RICK BONNIE

CADASTRES, MISCONCEPTIONS & NORTHERN GAUL

A CASE STUDY FROM THE BELGIAN HESBAYE REGION

CADASTRES, MISCONCEPTIONS & NORTHERN GAUL

Sidestone Press

RICK BONNIE

CADASTRES, MISCONCEPTIONS & NORTHERN GAUL

A CASE STUDY FROM THE BELGIAN HESBAYE REGION

Published by Sidestone Press, Leiden
www.sidestone.com
Sidestone registration number: SSP41920001

ISBN 978-90-8890-024-2

Cover illustration: A talus from the Belgian Hesbaye region
Cover design: Daniëlle Mirtenbaum
Photography: Tim Vanderbeken (courtesy of the *Zuid-Oost-Limburgse Archeologische Dienst*)

Layout:
Rick Bonnie
Daniëlle Mirtenbaum

IN LOVING MEMORY OF MY MOTHER

Maria Bonnie-van Hautem

(1957-2007)

Contents

List of Illustrations

Maps

Figures

Tables

Abbreviations

AAL	Acta Archaeologica Lovaniensia
AAS	Amsterdam Archaeological Studies
AB	Archaeologia Belgica
AD	*Archaeological Dialogues*
ANRW	Temporini, H. and W. Haase (1972 – present), eds., *Aufstieg und Niedergang der römischen Welt*. Berlin.
BABesch	Bulletin Antieke Beschaving
BAR	British Archaeological Reports ("IS" = International Supplements)
BG	Caesar, *De Bello Gallico*, in H.J. Edwards (1930) *The Gallic War*. Loeb Classical Library. London.
BJ	*Bonner Jahrbücher*
CAI	Centrale Archeologische Inventaris, Belgium
Germ.	Tacitus, *Germania*, in M. Hutton *et al.* (1970) *Tacitus: Five volumes*. Loeb Classical Library. London.
JRA	*Journal of Roman Archaeology*
JRS	*Journal of Roman Studies*
Jul.	Suetonius, *Divus Julius*, in D. Hurley and J.C. Rolfe (1997) *Suetonius*. Loeb Classical Library. Cambridge.
KJ	*Kölner Jahrbuch*
MEFRA	*Mélanges de l'École Française de Rome Antiquité*
OJA	*Oxford Journal of Archaeology*
OLL	*het Oude Land van Loon*
PGRM	Provinciaal Gallo-Romeins Museum, Tongres
PPGRM	Publikaties van het Provinciaal Gallo-Romeins Museum
ROB	Rijksdienst voor het Oudheidkundig Bodemonderzoek
RR	Columella, *Res Rustica,* in H.B. Ash *et al.* 1977. *On Agriculture*. Loeb Classical Library. London.

SAR	*Scottish Archaeological Review*
WA	*World Archaeology*
ZOLAD	Zuid-Oost-Limburgse Archeologische Dienst

