 66-72, 78-111. -Van Giffen, A.E., 1936: Der Warf in Ezinge, Provinz Groningen, Holland, und seine westgermaischen Hauser, in *Germania* 20, 40-70. -Waterbolk, H.T./J.W. Boersma, 1976: Bewoning in voor- en vroeghistorische tijd, in *Historie van Groningen- Stad en Land*, Groningen, 13-74. -Waterbolk, H.T., 1991: Ezinge, in *Reallexikon der germanischen Altertumskunde* 8, 60-76.

Site	24
Site type	settlement
Province	Groningen
Municipality	De Marne
Place	Ulrum
Toponym	Asingahof
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	clay
Start date	700
End date	800
Description	The only available information mentions a farmhouse of which the posts have been dendrochronologically dated between 731 and 741AD. Below the habitation level lay a three meter thick layer in which organic remains were well preserved.
Literature	-Groenendijk, H.A., 1998: Sector behoud- provinciaal archeologen- Groningen, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1995-1996, 43.

Site	25
Site type	settlement
Province	Overijsel
Municipality	Dalfsen
Place	Dalfsen
Toponym	De Gerner Marke
Completeness	part of site (delimited)
Excavated area in ha	4
Soil type	sand
Start date	725
End date	900
Description	The earliest settlement at this site was around the start of the first century AD, which lasted until the third century. After this the site was abandoned for a time. Occupation started again in the eighth century and continued until the eleventh or twelfth century. In this period the settlement was spread over two locations, closely related to a natural depression in the terrain. From the eighth century a remarkable increase in the number of outbuildings appears. The medieval pottery is mainly handmade, only a small part of it was imported in the Carolingian period.
Literature	-Blom, E./S. Wyns/H. van der Velde, 2006: *Dalfsen 'De Gerner Marke"*, ADC-rapport 766, Amersfoort. -Hulst, R.A., 2003: *Gemeente Dalfsen, Gernermarke. Aanvullend archeologisch onderzoek,* BAAC-rapport A-03.0020, 's-Hertogenbosch.

Site	26
Site type	settlement
Province	Overijsel
Municipality	Borne
Place	Borne
Toponym	Hoefblad
Completeness	part of site (not delimited)
Excavated area in ha	0.25
Soil type	sand
Start date	750
End date	900
Description	All traces are dated in the Carolingian period. The two houses overlap, however it is not certain which is the oldest. North of both houseplans lay some pits, two wells and some outbuildings, between which a burial was found. Only the northern boundary of the site could be established. 100 m west of the excavation a Carolingian well was dsicovered in 1988. Among the finds was a bronze bracelet. The finds contained in the burial included a sword and 16 denarii, dated between 790 and 840.
Literature	-Verlinde, A.D., 1988: Borne, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1987, 115-116. -Verlinde, A.D., 1989: Archeologische Kroniek van Overijssel 1988: Borne Hoefblad, in *Overijsselse Historische Bijdragen* 104, 182-188. -Verlinde, A.D., 1989: Borne, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1988, 123. -Verlinde, A.D., 1990: Archeologische Kroniek van Overijssel 1989: Borne Hoefblad, in *Overijsselse Historische Bijdragen* 105, 147-150.

Site	27
Site type	settlement
Province	Overijsel
Municipality	Dinkelland
Place	Rossum
Toponym	Haarstraat
Completeness	part of site (not delimited)
Excavated area in ha	0.02
Soil type	sand
Start date	750
End date	900
Description	In Rossum a small excavation yielding Carolingian traces was conducted in 1988. In terms of buildings, only a four-post granary was distinguishable. A well containing 20kg of pottery was also found, of which all but a very small Badorf sherd was handmade.
Literature	-Verlinde, A.D., 1989: Archeologische Kroniek over 1988: Rossum, gem. Weerselo, in *Overijsselse Historische Bijdragen* 104, 180-182. -Verlinde, A.D., 1989: Rossum, gem. Weerselo 2, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1988, 51.

Site	28
Site type	settlement
Province	Overijsel
Municipality	Enschede
Place	Enschede
Toponym	Usseler es
Completeness	part of site (not delimited)
Excavated area in ha	
Soil type	sand
Start date	700
End date	900
Description	Only one houseplan that has been identified as 'Odoorn C', dating it between 700 and 900. There are no finds from this period however, and no other features that are dated in the eighth or ninth century. Therefore the dating is unlikely.
Literature	-Van der Weerden, J.F, 2008: *Enschede Usseler es, Aanvullend Archeologisch Onderzoek*, BAAC-rapport A-07.0398, 's-Hertogenbosch.

Site	29
Site type	settlement
Province	Overijsel
Municipality	Wierden
Place	Wierden
Toponym	Huurne
Completeness	part of site (not delimited)
Excavated area in ha	0.55
Soil type	sand
Start date	750
End date	900
Description	From the ninth century onwards there was one yard at the same location. Habitation was moved to a different spot in the twelfth century. At least 5 times a new house was built on the same spot, one (and possibly two) of which can be dated in the Carolingian period.
Literature	-Prangsma, N.M./H. Vanneste, 2005: *Middeleeuwse bewoning in Huurne, gemeente Wierden, Definitief archeologisch onderzoek in het tracé van de A35 bij Wierden*, ADC-rapport 473, Amersfoort.

Site	30
Site type	settlement
Province	Overijsel
Municipality	Deventer
Place	Colmschate
Toponym	Colmschate
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	sand
Start date	750
End date	800
Description	In the area 'het Swormink' multiple excavations have taken place between 1995 and 1996 at different locations. Archaeological traces of all periods have been found. During a small-scale excavation an eighth century house was found. A well was located north of the house, of which the wood has been dated in 751 AD. More traces from this period are to be expected in the surrounding area, but have not been excavated as yet.
Literature	-Ten Bosch, F./M. Groothedde/B. Groenewoudt, 1997: De archeologie van 'het Swormink'. Over bewoningsexpansie en –continuïteit in Colmschate (gem. Deventer), in *Westerheem* 46, 22-40.

Site	31
Site type	settlement
Province	Overijsel
Municipality	Hengelo
Place	Hengelo
Toponym	Hasselo
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	sand
Start date	725
End date	900
Description	A development plot situated along the Cor Lemairestraat yielded a large portion of a Carolingian houseplan. The boat-shaped building is of the Gasselte A or B type and measured approximately 20m by 5-6m. Finds were mainly discovered in pits surrounding the building. Additionally a rectangular ditch, roughly enclosing an area the size of a houseplan was found which is thought to have been an enclosure for keeping sheep.
Literature	-Verlinde, A.D., 1987: Archeologische kroniek van Overijssel over 1985: Hasselo, gem. Hengelo, *Overijsselse Historische Bijdagen* 101, 146-148. -Verlinde, A.D. 1986: Hengelo, *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek,* 118.

Site	32
Site type	settlement
Province	Overijsel
Municipality	Hardenberg
Place	Hardenberg
Toponym	Baalder
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	sand
Start date	700
End date	900
Description	The finds are almost exclusively dated in the Carolingian period. The vast majority of the pottery was handmade. Three houses were discovered, of which two were built on the same spot.
Literature	-Verlinde, A.D., 1983: Karolingische bewoning te Baalder, gem. Hardenberg (Ov.), in *Westerheem* 32, 20-26. -Verlinde, A.D., 1983: Een herinterpretatie van de Karolingische grondsporen te Baalder (Ov.), in *Westerheem* 32, 365-370. -Van Beek, R./A.G. Kleinjan, 1980: Vroeg-middeleeuws aardewerk uit Baalder, gemeente Hardenberg (Ov.), *Westerheem* 29, 401-404.

Site	33
Site type	settlement
Province	Overijsel
Municipality	Raalte
Place	Heeten
Toponym	Rondweg Heeten
Completeness	part of site (not delimited)
Excavated area in ha	0.06
Soil type	sand
Start date	800
End date	900
Description	All archaeological traces found are dated in the ninth/tenth century. Only parts of houses were reconstructed, a few outbuildings and a well.
Literature	-Ploegaert, P.H.J.I., 2005: *Archeologisch onderzoek in het tracé van de N332 Rondweg Heeten, gemeente Raalte: Een opgraving met beperking*, ADC-rapport 493, Amersfoort.

Site	34
Site type	settlement
Province	Overijsel
Municipality	Raalte
Place	Raalte
Toponym	De Zegge VI
Completeness	part of site (not delimited)
Excavated area in ha	0.25
Soil type	sand
Start date	700
End date	900
Description	Only one possible houseplan with its corresponding outbuilding has been found, dated in the eighth and ninth century mostly by its form. There are almost no finds from the period. About 400 meters southwest of the Enk excavation a hoard with 39 complete and 9 fragments of silver coins was discovered. These dated between 822 and 877 AD.
Literature	-Van der Velde, H.M., 2002: *Raalte - De Zegge VI -AAO*, ADC-rapport 137, Amersfoort.

Site	35
Site type	settlement
Province	Gelderland
Municipality	Bronckhorst
Place	Hummelo
Toponym	Keppelseweg
Completeness	part of site (not delimited)
Excavated area in ha	0.5
Soil type	sand
Start date	725
End date	900
Description	The site contained stray finds dated to the iron age and Merovingian period, but the bulk of settlement traces date between the eighth and 12/thirteenth century. The high density of features means that Carolingian buildings and other features were difficult to discern among the many younger settlement traces. Nonetheless, seven main buildings, three outbuildings and seven wells were assigned to the Carolingian habitation phase. The site yielded signs of iron production or working.
Literature	-Van der Velde, H.M., 2014: *De oudste boerderijen van Hummelo. Een archeologische opgraving langs de Keppelseweg*, ADC-rapport 3625, Amersfoort.

Site	36
Site type	other/unknown
Province	Friesland
Municipality	Ferwerderadiel
Place	Blije
Toponym	Oosterbeintum
Completeness	off-site/isolated feature
Excavated area in ha	0.022
Soil type	clay
Start date	750
End date	900
Description	Two Carolingian phases have been identified on the terp. One dates between 750 and 800, the other in the ninth century. The features consist of layers, pits and ditches. Badorf sherds were found as well as handmade pottery and a comb.
Literature	-Knol. E./W. Prummel/H.T. Uytterschaut *et al*., 1996: Het vroeg-middeleeuws grafveld van Oosterbeintum, *in Jaarverslagen van de Vereniging voor Terpenonderzoek* 73-74 (1989-1990).

Site	37
Site type	settlement
Province	Overijsel
Municipality	Deventer
Place	Bathmen
Toponym	Bathmense Enk
Completeness	part of site (not delimited)
Excavated area in ha	2500
Soil type	sand
Start date	800
End date	1000
Description	Part of a settlement dating to the ninth-sixteenth century was excavated in several instances. First trial trenches and an excavation were carried out by the ROB in 1996 and subsequently local amateur archaeologists followed building activities on neighbouring plots. This led to another excavation in 1999. The west and south extents of the settlement seem to have been determined but not the north and east. The number of buildings and wells is based on the 1996 excavation, the information for the 1999 excavation is too general to get exact numbers.
Literature	-Groenewoudt, B./A. Verlinde, 1997: Bathmen-Bathmense enk, in *Overijsselse historische bijdragen* 111, 167-170. -Groenewoudt, B., 2000: Bathmen-Enklaan, in *Overijsselse historische bijdragen* 115, 165-169.

Site	38
Site type	other/unknown
Province	Groningen
Municipality	Winsum
Place	Wierum
Toponym	Wierum
Completeness	part of site (delimited)
Excavated area in ha	0.005
Soil type	clay
Start date	750
End date	900
Description	A small-scale investigation of a section (*steilkant*) on the terp of Wierum provided information on the long history of the build-up of the terp. There appears to have been a gap in habitation between the Roman period and the sixth or seventh century. The peak in habitation in the early middle ages seems to have been in the seventh century. Carolingian traces consisted of habitation layers, hearths and find material, mainly pottery. Younger features were probably erased by more recent activities.
Literature	-Nieuwhof, A., 2006*: De wierde Wierum (provincie Groningen). Een archeologisch steilkantonderzoek*, Groningen Archaeological Studies 3, Groningen.

Site	39
Site type	settlement
Province	Friesland
Municipality	Dongeradeel
Place	Anjum
Toponym	Terpsterweg
Completeness	part of site (delimited)
Excavated area in ha	0.12
Soil type	clay
Start date	700
End date	900
Description	Investigation of a section (*steilkant*) on a terp at Anjum revealed at most seven phases of occupation from the second to the nineteenth century. The terp itself was initially erected in the seventh century. Evidence for a building dating to the eighth century was identified in the section. The ninth century saw an extension and raising of the terp which continued in the tenth century.
Literature	-Nicolay, J.A.W. (ed.), 2010: *Terpbewoning in oostelijk Friesland. Twee opgravingen in het voormalige kweldergebied van Oostergo*, Groningen Archaeological Studies 10, Groningen.

Site	40
Site type	other/unknown
Province	Friesland
Municipality	Ferwerderadiel
Place	Burdaard
Toponym	Iedijk, Roomschotel
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	clay
Start date	750
End date	1000
Description	Investigation of a section (*steilkant*) on a terp at Birdaard yielded evidence for habitation from the late iron age onward, with a hiatus between the late Roman period and the sixth century. A well, of which the lining consisted of a barrel is the only feature dated to the Carolingian period.
Literature	-Nicolay, J.A.W. (ed.), 2010: *Terpbewoning in oostelijk Friesland. Twee opgravingen in het voormalige kweldergebied van Oostergo*, Groningen Archaeological Studies 10, Groningen.

Site	41
Site type	settlement
Province	Gelderland
Municipality	Doetinchem
Place	Wehl
Toponym	Motketel
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	sand
Start date	800
End date	900
Description	A medieval settlement dated between the ninth and twelfth century was partially excavated on the outskirts of the modern town of Wehl. The ninth century settlement remains consisted of outbuildings and a well. Other than occupation traces the site also provided evidence for iron production and -working.
Literature	-De Winter, J., 2013: *Uit de mist herrezen; bewoningssporen uit de ijzertijd en een nederzetting uit de vroege- en volle middeleeuwen in Wehl Motkete*l, BAAC rapport A-10.0262, 's-Hertogenbosch.

Site	42
Site type	settlement
Province	Friesland
Municipality	Leeuwarden
Place	Goutum
Toponym	Oude Diep
Completeness	part of site (delimited)
Excavated area in ha	0.2
Soil type	clay
Start date	750
End date	900
Description	The excavation of a terp yielded traces of early medieval habitation. The terp had been levelled in modern times meaning traces of occupation only survived towards the edge of the terp. One Carolingian yard could be reconstructed containing a building, pits and enclosed by a ditch.
Literature	-Van Malssen, N./S.J. Tuinstra, 2010: *Een archeologische opgraving op de locatie van twee archeologische monumenten aan het Oude Diep tussen Goutum en Wirdum*, gemeente Leeuwarden (Fr), ARC publicaties 210, Groningen.

Site	43
Site type	other/unknown
Province	Gelderland
Municipality	Buren
Place	Ommeren
Toponym	De Kroonheuvel
Completeness	part of site (not delimited)
Excavated area in ha	0.073
Soil type	clay
Start date	750
End date	900
Description	A trial trench campaign yielded traces of activity dating between circa 725 and 1400 AD. The Carolingian features consisted of pits and a filled-up natural watercourse.
Literature	-Verhelst, E.M.P., 2009: *Ommeren, plangebied De Kroonheuvel, gemeente Buren; archeologisch vooronderzoek: een inventariserend veldonderzoek proefsleuven*, RAAP rapport 1876, Weesp.

Site	44
Site type	settlement
Province	Gelderland
Municipality	Doetinchem
Place	Doetinchem
Toponym	Plangebied Lookwartier
Completeness	part of site (not delimited)
Excavated area in ha	1.35
Soil type	sand
Start date	700
End date	900
Description	The excavation provided evidence for continued occupation from the seventh to thirteenth century. No clear races of habitation were identified dating to the eighth or ninth century though there was evidence for agricutural activities and iron production and working as well as charcoal burning. The earliest traces of yards date to the late ninth century.
Literature	-Pronk, E.C., 2010: *Smeden voor de stad. Archeologisch onderzoek: een opgraving van een ijzertijdgrafveld en een middeleeuwse nederzetting in het Lookwartier te Doetinchem*, RAAP rapport 2085, Weesp.

Site	45
Site type	settlement
Province	Gelderland
Municipality	Bronckhorst
Place	Zelhem
Toponym	Hoek Stikkenweg/Gildenweg
Completeness	part of site (not delimited)
Excavated area in ha	0.025
Soil type	sand
Start date	800
End date	1000
Description	An archaeological supervision yielded the remains of a yard containing a main building and two sunken huts, dated between 800 and 1000 AD. The site also provided evidence for iron production.
Literature	-Van der Kuijl, E.E.A., 2003: *Archeologische begeleiding. Hoek Stikkenweg/Gildenweg Zelhem*, Synthegra 2003-40, Zelhem.

Site	46
Site type	settlement
Province	Gelderland
Municipality	Bronckhorst
Place	Zelhem
Toponym	Bedrijventerrein Vinkenkamp
Completeness	part of site (not delimited)
Excavated area in ha	1.2
Soil type	sand
Start date	750
End date	900
Description	Traces of a yard dated between 800 and 1000 AD were discovered during a trial trench campaign and subsequent excavation. The yard consisted of a main building, outbuildings, wells, sunken huts, pits and ditches. Evidence for iron production and charcoal burning were also found.
Literature	-Van der Linden, B. (ed.), 2006: *Waarderend proefsleuvenonderzoek en archeologische opgraving. Plangebied industrieterrein Vinkenkamp Zelhem*, Synthegra rapport 174073, Zelhem.

Site	47
Site type	settlement
Province	Friesland
Municipality	Súdwest Fryslân
Place	Sneek
Toponym	De Hemmen vp2
Completeness	part of site (not delimited)
Excavated area in ha	0.1
Soil type	clay
Start date	750
End date	1000
Description	The site consists of habitation layers belonging to a terp. The layers contained early medieval find material. Other than two ditches, no buildings or other structures could be identified.
Literature	-Hekman, J.J/N. Lubbers/M. Osinga/H. Veenstra, 2010: *Archeologisch onderzoek De Hemmen te Sneek. Opgraving en archeologische begeleiding*, Grontmij rapport 581, Assen.

Site	48
Site type	other/unknown
Province	Zuid Holland
Municipality	Westland
Place	De Lier
Toponym	Leehove
Completeness	part of site (not delimited)
Excavated area in ha	0.1
Soil type	clay
Start date	675
End date	900
Description	During a trial trench campaign and archaeological supervision an early medieval habitation level containing features and finds was discovered. The excavated traces point to the presence of an agrarian settlement containing several yards.
Literature	-Bult, E.J./J.M. Groen, 2009: *Leehove I. Een Aanvullende Archeologische Inventarisatie en tracébegeleiding op bedrijventerrein Leehove in De Lier (gemeente Westland)*, Delftse Archeologische Rapporten 27, Delft.

Site	49
Site type	other/unknown
Province	Noord Holland
Municipality	Schagen
Place	Schagen
Toponym	Bonkelaarsdijk 1
Completeness	part of site (not delimited)
Excavated area in ha	0.01
Soil type	peat
Start date	800
End date	1000
Description	A small-scale excavation yielded limited but clear evidence for Carolingian habitation in the form of pits and ditches. The features had been dug through a peat layer indicating occupation of peat covered areas in the region did take place in the early middle ages.
Literature	-Koning, J. de/K.T. Salomons, 2015: *Vroegmiddeleeuwse bewoning aan de Bonkelaarsdijk in Tjallewal, gemeente Schagen (NH)*, Hollandia reeks 515, Zaandijk.

Site	50
Site type	settlement
Province	Noord Brabant
Municipality	Tilburg
Place	Berkel-Enschot
Toponym	Hoge Hoek
Completeness	part of site (not delimited)
Excavated area in ha	0.53
Soil type	sand
Start date	750
End date	900
Description	A rescue excavation yielded traces of a building dated to the late eighth or early ninth century. Other traces beloning to a Carolingian yard could not be identified, partly due to the size of the exacation and party because of intercutting by younger settlement traces. The area seems to have been abandoned at some point during the ninth century and reinhabited in the tenth century.
Literature	-Van Zon, M., 2014: *Een wegcunet vol sporen. De onverwachte vondst van enkele middeleeuwse ontginningsboerderijen. Een (nood)opgraving in plangebied Hoge Hoek te Berkel-Enschot*, Archol rapport 220, Leiden.

Site	51
Site type	other/unknown
Province	Gelderland
Municipality	Berkelland
Place	Ruurlo
Toponym	't Rikkelder
Completeness	off-site/isolated feature
Excavated area in ha	0.05
Soil type	sand
Start date	725
End date	1000
Description	Several charcoal production pits were carbon dated between the eighth to tenth century.
Literature	-Klooster, B. (ed.), 2005: *Archeologische Opgraving, 't Rikkelder te Ruurlo*, Synthegra rapport 175119, Hoog-Keppel.

Site	52
Site type	other/unknown
Province	Gelderland
Municipality	Doetinchem
Place	Doetinchem
Toponym	Veemarktterrein
Completeness	off-site/isolated feature
Excavated area in ha	1.4
Soil type	sand
Start date	661
End date	990
Description	The site consists of charcoal production pits dating between the seventh and tenth century.
Literature	-Pronk, E.C., 2011: *Plangebied Veemarktterrein, gemeente Doetinchem; Een opgraving met resten uit het Meso- en Neolithicum, de Brons- en IJzertijd en de Vroege en Late Middeleeuwen*, RAAP rapport 2217, Weesp.

Site	53
Site type	other/unknown
Province	Gelderland
Municipality	Groesbeek
Place	Groesbeek
Toponym	Parachutistenstraat
Completeness	off-site/isolated feature
Excavated area in ha	0.8
Soil type	sand
Start date	750
End date	1100
Description	The site consists of charcoal production pits dating between the eighth and eleventh century.
Literature	-Hoegen, R.D./H.B.G Scholte Lubberink/E. Verhelst/N.W. Willemse, 2008: *Tussen bekken en stuwwal: plangebied Parachutistenstraat te Breedeweg, gemeente Groesbeek: een archeologische opgraving*, RAAP rapport 1744, Weesp.

Site	54
Site type	other/unknown
Province	Gelderland
Municipality	Duiven
Place	Duiven
Toponym	Gemeentehuis
Completeness	off-site/isolated feature
Excavated area in ha	0.003
Soil type	sand
Start date	750
End date	900
Description	An early medieval well was observed during non-archaeological excavations.
Literature	-livelink waarneming 7206

Site	55
Site type	settlement
Province	Noord Brabant
Municipality	Alphen-Chaam
Place	Galder
Toponym	Bollemeer
Completeness	part of site (not delimited)
Excavated area in ha	0.7
Soil type	sand
Start date	700
End date	900
Description	Part of a Carolingian yard was excavated as well as a high medieval yard. The Carolingian yard consisted of an outbuilding and several wells. Continuity of habitation does not appear likely based on the finds and the yards were also clearly separated spatially. One of the wells could be dated dendrochronologically to 757/758 AD.
Literature	-Koopmanschap, H.J.L.C./G. Sophie, 2014: *Archeologisch onderzoek voor het plangebied Bollemeer te Galder, gemeente Alphen-Chaam*, Antea Group Archeologie 2014/26, Heerenveen.

Site	56
Site type	settlement
Province	Groningen
Municipality	Groningen
Place	Groningen
Toponym	Tehuis
Completeness	part of site (not delimited)
Excavated area in ha	0.18
Soil type	sand
Start date	750
End date	1000
Description	The site consists of several outbuildings, a well and ditches dated between 750 and 1000 AD. Traces of both preceding and subsequent activity were also discovered.
Literature	-Huis in 't Veld, J.Y., 2008: *Twintig eeuwen stadsontwikkeling in beeld. Een opgraving aan de Lutkenieuwstraat te Groningen*, Stadse Fratsen 10, Groningen.

Site	57
Site type	settlement
Province	Overijsel
Municipality	Deventer
Place	Deventer
Toponym	Binnen de wal (oa Polstraatkwartier)
Completeness	part of site (delimited)
Excavated area in ha	0.6
Soil type	sand
Start date	800
End date	900
Description	Excavation in the Polstraatkwartier were carried out at various times during the twentieth century. A selection of archaeological investigations in this area has been studied (Mittendorff 2007), showing that it was probably inhabited from 800 onwards with plot demarcations developing in the second half of the ninth century. The parcelling system was orientated on three main northwest-southeast axes within an area delimited by a roughly semi-circular rampart, also constructed in the second half of the ninth century. Remains of 10 buildings could be identified with varying degrees of preservation. The parcelling system was mainly visible as zones containing relatively few features, sometimes ditches could be identified in the same zones in younger levels. During one excavation a peaty layer was discovered which must have been deposited at the end of the ninth century. At the Bruynsstraat more features dating between circa 825 and 900 were found, a ditch, postholes, pits and a hearth. No buildings could be reconstructed. In 1983/84 the state archaeological service conducted an excavation in the Ankersteeg close to the Bruynssteeg. Here at least one, possibly two buildings were recognized, both dated to the period 825-900. Excavations at the Smedenstraat yielded a house plan, a grainstore, ditches, remains of a fence, possibly a well, a sunken hut and several pits. Some pits may have been used for tanning leather or bleaching textiles. Two pits may have been used in the process of iron-working. They contained significant amounts of slag and charcoal. Another group of pits may have been used for storage. Smedenstraat 38-44 most notably revealed remains of the ninth century moat and rampart that enclosed the medieval town and evidence for the Viking attack on Deventer in 882 AD. Features belonging to the settlement prior to the attack were also found. These consisted of ditches, postholes and pits. A few features, among which a possible sunken hut must have been in use at the time of the attack as they were filled with ash-filled earth and covered by the subsequently erected rampart. The ditches and postholes are thought to represent remains of fencing associated with yards. The rampart was also discovered at several other location among which at Noordenbergschild (project 162) and Molenstraat 55 (project 076). The former investigation also yielded other features dating to the Carolingian period.
Literature	-Mittendorff, E., 2004: *Kelders vol scherven. Onderzoek naar keramiekcomplexen uit de 9e tot de 12e eeuw, afkomstig uit de Polstraat te Deventer*, Rapportages Archeologie Deventer 13, Hengelo. -Mittendorff, E., 2007: *Huizen van heren. Archeologisch onderzoek naar het proces van verstedelijking en de vorming van een stedelijke elite in het Polstraatkwartier van Deventer, ca. 800-1250*, Rapportages Archeologie Deventer 20, Deventer. -Bartels, M.H., 2006: *De Deventer wal tegen de Vikingen, archeologisch en historisch onderzoek naar de vroegmiddeleeuwse wal en stadsmuren (850-1900) en een vergelijking met andere vroegmiddeleeuwse omwalde nederzettingen*, Rapportages Archeologie Deventer 18, Deventer. -Mittendorf, E., B. Vermeulen, 2004: *Ambachtslieden, arme vrouwen en arbeiders. Archeologisch onderzoek naar de vroegmiddeleeuwse ambachtswijk en latere periodes aan de Bruynssteeg 6-10 te Deventer*, Rapportages Archeologie Deventer 14, Deventer. -Vermeulen, B., 2006: *Razende mannen, onrustige vrouwen. Archeologisch en historisch onderzoek naar de vroegmiddeleeuwse nederzetting, een adellijke hofstede en het St. Elisabethsgasthuis*, Rapportages Archeologie Deventer 17, Deventer.

Site	58
Site type	settlement
Province	Utrecht
Municipality	Wijk bij Duurstede
Place	Wijk bij Duurstede
Toponym	Hoogstraat O-IV
Completeness	part of site (delimited)
Excavated area in ha	5.7
Soil type	clay
Start date	650
End date	950
Description	The excavations of the harbour area of Dorestad started in 1971 and continued over the course of several campaigns until 1975. Many remains of posts were uncovered, as well as pits and ditches and a large quantity of finds. The interpretation of the remains changed somewhat from the publication of Hoogstraat I and that of the remainder of the harbour areas. At first all remains of posts were seen as part of the construction of jetties protruding out from the river bank toward the Rhine. However, later, houseplans were reconstructed that supposedly stood among the jetties. Due to meandering of the Rhine in easterly direction the jetties were repeatedly extended during the eighth and ninth centuries.
Literature	-Van Es, W.A./W.J.H. Verwers: *Excavations at Dorestad I: the harbour area, Hoogstraat I*, Nederlandse Oudheden 1, Amersfoort. -Van Es, W.A./W.J.H. Verwers/J. van Doesburg: *Excavations at Dorestad III: Hoogstraat O-IV*, Nederlandse Oudheden 16, Amersfoort.

Site	59
Site type	other/unknown
Province	Limburg
Municipality	Roermond
Place	Swalmen
Toponym	Nieuwenhof
Completeness	part of site (not delimited)
Excavated area in ha	1.43
Soil type	löss
Start date	750
End date	1075
Description	During excavation prior to the construction of motorway A73 medieval habitation dating from the tenth-twelfth century was found. Among the excavated features were also ditches and postholes dated to the Merovingian and Carolingian periods but no buildings could be discerned.
Literature	Van Doesburg, J./E. Vreenegoor (eds.), 2013: *Een middeleeuwse hoeve in Swalmen-Nieuwenhof. Archeologie in de A73-Zuid*, Rapportage Archeologische Monumentenzorg 204, Amersfoort.