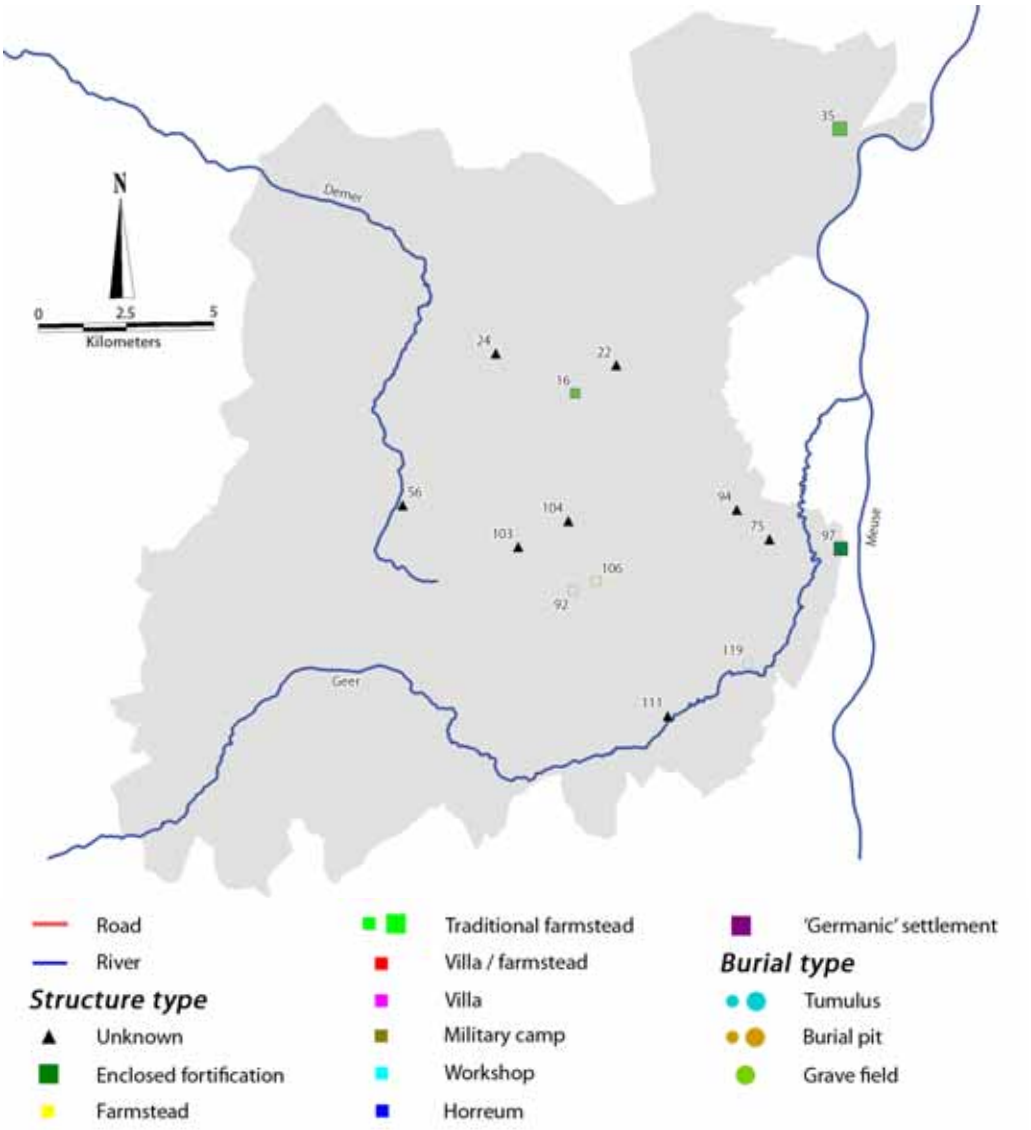
Acknowledgements

This book is a somewhat adapted version of my master's thesis, which I wrote while studying Classical Archaeology at Leiden University. During the course of preparing and finishing this thesis I have had help of various people and institutions who have (often unconsciously) given me many new ideas and directions in developing this thesis. Not only archaeologists, but also friends and family. The person to whom I am indebted the most gratitude is Tim Vanderbeken, who works at ZOLAD, as he first introduced me to the topic of Roman cadastres and to his hypothesis of a possible cadastre in the region around Tongres. I would also like to thank him for his enthusiasm, his helpful comments, the numerous photographs he sent me, the several informal meetings at Riemst, Belgium, and for showing me around in the Hesbaye region.

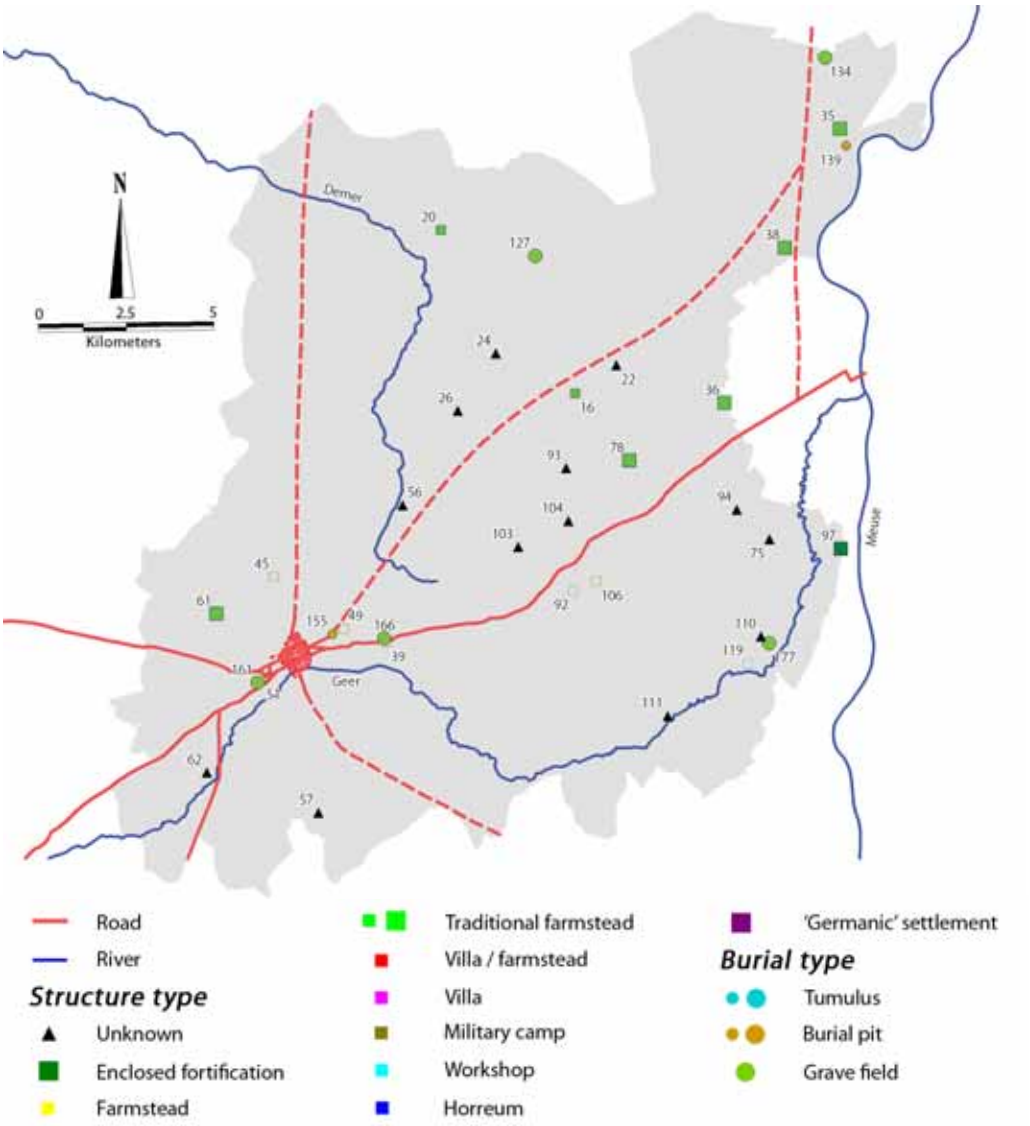
In addition, I would like to thank first of all my two supervisors at Leiden, John Bintliff and Jasper de Bruin, for their critical but helpful comments. Furthermore, I am indebted many thanks to the following persons for their help, comments, ideas and using their archives/libraries/inventories: Linda Bogaert, Guido Creemers, Wim Dijkman, Tessa de Groot, Karen Jeneson, Erwin Meyleman, John Peterson, Nico Roymans, Guido Schaepenbeek, Gilbert Soeters, Alain Vanderhoeven, Frank Vermeulen, Miguel John Versluys. Finally, I thank my girlfriend Daniëlle, for help, support and forbearance at all stages of the thesis and the publishing of this book.

I want to dedicate this book to my mother, Maria Bonnie-van Hautem. After a battle of more than ten years against breast cancer, she sadly lost the fight on June 12th 2007. This is for you, mom!