Site	60
Site type	settlement
Province	Drenthe
Municipality	Assen
Place	Assen
Toponym	Peelo, Marsdijk
Completeness	part of site (delimited)
Excavated area in ha	5
Soil type	sand
Start date	700
End date	1000
Description	During several excavation campaigns traces of habitation dating to the iron age, Roman period, early- and high middle ages were discovered. The earliest medieval settlement traces date to the eighth century. The settlement was spread over several clusters within a large area. The clusters contained main buildings (11), various outbuildings (26) and wells (11), but also pits and fencing.
Literature	-Kooi, P.B., 1995: Het project Peelo: Het onderzoek in de jaren 1981, 1982, 1986, 1987 en 1988, in *Palaeohistoria* 35/36, 169-306. -Kooi, P.B., 2001: Het project Peelo. Het onderzoek van het erf Huisinge (1995-1996), in *Palaeohistoria* 41/42, 447 – 472.

Site	61
Site type	other/unknown
Province	Overijsel
Municipality	Zwolle
Place	Zwolle
Toponym	Kelders Schepenzaal/Meentehuis/Mosterthuis
Completeness	part of site (not delimited)
Excavated area in ha	0.02
Soil type	sand
Start date	700
End date	900
Description	Excavations in the centre of Zwolle yielded Carolingian finds and stray features in the form of postholes and pits. The nature of the settlement in the Carolingian period could not be discerned.
Literature	Van Beek, R./V.T. van Vilsteren, 1980: Van Karel de Grote tot Karel de Vijfde; een archeologisch onderzoek in het oudste gedeelte van Zwolle, in A.C.F. Koch *et al.*, *Zwolle in de middeleeuwen, onderzoekingen naar een vroeg-stedelijke samenleving*, Zwolle, 5-93.

Site	62
Site type	settlement
Province	Noord Brabant
Municipality	Breda
Place	Breda
Toponym	Effen-Noord
Completeness	part of site (not delimited)
Excavated area in ha	2.5
Soil type	sand
Start date	700
End date	900
Description	A building was dated to the Carolingian period due to similarities with two building found during excavation to the west of Breda (site 204) which were carbon dated. A small amount of Carolingian pottery was also found.
Literature	-Kranendonk, P./P. van der Kroft/J.J. Lanzing/B.H.F.M. Meijlink (eds.), 2006: *Witte vlekken ingekleurd: archeologie in het tracé van de HSL-Zuid,* Rapportage Archeologische Monumentenzorg 113, Amersfoort.

Site	63
Site type	other/unknown
Province	Limburg
Municipality	Bergen (L.)
Place	Well (L.)
Toponym	Sintelberg/Aijerbandstraat
Completeness	off-site/isolated feature
Excavated area in ha	20.3
Soil type	clay
Start date	542
End date	1155
Description	During large scale excavations ahead of watermanagement works along the Meuse a concentration of charcoal rich pits and iron production slag was discovered.
Literature	-Bouma, N.,/A. Müller (eds.), 2014: *Tienduizend jaar landschaps- en bewoningsgeschiedenis in het Maasdal tussen Well en Aijen. Een verkennend en waarderend onderzoek in de deelgebieden 1 en 4 en een archeologische opgraving in deelgebied 2 te Well-Aijen Hoogwatergeul werkvak 4*, ADC rapport 3472, Amersfoort.

Site	64
Site type	settlement
Province	Noord Brabant
Municipality	Bernheze
Place	Heesch
Toponym	Hoogstraat 28-30
Completeness	off-site/isolated feature
Excavated area in ha	0.53
Soil type	sand
Start date	800
End date	900
Description	Among 13 wells found at this site one could be dated dendrochronologically to the Carolingian period (814-838). The remaining features were all dated to the high middle ages. Together with a small collection of Carolingian ceramics the well and a few pits suggest settlement started in the early ninth century.
Literature	-Tump, M., 2014: Bewoning van de 9e tot 14e eeuw aan de Hoogstraat te Heesch, BAAC rapport A-12.0149, 's-Hertogenbosch.

Site	65
Site type	other/unknown
Province	Limburg
Municipality	Venlo
Place	Lomm
Toponym	Lomm Hoogwatergeul
Completeness	off-site/isolated feature
Excavated area in ha	13.8
Soil type	clay
Start date	650
End date	1155
Description	Several charcoal production pits were found during large scale excavation along the Meuse. A few were carbon dated which produced a wide range of dates, among them one in the 8/ninth century.
Literature	-Gerrets, D.A./R. de Leeuwe (eds.), 2011: *Rituelen aan de Maas. Een archeologische opgraving te Lomm, Hoogwatergeul fase II*, ADC rapport 2333, Amersfoort. -Prangsma, N.M., 2008: *Lomm Hoogwatergeul fase 1 (gemeente Arcen en Velden). Een archeologische opgraving*, ADC rapport 1344, Amersfoort.

Site	66
Site type	settlement
Province	Drenthe
Municipality	Noordenveld
Place	Norg
Toponym	Esweg
Completeness	part of site (not delimited)
Excavated area in ha	1.39
Soil type	sand
Start date	675
End date	925
Description	Part of an early medieval site was excavated in two phases. Compared to other sites in the region perhaps one of the more striking features is the lack of ditches demarcating yards. However, archaeobotanical research indicated that hedges may have stood on the site which could have been used as yard boundaries. Main buildings appear to have increased in size from the eighth to the ninth century and there also seems to have been an increase in the number of small outbuilding through time.
Literature	-Dijkstra, J./J. Loopik, 2015: *Vroegmiddeleeuwse boerderijen onder een es in Norg, gemeente Noordenveld. Archeologische opgraving (Esweg Fase II)*, ADC rapport 3912, Amersfoort. -Huis in 't Veld, J.Y., 2015: *Een vroeg-middeleeuwse nederzetting in Norg, plangebied Esweg, fase 1, gemeente Noordenveld; archeologisch onderzoek: een opgraving*, RAAP rapport 2928, Weesp.

Site	67
Site type	settlement
Province	Limburg
Municipality	Maasgouw
Place	Beegden
Toponym	Eerdweg 4
Completeness	part of site (not delimited)
Excavated area in ha	0.4
Soil type	sand
Start date	675
End date	750
Description	early medieval habitation at this site is thought to have started in the sixth century and continued up till about 750 AD. The final phase consisted of a main building, possibly a small outbuiding and two or three sunken huts. Finds of Mayen and Badorf were all found in pits and are taken as evidence for habitation up to the middle of the eighth century when the site was cleared. The lack of millstone fragments was considered noteworthy. Even though most stone fragments were discovered in early medieval features, the only tephrite fragments were found in features associated with an iron age habitation phase.
Literature	-Dijkstra, J. (ed.), 2015: *Bewoningssporen uit de IJzertijd, Laat-Romeinse tijd en Vroege Middeleeuwen aan de Eerdweg in Beegden (gemeente Maasgouw). Een archeologische opgraving*, ADC rapport 3859, Amersfoort.

Site	68
Site type	other/unknown
Province	Noord Brabant
Municipality	Heusden
Place	Herpt
Toponym	Hoofdstraat (perceel 1302)
Completeness	off-site/isolated feature
Excavated area in ha	0.07
Soil type	clay
Start date	850
End date	900
Description	Besides high medieval features the site yielded a natural waterway which contained Carolingian ceramics. No other traces of Carolingian habitation were discovered. The rather high proportion of red painted Badorf sherds indicate that most of the material in the stream was deposited towards the end of the ninth century.
Literature	-Van Dijk, X.C.C., 2015: *Middeleeuwers in Herpt. Plangebied Hoofdstraat (perceel 1302), gemeente Heusden; archeologisch onderzoek: een archeologisch proefsleuvenonderzoek en opgraving*, RAAP rapport 2971, Weesp.

Site	69
Site type	other/unknown
Province	Limburg
Municipality	Mook en Middelaar
Place	Mook
Toponym	Centrumplan
Completeness	part of site (not delimited)
Excavated area in ha	0.21
Soil type	sand
Start date	700
End date	800
Description	During a small scale excavation a few features could be dated to the Carolingian period though other features which did not contain datable finds may also date to the period. There is also evidence for Merovingian habitation but not for the high middle ages, despite a carbon dating of charred grain from a sunken hut which lay between 978-1151.
Literature	-Mooren, J.R., 2017: *Mook Centrumplan. Archeologische begeleiding*, BAAC-rapport A-11.0335, 's-Hertogenbosch.

Site	70
Site type	settlement
Province	Gelderland
Municipality	Montferland
Place	Beek
Toponym	Eltenseweg 2
Completeness	part of site (not delimited)
Excavated area in ha	0.13
Soil type	sand
Start date	700
End date	900
Description	A yard which probably dates to the Carolingian period was excavated as well as a yard dated to the 12/thirteenth century. Unfortunately the excavation was not fully analysed due to problems reaching agreement with the developer, presumably over costs of analyses of various material categories. Therefore it is for example not certain whether one of the two excavated wells also dated to the Carolingian period. Several pits containing considerable amounts of slag and fragments of hearth/furnace lining were also discovered.
Literature	Krol, T.N./E.E.A. van der Kuijl, 2017: *Definitief rapport archeologische opgraving Eltenseweg 2 te Beek*, MUG-publicatie 2014-20, Leek.

Site	101
Site type	settlement
Province	Noord Brabant
Municipality	Uden
Place	Uden
Toponym	Schouwstraat
Completeness	part of site (not delimited)
Excavated area in ha	1
Soil type	sand
Start date	750
End date	900
Description	During an excavation prior to construction work on the A50 motorway near Uden one Carolingian houseplan was discovered though there is evidence for continuous habitation from the Merovingian period, perhaps lasting into the twelfth century. Clear evidence for a tenth century occupation phase is lacking within the confines of the excavation. The early medieval habitation was concentrated to the north of a fen, the high medieval habitation lay slightly further removed from, and on both the north and south side of the fen. One specific zone was characterised by a concentration of finds related to metal working and milling, and a substantial quantity of charred bone.
Literature	-Van Hoof, L.G.L./R. Jansen, 2002: *Archeologisch onderzoek A50 te Uden - bewoning uit de ijzertijd en de middeleeuwen. Een verkennend en definitief onderzoek te Uden-Schouwstraat in opdracht van Rijkswaterstaat*, Archol rapport 12, Oegstgeest. -Oude Rengerink, J.A.M., 1997: *Rijksweg A50 Eindhoven – Oss: Aanvullende Archeologische inventarisatie (AAI: fase A, B en C)*, RAAP-rapport 283, Amsterdam.

Site	102
Site type	settlement
Province	Noord Brabant
Municipality	Veldhoven
Place	Veldhoven
Toponym	Kruisstraat
Completeness	part of site (not delimited)
Excavated area in ha	0.107
Soil type	sand
Start date	850
End date	900
Description	An excavation prior to development of a plot in Veldhoven yielded part of a houseplan, possibly an oubuilding and a well dated to the Carolingian period. However, the reconstruction of the outbuilding was fairly tentative. The timber used in the well was dendrochronologically analysed but could not be linked to a known reference curve. The site was perhaps part of an estate mentioned in written sources.
Literature	-Van der Weerden, J.F., 2008: *Veldhoven Kruisstraat. Opgraving*, BAAC-rapport A-08.0401, 's-Hertogenbosch. -Van der Weerden, J.F., 2008: *Veldhoven Kruisstraat. Inventariserend veldonderzoek door middel van proefsleuven*, BAAC-rapport A-07.0397, 's-Hertogenbosch.

Site	103
Site type	other/unknown
Province	Noord Brabant
Municipality	Boxmeer
Place	Oeffelt
Toponym	Hoge Hoek
Completeness	off-site/isolated feature
Excavated area in ha	-
Soil type	-
Start date	725
End date	900
Description	There is only a short report available on the observations done by local amateur archaeologists. Carolingian finds and features were discovered during roadworks and digging work for the building of new houses. No structures could be recognised in the features. The finds indicate habitation from the second half of the eighth till the thirteenth century.
Literature	-Koeling, J., 1978: Karolingische bewoning op de Hoge Hoek in Oeffelt, *in Jaarverslag 1978, Archeologische Werkgemeenschap voor Nederland, afdeling Nijmegen en omstreken* 11, Nijmegen, 16-17.

Site	104
Site type	settlement
Province	Noord Brabant
Municipality	Boxmeer
Place	Beugen
Toponym	Sterckwijk
Completeness	part of site (not delimited)
Excavated area in ha	21.3
Soil type	sand
Start date	675
End date	950
Description	In three campaigns between 2007 and 2010 an area of circa 21 hectares in total was excavated in the village of Beugen. The excavation revealed traces of various periods from the Mesolithic onwards, including Carolingian habitation.
Literature	-Hissel, M./M. Parlevliet/J.P. Flamman, 2004: *Begraven Beugen II. Inventariserend veldonderzoek op het toekomstige bedrijvenpark Beugen-Zuid, gemeente Boxmeer*, AAC publicaties 21, Amsterdam. -Blom, E./H.M. van der Velde (eds.), 2015: *De archeologie van Boxmeer-Sterckwijck: 4500 jaar wonen, werken en begraven langs de Maas*, ADC Monografie 18, Amersfoort.

Site	105
Site type	settlement
Province	Noord Brabant
Municipality	Reusel-De Mierden
Place	Hulsel
Toponym	Kerkweg
Completeness	off-site/isolated feature
Excavated area in ha	0.03
Soil type	sand
Start date	725
End date	1225
Description	On a small plot two postholes were dated to the Carolingian period.
Literature	-Hissel, M., 2008: *Vijf keer archeologie in Reusel-De Mierden. Vijf kleine proefsleuven in Reusel, hulsel en Lage Mierde, gemeente Reusel-De Mierden (Noord-Brabant)*, AAC publicaties 48, Amsterdam.

Site	106
Site type	settlement
Province	Noord Brabant
Municipality	Alphen-Chaam
Place	Alphen
Toponym	Molenbaan
Completeness	part of site (not delimited)
Excavated area in ha	2.25
Soil type	sand
Start date	725
End date	900
Description	An aexcavation carried out ahead of road construction provided evidence for early medieval habitation, including a Carolingian phase. Habitation continued into the thirteenth century.
Literature	-Meijlink, B.H.F.M., 2005: *Archeologisch onderzoek in het tracé van de rondweg Alphen (gemeente Alphen-Chaam) in opdracht van de Provincie Noord-Brabant*, ADC rapport 399, Amersfoort.

Site	107
Site type	settlement
Province	Noord Brabant
Municipality	Reusel-De Mierden
Place	Hulsel
Toponym	Kerkekkers
Completeness	part of site (not delimited)
Excavated area in ha	1
Soil type	sand
Start date	725
End date	900
Description	Two separate excavations have yielded traces of two consecutive phases of an early- and high medieval settlement that shifted from north to south of several centuries. The oldest phase in the north appears to be late-Merovingian. None of the reconstructed Carolingian buildings is entirely certain due to later activity on the site erasing Carolingian features.
Literature	-Theuws, F.C.W.J., 1999: The archaeology and history of the curia of the abbey of Saint-Trond at Hulsel (province of North-Brabant) (ca. AD 700-1300), in N. Roymans/F. Theuws, *Land and Ancestors. Cultural dynamics in the Urnfield period and the Middle Ages in the Southern Netherlands*, Amsterdam, 241-308. -De Leeuw, R., 2008: *Nieuwe huizen in Hulsel. Een laat-Merovingische nederzetting met een nieuw huistype op een nieuwbouwlocatie*, Archol-rapport 112, Leiden. -Van Benthem, A., 2007: *Hulsel Kerkekkers. Gemeente Reusel - De Mierden. Inventariserend veldonderzoek in de vorm van proefsleuven*, ADC rapport 941, Amersfoort.

Site	108
Site type	settlement
Province	Noord Brabant
Municipality	Oss
Place	Herpen
Toponym	Wilgendaal
Completeness	part of site (not delimited)
Excavated area in ha	1.1
Soil type	sand
Start date	750
End date	900
Description	Only a selection of the trenches investigated by the ADC were documented due to a lack of time! The excavation was partly analysed in the Archol report. A large part of the early medieval settlement probably lay in the area excavated by the ADC. There was likely continuity from the Merovingian to Carolingian period but there appears to be a gap in occupation in the tenth century. There will undoubtedly have been buildings present within the excavated area but the poor standard of documentation makes it impossible to identify any.
Literature	-Jansen, R./E.A.G. Ball, 2002: *Van steentijd tot middeleeuwen: Archeologisch onderzoek rond een fossiele beekloop te Herpen-Wilgendaal*, Archol Rapport 11, Oegstgeest.

Site	109
Site type	other/unknown
Province	Noord Holland
Municipality	Medemblik
Place	Wervershoof
Toponym	Kromme Leek
Completeness	uncertain
Excavated area in ha	-
Soil type	peat
Start date	725
End date	900
Description	On both sides of a former river a layer containing Carolingian finds was discovered. A number of sedimentation layers in the river also contained Carolingian finds. The layers on both sides of the river lay directly on peat. A layer lying on top of the Carolingian layer contained Pingsdorf pottery which may signal continuity but that is not certain
Literature	Woltering, P.J., 1977: Wervershoof, in *Holland, regionaal historisch tijdschrift* 9, 208-210.

Site	110
Site type	settlement
Province	Noord Brabant
Municipality	Gemert-Bakel
Place	Bakel
Toponym	Achter de molen
Completeness	part of site (not delimited)
Excavated area in ha	0.7
Soil type	sand
Start date	850
End date	925
Description	The excavation yielded Carolingian features, among which buildings, that have been dated in the late ninth and early tenth century.There seems to have been continuity between the Carolingian period and the Central Middle Ages. Tephrite was found in large quantities but most of it can be associated with high medieval structures. It is unclear which, if any, tephrite belongs to the Carolingian period. A few postholes of (possible) Carolingian buildings contained clear remains of daub used in a wattle and daub construction. A possibly early medieval glass smoothing stone (srijkglas) was also discovered.
Literature	-Arnoldussen, S., 2003: *Middeleeuwse bewoning te Bakel-Achter de Molen (Brabant)*, Archol-rapport 16, Leiden. -Jansen, R., 2000: *Verkennende Archeologische onderzoeken Gemert-Bake*l, Archeologische Rapporten Maaskant 8/Archol rapport 1, Leiden.

Site	111
Site type	other/unknown
Province	Noord Holland
Municipality	Castricum
Place	Limmen
Toponym	Limmen
Completeness	uncertain
Excavated area in ha	0.004
Soil type	sand
Start date	750
End date	900
Description	A very small investigation was carried out after some complete Merovingian pots were discovered within circles of postholes during the working of a bulb field. The excavation yielded a number of postholes set in a kind of circle with a pit in the middle containing Carolingian pottery. The circle and pit were interpreted as storage units, but the possibility of burials is not excluded. However, considering the complete lack of any skeletal remains and the absence of parallels, this option appears less likely.
Literature	Cordfunke, E.H.P., 1969: Roman and early-medieval pottery from Limmen, Prov. North-Holland, in *Berichten van de rijksdienst voor het oudheidkundig bodemonderzoek* 19, Amersfoort, 291-296.

Site	112
Site type	other/unknown
Province	Noord Brabant
Municipality	Oss
Place	Oss
Toponym	Begijnenstraat
Completeness	off-site/isolated feature
Excavated area in ha	0.38
Soil type	sand
Start date	875
End date	950
Description	Circa 20 sherds dated to the Carolingian period were found, mainly during the trial trench campaign. Based on the overall pottery assemblage the medieval habitation is dated from 875 until the eleventh century.
Literature	Brouwer, M.C., J. de Winter, 2009: *Oss Begijnenstraat. Inventariserend veldonderzoek door middel van proefsleuven*, BAAC-rapport A-09.0041, 's-Hertogenbosch.

Site	113
Site type	settlement
Province	Noord Brabant
Municipality	Breda
Place	Breda
Toponym	Steenakker-Zuid/Emerakker
Completeness	part of site (not delimited)
Excavated area in ha	2.5
Soil type	sand
Start date	690
End date	1000
Description	In 1995 excavations took place at Emerakker in Breda. Among the features were a number of merovingian wells. In trial trenches dug slightly to the west of these excavations part of a possible house plan was discovered. Carbon dating was carried out on charcoal from one posthole which resulted in a date between 690 and 880 AD. One waterhole was dated through the pottery finds between 800-1000 AD. The advice was to excavate a part of the area investigated by trial trenches. This does not seem to have happened yet. Some indications for Merovingian settlement were also found. One well was dated between 1000 and 1200 based on the pottery. Whether there was continuity of habitation between the periods is not clear.
Literature	-Koot, C.W./R. Berkvens, 2004: *Bredase akkers eeuwenoud: 4000 jaar bewoningsgeschiedenis op de rand van zand en klei*, Rapportage Archeologische Monumentenzorg 102, Breda. -Nollen, J.H./L. de Jonge/T.H.L. Hos, 2012: *Steenakker Zuid Rat Verleghstraat - Inventariserend veldonderzoek door middel van proefsleuven*, Erfgoedrapport Breda 86, Breda.

Site	114
Site type	settlement
Province	Noord Brabant
Municipality	Breda
Place	Breda
Toponym	Huifakker
Completeness	excavated completely
Excavated area in ha	6.2
Soil type	sand
Start date	750
End date	900
Description	During large scale excavations to the west of Breda two Carolingian farmsteads were discovered in an area known as Huifakker. In the immediately surrounding area to the west and the east (Steenakker, Emerakker) settlement traces from the Merovingian period (late fifth to late seventh century) and possibly Carolingian peiode (site 113) have been discovered. One houseplan (76) lay within a former roman settlement. It is unclear whether the two farmsteads functioned simultaneously or successively. A high-medieval farmstead (twelfth century) was discovered near the southern Carolingian farmstead. There does not seem to have been continuity of habitation between the two periods.
Literature	Koot, C.W./R. Berkvens, 2004: *Bredase akkers eeuwenoud: 4000 jaar bewoningsgeschiedenis op de rand van zand en klei*, Rapportage Archeologische Monumentenzorg 102, Breda.

Site	115
Site type	other/unknown
Province	Noord Holland
Municipality	Den Helder
Place	Den Helder
Toponym	Torp
Completeness	off-site/isolated feature
Excavated area in ha	0.5
Soil type	clay
Start date	750
End date	900
Description	A few Carolingian pottery sherd were found in a layer that may have constituted the first habitation within the area of the later terp. It seems that the Carolingian habitation cannot be considered the first phase of the terp, but habitation took place directly on what was then the topsoil. Because of later use as a terp the Carolingian layer was largely disturbed. Remains of two buildings from the 11/twelfth century were also found.
Literature	-Van Es, W.A., 1973: Terp research: with particular reference to a medieval terp at Den Helder, province of North-Holland, in *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 23, Amersfoort, 337-345.

Site	116
Site type	settlement
Province	Noord Brabant
Municipality	Hilvarenbeek
Place	Hilvarenbeek
Toponym	Loosche akkers
Completeness	part of site (not delimited)
Excavated area in ha	0.04
Soil type	sand
Start date	675
End date	950
Description	Part of a possibly Carolingian house plan was discovered during a trial trench campaign. It is not clear whether certain ditches were contemporaneous with the building plan but they did have the same orientation.
Literature	-Smole, L., 2005: *Inventariserend veldonderzoek door middel van proefsleuven op de Loosche akkers te Hilvarenbeek*, ADC-rapport 358, Amersfoort.

Site	117
Site type	settlement
Province	Noord Brabant
Municipality	Heeze-Leende
Place	Sterksel
Toponym	Weiakkers, Kanhoeve II
Completeness	part of site (not delimited)
Excavated area in ha	2.22
Soil type	sand
Start date	650
End date	900
Description	Two farmsteads, both consisting of a main building and an outbuilding, but only one included a well. Both main building show signs of repairs. One later farmstead was found which is dated in the late ninth or tenth century.
Literature	-Vanneste, H.C.G.M., 2010: *Bewoning langs de Sterkselse Aa: erven uit de ijzertijd en middeleeuwen. Een archeologische opgraving te Sterksel-Weiakkers, Kanhoeve II*, ADC-rapport 1939, Amersfoort.

Site	118
Site type	settlement
Province	Noord Brabant
Municipality	Hilvarenbeek
Place	Diessen
Toponym	Vroonackers
Completeness	part of site (not delimited)
Excavated area in ha	0.62
Soil type	sand
Start date	700
End date	900
Description	It is not entirely clear whether the settlement continued into the tenth century. A few boat-shaped buildings were found and a well which provided a date of 1005 based on dendrochronology. Probably five more or less contemporaneous Carolingian farmsteads were present. Not all farmsteads were completely excavated, part of them probably lay outside the excavated area.
Literature	-Van Benthem, A., 2012: *De Vroonacker ontsloten. Een archeologische opgraving te Diessen, gemeente Hilvarenbeek*, ADC-rapport 2406, Amersfoort. -Wesdorp, M., 2010: *Een inventariserend veldonderzoek door middel van proefsleuven in het plangebied Vroonakker te Diessen, gemeente Hilvarenbeek*, Zuidnederlandse Archeologische Notities 216, Amsterdam.

Site	119
Site type	settlement
Province	Noord Brabant
Municipality	Grave
Place	Velp
Toponym	Hanenstraat
Completeness	uncertain
Excavated area in ha	0.05
Soil type	sand
Start date	800
End date	900
Description	Some pottery from the ninth century was discovered during a trial trench campaign. A large number of features was found but no ground plans were recognizable.
Literature	-Alma, X.J.F., 2009: *IJzertijd- en middeleeuwse bewoning aan de Hanenstraat te Velp (gemeente Grave). Een inventariserend Veldonderzoek in de vorm van proefsleuven*, ADC-rapport 2039, Amersfoort. -Te Kiefte, D., 2016: *Velp, Hanenstraat 12. Archeologische Begeleiding met protocol opgraven*, BAAC rapport A-14.0055, 's-Hertogenbosch.

Site	120
Site type	settlement
Province	Noord Brabant
Municipality	Bernheze
Place	Nistelrode
Toponym	Zwarte Molen
Completeness	part of site (not delimited)
Excavated area in ha	5.5
Soil type	sand
Start date	800
End date	900
Description	Merovingian habitation was present at the site from ca. 575 onward. One late ninth/tenth century building plan has been identified and a eleventh/twelfth century settlement. The Carolingian building was situated amidst roman settlement features. The Carolingian well lay ca 135 meters from the house plan. No outbuildings were discovered but they may also not have been recognized. Possibly there was a hiatus between the Merovingian and Carolingian occupation phase but the remainder of the Carolingian settlement may have lain outside the limits of the excavation. For both periods the settlements are characterised by Einzelhöfen.
Literature	-De Leeuwe, R/ R. Jansen/M.A. Goddijn, 2011: *Archol-rapport 101: Inventariserend Veldonderzoek Nistelrode-Zwarte Molen Fase 2a*, Archol-rapport 101, Leiden. -Jansen, R., 2007: *Bewoningsdynamiek op de Maashorst. De bewoningsgeschiedenis van Nistelrode van laat-neolithicum tot volle middeleeuwen*, Archol-rapport 48, Leiden. -Hensen G./M.P.J. Janssens, 2016: *Dolen door de Zwarte Molen: onbegrensde nederzettingen uit de IJzertijd tot en met de Volle Middeleeuwen - gemeente Bernheze; archeologisch onderzoek: een opgraving*, RAAP rapport 2794, Weesp.

Site	121
Site type	other/unknown
Province	Noord Brabant
Municipality	Boxtel
Place	Boxtel
Toponym	Achterberghstraat
Completeness	off-site/isolated feature
Excavated area in ha	0.1
Soil type	sand
Start date	800
End date	1000
Description	One pit containing early 'kogelpot' and a few stray sherds Mayen and Badorf.
Literature	-Brouwer, E.W., 2013: *DO Achterberghstraat te Boxtel gemeente Boxtel*, Synthegra Rapport S120388, Doetinchem.

Site	122
Site type	settlement
Province	Noord Brabant
Municipality	Eindhoven
Place	Eindhoven
Toponym	Eckartdal-Kleine Brink
Completeness	part of site (not delimited)
Excavated area in ha	0.16
Soil type	sand
Start date	700
End date	900
Description	Part of a possible Carolingian building plan was discovered. The reasons to believe the features were Carolingian were the find of 'kogelpot' sherds in the soil directly above the features and the configuration and fill of the features. Carbon dating of charcoal from one of the features resulted in a date in the Iron-age. However, iron-age settlement features were also discovered during the excavation with a very different kind of fill. Perhaps charcoal from this period ended up in later features.
Literature	-Van de Glind, M.A., 2011: *Eindhoven Eckartdal, Kleine Brink. Definitief onderzoek*, BAAC-rapport A-10.0241, 's-Hertogenbosch.

Site	123
Site type	settlement
Province	Noord Brabant
Municipality	Oosterhout
Place	Oosterhout
Toponym	Markt
Completeness	part of site (not delimited)
Excavated area in ha	0.06
Soil type	sand
Start date	725
End date	1050
Description	It was difficult to recognise building plans because of the presence of a medieval and early modern cemetery. One possible Carolingian building was found. It was dated between the eighth and eleventh century based on a few sherds of Mayen. A number of burials may be contemporaneous with the Carolingian building.
Literature	-Sam, L.A./M. Parlevliet/M. d'Hollosy/J.P. Flamman, 2005: *Graven op de markt, een middeleeuwse nederzetting en begraafplaats op de Markt van Oosterhout*, AAC-publicaties 32, Amsterdam.

Site	124
Site type	settlement
Province	Noord Brabant
Municipality	Deurne
Place	Deurne
Toponym	Groot Bottelsche Akker
Completeness	part of site (not delimited)
Excavated area in ha	3.8
Soil type	sand
Start date	750
End date	925
Description	The oldest medieval habitation at the site is dated between 675-750. The habitation seems to have consisted of an Einzelhof of which several phases were discovered. It is less clear whether there was continuity between the Carolingian period and the high middle ages, though settlement traces from the latter period were discovered.
Literature	-Hiddink, H.A., 2008: *Archeologisch onderzoek op de groot Bottelsche Akker bij Deurne. Bewoning uit de Steentijd, IJzertijd, Romeinse tijd, Vroeg en Volle Middeleeuwen*, Zuidnederlandse Archeologische Rapporten 33, Amsterdam.