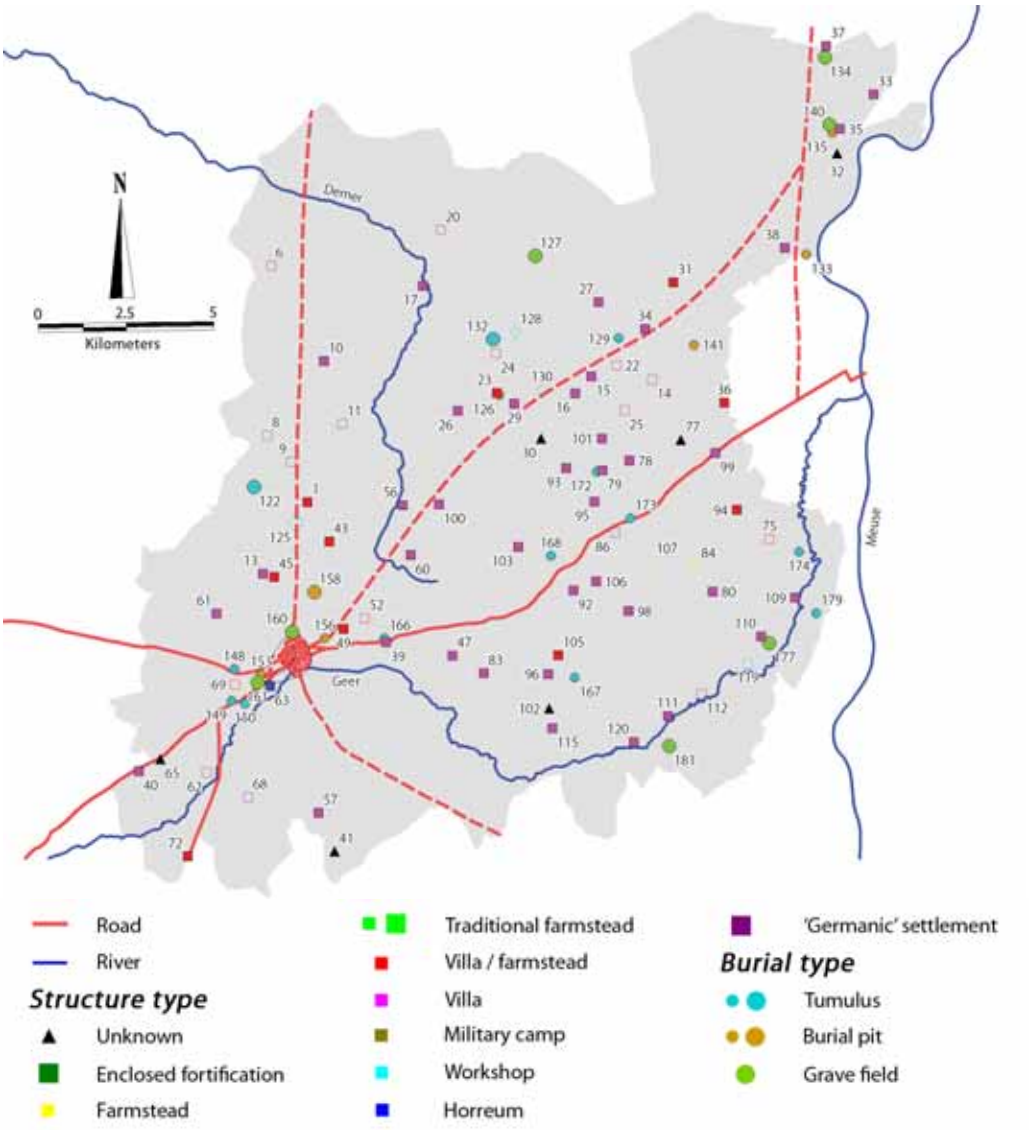
Rick Bonnie, May 2009



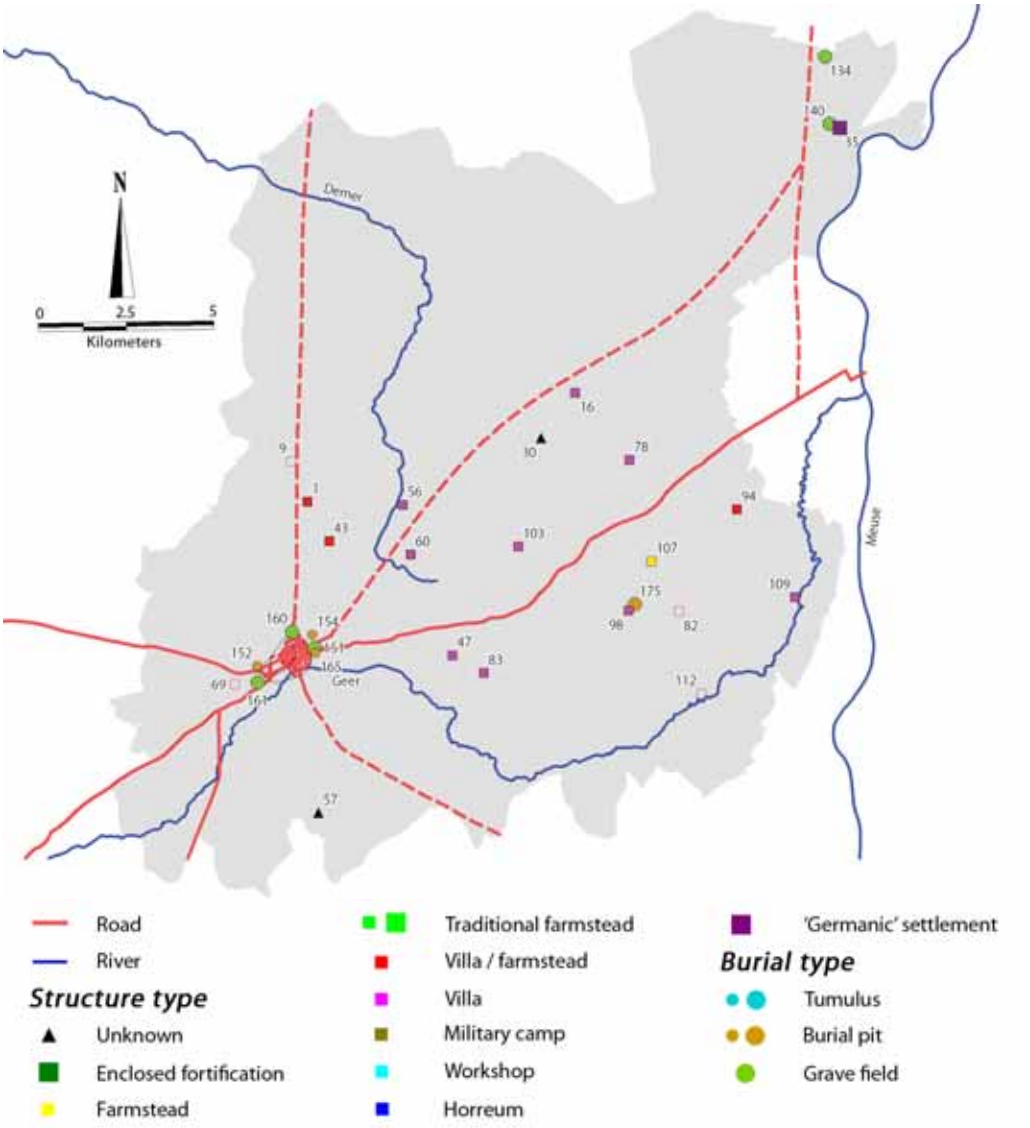
Map 1. Distribution of Late Iron Age sites in the Tongres-Maastricht area. Open symbols are tentative interpretations (numbers correspond to catalogue).