Site	125
Site type	settlement
Province	Noord Brabant
Municipality	Veghel
Place	Veghel
Toponym	Scheifelaar
Completeness	part of site (not delimited)
Excavated area in ha	0.25
Soil type	sand
Start date	725
End date	925
Description	Other than Carolingian features the ROB excavation in 1982 remains of a settlement dating between the eleventh and thirteenth century were found. Because the two Carolingian buildings that were found were dated in the latter part of this period there may have been continuity but that isn't clear. In 1992 another part of the high medieval settlement was excavated and only stray features and finds dating to the Carolingian period were found. In 2010 ADC carried out an excavation in the vicinity of the two earlier digs. Three buildings and two wells that probably date to the Ottonian period were discovered besides iron age, Roman and high medieval structures. One building was dated in the late ninth or tenth century based on the groundplan. Two wells were carbon dated 652-724 and 855-986 AD respectively. The dating of the buildings and one of the wells indicates that there may have been continuity between the Carolingian and Ottonian period.
Literature	-Verwers, W.J.H., 1999: North Brabant in Roman and early medieval times, V: Habitation history, in *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 43, 199-359. -Van der Veken, B./E. Blom (eds.), 2012: *Veghel De Scheifelaar II. Wonen tussen de vennen*, ADC-rapport 3350, Amersfoort.

Site	126
Site type	settlement
Province	Noord Brabant
Municipality	Eindhoven
Place	Eindhoven
Toponym	Blixembosch
Completeness	excavated completely
Excavated area in ha	1.2
Soil type	sand
Start date	750
End date	1050
Description	The site consists of several buildings and wells dated to the Carolingian period and high middle ages. A palisade which dates from the late Carolingian period enclosed the settlement.
Literature	-Arts, N., 1993: Middeleeuwse hoeven op Blixembosch bij Eindhoven, in: N. Roymans/ F. Theuws, *Eén en al zand. Twee jaar graven naar het brabants verleden*, Graven naar het Brabants verleden 1, 's-Hertogenbosch, 106-115.

Site	127
Site type	settlement
Province	Noord Brabant
Municipality	Someren
Place	Someren
Toponym	Witvrouwenbergweg
Completeness	part of site (not delimited)
Excavated area in ha	0.5
Soil type	sand
Start date	750
End date	900
Description	The site was occupied from the Merovingian period up till the thirteenth century but continuity is not clear. Fifteen wells were not examined due to a lack of funds. All house plans showed signs of repairs and/or rebuilding.
Literature	Verwers, W.J.H., 1999: North Brabant in Roman and early medieval times, V: Habitation history, in *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek*, 199-359.

Site	128
Site type	settlement
Province	Noord Brabant
Municipality	Grave
Place	Escharen
Toponym	Escharen
Completeness	part of site (not delimited)
Excavated area in ha	1.6
Soil type	sand
Start date	750
End date	900
Description	The Carolingian yards were reconstructed based on the occurrence of empty zones. A high medieval phase was present but continuity of habitation between the early middle ages and the high middle ages is not clear. A division has been made between yards that were predominantly agrarian and ones that practised artisanal production based on the distribution of rickstands and sunken huts. 16 buildings, 4 sunken huts and 3 wells could not be assigned to a specific period.
Literature	Verwers, W.J.H., 1999: North Brabant in Roman and early medieval times, V: Habitation history, in *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek*, 199-359.

Site	129
Site type	settlement
Province	Noord Brabant
Municipality	Goirle
Place	Goirle
Toponym	?
Completeness	uncertain
Excavated area in ha	0.55
Soil type	sand
Start date	-
End date	-
Description	This excavation is mentioned in Verwers' 1999 publication. However, no toponym is given and also no information about finds.
Literature	Verwers, W.J.H., 1999: North Brabant in Roman and early medieval times, V: Habitation history, in *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek*, 199-359.

Site	130
Site type	settlement
Province	Noord Brabant
Municipality	Bladel
Place	Bladel
Toponym	Danielpad
Completeness	part of site (not delimited)
Excavated area in ha	0.34
Soil type	sand
Start date	750
End date	900
Description	Besides the features mentioned above, two buildings and one well date from the late-Merovingian/early-Carolingian period, two main buildings, three secondary buildings and a well date from the tenth century and structures dating from the high middle ages were also discovered. The amount of buildings in the Carolingian period is not entirely clear. In the text two or three are mentioned while the excavation plan showing the Carolingian phase shows four buildings. Perhaps two phases within the Carolingian period are implied instead of two buildings.
Literature	-Verwers, W.J.H., 1999: North Brabant in Roman and early medieval times, V: Habitation history, in *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek*, 199-359.. -Vreenegoor, E., 1989: *De middeleeuwse nederzetting van Bladel archeologisch en historisch-geografisch belicht*, Amsterdam (unpublished MA thesis University of Amsterdam).

Site	131
Site type	settlement
Province	Noord Brabant
Municipality	Valkenswaard
Place	Valkenswaard
Toponym	Dommelen, Kerkakkers
Completeness	excavated completely
Excavated area in ha	4
Soil type	sand
Start date	750
End date	950
Description	In the southern part of the excavation there seems to have been one Carolingian yard, in the northern part three and later four yards existed simultaneously.
Literature	-Theuws, F.C.W.J./ A.A.A. Verhoeven/H.H. van Rechteren-Altena, 1990: Medieval settlement at Dommelen, in *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 38, Amersfoort, 229-430. -Theuws, F.C.W.J., 1988*: Archeologie van de periferie. Studies naar de ontwikkeling van bewoning en samenleving in het Maas-Demer-Schelde gebied in de vroege-middeleeuwen*, (PhD thesis University of Amsterdam) Amsterdam.

Site	132
Site type	settlement
Province	Noord Brabant
Municipality	Geldrop-Mierlo
Place	Geldrop
Toponym	Genoenhuis
Completeness	part of site (not delimited)
Excavated area in ha	4.2
Soil type	sand
Start date	750
End date	950
Description	Site excavated by the University of Amsterdam (IPP) in the late 1980s and early 1990s. The settlement was occupied from the Merovingian period up until the twelfth century. The eighth and ninth century occupation phase consisted of four main building and four wells. No outbuildings could be identified.
Literature	-Theuws, F.C.W.J., 1993: Heren en boeren in vroeg-middeleeuws Geldrop, in N. Roymans/F. Theuws, *Een en als zand. Twee jaar graven naar het Brabants verleden*, Graven naar het Brabantse verleden 1, 's-Hertogenbosch, 88-104.

Site	133
Site type	settlement
Province	Limburg
Municipality	Peel en Maas
Place	Maasbree
Toponym	Siberië
Completeness	part of site (not delimited)
Excavated area in ha	3.75
Soil type	sand
Start date	500
End date	800
Description	The archaeological evidence suggests that this settlement was occupied seasonally. The house plans are relatively small, 12 charcoal pits were discovered and no pottery was found. This explains the wide range of dates (well 503, two charcoal pits 667 and 776). Possibly one additional house plan, but not certain. There were probably more buildings in the surrounding area as they followed the diminishing forest. One burial was discovered from this period, interpreted as a death during the seasonal activities. A well was constructed of planks. This could also partially explain the discrepancy between the date of the well and the charcoal pits if the planks were reused.
Literature	-Van Renswoude, J./M. Schurmans, 2012: *Opgravingen in Maasbree-Siberië. Een grafveld uit de Romeinse tijd en bewoning uit de late prehistorie en Vroege Middeleeuwen*, Zuidnederlandse Archeologische Rapporten 48, Amsterdam. -Norde, E./J. van Renswoude, 2008: *IVO door middel van proefsleuven in het plangebied Siberië te Maasbree*, Zuidnederlandse Archeologische Notities 156, Amsterdam.

Site	134
Site type	settlement
Province	Noord Brabant
Municipality	Laarbeek
Place	Beek en Donk
Toponym	Oude Toren
Completeness	part of site (not delimited)
Excavated area in ha	0.3
Soil type	sand
Start date	675
End date	950
Description	The settlement probably started in the late-Merovingian period from which date one building and a pit. The Carolingian period is represented by two building plans and two wells. There seems to have been continuity into the tenth century and further up until the twelfth century. The Merovingian and Carolingian building plans were dated mainly on the building plan typology because of the large amount of later activity which probably caused contamination of older features with younger find material.
Literature	-Huijbers, A. (T.), 1994: Middeleeuwen: Beek en Donk, in *Brabants Heem* 46, 33-37.

Site	135
Site type	settlement
Province	Noord Brabant
Municipality	Waalre
Place	Waalre
Toponym	Aalst, Voormalige Onze-Lieve-Vrouwekerk
Completeness	part of site (not delimited)
Excavated area in ha	0.11
Soil type	sand
Start date	750
End date	900
Description	Excavation of the surroundings of a former church. No buildings from the Carolingian period were discovered though the presence of a well from the period suggests habitation in the direct vicinity. The well was found at the edge of the excavated area. Of one building the date isn't certain and it may date from the Carolingian period although the author seems to lean towards a Merovingian date. A Carolingian coin-hoard was discovered consisting of 12 silver imitations of denarii of Louis the Pious and Lothar I.
Literature	-Arts, N.M.A./A.J.A. Bijsterveld (eds.), 1998: *De schaduw van een heiligdom. De geschiedenis van Aalst en zijn middeleeuwse kerk*, Waalre.

Site	136
Site type	settlement
Province	Noord Brabant
Municipality	Geldrop-Mierlo
Place	Geldrop
Toponym	Hagelven
Completeness	part of site (not delimited)
Excavated area in ha	1.4
Soil type	sand
Start date	800
End date	900
Description	Part of this settlement may have been destroyed by work carried out in the late 1960's. However the yard which was discovered seems to have been an isolated settlement with no predecessor or successor.
Literature	-Bazelmans, J., 1990: Een hoeve uit de 9de eeuw, in J. Bazelmans/F. Theuws, *Tussen zes gehuchten. De laat-Romeinse en middeleeuwse bewoning van Geldrop- 't Zand*, Studies in Prae- en Protohistorie 5, Eindhoven, 32-37. -Janssen, A., 1970: De merkwaardige puttenreeks van Geldrop, in *Brabants Heem* 22, 39-43.

Site	137
Site type	settlement
Province	Noord Brabant
Municipality	Alphen-Chaam
Place	Alphen
Toponym	Centrumplan
Completeness	part of site (not delimited)
Excavated area in ha	0.2
Soil type	sand
Start date	675
End date	800
Description	A yard dating from the late-Merovingian, possibly early Carolingian period was discovered. It consisted of a building, a sunken hut and two wells.
Literature	-Van Dalfsen, J.W./M. Berkhout/E. de Nes, 2010: *Centrumplan, Alphen Gemeente Alphen-Chaam. Inventariserend Veldonderzoek door middel van proefsleuven*, B&G rapport 1019, Noordwijk. -Mostert, M., 2013: *Alphen Centrumplan. Opgraving*, BAAC rapport A-11.0133, 's-Hertogenbosch.

Site	138
Site type	settlement
Province	Noord Brabant
Municipality	Oosterhout
Place	Oosterhout
Toponym	Vrachelen 3/Vlinderbuurt
Completeness	-
Excavated area in ha	-
Soil type	sand
Start date	-
End date	-
Description	Excavation carried out by the municipal archaeological service and as yet not fully published.
Literature	-Koopmanschap, H.J.L.C., 2015: *De middeleeuwse huisplattegronden van Oosterhout-Vlindervallei (Vrachelen 3), een eerste overzicht*, Antea Group Archeologie 2015/85, Oosterhout.

Site	139
Site type	settlement
Province	Noord Brabant
Municipality	Tilburg
Place	Berkel-Enschot
Toponym	Enschotsebaan 2
Completeness	part of site (not delimited)
Excavated area in ha	6
Soil type	loam
Start date	750
End date	950
Description	The site revealed traces of habitation perhaps dating back to the Merovingian period with continuous habitation into the twelfth century. The eighth and ninth century occupation phase consisted of nine main buildings and eleven outbuildings, and also four wells. Several buildings seem to have been arranged around a rectangular open space. Evidence for a smithy were discovered that seems to have functioned in the Carolngian period, though it is not clear how long production lasted.
Literature	-Brouwer, M.C./R.G. van Mousch, 2015: *Leemspitters en landbouwers. Bewoning uit de late prehistorie en de middeleeuwen (8e t/m 14e eeuw) in het plangebied Tilburg, Enschotsebaan-Zuid 2*, BAAC-rapport A-09.0407, 's-Hertogenbosch.

Site	140
Site type	settlement
Province	Noord Brabant
Municipality	Tilburg
Place	Tilburg
Toponym	Havep
Completeness	part of site (not delimited)
Excavated area in ha	3,85
Soil type	sand
Start date	700
End date	900
Description	Early medieval occupation of the site started in the second half of the seventh century and habitation continued into the twelfth century. Four buildings have been dated to the Carolingian occupation phase. However several late Merovingian and Ottonian building plans may also belong to this phase, as well as several outbuildings. Three to five wells have also been assigned to the Carolingian period.
Literature	-Mostert, M./C. Verbeek, 2007: *Tilburg, Oude Goirleseweg. Proefsleuvenonderzoek*, Bilan 2007/152, Tilburg. - Van Zon, M./M.F.P. Dijkstra: *600 jaar middeleeuwse bewoning op het terrein van de voormalige textielfabriek HaVeP. Aanvullend inventariserend veldonderzoek en opgraving in plangebied Puijacker te Tilburg*, Archol rapport 177, Leiden.

Site	141
Site type	settlement
Province	Noord Brabant
Municipality	Cuijk
Place	Beers (NB.)
Toponym	Groot Linden
Completeness	part of site (not delimited)
Excavated area in ha	0.05
Soil type	loam
Start date	750
End date	900
Description	Besides the two wells a number of postholes were discovered but no building plan could be reconstructed from them.
Literature	-Verwers, W.J.H. /G.A.C. Beex, 1978: Beers, in *Brabants Heem* 17, 34-36. -Beex, G.A.C., 1977: Beers, Gassel, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1976, 108.

Site	142
Site type	settlement
Province	Noord Brabant
Municipality	Cuijk
Place	Beers (NB.)
Toponym	De Riet
Completeness	part of site (not delimited)
Excavated area in ha	2,25
Soil type	loam
Start date	700
End date	900
Description	The report on the trial trench campaign and definitive excavation is yet to be published. The site has yielded traces of habitation starting in the Merovingian period and continuing in to the eleventh century. Due to the fact that most features were situated in the same area there is considerable intercutting, making it difficult to identify early medieval building plans amongst the younger settlement traces. During the Carolingian occupation phase the settlement appears to have become more structured with yards remaining permanent for several generations. There is evidence for a smithy being active during the eighth century.
Literature	-

Site	143
Site type	settlement
Province	Noord Brabant
Municipality	Oisterwijk
Place	Moergestel
Toponym	Molenakkers
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	sand
Start date	750
End date	900
Description	Archaeological observations during digging of trenches for a gas pipeline and earth removal several wells and settlement traces were discovered. In the find report the amount of wells per period is not specified but most seem to be younger than the Carolingian period. One building plan was discovered which was dated to the Merovingian/Carolingian period. There is no published groundplan of this building. The settlement may also have continued into the tenth century but that is not clear. 11/twelfth century habitation is likely present.
Literature	-Verwers W.J.H./G.A.C. Beex, 1981: Moergestel, in *Brabants Heem* 19, 58-64. -Verwers, W.J.H., 1978: Moergestel, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1977, Amersfoort, 128. -Van Laarhoven, J., 1981: Archeologische vondsten te Moergestel. Overzicht van de opgegraven putten op de Broekzijde en Molenakkers en van de vroeg-middeleeuwse nederzetting op de Molenakkers met het urnenveld, in *De Kleine Meijerij* 32, 34-39.

Site	144
Site type	settlement
Province	Noord Brabant
Municipality	Cuijk
Place	Beers (NB.)
Toponym	Gassel, Over de Voort
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	loam
Start date	650
End date	725
Description	It is not certain that the sunken hut is actually a sunken hut or rather, a large pit. It did contain Carolingian pottery. The excavation could be divided in a southern and northern part. In the southern part four wells were discovered and postholes from which no building plan could be reconstructed. In the northern part a house plan of a building which is dated in the late Merovingian or early Carolingian period was discovered together with two smaller buildings and a well. It is not entirely clear where the sunken hut was found.
Literature	-Heidinga. H.A./E. Vreenegoor, 1990: Beers, Gassel IV, in *Brabants Heem* 34, 71-75.

Site	145
Site type	settlement
Province	Noord Brabant
Municipality	Oirschot
Place	Oirschot
Toponym	Lepelaar
Completeness	part of site (not delimited)
Excavated area in ha	0.001
Soil type	sand
Start date	875
End date	950
Description	A well discovered during building works. The wood was carbon dated between 800 and 1000. Besides fragments of Mayen it also contained sherds from Pingsdorf and Andenne.
Literature	-Verhoeven, A.A.A., 1988: Oirschot, in *Brabant Heem* 32, Waalre, 38-40.

Site	146
Site type	settlement
Province	Noord Brabant
Municipality	Someren
Place	Someren
Toponym	Waterdael
Completeness	part of site (not delimited)
Excavated area in ha	14.5
Soil type	sand
Start date	700
End date	950
Description	Many structures could not be dated very precisely. Habitation seems to have started in the Merovingian period and continued into the Carolingian period. Not all excavated areas show continuity though. The same is true of the subsequent high medieval habitation. Several houses were discovered as well as 17 granaries. Of the 27 barns four may in fact have been houses but too little of them remained to know for certain.
Literature	-De Boer, E./H.A. Hiddink (eds.), 2012: *Opgravingen in Waterdael III te Someren. Deel 2, bewoning uit de latere prehistorie, de Vroege en Volle Middeleeuwen*, Zuidnederlandse Archeologische Rapporten 50, Amsterdam.

Site	147
Site type	settlement
Province	Limburg
Municipality	Weert
Place	Weert
Toponym	Molenakker
Completeness	part of site (not delimited)
Excavated area in ha	4
Soil type	sand
Start date	700
End date	900
Description	Of the 1994 campaign two buildings were dated in the eighth century and two in the early middle ages (8-tenth centuries). No wells or other features were found. Also features from the high middle ages but no continuity. Though the habitation of this period was found in the same area of the excavation as Roman habitation, the Carolingian buildings were discovered in separate areas. During the 1995 campaign a number of isolated farmsteads were discovered, one consisting of a main building and a barn, another of two buildings and a well. This last cluster contained another building that had a Carolingian groundplan but only iron-age sherds were discovered in the features. All yards seem to have been isolated and consisted of one phase. As in the previous campaign settlement traces of the high middle ages were also discovered. In the report on the last campaign (1997) some new insights are given on results from previous campaigns. One of the buildings that could previously only be placed in the early middle ages is now dated more specifically to the Merovingian period. During a rescue excavation carried out before the 1997 campaign by amateur archaeologists another Carolingian yard was discovered consisting of a main building, haystacks and a well. During the 1997 campaign itself, one new yard was discovered with one main building a secondary building and a well. To the west of this yard another partial Carolingian building was discovered.
Literature	-Roymans, N., 1995: *Opgravingen in de Molenakker te Weert*, Zuidnederlandse Archeologische Rapporten 1, Amsterdam.
.	-Dijkstra, M., 1996: Middeleeuwse bewoningssporen in de Molenakkers en Kamperhoek, in N. Roymans/A. Tol, *Opgravingen in Kampershoek en de Molenakker te Weert*, Zuidnederlandse Archeologische Rapporten 4, Amsterdam, 38-47. -Dijkstra, M., 1999: De ontwikkeling van het middeleeuwse cultuurlandschap bij Kampershoek, in N. Roymans/A. Tol/ H. Hiddink (eds.), *Opgravingen in Kampershoek en de Molenakker te Weert, campagne 1996-1998*, Zuidnederlandse Archeologische Rapporten 5, Amsterdam, 51-60.

Site	148
Site type	settlement
Province	Limburg
Municipality	Gennep
Place	Gennep
Toponym	Centrum
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	loam
Start date	700
End date	950
Description	The toponym used here is not connected to any specific research but is used as an umbrella term for a number of excavations (see literature) carried out in the old town centre of Gennep. Because most of these excavations were quite small and the features from the Carolingian period probably belong to one settlement they have been grouped together as one find-spot. Mainly stray features dating to the Carolingian period were discovered here.
Literature	-Mooren, J.R., 2008: *Gennep Houtstraat. Definitief archeologisch onderzoek*, BAAC-rapport A-06.0120, 's-Hertogenbosch. -Reuselaars, I., 1993: Gennep, in *Publications de la société historique et archéologique dans le Limbourg* 129, 293-302.

Site	149
Site type	settlement
Province	Limburg
Municipality	Venray
Place	Merselo
Toponym	Grootdorp
Completeness	part of site (not delimited)
Excavated area in ha	0.57
Soil type	sand
Start date	800
End date	950
Description	Building 1 probably dates to the last quarter of the ninth century at the earliest. The features belonging to the building yielded no finds but one feature was dug through a horse burial which contained a Badorf sherd. Building three has the same earliest start date. Three buildings dating to the eleventh/twelfth century were also found. It is not clear if there was continuous habitation but it seems unlikely. One of the secondary buildings (a haystack) was dated in 9/tenth century based on its location. Three wells were dated in the late-Carolingian period, two wells were dated very broadly between 800 and 1200.
Literature	-Dijkstra, J./A.H. Schutte, 2007: *Merselo-Grootdorp, wonen aan de Peelrand. Een archeologische opgraving*, ADC-Rapport 716, Amersfoort. -Veldman, H.A.P, 2005: *Venray, Merselo Grootdorp, nr 64 IVO 3. Inventariserend veldonderzoek in de vorm van proefsleuven*, ADC-rapport 420, Amersfoort.

Site	150
Site type	settlement
Province	Limburg
Municipality	Horst aan de Maas
Place	Meterik
Toponym	Kempweg
Completeness	part of site (not delimited)
Excavated area in ha	1.4
Soil type	sand
Start date	725
End date	950
Description	The settlement shows continuous habitation from ca 630 to 1000 although the late merovingian habitation seems to be separate from that of the Carolingian period and tenth century. The amount of buildings is somewhat variable because a few have been subdivided in phases. Besides the Carolingian structures, two Merovingian main buidings and seven secondary buildings were found and also three tenth cent main buildings and two secondary buildings. In total four wells were discovered, dated 630, 642 (based on a plank), probably Merovingian and (early) Carolingian. A large part of the settlement was probably destroyed by the construction of a water reservoir.
Literature	-De Koning, J., 2009: *Een vroeg middeleeuwse nederzetting op het Meterikse veld (630 tot ca. 1000 n. Chr.). Definitieve opgraving in Horst aan de Maas, Meterik*, Zaandijk. -Gheysen, K./H. Vanneste/C. Verbeek, 2006: *Horst aan de Maas-Meterik, Kempweg. Inventariserend archeologisch onderzoek, waarderende fase door middel van proefsleuven*, Bilan rapport 2007/119, Tilburg.

Site	151
Site type	other/unknown
Province	Limburg
Municipality	Maastricht
Place	Maastricht
Toponym	Maastricht
Completeness	off-site/isolated feature
Excavated area in ha	1.16
Soil type	-
Start date	750
End date	900
Description	A number of sites in Maastricht have been grouped together here because none yielded clear evidence of habitation in the form of buildings or wells. In most cases only pits containing some Carolingian pottery were discovered. The separate excavated remains probably belong to separate smaller settlements but there is too little evidence to say for certain. -Lage Kanaaldijk: a number of burials which could date to the Carolingian period were found. Five features (not specified) dating to the Carolingian period were also discovered. -Achter de Comedie 12: A refuse pit and a rectangular, stone lined pit of which the function is not clear. -Boschstraatkwartier: Evidence for habitation was found in the form of pits and possibly a ditch during the excavations in the Boschstraatkwartier. There seems to be a concentration of Carolingian pottery in the very north of the central part of the excavation. Perhaps habitation from this period is to be found to the north of the excavated area. -Lantaarnstraat 5-9: 7/eighth century pavement and stray finds dating to the ninth to fourteenth century. -Rechtstraat 70: Carolingian pottery documented by the owner of the building of which the basement had been dug out. -Rechtstraat 80: More or less the same situation as Rechtstraat 70 but now more Carolingian pottery was found.
Literature	-Hulst, R., 1995: Lage Kanaaldijk 13: Voormalige Kaarsenfabriek, *in Publications de la société historique et archéologique dans le Limbourg* 131, 202-207. -Panhuysen, T.A.S.M., 1991: Maastricht. Opgravingen door het Gemeentelijk Oudheidkundig Bodemonderzoek Maastricht in het jaar 1990, in *Publications de la société historique et archéologique dans le Limbourg* 127, 237-239. -Panhuysen, T.A.S.M., 1988: Lantaarnstraat 5-9, in *Publications de la société historique et archéologique dans le Limbourg* 124, 384-386. -Bloemers, J.H.F., 1973: Maastricht, Rechtstraat, in *Publications de la société historique et archéologique dans le Limbourg* 107-108, 50-52. -Bloemers, J.H.F., 1973: Maastricht, Rechtstraat 80, in *Publications de la société historique et archéologique dans le Limbourg* 109, 47-48.

Site	152
Site type	settlement
Province	Limburg
Municipality	Venlo
Place	Venlo
Toponym	Lohofstraat
Completeness	off-site/isolated feature
Excavated area in ha	0.07
Soil type	sand
Start date	875
End date	925
Description	The excavation in the Lohofstraat yielded a ditch or moat that probably dates to between 875 and 925 based on the pottery. Other features from the Carolingian period were not found.
Literature	-Schotten, J., 2011: Venlo tussen Romeinse tijd en Middeleeuwen. Een turbulente tussentijd, in P. van der Heijden et al., *Venlo. Twintig eeuwen wonen aan de Maas*, Venlo, 97-106.

Site	153
Site type	settlement
Province	Limburg
Municipality	Venray
Place	Venray
Toponym	't Brukske/ St Antoniusveld
Completeness	part of site (not delimited)
Excavated area in ha	1
Soil type	sand
Start date	750
End date	900
Description	The site was excavated in two campaigns, hence the two toponyms. Both the excavation Het Brukske and St Antoniusveld have hardly been published. Evidence for habitation was found dating Roughly to the fifth up till the twelfth century. In the early eighth century one main building stood in the area with the toponym Het Brukske but from the second half of the eighth century until circa 1000 there was no habitation present in this part of the site. During this period habitation was only present at Sint Antoniusveld. The building plans of Het Brukske have been published. The amount of Carolingian buildings from St. Antoniusveld is not clear because the results have not been fully published. Two building dated to the tenth century. Thirteen wells were found but in the publication on this site these are not dated. The net excavated area is an estimate because the size of the Sint Anthoniusveld excavation is not clear.
Literature	-Stoepker, H./R. Proos, 1997: Middeleeuwse bewoning in en om Venray, in H. Stoepker (ed.), *De weg terug. Archeologische ontdekkingen langs de A73 bij Venray*, Abcoude, 47-56. -Spanjer, M. 1997: Bewoning op het Sint Antoniusveld, in H. Stoepker (ed.), *De weg terug. Archeologische ontdekkingen langs de A73 bij Venray*, Abcoude, 57-61. -Proos, R., 1997: Venray-'t Brukske, an early medieval settlement on the sandy soils of Limburg, in G. de Boe/F. Verhaeghe, *Rural settlements in medieval Europe. Papers of the 'Medieval Europe Brugge 1997' conference* 6, Zellik, 149-156.

Site	154
Site type	settlement
Province	Zuid Holland
Municipality	Katwijk
Place	Rijnsburg
Toponym	Abdijterrein
Completeness	part of site (not delimited)
Excavated area in ha	0.33
Soil type	clay
Start date	720
End date	890
Description	Dijkstra sees a clear break in the settlement organisation before and after circa 720. Phase 2 of the settlement comprises the Carolingian period. It is subdivided into phase 2a and 2b of which both contained one building and the second also contained a chapel with a cemetery. The buildings show a development from boat-shaped buildings in the Carolingian period to straight -walled buildings in the 10/eleventh century. In phase 3 (890-1050) a circular rampart is supposed to have been erected, partly because of the radial layout of the buildings. It is not clear if the buildings dated to this period were built directly after the construction of the circular fort or some time after.
Literature	-Dijkstra, M.F.P., 2011: *Rondom de monding van Rijn en Maas: landschap en bewoning tussen de 3e en 9e eeuw in Zuid-Holland, in het bijzonder de Oude Rijnstreek,* Amsterdam. -Sarfatij, H., 1977: Die Frühgeschichte von Rijnsburg (8.-12. Jahrhundert), ein historisch-archäologischer Bericht, in B.L. van Beek/R.W. Brandt/W. Groenman-van Waateringe (eds.), *Ex Horreo*, Amsterdam, 290-302.

Site	155
Site type	settlement
Province	Zuid Holland
Municipality	Katwijk
Place	Valkenburg
Toponym	De Woerd
Completeness	part of site (not delimited)
Excavated area in ha	5
Soil type	clay
Start date	750
End date	900
Description	Technically the De Woerd excavation comprised 3,5 ha but an area directly to the west of De Woerd measuring 1,5 ha was also excavated. Habitation was situated on a levee along the Oude Rijn. Most wells (exact number not given in report) were constructed with wooden barrels. They were found in rows which seem to indicate the boundaries of yards. There were probably 6 to 8 yards simultaneously at any given time during the Merovingian and Carolingian periods. It is not entirely clear whether all the buildings were houses, or if some or even all were secondary buildings.
Literature	-Bult, E.J./J. van Doesburg/D.P. Hallewas, 1990: De opgravingscampagne in de Vroeg-Middeleeuwse nederzetting op de Woerd bij Valkenburg (Z.H.) in 1987 en 1988, in Bult, E.J./D.P. Hallewas (eds.), *Graven bij Valkenburg III, het archeologisch onderzoek in 1987 en 1988*, Delft, 147-166. -Sablerolles, Y., 1990: Het Dierlijk botmateriaal uit de Vroege Middeleeuwen afkomstig van de nederzetting op de Woerd te Valkenburg (Z.H.), een voorbeschouwing, in Bult, E.J./D.P. Hallewas (eds.), *Graven bij Valkenburg III, het archeologisch onderzoek in 1987 en 1988*, Delft, 167-173. -Verhagen, M., 1990: De bruine beer (Ursus arctos L.) in Valkenburg (Z.H.), in Bult, E.J./D.P. Hallewas (eds.), *Graven bij Valkenburg III, het archeologisch onderzoek in 1987 en 1988*, Delft, 175-181. -Pal, T. van der, 1990: Hertshoornen kammen uit de Vroeg Middeleeuwse nederzetting op de Woerd te Valkenburg (Z.H), in Bult, E.J./D.P. Hallewas (eds.), *Graven bij Valkenburg III, het archeologisch onderzoek in 1987 en 1988*, Delft, 182-187.

Site	156
Site type	settlement
Province	Zuid Holland
Municipality	Teylingen
Place	Warmond
Toponym	Park Klinkenberg
Completeness	part of site (not delimited)
Excavated area in ha	0.15
Soil type	peat
Start date	865
End date	1042
Description	A small building was discovered in a peat layer. It was difficult to discern from the other organic remains in the peat. Other buildings may have been missed.
Literature	-Bink, M., 2005: *Warmond, Park Klinkenberg. Archeologisch onderzoek*, BAAC-rapport A-05.0004, 's-Hertogenbosch.

Site	157
Site type	other/unknown
Province	Zuid Holland
Municipality	Leiden
Place	Leiden
Toponym	Roomburg
Completeness	part of site (not delimited)
Excavated area in ha	0.6
Soil type	clay
Start date	600
End date	900
Description	The excavation was carried out in the area where the Roman vicus associated with the castellum Matilo lay. In addition three trenches were dug across the former canal of Corbulo. A campshot was constructed along the canal in at least the late-Merovingian period according to a number of dendrochronological dates. Fill layers of the canal yielded finds from the seventh until the ninth century. Some indications for artisanal activity were found, metal and bone working and indications for pottery production in the form of stamps used for decoration. In the northwestern part of the excavation of the vicus a few pits were discovered which probably belong to the early middle ages (not specified further).
Literature	-Hazenberg, T., 2000: *Leiden-Roomburg 1995-1997: archeologisch onderzoek naar het Kanaal van Corbulo en de vicus van het castellum Matilo*, Rapportage Archeologische Monumentenzorg 77, Amersfoort. -Van der Klei, J., 1964: Profiel van de gracht van Corbulo bij Leiden, in *Westerheem* 13, 95-102.

Site	158
Site type	settlement
Province	Zuid Holland
Municipality	Leiderdorp
Place	Leiderdorp
Toponym	Hoogmadeseweg/kom van aaiweg
Completeness	part of site (not delimited)
Excavated area in ha	0.05
Soil type	clay
Start date	700
End date	850
Description	The element of most interest at this site is a natural waterway that was channeled through extensive use of revetments in the eighth and ninth centuries. In the course of several excavation campaigns the channel has yielded a large quantity of finds. In 1952 Braat dug a number of trenches on a plot along the Kom van Aaiweg, just to the north of the excavations at Hoogmadeseweg. A section of a channel was found as well as possible settlement traces although no clear structures could be discerned. Settlement traces are less numerous at the site, partly due to clay winning in more recent times. The site seems to have been abandoned shortly after 840. The final publication of the most recent excavation at the site became available toward the end of the research and the finds from this excavation have therefore not been included in the inventory.
Literature	-Braat, W.C., 1952: Leython, in *Leids Jaarboekje* 44, 79-93. -Depuydt, S./A. Wagner, 2009: *Archeologisch onderzoek op de locatie Samsonveld-Tennispark De Munnik te Leiderdorp (gemeente Leiderdorp). Inventariserend veldonderzoek met proefsleuven*, Archeomedia rapport A03-493-K/495-K, Capelle aan den IJssel. -Dijkstra, M.F.P./A.A.A. Verhoeven/K.C.J. van Straten (eds.), 2016: *Nieuw licht op Leithon. Archeologisch onderzoek naar de vroegmiddeleeuwse bewoning in plangebied Leiderdorp-Plantage,* Themata 8, Amsterdam.

Site	159
Site type	settlement
Province	Noord Holland
Municipality	Castricum
Place	Castricum
Toponym	Oosterbuurt
Completeness	part of site (not delimited)
Excavated area in ha	0.64
Soil type	sand
Start date	675
End date	850
Description	The excavated buildings lay in three clusters, the buildings within these clusters were difficult to recognize. Some fragments of buildings were also discovered but these are only mentioned summarily and may not have been buildings at all. The 17 main buildings may well contain secondary buildings but that is not specified. In addition several wells dating to the Carolingian period were discovered. Among the finds were a few wooden objects and part of a ninth century shoe.
Literature	-Hagers, J-K.A./M.M. Sier, 1999: *Archeologisch onderzoek in de Oosterbuurt gemeente Castricum*, Rapportage Archeologische Monumentenzorg 53, Amersfoort.

Site	160
Site type	settlement
Province	Noord Holland
Municipality	Castricum
Place	Limmen
Toponym	De Krocht
Completeness	part of site (not delimited)
Excavated area in ha	1.2
Soil type	sand
Start date	825
End date	900
Description	The earliest early medieval feature at this site is a burial containing 7 sceatta's dating to the early eighth century. Occupation seems have started at the beginning of the ninth century and was subsequently inhabited continuously untill circa 1250. The Carolingian occupation phase consisted of four main buildings, three outbuildings, and ten wells. The site has also provided evidence for either gold or silver working.
Literature	-Dijkstra, M.F.P/J. de Koning/S. Lange, 2006: *Limmen - De Krocht, De opgraving van een middeleeuwse plattelandsnederzetting in Kennemerland*, AAC-publicaties 41, Amsterdam.

Site	161
Site type	settlement
Province	Noord Holland
Municipality	Uitgeest
Place	Uitgeest
Toponym	De Dog
Completeness	part of site (not delimited)
Excavated area in ha	1.5
Soil type	sand
Start date	750
End date	850
Description	The excavation yielded features from the iron age and early middle ages, both Merovingian and Carolingian. Possible continuity from the late iron age until the Carolingian period. Only the northerneastern extent of the settlement is not known. There seems to be a slight difference in orientation between the Merovingian and Carolingian buildings.
Literature	-Besteman, J.C., 1990: Uitgeest, in *Holland, regionaal historisch tijdschrift* 22, 324-329. -Besteman, J.C., 1984: Uitgeest 1 in *Holland, regionaal historisch tijdschrift* 16, 229-230. -De Koning, J., 1992: *Het vroeg-middeleeuws aardewerk van de opgraving Uitgeest de Dog (N-H), een poging tot datering en fasering*, (unpublished MA thesis University of Amsterdam), Amsterdam. -Dijkstra, J., 1992: *De vroeg-middeleeuwse nederzetting Uitgeest de Dog*, (unpublished MA thesis University of Amsterdam), Amsterdam.

Site	162
Site type	settlement
Province	Noord Holland
Municipality	Harenkarspel
Place	Warmenhuizen
Toponym	Hartentorp
Completeness	uncertain
Excavated area in ha	0.11
Soil type	clay
Start date	700
End date	900
Description	Warmenhuizen originally consisted of a series of shallow terps of which one is Hartentorp. The first habitation layers were probably layed directly on the underlying peat in order to create a dry surface. This probably occurred in the Carolingian period. A number of habitation layers from the Carolingian period was discovered by the ROB in 1977. In 2004 ADC carried out an excavation to the southeast of the ROB excavation. This again yielded evidence that habitation probably began in the Carolingian period. In the short reports of the 1977 excavation remains of two house plans dating to the early middle ages are mentioned but in the ADC report these are dated to the high middle ages. The ADC excavation did not produce remains of an early medieval habitation layer. Carolingian material was also discovered in a few other locations in Warmenhuizen though not in direct relation to features (wnr 228105)
Literature	-Woltering, P.J./M.J.A. de Haan, 1977: Warmenhuizen, gem. Warmenhuizen (N.-H.). Laat-Middeleeuwse terp waaronder vroegmiddeleeuwse nederzettingssporen, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1977, 26-29. -Woltering P.J., 1978: Warmenhuizen, in *Holland, regionaal historisch tijdschrift* 10, 270-274. -Waldus, W.B., 2005: *Warmenhuizen Hartendorp*, ADC rapport 402, Amersfoort. -Woltering, P.J., 1982: Een opgraving in Hartendorp, in M. Kuiper/V.J. Nobel, *Een kijkje in de geschiedenis van Warmenhuizen*, Stolphoevereeks 12, Warmenhuizen, 122-131.

Site	163
Site type	fortification
Province	Zeeland
Municipality	Vlissingen
Place	Oost-Souburg
Toponym	Ringwalburg
Completeness	part of site (delimited)
Excavated area in ha	1.1
Soil type	clay
Start date	880
End date	1000
Description	Excavations in the ringfort of Oost-Souburg. About 1/3 of the interior of the fort was excavated. The number of house plans is a minimum number because parts of the excavated area had been disturbed by later activities and erosion. The habitation has been separated into two phases of which the first is partly Carolingian. The building plans of the first phase were split up in to three types with subtypes. The houses were built on house-terps. Habitation is supposed to have started around 880 AD. Only two wells were discovered during the excavations, but neither could be dated.
Literature	-Heeringen, R.M. van/P.A. Henderikx/A. Mars, 1995: *Vroeg-Middeleeuwse ringwalburgen in Zeeland*, Goes/Amersfoort.

Site	164
Site type	settlement
Province	Noord Holland
Municipality	Medemblik
Place	Medemblik
Toponym	Oude Haven
Completeness	part of site (not delimited)
Excavated area in ha	0.15
Soil type	clay
Start date	700
End date	900
Description	This site comprises all excavations along the Oude Haven in Medemblik that yielded early medieval finds and features. -Oude Haven 1970: During this excavation Carolingian layers, pits and hearths were discovered. -Ridderstraat/Westerdijk: Excavation yielded traces of 1 house plan (three postholes and a hearth in a section) and a well that possibly belonged to the same yard. Besteman posited that this may signify the northern edge of the early medieval settlement. -Oude Haven Excavations 1975: An early medieval layer was discovered as well as 15 wells dating from the early middle ages onward, though the amount of wells per period is not specified. -Muntstraat/Korensteeg: At least three house plans but also 20 hearths, probably indicating continuous habitation on this spot from the Carolingian period until the 11/twelfth century. The find report mentions more than one well between two houses but not exactly how many or their exact date.
Literature	-Besteman, J.C., 1977: Carolingian Medemblik, in *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 24, Amersfoort, 43-104. -Besteman, J.C., 1991: Medemblik: *Ridderstraat,* in *Holland, regionaal historisch tijdschrift* 23. -Besteman, J.C., 1983: Medemblik, in *Holland, regionaal historisch tijdschrift* 15. -Woltering, P.J., 1976: Medemblik, in *Holland, regionaal historisch tijdschrift* 8. -Besteman, J.C., 1989: The pre-urban development of Medemblik: from an early medieval trading centre to a medieval town, in H.A. Heidinga/H.H. van Regteren-Altena*, Medemblik and Monnickendam. Aspects of medieval urbanization in northern Holland*, Amsterdam, 1-30.

Site	165
Site type	settlement
Province	Zeeland
Municipality	Veere
Place	Serooskerke
Toponym	N57
Completeness	part of site (delimited)
Excavated area in ha	3.9
Soil type	clay
Start date	675
End date	900
Description	Ahead of the construction of a new provincial road in Zeeland a number of findspots were investigated. At findspot 7 a building dating to the late seventh or early eighth century was discovered. The building was probably rebuilt several times. It is presumed that other, higher parts of the landscape were also inhabited at this time, but these have been disturbed by later levelling of the land. Finds of the later eighth and ninth century were more numerous but the number of features is lower and no clear structures could be identified. Besides findspot 7, Carolingian material was also discovered at findspots 4 and 13.
Literature	-Dijkstra, J./B. Meijlink, 2002: *Aanvullend Archeologisch Onderzoek langs Rijksweg 57, vindplaats 4 (ten zuidoosten van Serooskerke)*, ADC-rapport 117, Amersfoort. -Goossens, T./B. Meijlink, 2003: *Aanvullend Archeologisch Onderzoek in het tracé van de rijksweg N57 in Serooskerke-Noord, gemeente Veere (vindplaatsen 2, 6, 7, 8, 9, 10, 12, 13 en 16)*, ADC-rapport 161, Amersfoort. -Dijkstra, J./F.S. Zuidhoff, 2011: *Kansen op de kwelder. Archeologisch onderzoek op negen vindplaatsen in het nieuwe tracé van de Rijksweg N57 en de nieuwe rondweg ter hoogte van Serooskerke (Walcheren)*, ADC-monografie 10, Amersfoort.

Site	166
Site type	settlement
Province	Zeeland
Municipality	Vlissingen
Place	Vlissingen
Toponym	Lammerenburg 11
Completeness	off-site/isolated feature
Excavated area in ha	0.2
Soil type	clay
Start date	850
End date	925
Description	The first traces of habitation date to the late ninth century. A number of off-site features were discovered, mainly pits.
Literature	-Verhoeven, A.A.A./G. Williams, 2004: *Archeologisch onderzoek bij de wijk Lammerenburg II in de gemeente Vlissingen*, ADC-rapport 217, Amersfoort.

Site	167
Site type	settlement
Province	Noord Holland
Municipality	Castricum
Place	Limmen
Toponym	Zuidkerkelaan I + II
Completeness	part of site (not delimited)
Excavated area in ha	0.12
Soil type	sand
Start date	675
End date	900
Description	The Zuidkerkelaan I and II have been combined because of their proximity and because they were excavated at the same time. Both parts of the Zuidkerkelaan findspot yielded traces dating to the Carolingian period though the dating of early medieval traces from site II were more difficult to date. The traces from the latter site may also date from the late Merovingian period. Late iron age/Roman occupation traces were also present as well as high medieval and later traces. The dating of the wells was not entirely clear.
Literature	-Woltering, P.J., 1993: Limmen: Zuidkerkelaan I en II, in *Holland, regionaal historisch tijdschrif*t 25, 315-320.

Site	168
Site type	other/unknown
Province	Noord Holland
Municipality	Hollands Kroon
Place	Zijdewind
Toponym	Blokhuizen
Completeness	uncertain
Excavated area in ha	-
Soil type	peat
Start date	750
End date	900
Description	This site consist of a number of loose observations. No clear features have been discovered but there seems to be enough evidence to suspect that the area was inhabited in the early middle ages. The site has been linked to the former settlement of Geddingmore. An excavation in 1982 yielded traces of Carolingian habitation which were discovered under a burial ground of the twelfth century. What these features consisted of exactly is not mentioned. During the laying of water pipes in May 1998 Carolingian pottery was discovered in a stretch that passed the excavation of 1982. No features were discovered.
Literature	-Woltering, P.J., 1984: Niedorp: Blokhuizen, in *Holland, regionaal historisch tijdschrift* 16. -Soonius, C.M., 2001: *Waterleidingtracé Heerhugowaard-Schagen, Gemeente Niedorp, provincie Noord-Holland. Archeologisch toezicht*, RAAP-rapport 644, Amsterdam.

Site	169
Site type	other/unknown
Province	Noord Holland
Municipality	Schagen
Place	Schagen
Toponym	Waldervaart
Completeness	uncertain
Excavated area in ha	0.013
Soil type	clay
Start date	600
End date	800
Description	The findspot consist of a layer that contained Carolingian pottery (c.5000) and bone. Also a casting moald, probably for a key, was found as well as slag-material and iron ore.
Literature	-Diederik, F., 1982: Molenweg, Waldervaart. Een vroeg middeleeuwse nederzetting te Schagen, in *Westerheem* 31, 53-68. -Woltering, P.J., 1978: Schagen: Waldervaart, in *Holland, regionaal historisch tijdschrift* 10, 268-269.

Site	170
Site type	other/unknown
Province	Noord Holland
Municipality	Medemblik
Place	Medemblik
Toponym	Schuitenvoerderslaan
Completeness	off-site/isolated feature
Excavated area in ha	0.51
Soil type	sand
Start date	750
End date	900
Description	The natural soil consists of sand. However the Carolingian habitation layer lay on top of several prehistoric habitation layers. The Carolingian layer suffered erosion by floods and ploughing which meant that it only survived in a limited amount of places. In one area of the excavation a hearth was found that lay within a zone of daub that was interpreted as a sort of platform on which a house could have stood. Both hearth and platform contained Carolingian pottery. No postholes belonging to a building were discovered here, but the building may have been constructed out of sods.
Literature	-Besteman, J.C., 1977: Carolingian Medemblik, in *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 24, Amersfoort, 43-106. -Van Regteren Altena, H.H./J.A. Bakker, 1968: Opgravingen bij Medemblik, in *West-Friesland Oud & Nieuw* 35, 201-210.

Site	171
Site type	settlement
Province	Noord Holland
Municipality	Texel
Place	Den Burg
Toponym	Beatrixlaan
Completeness	part of site (not delimited)
Excavated area in ha	11.5
Soil type	sand
Start date	750
End date	900
Description	Because the settlement traces of the early middle ages are not clearly separated into Merovingian and Carolingian phases it is difficult to give the exact amount of structures per period. Only the number of main buildings seems clear. Secondary buildings, sunken huts and wells were also present.
Literature	-Woltering, P.J., 1977: Occupation history of Texel, I The excavations at Den Burg. Preliminary report, in *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 25, Amersfoort, 7-36. -Woltering, P.J., 1971: 2000 jaar wonen. Opgravingen op Texel, in *Spiegel Historiael* 6, 322-335.

Site	172
Site type	settlement
Province	Noord Holland
Municipality	Beverwijk
Place	Wijk aan Zee
Toponym	Hoogovens
Completeness	part of site (not delimited)
Excavated area in ha	0.09
Soil type	sand
Start date	750
End date	900
Description	In the initial report (Westerheem 16) not much detail is available on the buildings. Only one partial building is mentioned. One well may be Carolingian, though it only contained one fragment of handmade pottery. The observations were carried out in less than ideal circumstances. A layer of peat had formed on top of the habitation layer according to Bosman and Calkoen. Van den Berg reconstructed three house plans and two smaller outbuildings, one perhaps a shed or barn and the other probably a grainstore/haystack. A coin of Louis the Pious was found in one of the features belonging to building 3 which Van den Berg considers to be the oldest. A wooden post was carbon dated to 868 +/- 70 but it is not certain whether the post belonged to building 3 or 4.
Literature	-Bosman, M./H.J. Calkoen, 1967: Een Karolingische woonplaats bij Wijk aan Zee (gem. Beverwijk), in *Westerheem* 16, 224-331. -Van den Berg, T., 1990: *De Karolingische nederzetting bij Wijk aan Zee*, (unpublished MA thesis University of Amsterdam), Amsterdam. -De Koning, J., 2015: *Onder het stuifzand. Overstoven vroegmiddeleeuwse nederzettingen bij Bloemendaal de opgravingscampagnes Groot Olmen 2005, 2006 en 2007*, Zaandijk.

Site	173
Site type	other/unknown
Province	Noord Holland
Municipality	Den Helder
Place	Den Helder
Toponym	Balgzand
Completeness	off-site/isolated feature
Excavated area in ha	0.5
Soil type	peat
Start date	750
End date	900
Description	On Het Balgzand traces of peatwinning were discovered during a particularly low tide in 1964. Among the finds were sherds of Badorf pottery indicating that peatwinning took place in the Carolingian period. There seems to be a gap between the Carolingian use of the area and a 11/twelfth century phase, but this is difficult to confirm because the finds do not appear to have been found in context.
Literature	-Smit, P., 1972: Middeleeuwse bewoningsresten op het Balgzand, in *Westerheem* 21, 3-18. -Woltering, P.J., 1979: Den Helder: Balgzand, in *Holland, regionaal historisch tijdschrift* 11, 262.

Site	174
Site type	other/unknown
Province	Zuid Holland
Municipality	Rotterdam
Place	Rotterdam
Toponym	Overschiese Kleiweg/ VP 37
Completeness	off-site/isolated feature
Excavated area in ha	0.04
Soil type	clay
Start date	665
End date	865
Description	Under a dike a number of wooden post and a plank were discovered. These were carbon dated to between 665 and 865. Seeds from a ditch running beside the dike also dated within this period. The excavators are not certain whether this means the first phase of dike construction started in the early middle ages, they think it is unlikely. It seems some form of activity did take place here in the early middle ages.
Literature	Kranendonk, P./P. van der Kroft/J.J. Lanzing/B.H.F.M. Meijlink, 2006: *Witte vlekken ingekleurd. Archeologie in het tracé van de HSL-Zuid*, Rapportage Archeologische Monumentenzorg 113, Amersfoort.

Site	175
Site type	mixed
Province	Noord Holland
Municipality	Uitgeest
Place	Uitgeest
Toponym	Dorregeest
Completeness	part of site (not delimited)
Excavated area in ha	2.55
Soil type	sand
Start date	700
End date	900
Description	The site Dorregeest was excavated by the State Archaeological Service between 1980 and 1983. It was inhabited largely uninterupted between the Late Iron Age and the Late Middle Ages. Due to the long occupation history of the site, and consequent severe intercutting of features it was difficult to reconstruct the settlement configuration for each habitation phase.
Literature	-Woltering, P.J., 1983: Uitgeest, gem. Uitgeest. Nederzettingssporen Romeinse tijd, Vroege en Late Middeleeuwen, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1981, Amersfoort, 26-29. -Woltering, P.J., 1984: Uitgeest, gem. Uitgeest. Nederzettingssporen Romeinse tijd, Vroege en Late Middeleeuwen, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1982, Amersfoort, 27-30. -Woltering, P.J., 1985: Uitgeest, gem. Uitgeest. Nederzettingssporen Romeinse tijd, Vroege en Late Middeleeuwen, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1983, Amersfoort, 27. -De Koning, J., 2000: *Noord-Holland in het eerste millenium. De periferie tussen Oude Rijnmond en Westergo?*, internal report Frisia project. -De Koning, J., 2016: *Terug naar Dorregeest… Uitgeest-Dorregeest, offerplaats, nederzetting en kerk. Bewoning en grafritueel vanaf de late ijzertijd tot de late mideleeuwen*, Zaandijk.

Site	176
Site type	other/unknown
Province	Noord Holland
Municipality	Hollands Kroon
Place	Barsingerhorn
Toponym	Waardpolder
Completeness	uncertain
Excavated area in ha	-
Soil type	peat
Start date	750
End date	900
Description	The findspot consist of a circa 0,5m thick ash-rich layer containing Carolingian pottery. The layer lay on top of a thin remainder of a peat layer which in turn lay on a sandy ridge.
Literature	-Woltering, P.J., 1985: Bargerhorn: Waardpolder, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1983, 129.

Site	177
Site type	other/unknown
Province	Noord Brabant
Municipality	Cuijk
Place	Cuijk
Toponym	Beversestraat/Hork
Completeness	part of site (not delimited)
Excavated area in ha	0.04
Soil type	sand
Start date	725
End date	900
Description	In a trench dug by the AWN numerous postholes and pits were discovered containing Carolingian and high medieval pottery.
Literature	Verwers, W.J.H., 1985: Cuijk, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1983, 149.

Site	178
Site type	other/unknown
Province	Noord Brabant
Municipality	Someren
Place	Someren
Toponym	Someren
Completeness	uncertain
Excavated area in ha	0.25
Soil type	sand
Start date	750
End date	900
Description	During digging activities in Someren in 1976/77 an amateur archaeologist discovered two wells of which one contained Carolingian pottery. In the surrounding area he found more Carolingian pottery but also later material. The other well could therefore be younger. One fibula dated between the ninth and 1th centuries.
Literature	Verwers, W.J.H., 1986: Someren, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1984, 165.

Site	179
Site type	other/unknown
Province	Noord Brabant
Municipality	Woensdrecht
Place	Hoogerheide
Toponym	Hoogerheide
Completeness	off-site/isolated feature
Excavated area in ha	-
Soil type	sand
Start date	750
End date	900
Description	A small trench (measurements not known) was excavated in Hoogerheide. A number of postholes and pits was discovered and a 10-30cm thick Merovingian/Carolingian habitation layer which lay between plaggen soil and the natural cover sand. According to Archis there is a report on the excavation in the RCE archive but this may concern De Jong's report. However, the report does not contain any further information on the features.
Literature	-De Jong, Th., 1989: *Vroeg-Karolingisch maaltijdafval uit Woensdrecht*, unpublished report. -Verwers, W.J.H., 1990: Woensdrecht, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1989, 178.

Site	180
Site type	settlement
Province	Noord Brabant
Municipality	Tilburg
Place	Berkel-Enschot
Toponym	Berkelse Akkers
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	sand
Start date	750
End date	900
Description	The Carolingian features received limited attention, the main focus of the excavation was an iron age burial ground. Part of one building of which it is not clear if it was a main or secondary building, and two wells of the Carolingian period were discovered.
Literature	-Verwers, W.J.H., 1994: Berkel Enschot, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1993, 190. -Kleij, P., 1993: *Voorlopig verslag eerste fase opgraving Berkel-Enschot*, ITHO Archeologische reeks 4, Tilburg.

Site	181
Site type	settlement
Province	Noord Brabant
Municipality	Oisterwijk
Place	Oisterwijk
Toponym	Poirterstraat
Completeness	part of site (not delimited)
Excavated area in ha	0.15
Soil type	sand
Start date	850
End date	950
Description	Only a very small part of what was probably a larger settlement was excavated. The finds indicate that the site was inhabited from the late ninth until the late eleventh century. Perhaps part of a Carolingian period building was found but it is difficult to say because of disturbance by later features and the small size of the excavation.
Literature	-Keijers, D.M.G., 2012: *800 jaar Oisterwijk, 1300 jaar Oost-Tilburg? Gemeente Oisterwijk. Archeologisch onderzoek: een opgraving aan het klooster Catharinenberg te Oisterwijk*, RAAP-rapport 2518, Weesp.

Site	182
Site type	settlement
Province	Zuid Holland
Municipality	Wassenaar
Place	Wassenaar
Toponym	Plein 2/Regthuys
Completeness	part of site (not delimited)
Excavated area in ha	0.05
Soil type	sand
Start date	725
End date	900
Description	This site is comprised of two separate excavations, one conducted in 1985 and the other in 2008. The two lay circa 70 meters apart. The investigation in 1985 was small scale and only a layer containing late-Merovingian and Carolingian pottery was discovered. The investigation in 2008 yielded Carolingian settlement traces. They were discovered in the top layer of the beach ridge, just under the late medieval cultivation layer. One pit is associated with artisanal activity by the excavators. It may have been a sunken hut. Continuity into the tenth century is not entirely clear but may have been the case based on a handful of features dated to the tenth-twelfth century.
Literature	-Hallewas, D.P., 1986: Wassenaar: Plein 2, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1985, 149. -Depuydt, S./P.T.A. de Rijk/A. Timmers, in prep.: *Archeologisch onderzoek Plein 17-18 ('t Regthuys) te Wassenaar (gemeente Wassenaar)*, Archeomedia/Arnicon rapport A10–010–R, Capelle aan den IJssel.

Site	183
Site type	other/unknown
Province	Zuid Holland
Municipality	Zoeterwoude
Place	Zoeterwoude
Toponym	Zwieten
Completeness	off-site/isolated feature
Excavated area in ha	
Soil type	clay
Start date	750
End date	900
Description	In a fill-layer of a natural waterway a certain amount of Carolingian pottery was discovered. Remains of a campshot were discovered in the gulley which the excavators dated in the Roman period. However, it could also be Carolingian. A settlement may have been situated nearby.
Literature	-Sarfatij, H., 1973: Zoeterwoude, in *Bulletin Koninklijke Nederlandse Oudheidkundige Bond* 72, *29-*31.

Site	184
Site type	settlement
Province	Limburg
Municipality	Venray
Place	Venray
Toponym	Wilhelminaplein
Completeness	part of site (not delimited)
Excavated area in ha	0.25
Soil type	sand
Start date	700
End date	900
Description	Although a significant amount of pottery and some post-holes from the Carolingian period were discovered no buildings could be reconstructed because of the large number of later features. The find of a glass bead points towards a late-Merovingian start date according to the excavators. No other obviously Merovingian material was found. Habitation dating to the 11/twelfth century was also found but it is not certain that there was continuity of habitation from the early middle ages.
Literature	-Stoepker, H., 1994: Venray Wilhelminaplein, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1993, 86-87.

Site	185
Site type	other/unknown
Province	Utrecht
Municipality	Utrecht
Place	Vleuten
Toponym	Huis te Vleuten/Utrechtseweg
Completeness	off-site/isolated feature
Excavated area in ha	0.6
Soil type	clay
Start date	750
End date	900
Description	Two features were discovered that were dated to the Carolingian period based on the pottery finds.
Literature	-Dijkstra, J./P.C. de Boer, 2005: *Huis te Vleuten opgegraven Archeologisch onderzoek in het kader van het project Spoorverbreding VleuGel/Randstadspoor*, ADC-rapport 403, Amersfoort.

Site	186
Site type	settlement
Province	Utrecht
Municipality	Wijk bij Duurstede
Place	Wijk bij Duurstede
Toponym	Steenstraat/Zandweg
Completeness	part of site (not delimited)
Excavated area in ha	0.08
Soil type	sand
Start date	675
End date	950
Description	A number of pits and three to five wells dating to the Carolingian period were discovered. The Carolingian wheel turned pottery from the excavation mainly belongs to the early Dorestad types. No fragments of WI and WII were found. The pottery shows a gap between the early eighth and late ninth centuries.
Literature	-Van der Heijden, F.J.G., 2000: *Archeologisch onderzoek in Wijk bij Duurstede locatie Singel/Zandweg*, ADC-rapport 32, Amersfoort.

Site	187
Site type	settlement
Province	Utrecht
Municipality	Wijk bij Duurstede
Place	Wijk bij Duurstede
Toponym	Veilingterrein/Zandweg
Completeness	part of site (not delimited)
Excavated area in ha	1.85
Soil type	clay
Start date	650
End date	900
Description	Due to their proximity these two sites have been treated as one. The archaeological remains belong to the same settlement as site 528. However, due to the considerable difference in research and publication practises they have been assigned separate site numbers. At the excavation Zandweg/Frankenweg it was only possible to reconstruct one building. At the Veilingterrein excavation the Carolingian period has been split up in to three subperiods, a) late M/ early C (650-775); b) C (775-850); c) late C (850-900). Per phase there were: a) two buildings, ditches, 12 wells, inhumations, pits, b/c) eight buildings, 112 wells, pits, latrines, oven-pits, ditches. Indications for continuity after the Carolingian period are few.
Literature	-Sier, M.M./J. van Doesburg/W.J.H. Verwers (eds.), 2004: *Wijk bij Duurstede-Frankenweg/Zandweg,* ADC-rapport 282, Amersfoort. -Dijkstra, J. (ed.), 2012: *Het domein van de boer en de ambachtsman. Een opgraving op het terrein van de voormalige fruitveiling te Wijk bij Duurstede: een deel van Dorestad en de villa Wijk archeologisch onderzocht*, ADC-monografie 12, Amersfoort.

Site	188
Site type	other/unknown
Province	Utrecht
Municipality	Wijk bij Duurstede
Place	Wijk bij Duurstede
Toponym	Steenstraat 14
Completeness	off-site/isolated feature
Excavated area in ha	0.09
Soil type	clay
Start date	700
End date	900
Description	The excavation consisted of an archaeological supervision and a small excavation. Only three Carolingian features were discovered and a reasonable amount of pottery.
Literature	-Bouma, N., 2012: *Laatmiddeleeuwse sporen aan de Steenstraat 14 te Wijk bij Duurstede. Een archeologische opgraving en een archeologische begeleiding*, ADC-rapport 3200, Amersfoort.

Site	189
Site type	settlement
Province	Utrecht
Municipality	Wijk bij Duurstede
Place	Wijk bij Duurstede
Toponym	David van Bourgondiëweg
Completeness	part of site (not delimited)
Excavated area in ha	0.13
Soil type	clay
Start date	675
End date	900
Description	A relatively small excavation just to the north of the town centre of Wijk bij Duurstede. The features dating to the Carolingian period have been interpreted as belonging to yards.
Literature	-Dijkstra, M.F.P., 2004: *Gulle gaven, greppels en waterputten. De opgraving Wijk bij Duurstede - David van Bourgondiëweg*, AAC-rapport 26, Amsterdam.

Site	190
Site type	mixed
Province	Utrecht
Municipality	Wijk bij Duurstede
Place	Wijk bij Duurstede
Toponym	De Geer II
Completeness	uncertain
Excavated area in ha	1.18
Soil type	clay
Start date	700
End date	900
Description	Besides an early medieval cemetery the site mainly yielded remains of pits and ditches. It appears to represent part of the periphery of Dorestad.
Literature	-Williams, G.I., 2010: *Wijk bij Duurstede, De Geer II. Een Inventariserend Veldonderzoek door middel van proefsleuven*, ADC-rapport 2004, Amersfoort. -Williams, G.I. (ed.), 2013: *Een nieuw stukje Dorestad. Een archeologische opgraving op De Geer II in Wijk bij Duurstede,* ADC-rapport 3467, Amersfoort.

Site	191
Site type	settlement
Province	Zeeland
Municipality	Veere
Place	Domburg
Toponym	Ringwalburg/ Motel 't Groentje
Completeness	part of site (delimited)
Excavated area in ha	0.2
Soil type	sand
Start date	800
End date	925
Description	A number of small scale excavations were carried out around the edge of the ringfort before a relatively large scale excavation was carried out in the supposed centre of the ringfort in 2010 (Motel 't Groentje). The small scale excavations yielded information about the build-up of layers on the site and provided some idea of the construction of the embankment and moat. During the 1993 excavation a burial was discovered that was placed in the embankment during its construction. An excavation by ADC in 2001 yielded the first remains of buildings. The building was interpreted to have lain beneath the embankment. However, the author of the report on 't Groentje does not agree and interprets the layers attributed to the embankment by ADC to be habitation layers within the building. Another burial was also discovered. During the excavation 't Groentje five buildings were found, four dating to the late ninth century, one to the end of the ninth or beginning of the tenth century. Under the level where the buildings were found another anthropogenic layer of circa 1,7 meters thick was discovered. This was only seen in sections, but in some traces of habitation were recognised. This implies that the habitation on the site must be older than the level with buildings from the late ninth century.
Literature	-Ufkes, A., 2011: *Een archeologische opgraving in de vroegmiddeleeuwse ringwalburg van Domburg, gem. Veere (Z.)*, ARC-rapport 2010-223, Groningen. -Van Heeringen, R.M., 1987a: Domburg-Badhotel, *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1986, 8–10. -Van Heeringen, R.M., 1987b: Domburg-Badhotel, *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1986, 85-86. -Van Heeringen, R.M./P.A. Henderikx/A. Mars (eds.), 1995: *Vroeg-Middeleeuwse ringwalburgen in Zeeland*, Goes/Amersfoort. -Van Heeringen, R.M., 1992: Bewoning en landschapsontwikkeling van Zeeland van 850–1200 na Chr, *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1991, 57-59. -Van Heeringen, R.M., 1993: Bewoning en landschapsontwikkeling van Zeeland van 850 tot 1200 na Chr, *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1992, 56-57. -Van Heeringen, R.M., 1994: Bewoning en landschapsontwikkeling van Zeeland van 850–1200 na Chr., *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1993, 56-59. -Van Rooijen, C.A.M./J. van Doesburg/G.H. Scheepstra (eds.), 2006: Archeologisch onderzoek (2001) naar de resten van de vroeg-middeleeuwse ringwalburg te Domburg (gem. Veere), Rapportage Archeologische Monumentenzorg 115, Amersfoort.

Site	192
Site type	settlement
Province	Noord Holland
Municipality	Alkmaar
Place	Oudorp
Toponym	Junostraat
Completeness	off-site/isolated feature
Excavated area in ha	-
Soil type	sand
Start date	700
End date	1200
Description	Small excavation of which there is only a very short report in the archaeological chronical of North-Holland. Two wells and a ditch were discovered and some evidence for iron-working. However these features are not dated exactly in the find report.
Literature	-Bitter, P., 1995: Alkmaar, in *Holland, regionaal historisch tijdschrift* 27, 340.

Site	193
Site type	settlement
Province	Noord Holland
Municipality	Alkmaar
Place	Alkmaar
Toponym	Ropjeskuil
Completeness	uncertain
Excavated area in ha	1.2
Soil type	sand
Start date	700
End date	900
Description	A relatively large area was excavated but the report consist of a short note in the provincial archaeological chronical. At least two wells were discovered and an unknown number of other features.
Literature	-Bitter, P., 1993: Alkmaar, in *Holland, regionaal historisch tijdschrift* 25, 306.

Site	194
Site type	settlement
Province	Noord Holland
Municipality	Medemblik
Place	Medemblik
Toponym	Droge Wijmers
Completeness	part of site (not delimited)
Excavated area in ha	0.2
Soil type	clay
Start date	700
End date	900
Description	On a small ridge consisting of marine clay, but also on adjacent peat deposits, traces of Carolingian occupation were discovered. The Carolingian habitation layer seemed to have been almost completely preserved within the excavated area. Two areas of use were identified by the find of two hearths, one on the ridge and one on the peat. No traces of buildings were found, but fragments of beams found in some pits may point to cabin-like constructions.
Literature	-Woltering, P.J., 1978: Medemblik: Droge Wijmers, in *Holland, regionaal-historisch tijdschrift* 10, 267-268.

Site	195
Site type	settlement
Province	Zuid Holland
Municipality	Vlaardingen
Place	Vlaardingen
Toponym	Fonotheek
Completeness	part of site (not delimited)
Excavated area in ha	0.01
Soil type	clay
Start date	675
End date	1000
Description	A small excavation was carried out in the centre of Vlaardingen in 1990 by members of the AWN. Pottery and a pit dating to the late seventh and eighth century were found at the top of a natural levee which lay ca. 4,5 meters below current street level. On top of this lay several elevation layers from various periods. The early medieval layers were about 70cm thick. The oldest timber building phase is dated to the ninth or tenth century.
Literature	-Ter Brugge, J.P., 1991: Vlaardingen: Fonotheek, in *Holland, regionaal-historisch tijdschrift* 23, 364-365. -Ter Brugge, J.P./J.M. Moree, 1990: Opgraving locatie Fonotheek te Vlaardingen, in *Terra Nigra* 113, 13-19. -Ter Brugge, J.P., 1990: Opgraving locatie Fonotheek te Vlaardingen II, in *Terra Nigra* 114, 6-10.

Site	196
Site type	settlement
Province	Noord Holland
Municipality	Harenkarspel
Place	Warmenhuizen
Toponym	Wulpendorp
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	peat
Start date	700
End date	900
Description	During the construction of a parking lot members of the AWN recorded a number of features dating to the Carolingian and late medieval period. The Carolingian finds and features seem to indicate that habitation occurred directly on the peat at this time and that the terp (Wulpendorp) was erected later.
Literature	Woltering, P.J./J.-K.A. Jagers, 1993: Warmenhuizen, in *Holland, regionaal-historisch tijdschrift* 25, 324.

Site	197
Site type	settlement
Province	Zuid Holland
Municipality	Katwijk
Place	Katwijk
Toponym	Zanderij Westerbaan
Completeness	part of site (not delimited)
Excavated area in ha	4.4
Soil type	sand
Start date	700
End date	775
Description	(Based on Dijkstra 2011) The first archaeological finds in this area were recorded in 1858 and included a number of wells. During an excavation by the ROB in 1996 and 1997 settlement traces of the Roman and early medieval period were discovered in the same area. This excavation was carried out due to planned building activities. These were inspected by local members of the AWN, which led to a small scale excavation in 2003. In 2005 ADC carried out another excavation yielding more early medieval features. Habitation probably started in the late fifth century, with a peak in the second half of the sixth century. A limited number of traces have been discovered dating to the Carolingian period. These consist of an isolated building, a partial yard and a dendrochronologically dated post (date 761 +/-10). Pottery and coin finds indicate continuous habitation up till the end of the eighth century. Because the settlement seems to have occupied a much larger area because of it being moved several times, it is possible that a larger Carolingian settlement was situated outside the excavated areas. These can be separated in to a northern, central and southern part. One boat-shaped building in the south-eastern corner of the northern part may date to the 8-ninth century. In the central part a yard with a main building and a well dated to 750 +/-8 was discovered. The southern part, contained few recognisable structures from any period. One sunken-hut was dated to the early eighth century but could also be earlier. In the central and southern part minimal signs of bone-working were found, in the southern part there were also indications for minting or working of precious metals in the late-seventh century. Between 2008 and 2010 further excavations were undertaken at Katwijk Zanderij-Westerbaan bij the ADC. The 2008 excavation was directly adjacent the central part of the earlier excavations. This resulted in more traces dating to the eighth century, evidence for land-use and the possibility to date the onset of the younger dunes in Katwijk to the 9-eleventh century. A further four main buildings and one possible main or secondary building were discovered. Remains of a system of plot-divisions and a path running alongside the settlement were also discovered. Eight haystacks have been assigned to the early Carolingian period but it is not clear what the dating of these buildings has been based on. The coin finds consisted of 12 sceattas and 1 denarius of Pippin I.
Literature	-Jansen, L.J.F., 1859: Ontdekking van Romeinsche en Frankische oudheden te Katwijk, in *Oudheidkundige Verhandelingen en Mededelingen van het RMO* III, 47-64. -Van der Velde, H.M. (ed.), 2008: *Cananefaten en Friezen aan de monding van de Rijn. Tien jaar Archeologisch onderzoek op de Zanderij-Westerbaan te Katwijk (1996-2006)*, ADC Monografie 5, Amersfoort. -Dijkstra, M.F.P., 2011: *Rondom de monding van Rijn & Maas*, Amsterdam. -Van der Velde, H.M. (ed.), 2011: *Centrale erven langs de monding van de Oude Rijn gedurende de Vroege Middeleeuwen. Archeologisch onderzoek op en rond de Zanderij-Westerbaan in Katwijk. De projecten Duinvallei fase 8 en 9 en Colligny*, ADC-monografie 12, Amersfoort.

Site	198
Site type	other/unknown
Province	Zuid Holland
Municipality	Rijnwoude
Place	Koudekerk aan den Rijn
Toponym	Lagewaard
Completeness	off-site/isolated feature
Excavated area in ha	1.7
Soil type	clay
Start date	720
End date	850
Description	The excavation yielded a settlement of the Merovingian period, but there are also strong indications for Carolingian habitation in the direct vicinity. This is mainly based on the number of finds from the Carolingian period found in a filled up channel. The settlement had ceased to exist by about 800-850 AD.
Literature	-Dijkstra, M.F.P., 2011: *Rondom de monding van Rijn en Maas*, Amsterdam. -Dijkstra, M.F.P./P.F.A. van Grinsven, 2006: *Een nederzetting achter het torentje. De lokale bewoningsgeschiedenis van Koudekerk aan den Rijn tot het jaar 1000*, Koudekerk aan den Rijn. -Dijkstra, M.F.P./P.F.A. van Grinsven, 2007: *De vroeg-middeleeuwse nederzetting te Koudekerk aan den Rijn. Een bijna vergeten opgraving in de Lagewaardse polder*, Renus Reeks 1, Leiden.

Site	199
Site type	settlement
Province	Utrecht
Municipality	Bunnik
Place	Bunnik
Toponym	De Brakel
Completeness	part of site (not delimited)
Excavated area in ha	0.1
Soil type	-
Start date	700
End date	900
Description	This findspot was investigated prior to the creation of a golf course. A survey, coring campaign and three trial trenches were carried out which yielded traces of early medieval habitation in the form of postholes belonging to buildings, pits and a well. The features were eroded in the southern part of the terrain due to a, possibly later-medieval, breakthrough of the Kromme Rijn related to flooding.
Literature	-Visscher, H.C.H., 1994: *Tweede verslag archeologisch onderzoek De Brakel*, RAAP-briefrapport, Weesp. -Visscher, H.C.H., 1993: *Eerste verslag archeologisch onderzoek De Brakel*, RAAP-briefrapport, Weesp. -Van Dockum, S.G., 1998: Bunnik: De Brakel, in *Archeologische kroniek van Utrecht 1994-1995*, Utrecht. -Van Dockum, S.G., 1997: Bunnik: De Brakel, in *Archeologische kroniek provincie Utrecht 1992-1993*, Utrecht.

Site	200
Site type	other/unknown
Province	Utrecht
Municipality	Woerden
Place	Harmelen
Toponym	Appellaan/De Tiendhof
Completeness	uncertain
Excavated area in ha	-
Soil type	-
Start date	-
End date	-
Description	During an inspection of the digging of a pond and sand-winning, traces of habitation from the seventh-twelfth century were found. The finds indicate a peak in the second half of the ninth century. In terms of features, remains of a campshot and a channel were discovered containing early medieval refuse. Nearby, observations were done during the laying of sewer pipes. A number of unspecified features were seen, also dating between the seventh and twelfth century.
Literature	-Van Dockum, S.G./D.H. Kok/F. Vogelzang (eds.), 1997: Harmelen, Appellaan, *in Archeologische kroniek provincie Utrecht 1990-1991*, 42. -Van Tent, W.J., 1988: Harmelen, in *Archeologische kroniek provincie Utrecht 1980-1984*, 53-54.

Site	201
Site type	other/unknown
Province	Utrecht
Municipality	Wijk bij Duurstede
Place	Wijk bij Duurstede
Toponym	De Geer
Completeness	part of site (delimited)
Excavated area in ha	3
Soil type	clay
Start date	725
End date	900
Description	During the excavation campaigns in the north-western part of Wijk bij Duurstede, known as 'De Geer' the most notable Carolingian feature was a ditch system which is interpreted as a rectangular enclosure. There seems to have been an entrance in the northern boundary and within the enclosure no traces of buildings were discovered. A number of pits and wells from the Carolingian period were discovered, how many is not specified in the ROB reports. The enclosure has been interpreted as a fortified refuge (vluchtburcht), but this is not certain. The interpretation may be influenced by the presence of a moated site from the late-medieval period which lay in the same excavated area. Traces of habitation from the Merovingian period (as well as bronze- and iron-age) were also found. In a 2010 article the site of De Geer is discussed by Van Es and Verwers. They postulate that the location of buildings dating to the early middle ages can be ascertained from the position of pits which would (according to them) have lain just outside the buildings along the gable-ends. They estimate that there were 10 to 20 buildings based on the clustering of pits. The exact date of the habitation is not mentioned. However, the enclosure is dated to the end of the Dorestad period or possibly later. The only clear building plan from the early middle ages on the site is linked to the enclosure and also dated in the later Carolingian period. The enclosure was interpreted as a demesne centre by Van Es and Verwers.
Literature	See Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek 1989-1994, Project Centraal Rivierengebied for excavation reports. -Van Es, W.A./W.J.H. Verwers, 2010: early Medieval settlements along the Rhine: precursors and contemporaries of Dorestad, in *Journal of Archaeology in the Low Countries* 2-1, 5-39. -Van Es, W.A., 1994: Wijk bij Duurstede - De Geer, in W.A. van Es/W.A.M. Hessing (eds.), *Romeinen, Friezen en Franken in het hart van Nederland: van Traiectum naar Dorestad (50 v. Chr.- 950 n. Chr.*, Utrecht, 231-233.

Site	202
Site type	settlement
Province	Noord Brabant
Municipality	Gemert-Bakel
Place	Milheeze
Toponym	Milheeze Zuidrand
Completeness	part of site (not delimited)
Excavated area in ha	0.44
Soil type	sand
Start date	700
End date	925
Description	Many of the excavated buildings could only be partially excavated which makes identification difficult. It also seems as if the settlement moved from west to east through time, and it is the western and southern part of the settlement that lay outside the boundaries of the excavation. Building 7 has been added to the count because typologically it may date to the late ninth or tenth century. However, the pottery associated with it seems to point to a tenth century date at the earliest. Building 8 has also been added because it has been dated between 700 and 750. Main-buildings that clearly date to the Carolingian period based on typology were not discovered. Of the 3 wells found during the excavation 2 may date to the Carolingian period, one perhaps at the beginning and one at the end of the period. Traces of a road were discovered but it is not clear whether this was present in the Carolingian period.
Literature	-De Jong, Th., 2008: *Archeologisch onderzoek Gemert-Bakel, Milheeze-Zuidrand. Omheinde nederzetting aan een splitsing van wegen. Rapportage van de opgraving*, Archeologisch Centrum Eindhoven rapport 27, Eindhoven.

Site	203
Site type	settlement
Province	Noord Brabant
Municipality	Oirschot
Place	Oirschot
Toponym	Gasthuisstraat
Completeness	part of site (not delimited)
Excavated area in ha	0.18
Soil type	sand
Start date	700
End date	925
Description	Three wells were discovered off which one could not be excavated because it mostly lay outside the boundaries of the excavation. The other two wells were dated through dendrochronology to the Carolingian period. One main building probably dates to the early tenth century based on typology. Another building is dated before the tenth century because it is intercut by ditches from that time. However, only a small part of this building could be excavated.
Literature	-Kooi, M., 2012: *Oirschot (NB), Gasthuisstraat. Definitief Archeologisch Onderzoek*, BAAC-BILAN rapport 2012/B1665, 's-Hertogenbosch.

Site	204
Site type	settlement
Province	Noord Brabant
Municipality	Breda
Place	Breda
Toponym	Huifakker/Heilaar-Noord
Completeness	part of site (not delimited)
Excavated area in ha	6.8
Soil type	sand
Start date	650
End date	890
Description	No finds from the early middle ages were found during the Heilaar-Noord excavation, but three house plans were dated to the Merovingian or Carolingian period based on typology. Post-holes from each building were carbon dated which resulted in quite broad dates between circa 650 and 770. These buildings may therefore simply be Merovingian and not Carolingian at all. During a trial trench campaign just to the south of the excavation discussed above, a small part of a building was discovered that may date to the Carolingian period. A well may also date to this period, but it was not excavated further. It does not seem that find material was discovered here either. A complete excavation was never carried out nor was the area developed. Further excavations (Westrik and Bierensweg) to the east ahead of the construction of a high speed railway (HSL) uncovered several buildings (main- and outbuildings) and wells which were carbon-dated roughly between 650 and 890 AD. Two wells were dendrochronologically dated between 706-718 and 832-840 respectively. Together the excavated features present a picture of habitation which was thinly spread over a relatively wide area, certainly when sites 113 and 114 are also added. The dating of the structures is also quite wide between the second half of the seventh century and the late ninth century.
Literature	-Ter Wal, A., 2010: *Breda. Heilaar-Noord. Opgraving*, BAAC-rapport A-06.0127, 's-Hertogenbosch. -Van der Weerden, J.F., 2007: *Breda, Greenery*, BAAC-rapport A-06.0377, 's-Hertogenbosch. -Kranendonk, P./P. van der Kroft/J.J. Lanzing/B.H.F.M. Meijlink (eds.), 2006: *Witte vlekken ingekleurd: archeologie in het tracé van de HSL-Zuid*, Rapportage Archeologische Monumentenzorg 113, Amersfoort.

Site	205
Site type	other/unknown
Province	Noord Brabant
Municipality	Geldrop-Mierlo
Place	Mierlo
Toponym	Huize Bethanië
Completeness	off-site/isolated feature
Excavated area in ha	1.4
Soil type	sand
Start date	750
End date	751
Description	One well was discovered of which the hollowed out tree trunk gave a dendrochronological date of 750-751 AD. The fill of the well contained one sherd, a rim of (Maaslands) pottery. The excavation yielded one other early medieval feature, a Merovingian burial.
Literature	-Mostert, M., 2011: *Geldrop-Mierlo (NBR). Huize Bethanië. Archeologische begeleiding conform Opgraven*, BAAC-BILAN rapport 2011/B1425, 's-Hertogenbosch.

Site	206
Site type	other/unknown
Province	Noord Brabant
Municipality	Waalre
Place	Aalst
Toponym	Brabantialaan/Wilhelminalaan
Completeness	off-site/isolated feature
Excavated area in ha	0.125
Soil type	sand
Start date	664
End date	878
Description	A number of clusters of timber camshots and a possible bridgehead were discovered during an archaeological supervision of the digging of a new meander for a brook. A few of these could be dated to the Carolingian period through dendrochronological dating. The six clusters may have belonged to one larger structure. The oldest carbon date lay between 344 and 541, the oldest dendrochronological date was 562 AD. The youngest carbon date fell between 1040 and 1264. Most dates lay in the seventh and eighth century. A few of the planks which formed the surface of the bridge were found in situ. The excavation also revealed that the Tongelreep had a fairly strong current during the early middle ages.
Literature	-Sprengers, N.H.A., 2011: *Herinrichting van de Tongelreep te Aalst, gemeente Waalre; een archeologische begeleiding*, RAAP-rapport 2253, Weesp.

Site	207
Site type	other/unknown
Province	Noord Brabant
Municipality	Zundert
Place	Zundert
Toponym	Klein Zundert
Completeness	off-site/isolated feature
Excavated area in ha	0.01
Soil type	peat
Start date	686
End date	989
Description	During an archaeological supervision of the digging of a new watercourse for a brook, remains of a possibly early medieval timber pathway were discovered. Unfortunately the find was done in an area that had already been excluded from further investigation during a desk study. Therefore the remains had been disturbed quite heavily before archaeological investigation could take place. An oak plank and post were found on and in a peat layer. The post was carbon dated to between 686 and 989 AD. The location of the pathway can be related to an narrowing of the brook-valley at the point where the remains were found. These bottlenecks are seen as ideal locations to cross brook-valleys.
Literature	-Sprengers, N.H.A., 2012: *Kleine Beek te Zundert, gemeente Zundert Archeologische begeleiding van de graafwerkzaamheden*, RAAP rapport 2477, Weesp.

Site	208
Site type	other/unknown
Province	Noord Brabant
Municipality	Eersel
Place	Vessem
Toponym	Vessem
Completeness	off-site/isolated feature
Excavated area in ha	0.013
Soil type	sand
Start date	595
End date	967
Description	During an archaeological supervision of the digging of a new watercourse for a brook a campshot was found. Five post and planks were carbon-dated to between 596 and 967 AD. It is suggested that the campshot may be related to a mill because of the nature of the sediments found along it. They indicate a localised fast current at this point in the brook which may be related to intentional adaptations to the stream made by a miller. The find of a fragment of tephrite is seen as another indication for the possible presence of a mill.
Literature	-Roymans, J.A.M./N. Sprengers, 2012: *Tien bronzen bijlen bij een Romeinse dam, herinrichting beekdal Kleine Beerze, deeltraject Hoogeloon-Vessem, gemeenten Bladel en Eersel; resultaten archeologische begeleiding en opgraving*, RAAP rapport 2537, Weesp.

Site	209
Site type	other/unknown
Province	Zeeland
Municipality	Goes
Place	Goes
Toponym	De Poel II, vindplaats 3
Completeness	off-site/isolated feature
Excavated area in ha	0.53
Soil type	peat
Start date	800
End date	903
Description	During an archaeological supervision of the digging of water features several posts were discovered in a peat layer. Two of these were dendrochronologically dated which provided dates of 820 +-20 and 900 +-3. Five posts were found more or less in a row. Because the finds were observed by amateur archaeologists and not recorded very exactly, the find context is not clear.
Literature	-Wattenberghe, J.E.M., 2010: *Bestemingsplan De Poel II, vindplaats 3, Goes, Gemeente Goes. Vindplaats 3-west: Inventariserend veldonderzoek door middel van proefsleuven. Vindplaats 3-Oost: Archeologische begeleiding onder protocol opgraven*, Heinenoord.

Site	210
Site type	fortification
Province	Noord Holland
Municipality	Texel
Place	Den Burg
Toponym	Groene Plaats/Raadhuis
Completeness	part of site (not delimited)
Excavated area in ha	0.2
Soil type	sand
Start date	650
End date	800
Description	The remains of a circular fort, dated by Woltering to the second half of the seventh and eighth century. Three moats/ditches were found, one circa 10-12 meters wide and two others which were less wide. The broadest lay between the other two, of which the ditch on the inner side seems to have been dug somewhat later. This ditch was dug through part of the first rampard. Four habitation layers were recognised within the area bounded by the rampart, together comprising circa 1 meter of deposits. Outside the outer moat a number of features were discovered that were also dated to the early middle ages. Most pottery by far was handmade. In 1979 a few small excavation trenches yielded early medieval features dating between 650 and 900. Among the features were several sod-walls and a well. The build-up of settlement layers seems comparable to that at terp excavations.
Literature	-Woltering, P.J., 2002: Vroeg-middeleeuws Den Burg op Texel. Een versterkte nederzetting uit de 7e-8e eeuw, in G.H. Scheepstra/W.J.H. Verwers/P.J. Woltering, *Middeleeuwse toestanden. Archeologie, geschiedenis en monumentenzorg*, Hilversum, 25-64.

Site	211
Site type	settlement
Province	Noord Brabant
Municipality	Gilze en Rijen
Place	Gilze
Toponym	Kerkstraat
Completeness	part of site (not delimited)
Excavated area in ha	0.05
Soil type	sand
Start date	750
End date	900
Description	Although postholes were discovered, no building plans could be reconstructed. high medieval features were also found, among which a well, but it is not clear whether there was continuity of habitation at the site.
Literature	-Vermeulen, A.M., 1996: *Gilze duizend jaar? Een verslag van het archeologisch onderzoek in de dorpskern van Gilze in de winter van 1994*, Zuidnederlandse Archeologische Rapporten 3, Amsterdam.

Site	212
Site type	settlement
Province	Noord Holland
Municipality	Bloemendaal
Place	Bloemendaal
Toponym	Groot Olmen
Completeness	part of site (not delimited)
Excavated area in ha	0.75
Soil type	sand
Start date	675
End date	850
Description	In the dunes near Bloemendaal early medieval material was found at several different locations. In 2006 and 2007 Hollandia excavated a settllement (location 1-3) dating between the fifth and seventh century. No house plans could be dated to the Carolingian period, but in at least two pools there were fill layers that contained late seventh and eighth century material. A survey combined with some small trial trenches carried out by the ROB prior to the Hollandia excavations showed that locations 4, 5, 8 and 14 were in use during the eighth and early ninth century. Hollandia excavated the locations 8 and 14 which yielded settlement traces from between the seventh and ninth century. Seven buildings were discovered, one well and remnants of fences. Site 8 represented a single building dated to the ninth century and where habitation layers were partially preserved. Site 14 contained the remains of six buildings dating between the seventh and ninth century.
Literature	-De Koning, J., 2015: *Onder het stuifzand. Overstoven vroegmiddeleeuwse nederzettingen bij Bloemendaal de opgravingscampagnes Groot Olmen 2005, 2006 en 2007*, Zaandijk. -Van Doesburg, J., 2008: *Natuurontwikkeling Provinciaal Waterleidingbedrijf Noord-Holland Waardestellend archeologisch onderzoek naar het voorkomen van vroegmiddeleeuwse bewoningssporen in het duingebied van Groot Olmen, Nationaal Park Zuid- Kennemerland, Provincie Noord-Holland*, Rapportage Archeologische Monumentenzorg 158, Amersfoort.

Site	213
Site type	settlement
Province	Noord Holland
Municipality	Castricum
Place	Castricum
Toponym	Willem de Rijkelaan
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	sand
Start date	700
End date	900
Description	No traces of buildings were found during this archaeological inspection by local volunteers but five wells, probably dating to the eighth or ninth century were discovered. The wells were dated based on the associated pottery (Badorf and early *Kugeltopf*).
Literature	-Mooij, E., 1992: De onderkant van Castricum, in S. de Jong (ed.), *Op zoek naar Castricum's verleden*, in Castricum, 10-33.

Site	214
Site type	other/unknown
Province	Noord Holland
Municipality	Hollands Kroon
Place	Kolhorn
Toponym	Volhouden
Completeness	off-site/isolated feature
Excavated area in ha	0.35
Soil type	peat
Start date	800
End date	1000
Description	This findspot consist of the remains of a peat layer which contained early medieval pottery, indicating that habitation was present in the vicinity. In later times most of the peat was removed for turf-winning, which may explain why no settlement traces were found.
Literature	-Van der Beek, H.S.M./M.M. Sier, 1996: *Aanvullend archeologisch onderzoek (AAO) op twee locaties binnen het plangebied 'Windturbinepark Waardpolder' (Noord-Holland)*, Rapportage Archeologische Monumentenzorg 3, Amersfoort.

Site	215
Site type	other/unknown
Province	Zuid Holland
Municipality	Alphen aan den Rijn
Place	Alphen aan den Rijn
Toponym	Kwekerij Lemkes
Completeness	off-site/isolated feature
Excavated area in ha	0.17
Soil type	clay
Start date	675
End date	900
Description	During an inspection of a building site by members of the AWN features containing mostly Roman material were found. One large circular feature, which was interpreted as a well contained Carolingian or perhaps late Merovingian material. At a later date, during the digging of a ditch, part of a campshot was found along a former channel. Layers associated with the campshot yielded Roman and Carolingian finds. Some samples of posts were taken for dendrochronological dating but this does not seem to have been conducted.
Literature	-?, 1988: Veldwerk Alphen aan den Rijn, in *Renus*, 7-8. -Hessing, W.A.M., 1991: Alphen aan den Rijn: Rijksweg 11, in *Holland, regionaal historisch tijdschrift* 23, 343.

Site	216
Site type	settlement
Province	Utrecht
Municipality	Utrecht
Place	Vleuten
Toponym	Haarzicht
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	clay
Start date	700
End date	800
Description	Trial trenches yielded features and finds from both the Merovingian and Carolingian period. The final excavation took place after both the inventories of sites and finds had been completed and has not yet been published. Therefore only the results of the trial trenches have been included in this study. The exact nature of the features is not clear due to the limited width of the trial trenches, but it seems likely that remains of buildings, a campshot along a channel and possibly sunken huts and wells were found. The dating of structures is not always clear because no distinction is made between Merovingian and Carolingian features. A crevasse containing mainly early medieval findlayers was also discovered. Several slags with remains of oven-lining were found indicating metal-working within the settlement.
Literature	-Hoegen, R.D.,/B. Jansen, 2008: *Plangebied Haarzicht te Vleuten, gemeente Utrecht; archeologisch vooronderzoek: een inventariserend veldonderzoek (proefsleuven)*, RAAP-rapport 1696, Weesp.

Site	217
Site type	other/unknown
Province	Noord Holland
Municipality	Schagen
Place	Schagen
Toponym	Polder Burghorn
Completeness	off-site/isolated feature
Excavated area in ha	0.08
Soil type	clay
Start date	700
End date	800
Description	Two ditches were dated to the eighth century based on pottery finds. Pottery dating to the Carolingian period was also found in younger features and as surface finds. Why the early medieval pottery is dated exclusively in the eighth century is not entirely clear. An interesting aspect is that the site was covered by a peat layer up until the eighth century, which subsequently oxidized, after which the area seems to have become inhabited.
Literature	Geerts, R.C.A., 2012: *Weggevaagd door het wassende water: Wonen in de Polder Burghorn te Schagen. Een Inventariserend Veldonderzoek in de vorm van proefsleuven*, ADC-rapport 2945, Amersfoort.

Site	218
Site type	other/unknown
Province	Zeeland
Municipality	Sluis
Place	Oostburg
Toponym	Terp Commerswal
Completeness	off-site/isolated feature
Excavated area in ha	
Soil type	clay
Start date	700
End date	1000
Description	Two trial trenches were dug near a terp known as Commerswal, slightly to the west of Oostburg. A layer was found containing medieval handmade pottery and animal bone. One bone was carbon dated to 1185 +- 15 BP. The terp itself was not located, it may have been constructed in the tenth centrury or later (like other vliedbergen). It appears that the site was used in some way in the early middle ages, perhaps as a location to accommodate sheep in case of high water.
Literature	Van Heeringen, R.M., 1995: Oostburg 2, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1994, 114.

Site	219
Site type	settlement
Province	Zuid Holland
Municipality	Westland
Place	Naaldwijk
Toponym	Naaldwijk Holland College/Hoogeland
Completeness	part of site (not delimited)
Excavated area in ha	1.6
Soil type	sand
Start date	675
End date	900
Description	The site has been excavated in the course of several campaigns conducted by ADC and Archol. During the excavation carried out by ADC two buildings possibly dating to the (early-) Carolingian period were discovered though one may be younger and the other is probably later. Otherwise mainly wells (11) dating to the Carolingian period were discovered. All wells were dated using the associated pottery and the dating is not always certain. The Archol excavation yielded one Carolingian building and three more wells. One other well may date to the Carolingian period but the finds and dendrochronological date allow a broad margin of dating. Other wells could not be dated more accurately than 'medieval'. Therefore the number of Carolingian wells may have been greater. There is some evidence for a Merovingian habitation phase in the form of wells. Some seem to date to the end of the seventh/beginning pf the eighth century. Continuity into the Ottonian period is not clear but may have been the case. Further excavations in 2011 uncovered six more Carolingian buildings and 10 wells. Otherwise the excavation did not change the interpretation of the settlement from that derived from previous campaigns.
Literature	-Van der Feijst, L./J. de Bruin/E. Blom (eds.), 2008: *De nederzetting te Naaldwijk II. Terug naar de sporen van Holwerda*, ADC rapport 1271, Amersfoort. -Goossens. T.A. (red). 2012: *Van akker tot Hooghwerf. Onderzoek naar de bewoning in de ijzertijd, inheems-Romeinse tijd, de middeleeuwen en de nieuwe tijd op de haakwal van Naaldwijk (plangebied Hoogeland, gemeente Westland)*, Archol-rapport 167, Leiden. -Van der Feijst, L.M.B. (ed.), 2015: *De nederzetting te Naaldwijk IV. De opgravingscampagne van 2011*, ADC rapport 3608, Amersfoort.

Site	220
Site type	other/unknown
Province	Noord Brabant
Municipality	Oss
Place	Deursen-Dennenburg
Toponym	Laagstraat
Completeness	off-site/isolated feature
Excavated area in ha	-
Soil type	sand
Start date	750
End date	900
Description	Observations carried out by amateur archaeologists in a sewer trench. A well made of a hollowed out oak was found containing Carolingian sherds.
Literature	-Van Alphen, G.H.J./R.R. Datema, 1985: Een Karolingische boomstamwaterput te Deursen, in *Jaarverslag 1985, Archeologische Werkgemeenschap voor Nederland, afdeling Nijmegen en omstreken* 18, Nijmegen, 29-30.

Site	221
Site type	settlement
Province	Zuid Holland
Municipality	Spijkenisse
Place	Spijkenisse
Toponym	Hartel-west
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	clay
Start date	880
End date	1000
Description	Excavation of a building which according to carbon dating of the remains of the wooden posts was constructed around 880 AD. A ditch running along the building and three hearths were also discovered. A unique find was that of a wooden bench. Remains of a 12/thirteenth century settlement were also found, continuity of habitation is not certain.
Literature	-Van Trierum, M., 2009: *De archeologie van Spijkenisse*, Boornieuws 11, Rotterdam. -Bult, E.J., 2009: *Spijkenisse Hartel-West. Het aardewerk van de middeleeuwse nederzetting op vindplaats 10-117*, BOORrapporten 479, Rotterdam.

Site	500
Site type	settlement
Province	Gelderland
Municipality	Nijmegen
Place	Lent
Toponym	Lentseveld
Completeness	part of site (delimited)
Excavated area in ha	4
Soil type	clay
Start date	875
End date	1050
Description	The site consists of the northeastern part of an enclosed settlement. This settlement was surrounded by a wide V-shaped ditch. Three single aisled buildings (barns?) were excavated. The habitation probably started in the late ninth century and continued in the tenth and possibly early eleventh century. In the eleventh century, the settlement seems to have been abandoned and for the next centuries used as agricultural land.
Literature	-Van den Broeke, P.W./J.A. den Braven/A.A.W.J. Daniël 2011: *Een ijzertijdgrafveld en een erf uit de Ottoonse tijd in het Lentseveld. Archeologisch onderzoek in Nijmegen-Lent*, Archeologische Berichten Nijmegen - Rapport 24, Nijmegen.

Site	501
Site type	settlement
Province	Gelderland
Municipality	Wijchen
Place	Wijchen
Toponym	Sportpark Woezik-Noord
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	sand
Start date	725
End date	1500
Description	During rescue excavations a medieval settlement was partly excavated. The oldest phase of this settlement dates from the (late Merovingian or) Carolingian period. At least eight sunken huts and one well date to this period. A possible houseplan belonging to a rectangular building (8 x 4m) seems to be contemporary with the sunken huts, although in the excavation report a tenth century date is suggested. The medieval settlement belongs to the former hamlet of Woezik, which is mentioned in 1196 in relation to royal domains in the Nijmegen area. Unfortunately, the medieval features were not properly excavated because of logistic and financial problems. In addition to this, the post-excavation analysis was only partly done. In a nearby trial trench at the Paschalishof south of the Woeziksestraat, only two possibly early medieval features were found: a ditch and a pit with one fragment of *Kugeltopf*-pottery. The early medieval pottery found on this location consists of seven fragments of Carolingian wheelturned pottery and probably also some fragments of handmade *Kugeltopf* -pottery.
Literature	-Heirbaut, E.N.A., 2011: *Sieraden op de brandstapel. Onderzoek naar een crematiegrafveld uit de midden-ijzertijd en middeleeuwse bewoning op het sportpark te Woezik-Noord, gemeente Wijchen*, Archeologische Berichten Wijchen - Rapport 12, Nijmegen. -Wildenberg, J., 2009: *Een Archeologisch proefsleuvenonderzoek op de Paschalishof te Wijchen*, Archeologische Berichten Nijmegen - Briefrapport 45, Nijmegen.

Site	502
Site type	settlement
Province	Gelderland
Municipality	Nijmegen
Place	Lent
Toponym	dorpskern
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	clay
Start date	650
End date	1150
Description	Over the past three decades, many early medieval remains have been brought to light during various excavations and archaeological observations in the village of Lent. Besides the Merovingian cemetries Lentseveld and Azaleastraat, numerous finds and features indicate early medieval habitation in the village. The settlement traces from the Carolingian period seem to be concentrated in the area of Shoolstraat - Steltsestraat - Hortensiastraat and Dorpsplein. Two wells probably date to the Carolingian period, as well as several waste pits, ditches and post holes. Because of the small scale of the research, a clear idea of the internal layout and indivdual phases of the Carolingian settlement is lacking.
Literature	-Van den Broeke, P.W., 2009: *Vindplaatsen in vogelvlucht. Beknopt overzicht van het archeologische onderzoek in de Waalsprong 1996-2001*, Archeologische Berichten Nijmegen - Rapport 1, Nijmegen. -Van den Broeke, P.W./J.A. den Braven 2009: *Archeologisch onderzoek op het Dorpsplein in Nijmegen-Lent. Nederzettingssporen uit de Romeinse tijd en de vroege tot volle middeleeuwen*, Archeologische Berichten Nijmegen - Rapport 12, Nijmegen. -Van Es, W.A./R.S. Hulst 1991: *Das merowingische Gräberfeld von Lent*, Nederlandse Oudheden 14/Projekt oostelijk rivierengebied 2, Amersfoort. -Harmsen, C./J. Hendriks/J.A. den Braven 2012: *Archeologisch onderzoek in de Lentse Schoolstraat in Nijmegen-Lent. Nederzettingssporen uit de vroege en volle middeleeuwen*, Archeologische Berichten Nijmegen - Rapport 33, Nijmegen. -Tuijn, W., 1984: Verslag van de werkgroep Vroege Middeleeuwen, in *Jaarverslag AWN afdeling Nijmegen e.o*. 17, 5-7.

Site	503
Site type	settlement
Province	Gelderland
Municipality	Overbetuwe
Place	Elst
Toponym	Reethse straat
Completeness	part of site (delimited)
Excavated area in ha	820
Soil type	clay
Start date	725
End date	900
Description	During the archaeological research a total of 427 features were found, including many post holes. Based on the stratigraphy and find material, this settlement area was inhabited in the Roman period and medieval period. Only a selection of the features was investigated as regards to depth, date, etc. Circa 286 features seem to date from the Middle Ages, based on related find material. Among these features there are at least one ditch, two post holes and a small oven which date to the Carolingian period. According to Franzen and Tol (2002, 13) this oven might have been used for pottery production. However, the large quantity of burned botanic material (mostly barley) from the fill of the oven indicate that the oven could also be used for baking bread. It is not clear whether the four partly excavated wells also date to the Carolingian period. A rectangular building in trench 3 dates from the Carolingian period or later. The post-excavation analysis and the rapport (RAM 42) focussed on the preservation of the features and finds. A new analysis of the excavation data will most probably give a better understanding of the site. Besides pottery (Badorf-, Mayen- and *Kugeltopf*-pottery), a piece of yellowgreen glass with horizontal ribs on the neck and shoulder seems to date to the Carolingian period.
Literature	-Franzen, P.F.J./A. Tol (red.), 2002: *Aanvullend Archeologisch Onderzoek in het tracé van de Betuweroute, vindplaats 51 Elst/Reethse Straat*, Rapportage Archeologische Monumentenzorg 42, Amersfoort.

Site	504
Site type	settlement
Province	Gelderland
Municipality	Ubbergen
Place	Leuth
Toponym	centrum
Completeness	part of site (delimited)
Excavated area in ha	0.28
Soil type	clay
Start date	750
End date	900
Description	All features found in the village of Leuth seem to date from the tenth century onwards. However, Carolingian finds show that the settlement probably started in the ninth century. The oldest elevation layer may date from the Carolingian period. In the (late) ninth or tenth century the settlement is divided in allotments which were bound by ditches. The settlement was only partly excavated: of most features no vertical sections were made, furthermore the depth of the trenches dependended on what was required for the development.
Literature	-Van Enckevort, H./M. Magnée-Nentjes 2009: *Vondsten rond de kerk. Archeologisch onderzoek in het centrum van Leuth*, Archeologische Berichten Ubbergen - Rapport 2, Nijmegen.

Site	505
Site type	settlement
Province	Gelderland
Municipality	Beuningen
Place	Beuningen (Gld.)
Toponym	Tinnegieter
Completeness	part of site (not delimited)
Excavated area in ha	1.26
Soil type	clay
Start date	725
End date	900
Description	"Oude woongrond" with settlement traces dating to the iron age, Roman Period, the Merovingian Period, the Carolingian Period and the high middle ages. In 1979 several (high) medieval waste pits and wells were found during during several archaeological supervisions in the area. In 1981 amateur archaeologists found north of the Roman road (Koningsstraat) medieval pottery sherds (including Carolingian pottery) and 13 wells (of which at least 2 wells date to the Carolingian period). In the years 1980-86/94 a relatively large area south of the Roman road (Koningsstraat) was excavated by the State Archaeological Service (ROB). Most house plans found with this excavation seem to date from the high middle ages. A large number of wells made of hollowed tree trunks date from the early and high medieval period. A well made of a hollowed tree trunk which was found in 1971 suggest that the medieval settlement extented to the east of the Wilhelminalaan.
Literature	-Goossens, E., 2010: *Archeologische monumentenzorg in de gemeente Beuningen. Actualisatie van de archeologische waarden- en verwachtingenkaart en vervaardiging van archeologische beleidsadvieskaart*, RAAP-Rapport 2170, Zutphen. -Hulst, R.S., 1987: Beuningen, gem. Beuningen. Romeinse tijd tot Late Middeleeuwen, *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1986, 32-33. -Mijers, R., 1981: Sporen van middeleeuwse bewoning aan de Koningsstraat te Beuningen, in *Jaarverslag AWN Nijmegen 1980*, 28-40. -Thijssen, J.R.A.M., 1981: Een Karolingische hondeschedel uit Beuningen, in *Jaarverslag AWN Nijmegen 1980*, 41.

Site	506
Site type	settlement
Province	Gelderland
Municipality	Druten
Place	Druten
Toponym	Ambtshuisstraat
Completeness	part of site (not delimited)
Excavated area in ha	0.06
Soil type	clay
Start date	725
End date	900
Description	In the six trial trenches dug by BAAC some settlement features were found, which date from the late iron age, the Roman period, the early middle ages and the high middle ages. In the publication of BAAC (Bink 2006) the features and find material is discussed only briefly. Most features seem to date from the high middle ages. Approximately 32 sherds of wheelturned pottery date from the early middle ages, especially the late Merovingian period and Carolingian period. These finds seem to suggest continuity of habitation during the early middle ages. Besides 14 sherds of Carolingian wheelturned pottery (Badorf and Mayen), a total of 25 sherds of handmade *Kugeltopf* pottery was found. Although this pottery is dated by BAAC in the high middle ages, the possibility that some of these sherds date from the Carolingian period can't be ruled out. Most of the Carolingian finds could not be related to features, but a concentration in the northern part of the excavation area (trench 1 and 3) suggest that the settlement was situated here. In trench 1 a well (feature 7) could date from the Carolingian period. The upper fills contain Merovingian coarse ware, Carolingian Vorgebirge pottery, *Kugeltopf* pottery, Pingsdorf (or late Badorf) pottery and Paffrath-like pottery. A more or less rectangular feature in the south side of trench 3 (feature 60) seems to be a sunken hut, possibly from the Merovingian or Carolingian period. However, in the excavation report (Bink 2006) this feature is described as a ditch. It contained no finds.
Literature	-Van Putten, M.J., 2005: *Plangebied Ambthuisstraat-Stevenpad te Druten*, BAAC-rapport A-05.0210, Deventer. -Bink, M., 2006: *Druten Ambtshuisstraat. Inventariserend archeologisch Veldonderzoek door middel van proefsleuven*, 's-Hertogenbosch (BAAC- rapport A-06.0035) -Louwe, E./K. Klerks/R.M. van Heeringen, 2009: *Appartementencomplex aan de Kattenburg 45-49, gemeente Druten. Een Bureauonderzoek en Inventariserend Veldonderzoek door middel van boringen*, Vestigia-rapport 584, Amersfoort.

Site	507
Site type	settlement
Province	Gelderland
Municipality	Ede
Place	Oud Reemst
Toponym	Oud Reemsterzand
Completeness	part of site (not delimited)
Excavated area in ha	0.16
Soil type	sand
Start date	700
End date	900
Description	Part of a medieval settlement discovered during landscape management on the heathlands to the northeast of the modern town Oud Reemst. The settlement traces consist of postholes belonging to several (parts of) buildings, pits and sunken huts. The settlement traces were located more or less in the area where Heidinga had predicted in his dissertation. It was not clear from the excavated remains whether the site was continually inhabited during the early and high middle ages or if it was revisited several times.
Literature	-Van Doesburg, J./ J.W. de Kort/J. Schreurs, 2011: *Een middeleeuwse nederzetting in het Oud Reemsterzand. Waardestellend onderzoek in het Park de Hoge veluwe in november 2009*, Beknopte Rapportage Archeologische Monumentenzorg 22, Amersfoort.

Site	508
Site type	settlement
Province	Gelderland
Municipality	Beuningen
Place	Winssen
Toponym	Plakstraat 5a
Completeness	part of site (not delimited)
Excavated area in ha	0.02
Soil type	clay
Start date	850
End date	950
Description	During this small scale excavation seven features were found that seem to date to the (late) Carolingian and/or Ottonian period (and not from the tenth tot twelfth century as claimed in the excavation report). A waste pit with iron slag (feature 7) and a possible oven pit (feature 2) indicates iron production. The settlement is situated in the shadow of late medieval castle Poelhof / 'huis te Winssen'. A relative large number of *Kugeltopf* pottery was found (n = 186), mostly tempered with crushed stone. Some of the early *Kugeltopf* pottery was decorated with waffle imprints. Most of the pottery (n = 99) was found in a waste pit (feature 1). Noteworthy is a complete '*Kugeltopf*' from this feature which contained 33 fragments of freshwater mussel. Some sherds of (late) Badorf pottery (with roulette stamp - Dorestad W IIB/C) were erroneously described as Pingsdorf and unknown late medieval pottery in the excavation report.
Literature	-Corver, B.A., 2009: *Archeologische opgraving (DO) Plakstraat 5a, Winssen Gemeente Beuningen*, Becker & Van de Graaf - Rapport 33805, Noordwijk. -Goossens, E., 2010: *Archeologische monumentenzorg in de gemeente Beuningen. Actualisatie van de archeologische waarden- en verwachtingenkaart en vervaardiging van archeologische beleidsadvieskaart*, RAAP-Rapport 2170, Zutphen.

Site	509
Site type	settlement
Province	Gelderland
Municipality	Beuningen
Place	Winssen
Toponym	Winssen-dorp
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	clay
Start date	500
End date	1200
Description	In 1965, a well made of a tree trunk was found during construction activities. This well seems to date to the early or high middle ages. Because of a lack of finds from the well, no exact date is known.
Literature	-Goossens, E., 2010: *Archeologische monumentenzorg in de gemeente Beuningen. Actualisatie van de archeologische waarden- en verwachtingenkaart en vervaardiging van archeologische beleidsadvieskaart*, RAAP-Rapport 2170, Zutphen.

Site	510
Site type	settlement
Province	Gelderland
Municipality	Beuningen
Place	Winssen
Toponym	Winssen-kerk
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	clay
Start date	-
End date	-
Description	This settlement area is situated on 'oude woongrond' on the natural levee of the river Waal. The area is clearly raised and several pottery fragments from the early medieval period and later were found here.
Literature	-Goossens, E., 2010: *Archeologische monumentenzorg in de gemeente Beuningen. Actualisatie van de archeologische waarden- en verwachtingenkaart en vervaardiging van archeologische beleidsadvieskaart*, RAAP-Rapport 2170, Zutphen. -Modderman, P.J.R., 1951: *De Oude Woongronden in het land van Maas en Waal*, Oudheidkundige Mededelingen uit het Rijksmuseum van Oudheden te Leiden 32, Leiden.

Site	511
Site type	settlement
Province	Gelderland
Municipality	Beuningen
Place	Beuningen (Gld.)
Toponym	centrum / Molenstraat / Wilhelminalaan /Alde
Completeness	part of site (not delimited)
Excavated area in ha	0.25
Soil type	clay
Start date	725
End date	900
Description	'Oude woongrond' with settlement traces from the Roman period, the early middle ages, the high middle ages and modern period. In the report of the Molenstraat excavations (1997-98) by the State Archaeological Service (ROB) the emphasis is laid on the Roman finds and features; the medieval remains are only discussed briefly. At least five wells, made of hollowed tree trunks, seem to date to the early middle ages (late Merovingian and/or Carolingian period). Four other wells date to the early or high middle ages. A single aisled building probably dates to the Carolingian or Ottonian period. Seven early medieval features contain iron slags suggesting iron production. The early medieval pottery includes late Merovingian Ubbergen ware and Carolingian Badorf ware. An excavation/archaeological supervision has been carried out by Synthegra (Alde Steeg). Several medieval features were found, including one Carolingian well and two Carolingian (waste) pits. Maybe the area investigated by RAAP, west of the Wilhelminalaan at the castle site Blanckenburg, also belongs to the same early medieval settlement. In a trial trench of RAAP several medieval features were found, including a E-W orientated ditch which is believed to date to the Carolingian Period. The many Carolingian finds, mostly pottery, suggest that in the Carolingian period the settlement core may have been situated here. Directly south of the medieval settlement rich Merovingian graves were found around 1955. Directly north on site Asdonck only high medieval features were discovered. On this location only a few sherds from the Merovingian and Carolingian period were found (the number of pottery fragments mentioned in the archis waarneming is wrong).
Literature	-Diependaal, S./S.M. Koeman/T.A. Spitzers 2011*: Inventariserend Veldonderzoek door middel van proefsleuven, Alde Steeg te Beuningen*, Synthegra Rapport S110133, Doetinchem. -Van der Gaauw, P., 1990: *Boor- en proefsleuvenonderzoek in de gemeente Beuningen*, RAAP-Rapport 45, Amsterdam. -Van der Kamp, J.S./M. Polak 2001: *Archeologisch onderzoek aan de Molenstraat te Beuningen (1997-1998)*, Rapportage Archeologische Monumentenzorg 92, Amersfoort. -Kremer, H./D. Hagens 2010: *Bureauonderzoek en Inventariserend Veldonderzoek, karterend booronderzoek, Alde Steeg te Beuningen*, Synthegra Rapport S100094, Doetinchem. -Modderman, P.J.R., 1951: *De Oude Woongronden in het land van Maas en Waal*, Oudheidkundige Mededelingen uit het Rijksmuseum van Oudheden te Leiden 32, Leiden. -Schuurman, E.I., 2010: *Plangebied de Asdonck, gemeente Beuningen. Archeologisch vooronderzoek: een inventariserend veldonderzoek (proefsleuven en opgraving)*, RAAP-rapport 2135, Zutphen.

Site	512
Site type	settlement
Province	Gelderland
Municipality	Beuningen
Place	Beuningen (Gld.)
Toponym	De Heuve
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	clay
Start date	725
End date	900
Description	'Oude woongrond' with settlement traces from the bronze Age, the iron age, the Roman Period, the early middle ages and the high middle ages. During the excavation by the State Archaeological Service (ROB) in 1995 several features (waste pits, fire places) were observed, probably dating mostly to the high middle ages. However, because the features were not fully investigated the exact date is uncertain. Most pottery dates from the high middle ages, only a few sherds date from the Roman Period and early medieval period. At the Krommehoekstraat, directly north of the ´oude woongrond´, several early or high medieval wells were found in 1981. Perhaps these wells belong to the same medieval settlement.
Literature	-Goossens, E., 2010: *Archeologische monumentenzorg in de gemeente Beuningen. Actualisatie van de archeologische waarden- en verwachtingenkaart en vervaardiging van archeologische beleidsadvieskaart*, RAAP-Rapport 2170, Zutphen. -Willems, W.J.H., 1985: Romans and Batavians, a regional study in the Dutch Eastern River Area, I, in *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 31, 7-217.

Site	513
Site type	settlement
Province	Gelderland
Municipality	Beuningen
Place	Ewijk
Toponym	Ewijkse Steeg / Hoge Woerd
Completeness	part of site (delimited)
Excavated area in ha	-
Soil type	clay
Start date	725
End date	900
Description	'Oude woongrond' with habitation in the iron age, the Roman Period, the Carolingian Period and the high middle ages. In the period of 1970-72 amateur archeologists collected finds from this location, including Carolingian pottery (Mayen). In 1991 the State Archaeological Service conducted a small excavation at the archaeological monument. The ten trenches were situated along the route of ditches and sewer trenches, which were planned here for the realization of the industrial area Schoenmaker-West. In the west part several settlement traces of the Carolingian and high medieval period were found. In the lower part a ca. 10 m wide cluster of ditches was excavated. These ditches date from the Carolingian period and the high middle ages (Ottonian period). The ditches probably form the boundary of the medieval settlement and may also have played a role in local watermanagement. Interesting are the many pieces of Roman stone building material which were found in Carolingian features. They may have originated from the nearby Roman villa of Ewijk - De Aalst.
Literature	-Goossens, E., 2010: *Archeologische monumentenzorg in de gemeente Beuningen. Actualisatie van de archeologische waarden- en verwachtingenkaart en vervaardiging van archeologische beleidsadvieskaart*, RAAP-Rapport 2170, Zutphen. -Hulst, R.S./A.G. Jong/W. Koudijs 1992: Beuningen Ewijk - Hoge Woerd, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1991, 66-67. -Modderman, P.J.R., 1951: *De Oude Woongronden in het land van Maas en Waal*, Oudheidkundige Mededelingen uit het Rijksmuseum van Oudheden te Leiden 32, Leiden. -Peddemors, A., 1978: Die archäologischen Funde aus dem 'Land van Maas en Waal', I, in *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 28, 7-79. -Tuyn, W., 1970: Hoge Woerd Ewijk, in *Jaarverslag AWN Nijmegen* 1970, 1. -Willems, W.J.H., 1985: Romans and Batavians, a regional study in the Dutch Eastern River Area, I, in *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 31, 7-217.

Site	514
Site type	settlement
Province	Gelderland
Municipality	Beuningen
Place	Winssen
Toponym	Leegstraat
Completeness	part of site (not delimited)
Excavated area in ha	0.01
Soil type	clay
Start date	725
End date	900
Description	In two small trial trenches a relative large amount of medieval pottery was found. Besides many pottery sherds from the high middle ages a few sherds date to the Carolingian period. The oldest habitation phase seems to date to the ninth century. Unfortunately, the site was not investigated futher, because ADC considered it as not important.
Literature	-Goossens, E., 2010: *Archeologische monumentenzorg in de gemeente Beuningen. Actualisatie van de archeologische waarden- en verwachtingenkaart en vervaardiging van archeologische beleidsadvieskaart*, RAAP-Rapport 2170, Zutphen. -Loopik, J./J. Claeys, 2010: *Beuningen - Winssen, plangebied Leegstraat. Een inventariserend Veldonderzoek in de vorm van proefsleuven*, ADC Rapport 2204, Amersfoort. -Nillesen, R./S.M. Koeman/H. Wassink 2009: *Bureauonderzoek en karterend veldonderzoek d.m.v. boringen Leegstraat te Winssen, gemeente Beuningen*, Synthegra Rapport S090034, Doetinchem.

Site	515
Site type	settlement
Province	Gelderland
Municipality	Overbetuwe
Place	Zetten
Toponym	De Hoge Hof
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	clay
Start date	850
End date	900
Description	During an excavation by Braat several features from the (late) Carolingian period were found. Amoung the finds were numerous sherds of late Carolingian pottery (Badorf, RBA, Hunneschans, etc.). One of the Carolingian wells contained a wooden plate. The medieval features and finds are only discussed briefly in the report by Braat. A new analysis of the excavation plan showing all features, as published by Braat, suggest the presence of 5 wells made of hollowed tree trunks (of which 3 date to the Carolingian period), 11 possible wells from the Roman or medieval period, six boat-shaped buildings from the high middle ages, one grainstore or a larger building and six haystacks from the early to late middle ages (one with a circular ditch which was interpreted as a Batavian house by Braat). Some rectangular features could be early medieval sunken huts.
Literature	-Braat, W.C., 1937: De Hooge Hof, een Bataafsche nederzetting te Zetten, in *Oudheidkundige Mededelingen uit het Rijksmuseum van Oudheden te Leiden* 18, 22-40. -Willems, W.J.H., 1985: Romans and Batavians, a regional study in the Dutch Eastern River Area, I, in *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 31, 7-217.

Site	516
Site type	settlement
Province	Gelderland
Municipality	Overbetuwe
Place	Elst
Toponym	Brienenshof
Completeness	part of site (delimited)
Excavated area in ha	-
Soil type	clay
Start date	725
End date	900
Description	During a survey in 1970 several Merovingian and Carolingian pottery sherds were found here, suggesting early medieval habitation. In the following excavation by the State Archaeological Service (ROB) some settlement features of the Carolingian period were found, but not as many as hoped for. Of the pottery found during the excavation, only 7% dates to the Carolingian period. In some features a very high number of stone fragments (tuff, limestone, etc.) was found, especially in Carolingian and later medieval features. It appears to be re-used Roman building material from the Roman vicus of Elst (temple), approximately 750m north of this site. During the excavation no less than 70 wells were discovered, of which an uncertain number date to the Carolingian period. The Carolingian and high medieval settlement seems to be somewhat elongated (a row settlement?) with farmsteads aligned along the central axis. The boat-shaped houses which were recognized during the preliminary post-excavation analysis probably date from the high middle ages. In contrast to the boat-shaped houses from Beuningen - De Tinngegieter most of them seem to be typologically related to the houses from the northern and central sandy soils in the Netherlands. After the excavation by the ROB the AWN conducted an archaeological research consisting of three small trenches. Many settlement traces were found, most of them dating to the high middle ages.
Literature	-Heunks, E., 2004: *Gemeente Overbetuwe: een archeologische beleidsadvieskaart (onderdeel van het Erfgoedplan Gemeente Overbetuwe)*, RAAP-rapport 1074, Amsterdam. -Hulst, R.S./A.G. Jong 1989: Elst, gem. Elst, Brienenshof, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1988, 29-30. -Hulst, R.S./A.G. Jong/A. Buisman 1990: Elst, de Brienenshof, gem. Elst, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1989, 38-39. -Tuyn, W./A. Hendriks 1989: Het laatste stukje Brienenshof, in *Jaarverslag AWN Nijmegen 1988*, 29-30. -Willems, W.J.H., 1985: Romans and Batavians, a regional study in the Dutch Eastern River Area, I, in *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 31, 7-217. -Willemse, N.W., 2009: *Archeologisch beleid van de gemeente Overbetuwe*, RAAP-rapport 2003, Weesp.

Site	517
Site type	settlement
Province	Gelderland
Municipality	Overbetuwe
Place	Elst
Toponym	Steenoven / Galgenplek
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	clay
Start date	725
End date	900
Description	During an archaeologicial supervision by the AWN medieval settement traces were found. Carolingian features and finds are less well represented comparison to features of the Merovingian period and the high middle ages. At the Steenovensite the Merovingian features seem to be concentrated in the south-east corner, whereas the high medieval features (twelfth/thirteenth century) seem to be concentrated in the north-west corner. One well possibly dates to either the Merovingian or Carolingian period. In the south corner some pottery sherds from the Carolingian period were found.
Literature	-Tuyn, W.N., 1985: Het bouwplan Steenoven te Elst, in *Jaarverslag AWN Nijmegen 1984*, 38-39. -Willemse, N.W., 2009: *Archeologisch beleid van de gemeente Overbetuwe*, RAAP-rapport 2003, Weesp.

Site	518
Site type	settlement
Province	Gelderland
Municipality	Overbetuwe
Place	Oosterhout
Toponym	Elzenwoerd
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	clay
Start date	725
End date	900
Description	The reinforcement of a dike led to the excavation of a small strip of land along the river Waal. Several settlement traces from the Roman period up to the late middle ages were found, including a waste pit with pottery from the eighth century, a well made of two wooden barrels containing Carolingian pottery (Badorf?) and a well made of a hollowed tree trunk dating to the early or high middle ages.
Literature	-Willemse, N.W., 2009: *Archeologisch beleid van de gemeente Overbetuwe*, RAAP-rapport 2003, Weesp.

Site	519
Site type	settlement
Province	Gelderland
Municipality	Overbetuwe
Place	Zetten
Toponym	De Vergulde Bodem / plangebied Den Hartog
Completeness	part of site (not delimited)
Excavated area in ha	0.09
Soil type	clay
Start date	725
End date	900
Description	"Oude woongrond" with many surface finds including pottery from the Merovingian period, the Carolingian period and the high middle ages. BAAC conducted a trial trench campaign in 2005 consisting of three trenches of 5 x 60 m. This trial excavation revealed many finds and features, mostly from the late iron age, the Roman Period and the early middle ages (Carolingian and Ottonian period). The Carolingian finds and features are discussed only briefly in the report.
Literature	-Meij, A.M.V., 2005: *Plangebied Den Hartog en Loeffen te Zetten, gemeente Overbetuwe; archeologisch vooronderzoek: een bureau- en inventariserend veldonderzoek*, RAAP-notitie 1073, Zutphen. -Modderman, P.J.R., 1949: Het oudheidkundige onderzoek van de oude woongronden in de Over- en Neder-Betuwe, in *Oudheidkundige Mededelingen uit het Rijksmuseum van Oudheden te Leiden* 30, 66-93. -Mooren, J.R., 2006: *Zetten Plangebied Den Hartog. Inventariserend veldonderzoek door middel van proefsleuven*, BAAC-rapport A-05.0229, 's-Hertogenbosch. -Willems, W.J.H., 1985: Romans and Batavians, a regional study in the Dutch Eastern River Area, I, in *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 31, 7-217. -Willemse, N.W., 2009: *Archeologisch beleid van de gemeente Overbetuwe*, RAAP-rapport 2003, Weesp.

Site	520
Site type	settlement
Province	Gelderland
Municipality	Overbetuwe
Place	Elst
Toponym	Centrum
Completeness	part of site (delimited)
Excavated area in ha	0.024
Soil type	clay
Start date	850
End date	1200
Description	The site is situated ca. 100m northeast of the St.-Maartenschurch, which was built in the eighth century on the remains of a Roman temple. Based on radiocarbon dating, the oldest graves found at the church date to the Carolingian period (1230 BP, +/-25; 1155 BP +/- 25). In 1994, several Carolingian waste pits were found in a construction pit of a house at the Grote Molenstraat. The pits contained Carolingian pottery (i.e. reliefband amphoras type Dorestad WI/II, Badorf type Dorestad WIIA and WIIC, Mayen type Dorestad WIIIA and early *Kugeltopf*), some Roman pottery fragments, many animal bones (cattle), a few iron nales, a large iron slag, fragments of Roman roof tiles, mortar, pieces of tufa and limestone. Besides the Carolingian waste pits, a pit containing human and animal bones was found. The human bones are probably rebuired remains of graves from the St.-Maartenskerk. In 2011, during a trial excavation by Archeodienst, parts of two medieval ditches were found at the Princes Irenestraat, probably belonging to a moated site (an enclosed settlement?). The course of the ditches seem to correspond with the historical allotment which can be seen on maps from the nineteenth century. One ditch appears to have been dug in the late Carolingian period and was probably in use up to the twelfth century. The date of this ditch, however, is based on late RBA, which probably dates from the tenth or eleventh century. Northwest from the ditch several medieval (settlement) features were found dating to the high middle ages and possibly also the Carolingian period. It appears that in the Carolingian period the area around the church was inhabited.
Literature	-Derks, T./J. van Kerckhove/P. Hoff (eds.), 2008: *Nieuw archeologisch onderzoek rond de Grote Kerk van Elst, gemeente Overbetuwe (2002-2003)*, Zuidnederlandse Archeologische Rapporten 31, Amsterdam. -Van de Graaf, W.S., 2011: *Hoge Middeleeuwen aan de Princes Irenestraat in Elst, een proefsleuvenonderzoek*, Archeodienst Rapport 77, Zevenaar. -Keunen, L.J./L.M. Flokstra, 2009: *Plangebied centrum Elst, actualisatie archeologische waarden en verwachtingenkaart*, RAAP-rapport 1844, Zutphen. -Tuijn, W., 1994: Een korte blik in Karolingisch Elst, in *Jaarverslag 1994 AWN afdeling Nijmegen e.o.*, 23-24.

Site	521
Site type	settlement
Province	Gelderland
Municipality	Tiel
Place	Kerk Avezaath
Toponym	Linge
Completeness	part of site (delimited)
Excavated area in ha	0.93
Soil type	clay
Start date	725
End date	900
Description	Most Carolingian features were located in the southern part of the medieval settlement discovered at Stenen Kamer/Linge. Here a boat shaped house, a rectangular barn, six outbuildings, two charcoal production pits, one well and several waste pits and ditches were excavated.
Literature	-Botman, A.E./M.C. Kenemans, 2001: Sporen en structuren, in A.A.A. Verhoeven/O. Brinkkemper (eds.), *Archeologie in de Betuweroute: Twaalf eeuwen bewoning langs de Linge bij De Stenen Kamer in Kerk-Avezaath*, Rapportage Archeologische Monumentenzorg 85, Amersfoort, 59-130.

Site	522
Site type	settlement
Province	Utrecht
Municipality	Leusden
Place	Leusden
Toponym	Oud-Leusden
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	sand
Start date	550
End date	1300
Description	The village of Oud-Leusden is mentioned in written sources for the first time in 777 as villa Lisiduna. Part of this medieval settlement was excavated in the period 1982-1985 prior to the road construction of the A28 by the State Archaeological Service (ROB) and amateur archaeologists of the AWN. During the excavation a Merovingian graveyard and early to high medieval settlement traces were found (house plans, sunken huts and wells). The early medieval settlement traces seem to concentrate east of the Vlooswijkse weg. Besides 30 (late Roman or) early medieval sunken huts and 3 wells, many post holes were found, probably from 13 early medieval house plans and 1 outbuilding (spieker). Although the promising excavation results were published in preliminary reports, the site was never properly further analysed. Four boat shaped house plans - originally dated in the high middle ages - show similarities with a house plan of Stenen Kamer - Linge, which is believed to date from the period 850-925 AD. There was probably continuity of habitation from the middle of the six century up to the thirteenth century. In 2003 the Sectie Archeologie - gemeente Amersfoort conducted a trial trench campaign directly north of the old ROB-excavation. Here, several house plans from the Carolingian period and/or the high middle ages were found. Unfortunately no further excavations were conducted subsequently.
Literature	-Van der Graaf, K./K. Anderson, 1990: *Archeologische waarden in de provincie Utrecht: verslag van het kwaliteitsbepalend onderzoek*, RAAP-rapport 43-2, Weesp. -Hulst, R.A., 2003: *Inventariserend en waarderend archeologisch onderzoek. Uitbreiding begraafplaats Oud-Leusden*, Amersfoort. -Van Tent, W.J., 1984: Leusden, *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1982, 124-125. -Van Tent, W.J., 1985: De Opgravingen bij Oud-Leusden, in *Flehite* 17, 10-17. -Van Tent, W.J., 1986: Leusden, *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1985, 128. -Van Tent, W.J., 1988: Leusden, in *Archeologische kroniek van de provincie Utrecht over de jaren* 1980-1984, Utrecht, 19-33. -Van Tent, W.J./A. Buisman/G. van Haaff 1985: Oud-Leusden, gem. Leusden. Nederzettingen uit de Romeinse tijd en de middeleeuwen, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1983, 58-59. -Van Tent, W.J./G. van Haaff 1986: Oud-Leusden, gem. Leusden (wegtracé A28). Nederzettingen uit ijzertijd, Romeinse tijd en vroege en late middeleeuwen; grafveld uit vroege middeleeuwen, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1984, 63-66.

Site	523
Site type	settlement
Province	Utrecht
Municipality	Houten
Place	Houten
Toponym	Tiellandt(weg) / De Stenen Poort
Completeness	part of site (not delimited)
Excavated area in ha	7
Soil type	clay
Start date	725
End date	900
Description	The reason to conduct large scale excavations here in 1985-87 was the large amount of Merovingian and Carolingian stray finds suggesting a settlement similar to Dorestad. On a plowed field directly to the south of the Tiellandtweg no less than 13.000 pottery sherds were found, including much material dating to the early middle ages. In the southern part of the excavation trenches of the campaign of 1985 a few Carolingian settlement features were found, mostly ditches and a partly excavated (possibly) Carolingian house plan. However, most of the early medieval settlement features (many post holes and more than 15 wells) seem to date to the late Merovingian period (seventh - first half eighth century). Several haystacks (with five to six post holes and in some cases also with a ring ditch) seem to date to the high middle ages, although a (late) Carolingian date cannot be ruled out. During the last campaign of the excavation (1987) only a few features and finds from the Carolingian period were found. During more recent trial excavations by RAAP (2012) directly southwest of the excavations by the ROB at the location 'De Stenen Poort' several medieval features were found (post holes, waste pits and ditches), mostly from the high and late medieval period.
Literature	-Briels, I.R.P.M., 2013: *Plangebied de Stenen Poort te Houten, gemeente Houten. Archeologisch vooronderzoek: een bureau- en inventariserend veldonderzoek proefsleuven*, RAAP-rapport 2602, Weesp. -Van Es, W.A./W.A.M. Hessing/R.E. Lutter/G. van Haaff/A.G. Jong/W. Snijder, 1986: Houten, gem. Houten. Opgraving in het uitbreidingsgebied Tiellandt (putten 1-23). Bewoningssporen ijzertijd, Romeinse tijd, Vroege en Late Middeleeuwen, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1985, 49-51. -Van Es, W.A./W.A.M. Hessing/L.I. Kooistra/A.G. Jong/R.E. Lutter/H. ter Schegget, 1987: Opgraving in het uitbreidingsgebied Tiellandt (putten 27-48). Bewoningssporen uit de ijzertijd, Romeinse tijd, vroege en late middeleeuwen, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1986, 54-57. -Van Es, W.A./J. van der Roest/L.I. Kooistra/W.A.M. Hessing/A.G. Jong, 1988: Opgraving in het uitbreidingsgebied Tiellandt (putten 49-68). Bewoningssporen uit de ijzertijd, Romeinse tijd, vroege en late middeleeuwen, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1987, 46-48. -Kooistra, L.I./W.A.M. Hessing 1990: Ein Frühmittelalterlicher Brunnen mit einer exotischen Frucht aus Houten, in *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 38-1988, 207-228. -Noordam, J.W./W.J. van Tent, 1979: Houten: bewoning uit de Romeinse tijd en de middeleeuwen, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1978, 44-45. -Vos, W., 2009: *Bataafs platteland. Het Romeinse nederzettingslandschap in het Nederlandse Kromme-Rijngebied*, Amsterdam (PhD thesis Vrije Universiteit Amsterdam).

Site	524
Site type	settlement
Province	Utrecht
Municipality	Houten
Place	Houten
Toponym	Loeriker hofstede (terrein 9)
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	clay
Start date	725
End date	900
Description	This site revealed only 19 Carolingian pottery sherds, probably older intrusion or stray finds from a nearby settlement. Only three features may date to the Carolingian period (two waste pits and one post hole) based on the related finds.
Literature	-Dijkstra, J./A. van Benthem 2004: *Definitief Archeologisch Onderzoek op terrein 9 in Houten*, ADC-rapport 264, Amersfoort.

Site	525
Site type	settlement
Province	Utrecht
Municipality	Utrecht
Place	Utrecht
Toponym	A2, Leidsche Rijn
Completeness	part of site (delimited)
Excavated area in ha	2.35
Soil type	clay
Start date	575
End date	775
Description	In the period 2000-2001 a field survey, several corings and a trial excavation were conducted in response to plans ro expand the highway A2 in Leidsche Rijn in the west of the city of Utrecht. The archaeological research demonstrated that an early medieval settlement was situated here. In 2005 a large part of this settlement was excavated by the municipality of Utrecht (project LR51 en LR54). It turned out that the early medieval settlement was located on a relatively high part in the landscape along the Oude Rijn. The second half of the seventh and the early eighth century formed the heyday of the settlement. In the course of the second half of the eighth century habitation declined. However, a few stray finds from the ninth century suggest that the area was also inhabited later in the Carolingian period. It is very plausible that late eighth and early ninth century settlement traces are situated directly east and west of the excavated area. In total 88 early medieval buildings were found, of which 14 farm houses and 74 outbuildings. Noteworthy are 34 outbuildings with long sharpened wooden posts, maybe granaries. Besides farming and small scale artisan production, trade activities may have taken place judging by the discovery of 37 early medieval coins.
Literature	-Henk, Y., 2005: *Archeologisch vooronderzoek Leidsche Rijn Rugbyvelden*, RAAP-briefrapport 85, Amsterdam. -Jansen, B., 2001: *Rijksweg A2, Leidsche Rijn (km 59.7 tot 62.5). Een Aanvullende Archeologische Inventarisatie*, RAAP-rapport 668, Amsterdam. -Van der Kamp, J.S., 2004: *Middeleeuwse bewoning langs de snelweg. Archeologisch proefonderzoek i.v.m. verlegging Rijksweg A2*, Basisrapportage archeologie 5, Utrecht. -Nokkert, M./A.C. Aarts/H.L. Wynia, 2009: *Vroegmiddeleeuwse bewoning langs de A2. Een nederzetting uit de zevende en achtste eeuw in Leidsche Rijn*, Basisrapportage archeologie 26, Utrecht.

Site	526
Site type	settlement
Province	Utrecht
Municipality	Utrecht
Place	Vleuten
Toponym	Appellaantje / Huis te Vleuten e.o. (locatie 9)
Completeness	part of site (not delimited)
Excavated area in ha	2
Soil type	clay
Start date	500
End date	800
Description	In 1993 this early medieval settlement was discovered during a field survey by RAAP (site 8 and 9). During a trial excavation in 1994 by the State Archaeological Service (ROB) several features and finds from the Merovingian and Carolingian period were found. Further archaeological research in 2005 showed that the site was seriously disturbed and therefore was no longer eligible for preservation. In 2007 the remaining early medieval features were excavated by the municipality of Utrecht. The early medieval settlement was situated in the inner curve of the river Oude Rijn. The site seems to have been continuously inhabited during the sixth and eighth century. In the ninth century the settlement was abandoned, possibly as a result of flooding. The early medieval settlement had an agrarian character, although small scale artisan production and trade also seems to have taken place.
Literature	-Brugge, J.P., 1997: Vleuten-De Meern en Harmelen, in *Archeologische Kroniek Provincie Utrecht* 1994-1995, 110. -Haarhuis, H.F.A./E.P. Graafstal, 1993: *Vleuten-Harmelen. Een archeologische kartering, inventarisatie en waardering*, RAAP-rapport 80, Amsterdam. -Den Hartog, C.M.W., 2010: *Appellaantje. LR55: Een vroegmiddeleeuwse nederzetting aan de Wilhelminalaan bij Vleuten*, Basisrapportage Archeologie 30, Utrecht.

Site	527
Site type	settlement
Province	Gelderland
Municipality	Buren
Place	Buren
Toponym	Huis Malburg
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	clay
Start date	725
End date	900
Description	Settlement with features and finds dating to the early and high middle ages. Only a relatively small number of features appears to date to the Carolingian period (c. 105 features). Most Carolingian features consist of pits with an unknown function. No Carolingian house plans were recognized, probably because many features were disturbed during the high middle ages.
Literature	-Oudhof, J.W.M./J. Dijkstra/A.A.A. Verhoeven, 2000*: Archeologie in de Betuweroute 'Huis Malburg' van spoor tot spoor. Een middeleeuwse nederzetting in Kerk-Avezaath*, Rapportage Archeologische Monumentenzorg 81, Amersfoort.

Site	528
Site type	settlement
Province	Utrecht
Municipality	Wijk bij Duurstede
Place	Wijk bij Duurstede
Toponym	De Heul
Completeness	part of site (delimited)
Excavated area in ha	20.3
Soil type	clay
Start date	725
End date	900
Description	De Heul is believed to represent a large section of the inhabited/agrarian part of early medieval Dorestad. Between 1967 and 1995 the State Archaeological Service conducted large scale excavations here. Other than settlement traces the excavations also unearthed several early medieval cemeteries. Evidence for craft production was discovered such as iron working and stone cutting. The site has yielded a wide array of material culture.
Literature	-Van Es, W.A./W.J.H. Verwers, 1995: House plans from Dorestad, in *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 41, 173-186. -Van Es, W.A., 1969: Excavations at Dorestad; a Preliminary Report: 1967-1968, in *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 19, 183-207. -Van Es, W.A./W.J.H. Verwers, 2015: Excavations at Dorestad 4. The Settlement on the River Bank Area, Nederlandse Oudheden 18, Amersfoort.

Site	529
Site type	settlement
Province	Gelderland
Municipality	Barneveld
Place	Kootwijk
Toponym	Kootwijk 2
Completeness	excavated completely
Excavated area in ha	-
Soil type	sand
Start date	750
End date	1000
Description	At the Kootwijk 2 site a total of 52 farmhouses, 2 small houses, c. 30 barns, c. 10 small granaries or haystacks, 180-190 sunken huts, 55 wells, many pits, a few 'privies' or dogkennels, several ovens and various other possible buildings and constructions were excavated. These settlement features date to the second half of the eighth to the tenth century. On basis of typology of the house plans and find material (pottery), 10 phases of 25 years have been distinguised. Phase 1A-3B date to the Carolingian period.
Literature	-Van Benthem, A., 1994: *Het Karolingisch aardewerk van Kootwijk. Vindplaats 2*, Amsterdam (unpublished MA thesis University of Amsterdam). -Groenman-van Waateringe, W./L.H. van Wijngaarden-Bakker, 1987: *Farm Life in a Carolingian village. A model based on botanical and zoological data from an excavated site*, Studies in Prae- en Protohistorie 1, Assen/Maastricht. -Heidinga, H.A., 1987: *Medieval settlement and economie north of the Lower Rhine. Archaeology and history of Kootwijk and the Veluwe (the Netherlands)*, Assen/Maastricht. -Heidinga, H.A., 1990: From Kootwijk to Rhenen: in search of the elite in the Central Netherlands in the early middle ages, in J.C. Besteman/J.M. Bos/H.A. Heidinga (eds.), *Medieval Archaeology in the Netherlands. Studies presented to H.H. van Regteren Altena, Studies in Pre- en Protohistorie* 4, Assen/Maastricht, 9-40. -Verhoeven, A.A.A., 1998: *Middeleeuws gebruiksaardewerk in Nederland (8ste - 13de eeuw)*, Amsterdam Archaeological Studies 3, Amsterdam.

Site	530
Site type	settlement
Province	Gelderland
Municipality	Apeldoorn
Place	Uddel
Toponym	Aardhuisweg
Completeness	part of site (not delimited)
Excavated area in ha	0.08
Soil type	sand
Start date	700
End date	900
Description	Settlement situated relatively close by the semi-circular earthwork known as the Huneschans. The settlement appears to have been inhabited first somewhere during the eighth century and was abandoned in the course of the ninth century. The site was excavated in a patchwork manner meaning a degree of interpolation is necessary in the interpretation of the archaeological results. Nonetheless, a large number of main buildings, outbuildings and sunken huts were excavated. The site also yielded ample evidence for stages of iron production and iron working.
Literature	-Diependaal, S./E.M. ten Broeke/P.J.L. Wemerman, 2015: Uttiloch. Proefsleuvenonderzoek en opgraving van een karolingische nederzetting binnen het plangebied Heegderweg - Aardhuisweg te Uddel, Econsultancy rapport 13055599, Doetinchem.

Site	531
Site type	settlement
Province	Gelderland
Municipality	Zutphen
Place	Zutphen
Toponym	centrum
Completeness	part of site (delimited)
Excavated area in ha	-
Soil type	clay
Start date	725
End date	900
Description	Several excavations in the medieval town of Zutphen have revealed Carolingian settlement features. A large wooden hall, several sunken huts and a house date to the ninth century. This 'curtis' was destroyed in the late ninth century, possibly during the Viking attack of 882. Shortly after this event, a circular fort (ringwalburg) was constructed.
Literature	-Fermin, H.A.C./M. Groothedde 2006: *De Zutphense ringwalburg van de 9e tot de vroege 14e eeuw. Nieuwe gegevens en inzichten uit archeologisch onderzoek en boringen op de Zutphense markten*, Zutphense Archeologische Publicaties 22, Zutphen. -Groothedde, M., 2013: *Een vorstelijke palts te Zutphen? Macht en prestige op en rond het plein 's-Gravenhof van de Karolingische tijd tot aan de stadsrechtverlening*, Zutphense Archeologische Publicaties 77, Zutphen.

Site	532
Site type	settlement
Province	Gelderland
Municipality	Zutphen
Place	Warnsveld
Toponym	Hofweg
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	clay
Start date	825
End date	900
Description	Partly excavated yard dating to the ninth century with two overlapping houseplans, two wells, one oven (?) and several waste pits. One well could be dendrochronologically dated (terminus post quem 840/841 AD). This well contained a thick layers with waste material (including pottery, animal bone, freshwater mussels, and fragments of a leather shoe) interspersed with layers of leaves. The other well contained a large quantity of charcoal and burnt wood and loam (wattle and daub), basalt lava (quern-stone) and (late) Carolingian pottery among other finds. The fire may be related to a Viking attack in 882, for which there is archaeological evidence in the nearby town of Zutphen.
Literature	-Van Genabeek, R., 2001: Een Karolingisch erf in Warnsveld: Archeologisch onderzoek aan de Hofweg in Warnsveld, in *Westerheem* 4, 142-151.

Site	533
Site type	settlement
Province	Gelderland
Municipality	Bronckhorst
Place	Zelhem
Toponym	't Soerlant
Completeness	part of site (not delimited)
Excavated area in ha	1.2
Soil type	sand
Start date	675
End date	825
Description	Between 2001 and 2008 a settlement dating to the late seventh to the early ninth centuries was excavated ('t Soerlant III and IV). The western part consisted of three contemporary yards with buildings grouped around an open space with some outbuildings and wells. Stratigraphically three settlement phases could be determined. Most houseplans are of the type Zelhem. One houseplan seems to represent a large wooden hall (Beers-Gassel type). A large number of sunken huts were situated at the edge of the settlement. Three wells could be dendrochronologically dated, respectively around 775 AD (+/-8), 795 AD (+/-6), and between 799 AD (+/-6) and 807 AD (+/-6). The eastern part of the settlement consisted of a single farmhouse with some haystacks and sunken huts. Almost no wheelturned pottery was found. Although several pits contained iron slags, there is no proof for iron production. The cultivated crops are similair to that of early medieval Kootwijk: rye, barley, oats and broad bean. In 2008 a Carolingian well was found during a trial trench at 't Soerlant IV. This part of the settlement has as yet not been excavated further.
Literature	-De Ridder, J.A.A., 2010: *Zelhem 't Soerlant IV, Gemeente Bronckhorst,* ADC-rapport 1692, Amersfoort. -Van der Velde, H.M., 2010: *Wonen in een grensgebied. Een langetermijngeschiedenis van het Oost-Nederlandse cultuurlandschap (500 v. Chr.-1300 na Chr.*), Nederlandse Archeologische Rapporten 40, Amersfoort. -Kenemans, M.C./H.M. van der Velde, H.M., 2002: Archeologisch onderzoek op de toekomstige woningbouwlocatie Soerlant III te Zelhem, ADC-rapport 135, Bunschoten. -Van der Velde, H.M./M.C. Kenemans, 2003: *Aanvullend Archeologisch Onderzoek op de toekomstige woningbouwlocatie Soerlant IV te Zelhem*, ADC-rapport 166, Bunschoten.

Site	534
Site type	settlement
Province	Gelderland
Municipality	Bronckhorst
Place	Zelhem
Toponym	Zelhemse Enk (vindplaats 1)
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	sand
Start date	800
End date	1000
Description	During the excavation a total of six farmhouses, three barns and a large number of other outbuildings dating to the ninth and tenth centuries were found. The analysis of the seeds and fruits from several pits and wells, show that rye, barley and oats were cultivated. Some blackberries indicate that the inhabitants also collected fruits in the environs of the settlement. Several fire places and the large quantity of iron slags (with an estimated total of 8000 kilo) indicates the production of iron. The wood from the wells were analysed for dendrochronology, unfortunately without a positive result.
Literature	-Van der Velde, H.M./M.C. Kenemans, 2002: *Archeologisch onderzoek op de Zelhemse Enk. De aanleg van de provinciale weg N315*, ADC-rapport 120, Bunschoten.

Site	535
Site type	settlement
Province	Gelderland
Municipality	Lochem
Place	Laren
Toponym	Zuthpenseweg
Completeness	part of site (not delimited)
Excavated area in ha	0.48
Soil type	sand
Start date	700
End date	850
Description	During the excavation in 2004 part of an early medieval settlement was excavated. Five farmhouses date to the eighth or (early) ninth century. Two houseplans can be described al type Hoog-Buurlo, one houseplan as type Gasselta A and two houseplans as a combination of these two types. From one of the wells we have a dendrochronological date: 818-828 AD. The excavation revealed a relatively high amount of early medieval wheelturned pottery (12%) compaired with other settlements in the region. Nonetheless, most of the pottery consists of handmade pottery in the Hessens-Schortens tradition.
Literature	-Meij, A.M.V., 2003: *Plangebied Zutphenseweg te Laren, gemeente Lochem; een inventariserend archeologisch onderzoek*, RAAP-notitie 326, Amsterdam. -Ploegaert, P., 2004: *Inventariserend Veld Onderzoek Lochem 'Zutphenseweg'*, ADC-rapport 219, Amersfoort. -Van der Velde, H.M./P.H.J.I. Ploegaert, 2005: *Archeologisch onderzoek langs de Zutphense weg te Laren (gem. Lochem)*, ADC-rapport 332, Amersfoort.

Site	536
Site type	settlement
Province	Gelderland
Municipality	Zutphen
Place	Zutphen
Toponym	Eme-Ooyerhoek
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	sand
Start date	600
End date	1000
Description	Settlement dated between the seventh and tenth century of which the Carolingian occupation phase consisted of at least five main buldings and six wells.
Literature	-Bouwmeester, H.M.P., 2000: *Eme in de Romeinse en Frankische tijd - archeologisch onderzoek naar de nederzetting en het grafveld op de terreinen van het Laaksche veld en de Laaksche tuin in de Ooyerhoek, gemeente Zutphen*, BAAC-rapport A-98.0045, Deventer. -Groothedde, M., 1996: *Leesten en Eme. Archeologisch en historisch onderzoek naar verdwenen buurschappen bij Zutphen*, Zwolle.

Site	537
Site type	other/unknown
Province	Gelderland
Municipality	Zutphen
Place	Zutphen
Toponym	Looërenk
Completeness	off-site/isolated feature
Excavated area in ha	9
Soil type	sand
Start date	700
End date	900
Description	During the large scale excavations of the Looërenk (South East of Zutphen) a total of 247 pits with a large quantity of charcoal was found. These pits were interpret as the remains of charcoal production pits. The charcoal of six pits was radiocarbon dated resulting in dates between the eighth or ninth century (with correction for old-wood effect).
Literature	-Bouwmeester, H.M.P./H.A.C. Fermin/M. Groothedde 2008: *Geschapen landschap. Tienduizend jaar bewoning en ontwikkeling van het cultuurlandschap op de Looërenk in Zutphen*, BAAC-rapport A-00.0068, 's-Hertogenbosch. -Groothedde, M., 2013: *Een vorstelijke palts te Zutphen. Macht en prestige op en rond het plein 's-Gravenhof van de Karolingische tijd tot aan de stadsrechtverlening*, Leiden (PhD thesis University Leiden).

Site	538
Site type	settlement
Province	Gelderland
Municipality	Putten
Place	Putten
Toponym	Husselerveld
Completeness	part of site (not delimited)
Excavated area in ha	2.7
Soil type	sand
Start date	750
End date	850
Description	Settlement with continious habition from the Merovingian period to the high middle ages. About 14 houses date to the Carolingian period. Most of them are of the type Odoorn C'/Kootwijk A2 or Kootwijk B1, and seem to date from the period c. 750-850 AD. The individual date of the sunken huts is not always clear, but most of them will be early medieval. Around 32 outbuildings (spiekers) seem to date to the the early middle ages.
Literature	-Blom, M.C./A.M.I. van Waveren, 2005: *Nederzettingssporen uit de Ijzertijd tot in de Volle Middeleeuwen. Een archeologische opgraving op het Husselerveld te Putten, gemeente Putten (Gld.)*, ARC-Publicaties 121, Groningen. -Hulst, R.S., 1992: Putten, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1991, Amersfoort, 145. -Hulst, R.S., 1993: Putten, in *Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 1992, Amersfoort, 158. -Van Stormbroek, W., 1992: Opgraving van de boerderij op het Husselerveld, in *De Graver* 1-1, 57. -Van Stormbroek, W., 1992: Resultaten van de opgraving in Hussel, in *De Graver* 1-2, 2-4.

Site	539
Site type	settlement
Province	Utrecht
Municipality	Houten
Place	Houten
Toponym	Burgemeester Wallerweg
Completeness	part of site (not delimited)
Excavated area in ha	0.035
Soil type	clay
Start date	725
End date	900
Description	During this small scale excavation two Carolingian wells were found, situated only a short distance from each other. The wood from one Carolingian well has been analysed and comprised two pieces of alder and four pieces of oak. In the Carolingian wells several pottery fragments were found, including two rim sherds: type Dorestad W IIC and type Dorestad W IIIB. Furthermore, pottery from the Merovingian and Carolingian period was found all over a debris layer from a Roman stone villa-building.
Literature	-Bogaers, J.E., 1957: 'Houten', in *Bulletin Koninklijke Nederlandse Oudheidkundige Bond*, *14, *53, *109. -Van Dockum, S.G., 1990: Houten in the Roman Period, part I: a stone building in Burgemeester Wallerweg, in *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 40, 297-323.

Site	540
Site type	settlement
Province	Utrecht
Municipality	Houten
Place	Houten
Toponym	Loerik Binnenweg (terrein 21)
Completeness	part of site (not delimited)
Excavated area in ha	1.2
Soil type	clay
Start date	725
End date	900
Description	The settlement seems to have been continiously inhabited during the late Roman period, the Merovingian period and Carolingian period. Of the latter period two wells have been identified. The wood from one Carolingian well (W6) has been analyzed and consisted of poplar. At least one large ditch (G5) seems to date in the Carolingian period. The other Carolingian features includes many pits with an unknown function. One pit (K3) contains a large amount of charcoal, burnt clay and bone. The archeobotanical remains from several Carolingian pits have been analyzed. The carbonised seeds of crops mainly consist of barley. The early medieval pottery conprises handmade pottery and wheel turnded Carolingian pottery, mostly Badorf and Mayen wares. During the excavation only two Carolingian metal objects were found, namely a silver denerius of Charlemagne (793-812 AD) and a obolus of Pippin II of Aquitain (838-852 AD). The bone material from Carolingian features includes cattle, pig, sheep/goat, horse, red deer, beaver and brown bear. Because of the lack of Carolingian house plans at this site, it is believed that the core of the Carolingian settlement was situated elsewhere, maybe at site 22 (south of site 21). Here only two small trial trenches were excavated. The trial trenches contained no Carolingian features, but 46 sherds of pottery from the Carolingian period suggest Carolingian habitation. At site 22 an early medieval curtis or manor (Houten - Loeriker hofstede) is assumed. The village of Houten is mentioned in two early medieval written records, namely the list of estates of the St.-Maartenschurch of Utrecht (before 860) and the abbey of Werden (before 1000?).
Literature	-Van Benthem, A./H.M. van der Velde, 2002: *Archeologisch onderzoek bij de Binnentuin te Houten (terrein 39A-22)*, ADC-rapport 118, Bunschoten. -Henderikx, P.A., 1987: *De beneden-delta van Rijn en Maas. Landschap en bewoning van de Romeinse tijd tot ca. 1000*, Hollandse Studiën 19, Hilversum. -Vos, W.K./J.J. Lanzing, 2001: *Houten-Zuid 'Het archeologisch onderzoek op terrein 21'*, ADC Rapport 36, Bunschoten.

Site	541
Site type	settlement
Province	Utrecht
Municipality	Utrecht
Place	Utrecht
Toponym	Buurkerk
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	clay
Start date	-
End date	-
Description	In the 1930's, a small quantity of Carolingian pottery was found during the restoration of the Buurkerk parish church. In 1996 a small excavation was conducted in the Buurkerk. Besides Carolingian pottery from layers a waste pit was found with a fragment of amber and the tips and pedicles of a set of deer antlers.
Literature	-Van Rooijen, C., 1994: Buurkerk, in T.J. Hoekstra/E.M. Kylstra (eds.), *Archeologische en bouwhistorische kroniek van de gemeente Utrecht 1991-1992*, Utrecht, 7-11. -Van Rooijen, C., 2010: Utrecht in the early medieval period. An archaeological analysis of its topography and a discussion of the location of the Stathe vicus, in *Medieval and Modern Matters* 1, 155-196. -Wynia, H.L./C.A.M. van Rooijen, 1998: Buurkerkhof, in D.H. Kok/J.P. ter Brugge/S.G. van Dockum/F. Vogelzang (eds.), *Archeologische kroniek provincie Utrecht 1996-1997*, Utrecht, 75-79.

Site	542
Site type	settlement
Province	Utrecht
Municipality	Utrecht
Place	Utrecht
Toponym	Stadhuis
Completeness	off-site/isolated feature
Excavated area in ha	-
Soil type	clay
Start date	773
End date	806
Description	During the excavation beneath the town hall Carolingian pottery and a revetment were found. The wood of the revetment was dendrochronologically analysed and had a felling date between 773 and 806 AD.
Literature	-Van der Mark, R./H. Hundertmark, 2000: Stadhuis, in D. Kok/K. van der Graaf/F. Vogelzang (eds.), *Archeologische kroniek provincie Utrecht 1998-1999*, Utrecht, 125-142. -Van Rooijen, C., 2010: Utrecht in the early medieval period. An archaeological analysis of its topography and a discussion of the location of the Stathe vicus, in *Medieval and Modern Matters* 1, 155-196.

Site	543
Site type	settlement
Province	Gelderland
Municipality	Druten
Place	Puiflijk
Toponym	Meerstraat 9 - Tabaksveld
Completeness	part of site (not delimited)
Excavated area in ha	0.09
Soil type	clay
Start date	725
End date	900
Description	During excavations a ditch containing Carolingian pottery was found. However, most of the features, including sunken huts, seem to date to the high middle ages.
Literature	-Corver, B.A./T. Nales, 2010: *Inventariserend veldonderzoek d.m.v. een proefsleuf. Meerstraat 9, Puiflijk, gemeente Druten*, B&G rapport 978, Noordwijk. -De Winter, J., 2013: *Voortgangsverslag. A-12.0424, Puiflijk, Meerstraat 9, Definitief Onderzoek*, BAAC Voortgangsverslag A-12.0424, 's-Hertogenbosch.

Site	544
Site type	settlement
Province	Gelderland
Municipality	Overbetuwe
Place	Elst
Toponym	Grote Molenstraat
Completeness	off-site/isolated feature
Excavated area in ha	-
Soil type	clay
Start date	680
End date	970
Description	The site consists of Late Merovingian and Carolingian revetments and fill up of the inside bend of the gully of Santacker-Driel (location 5b - Distelheuvel Oost). In a trial trench c. 120 wooden posts of revetments were found. The associated fill up contained many Roman finds, but seems to have an early medieval origin. Postst from several row provided radiocarbon dates of 680-900, 710-970 AD and 820-1020 AD. The different rows of posts show variations in both the wood used in their construction and construction methods. . Nearby the revetments an early medieval dump in a gully was discovered (location 5a). Both sites (location 5a and 5b) probably extend beyond the research area. The archaeologcial remains seem to belong to an early medieval settlement located west of Elst - Grote Molenstraat. In the excavation report the Carolingian find material is not discussed separately for each site. The early medieval pottery consists mostly of late Merovingian and Carolingian material.
Literature	-Janssens, M., 2010: *Plangebied Grote Molenstraat. Gemeente Overbetuwe. Archeologisch onderzoek: proefsleuven en opgraving*, Raap-Rapport 2075, Weesp.

Site	545
Site type	settlement
Province	Gelderland
Municipality	Nijmegen
Place	Nijmegen
Toponym	Benedenstad
Completeness	part of site (not delimited)
Excavated area in ha	1.7
Soil type	sand
Start date	725
End date	900
Description	In the period 1979-1989 the State Archaeological Service conducted many excavations in the Lower Town of Nijmegen. The trenches on both sides of the Grotestraat contained most Carolingian settlement features and finds. Unfortunately, a large part of the Carolingian settlement was disturbed by cellars and cess pits from the late medieval and post medieval period. Furthermore, the excavations have not been fully analysed, especially the early and high medieval phases. So far, only the Carolingian features and finds of the excavations of Waalkade - Achter de Vismarkt have been fully analysed. Here, several (waste) pits, post holes, a sunken hut with an oven, ditches and a fence seem to date to the eighth and ninth centuries. In this period habitation was quite sparse and seems to have had an agrarian character. The Carolingian pottery includes Badorf-, Mayen- and *Kugeltopf*-ware, which in many cases was found in later featurs. The Carolingian settlement in the Lower Town of Nijmegen might be seen as a rural manor in the shadow of the royal palace on the Valkhof. However, the exact relation between these two topographical elements of early medieval Nijmegen is not clear.
Literature	-Den Braven, J.A., 2009: *Urbs Noviomagum. Een archeologische analyse van het urbanisatieproces van Nijmegen tussen ca. 725-1250 na Chr.*, (unpublished MA thesis University of Amsterdam) Amsterdam. -Clevis, H.H.C.C., 1990: *Nijmegen: investigations into the historical topography and development of the Lower Town between 1300 and 1500*, Utrecht (PhD thesis University Utrecht). -Clevis, H.H.C.C./J.R.A.M. Thijssen, 1990: Nijmegen, van huis tot huis in de archeologie en de geschiedenis, in H. Sarfatij (ed.), *Verborgen steden. Stadsarcheologie in Nederland*, Amsterdam, 139-144. -Sarfatij, H., 1990a: De vroege topografie van middeleeuws Nijmegen (7e-13e eeuw): enige hoofdlijnen uit de archeologie van de Benedenstad, in J.B. Berns/P.A. Henderikx/P.H.D. Leupen/E.N. Palmboom/R. Rentenaar (eds.), *Feestbundel aangeboden aan prof. dr. D.P. Blok ter gelegenheid van zijn 65ste verjaardag en zijn afscheid als hoogleraar in de nederzettingsgeschiedenis in verband met de plaatsnaamkunde aan de Universiteit van Amsterdam*, Hilversum, 321-330. -Sarfatij, H., 1990b: Dutch towns in the formative period (AD 1000-1400). The archaeology of settlement and building, in J.C. Besteman/J.M. Bos/H.A. Heidinga (eds.), *Medieval archaeology in the Netherlands. Studies presented to H.H. van Regteren Altena*, Assen/Maastricht, 183-198.

Site	546
Site type	settlement
Province	Gelderland
Municipality	Wijchen
Place	Wijchen
Toponym	De Pas
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	sand
Start date	725
End date	1200
Description	The JAWN 1968 mentions site b with early medieval iron production and many wells made of tree trunks and medieval layers with Badorf- and Pingsdorf-pottery. The exact location of this site is unknown.
Literature	-Tuyn, W., 1968: De Pas te Wijchen, in *Jaarverslag AWN Nijmegen e.o.* 1967, 1.

Site	547
Site type	settlement
Province	Gelderland
Municipality	Wijchen
Place	Wijchen
Toponym	De Pas
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	sand
Start date	800
End date	1100
Description	During the reparcelling 'Rijk van Nijmegen-Noord te Woezik' in 1967 and 1968 amateur archaelogist found a considerble amount of medieval pottery, which was dated by J.G.N. Renaud in the eleventh century. It is plausible, however, that at least a part of the pottery dates from the Carolingian period. Most of the pottery consists of red *Kugeltopf*-pottery with waffle imprints on the shoulder. Also some sherds of Pingsdorf-pottery and late reliefband-amphora were found. Some of the medieval pottery is associated with pits and post holes, probably from rectangular house plans. In addition, during the excavation by the IPL (Leiden University) several rectangular pits were found, of which at least one is of medieval origin. It is not impossible that these pits are in fact sunken huts.
Literature	-Van den Broeke, P.W., 1984: Nederzettingsvondsten uit de ijzertijd op De Pas, gem. Wijchen, *in Analecta Praehistorica Leidensia* 17, Leiden. -Hulst, R.S., 1967: Archeologisch nieuws - Wychen, in *Bulletin Koninklijke Nederlandse Oudheidkundige Bond*, *118. -Thijssen, J.R.A.M., 2009: Middeleeuws en jonger aardewerk, in E.N.A. Heirbaut, *Proefsleuvenonderzoek te Woezik-Noord - Gemeente Wijchen. Resten van een crematiegrafveld uit de ijzertijd en bewoning uit de volle middeleeuwen*, Archeologische Berichten Wijchen Rapport 6, Nijmegen, 13-16. -Tuyn, W., 1968: De Pas te Wijchen, *Jaarverslag AWN Nijmegen e.o.* 1967, 1.

Site	548
Site type	settlement
Province	Gelderland
Municipality	Wijchen
Place	Wijchen
Toponym	Tienakker / Oud Ravensteinseweg
Completeness	part of site (not delimited)
Excavated area in ha	1.17
Soil type	sand
Start date	725
End date	900
Description	The site was seriously disturbed in the early 1970's by soil extraction, leveling and construction of new buildings. Medieval pottery (early *Kugeltopf* with imprints and Badorf-pottery) which was found here by amateur archaeologists in 1971 suggested Carolingian habitation. During excavations by BAMN nine medieval wells were found. The date of these wells is not always clear, but at least two wells made of hollowed tree trunks seem to date from the (late) Carolingian period. The medieval settlement was located on a Roman villa-site (1th-3th century), which seems to have been continuously inhabited from the fourth century to the high medieval period. The medieval settlement and associated arable fields probably also include the area directly north of the Oud Ravensteinseweg. Here, in 1972/73 amateur archaeologists found Roman and medieval pottery, including a few sherds from the late Merovingian and Carolingian period. Also, in 2012 RAAP recovered several finds from the Roman to the medieval period and a few ditches, pits and post holes beneath the Oud Ravensteinseweg.
Literature	-Den Braven, J.A., in prep.: Scherven uit de oude doos. Het vroegmiddeleeuwse aardewerk van de Oud Ravensteinseweg te Wijchen, in *Jaarverslag AWN* 2013, Nijmegen. -Flokstra, L.M., 2012: *Plangebied Oud-Ravensteinseweg te Wijchen. Archeologisch vooronderzoek: een bureau- en inventariserend veldonderzoek (verkennend booronderzoek)*, RAAP-notitie 4155, Weesp. -Goossens, E./L.M. Flokstra, 2008: *Archeologiebeleid gemeente Wijchen*, RAAP-rapport 1828, Weesp. -Heirbaut, E.N.A./H. van Enckevort (eds.) 2011: *De verdwenen villa van De Tienakker. Archeologisch onderzoek naar het Romeinse verleden van Wijchen*, Archeologische Berichten Wijchen Rapport 4, Nijmegen. -Willems, W.J.H., 1981: Romans and Batavians. A regional study in the Dutch Eastern River Area I, in *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 31, 7-218. -Willems, W.J.H., 1984: Romans and Batavians. A regional study in the Dutch Eastern River Area II, in *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 34, 39-331.

Site	549
Site type	settlement
Province	Gelderland
Municipality	Lingewaard
Place	Huissen
Toponym	Bergerden (site 2)
Completeness	off-site/isolated feature
Excavated area in ha	-
Soil type	clay
Start date	725
End date	900
Description	During a trial excavation a relative large number of Carolingian pottery sherds (*Kugeltopf*, Badorf and Mayen ware) was found. Although a Carolingian settlement is assumed here, none of the excavated features could be dated with certainty in the Carolingian period. The southern part of site 2 consists of an old gully.
Literature	-Van Enckevort, H., 2008: *Sleuven in het land. Inventariserend veldonderzoek op twee nederzettingsterreinen uit de ijzertijd, Romeinse tijd en vroege middeleeuwen in Bergerden - gemeente Lingewaard*, Archeologische Berichten Nijmegen Rapport 9, Nijmegen.

Site	550
Site type	settlement
Province	Gelderland
Municipality	Wijchen
Place	Wijchen
Toponym	Mr. van Coothlaan, Valendrieseweg
Completeness	part of site (not delimited)
Excavated area in ha	0.009
Soil type	sand
Start date	725
End date	900
Description	During this archaeological supervision, three Carolingian pits were found. A waste pit with charcoal, small bronze fragments, bronze slag and pottery was dated by the excavaters in the tenth-eleventh centuries, but based on the pottery a Carolingian date is also possible.
Literature	-Magnée-Nentjes, M., 2007: *Archeologisch onderzoek in de Meester van Coothlaan en de Valendriesweg te Wijchen*, Archeologische Berichten Nijmegen - Briefrapport 3, Nijmegen.

Site	551
Site type	settlement
Province	Gelderland
Municipality	Wijchen
Place	Wijchen
Toponym	kruispunt Touwslagersbaan/Oude Klapstraat
Completeness	part of site (not delimited)
Excavated area in ha	0.01
Soil type	sand
Start date	725
End date	900
Description	The site has been investigated during several excavation campaigns. To2: This small scale excavation consisted of only one trial trench. The site turned out to be partially disturbed in the recent past. In total, seven pottery sherds date to the early medieval period, possibly to the Carolingian period (Mayen-pottery?). Four features - including two wells - are dated in the same period, based on these pottery finds. Unfortunately, the features could not fully be analysed due to safety aspects and the appreciative character of the excavation. The exact date for the early medieval features is therefore not clear. The stratigraphically oldest well (S1) was made out of a hollowed tree trunk. The wood turned out not to be suitable for dendrochronological research. The few finds from this well, including three pottery sherds, suggest an early medieval date. The same applies to two features found only a few meters southeast of the early medieval wells. Hee1: During the archaeological supervion in the Herenstraat (directly north of de Touwslagersbaan) several medieval wells (of which some perhaps have a Carolingian date) and other settlement features were found. In trench 4 a (waste) pit was found with late Merovingian and Carolingian pottery, Roman brick (tegula and imbrex) and tuff. In the same trench also a (waste) pit with only Carolingian pottery was found. Most of the early medieval pottery seems to date to the (late) Merovingian period; only two fragments of wheelturned (Badorf)pottery date from the Carolingian period. The early medieval settlement features found in the Touwslagersbaan/Herenstraat area may belong to the same settlement as Tienakker (site 548).
Literature	-Diepeveen, M./H. van Enckevort 2008: *Archeologisch onderzoek aan de Touwslagerbaan 38 te Wijchen*, Archeologische Berichten Nijmegen Briefrapport 13, Nijmegen. -Van Enckevort, H./J. Wildenberg, 2009: *Waterputten onder de Herenstraat te Wijchen*, Archeologische Berichten Nijmegen Briefrapport 47, Nijmegen.

Site	552
Site type	settlement
Province	Gelderland
Municipality	Wijchen
Place	Wijchen
Toponym	Klapstraat / De Elsthof
Completeness	part of site (not delimited)
Excavated area in ha	0.06
Soil type	sand
Start date	725
End date	900
Description	In the most northern trial trench an early medieval well was found, but unfortunately not excavated further. Based on associated pottery finds, the well probably dates to the late Merovingian or Carolingian period. The fill of the construction pit of the well also contained a small piece of bronze: probably the pouring canal of a casting mold. The well lay beneath an anthropogenic layer with pottery of the fifth-tenth centuries. A few (waste) pits and post holes containing early medieval pottery will probably date to the high or late middle ages based on stratigraphy: they seem to have been dug from the previouly mentioned layer. In the most southern three trial trenches six possibly medieval features were found, including: - a (waste) pit with a few fragments of Merovingian or Carolingian wheelturned pottery and handmade *Kugeltopf*-pottery - a (waste) pit with a few fragments of Merovingian or Carolingian wheelturned pottery
Literature	-Heunks, E., 2007: *Wijchen Klapstraat/De Elsthof, gemeente Wijchen; Archeologisch vooronderzoek: een bureau- en inventariserend veldonderzoek (verkenning en kartering)*, RAAP-Rapport 1479, Weesp. -Magnée-Nentjes, M., 2008: *Zoeken naar een middeleeuwse nederzetting. Een inventariserend archeologisch onderzoek aan de Klapstraat in Wijchen,* Archeologische Berichten Nijmegen Briefrapport 19, Nijmegen. -Magnée-Nentjes, M., 2008: *Archeologisch onderzoek langs de Klapstraat in Wijchen*, Archeologische Berichten Nijmegen Briefrapport 22, Nijmegen.

Site	553
Site type	settlement
Province	Gelderland
Municipality	Wijchen
Place	Hernen
Toponym	Zandbergseweg / Het Hoge Rot
Completeness	part of site (not delimited)
Excavated area in ha	0.32
Soil type	sand
Start date	675
End date	900
Description	During the archaeological research (consisting of 7 trial trenches and archaeological supervision afterwards), it emerged that large parts the excavation area had been disturbed recently. A relative high number of early medieval pottery sherds (n>25), suggests a settlement on the flanks of an old river dune. The wheelturned pottery consists of a few sherds of Merovingian coarse ware (including regional products like Ubbergen-pottery) and 23 sherds of Carolingian Mayen- and Badorf-pottery. Part of the handmade *Kugeltopf*-pottery may also date to the Carolingian period. The early medieval pottery was concentrated in the middle part of the excavated area. In the northern part only one early medieval (waste) pit was found, based on the associated pottery.
Literature	-Diepeveen, M./E.N.A. Heirbaut, 2010: *Bewoningssporen vanaf de prehistorie tot heden en Romeinse graven op Het Hoge Rot in Hernen, gemeente Wijchen*, Archeologische Berichten Nijmegen Briefrapport 70, Nijmegen.

Site	554
Site type	settlement
Province	Gelderland
Municipality	Arnhem
Place	Arnhem
Toponym	Musiskwartier
Completeness	part of site (not delimited)
Excavated area in ha	0.44
Soil type	sand
Start date	725
End date	900
Description	Most settlement features, including house plans and a sunken hut, seem to date to the high Middle Ages. Only a few features may date to the (late) Carolingian period.
Literature	-Van der Mark, R./P.J.L. Wemerman/A. van de Venne, 2009: *Aan de Beek, op de Beek. 1000 jaar wonen aan de St. Jansbeek te Arnhem. Basisrapportage archeologisch onderzoek Arnhem-Musiskwartier*, Arnhem.

Site	555
Site type	settlement
Province	Gelderland
Municipality	Wijchen
Place	Wijchen
Toponym	Het Sterrenbos-Centrumplan
Completeness	part of site (not delimited)
Excavated area in ha	-
Soil type	sand
Start date	725
End date	900
Description	In 1992, amateur archaeologists found 24 wells and 1 cess pit during the construction of an underground parking lot in the centre of Wijchen. Most of the wells (of which 23 were made out of hollowed tree trunks) seem to date to the high middle ages. Unfortunately, the find material from the different wells was mixed. Based on the relative high number of Carolingian pottery, at least one well probably dates to the Carolingian period. The Carolingian pottery consists of Badorf-, Walberberg- and Mayen-pottery and early handmade *Kugeltopf*-pottery. The medieval settlement area partially overlaps with the Merovingian cemetery of Wijchen.
Literature	-Heeren, S./T. Hazenberg (eds.), 2010: *Voorname dames, stoere soldaten en eenvoudige lieden. Begravingen en nederzettingssporen uit het neolithicum, de laat-Romeinse tijd en Middeleeuwen te Wijchen-Centrum*, Hazenberg Archeologische Serie 1, Leiden. -Tuijn, W., 1992: Middeleeuwse bewoning in Wijchen-centrum, in *Jaarsverslag AWN Nijmegen e.o.* 1992, 19-24.

Site	556
Site type	settlement
Province	Gelderland
Municipality	Wijchen
Place	Bergharen
Toponym	De Weem
Completeness	part of site (not delimited)
Excavated area in ha	0.07
Soil type	sand
Start date	725
End date	900
Description	During a small scale excavation a number of medieval settlement features (eighth-thirteenth centuries) were found. The Carolingian pottery consists of Badorf-, Hunneschans- and Mayen-pottery. Part of the grey wares and the handmade *Kugeltopf*-pottery may also date to the Carolingian period.
Literature	-M.C. Diepeveen/H. van Enckevoort, 2009: *Aan de rand van een middeleeuwse nederzetting. Archeologisch onderzoek in de bouwput van het Kulturhus in Bergharen, gemeente Wijchen*, Archeologische Berichten Nijmegen Rapport 9, Nijmegen.

Site	557
Site type	settlement
Province	Utrecht
Municipality	Utrecht
Place	Utrecht
Toponym	Domplein
Completeness	part of site (delimited)
Excavated area in ha	-
Soil type	clay
Start date	750
End date	900
Description	In 1949, during the excavations on the Domplein by prof. dr. A.E. van Giffen, one Carolingian well was discovered on the Domplein (the former Roman fort Trajectum). This well (located in trench XX, directly north of the Heilige Kruis Kapel) contained an almost complete pitcher of Badorf pottery (type Dorestad WIIC), which is nowadays on permanent display in the exhibation 'DomUnder'.
Literature	-Wynia, H., 2013: Graven op het Domplein, in *DompleinMagazine, Special I: Het Domplein in Utrecht*, Utrecht, 9-15.