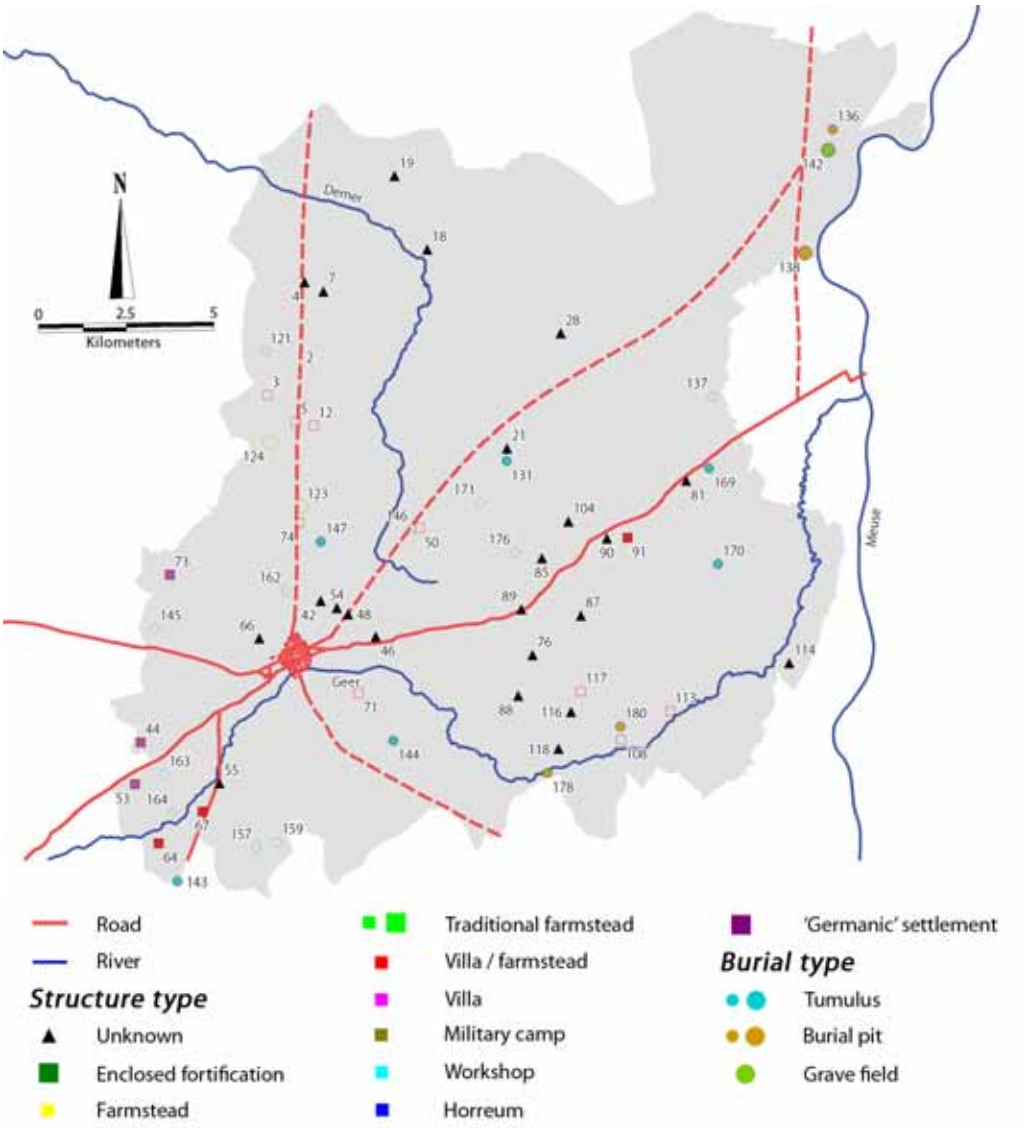
Map 2. Distribution of Early Roman sites in the Tongres-Maastricht area. Open symbols are tentative interpretations (numbers correspond to catalogue).



Map 3. Distribution of Middle Roman sites in the Tongres-Maastricht area. Open symbols are tentative interpretations (numbers correspond to catalogue).



Map 4. Distribution of Late Roman sites in the Tongres-Maastricht area. Open symbols are tentative interpretations (numbers correspond to catalogue).



Map 5. Distribution of undated Late Iron Age to Late Roman sites in the Tongres-Maastricht area. Open symbols are tentative interpretations (numbers correspond to catalogue).

I

Introduction

"Contemporary beliefs, visions and myths can and often do lead to metaphorical and physical (re)construction of the archaeological record, and constructed landscapes are particularly susceptible to such 'freezing' of meaning."

Knapp and Ashmore 1999: 10

In the 1950s, two Belgian scholars believed to have found evidence for what is called a *centuriatio* around the Roman provincial city of Tongres (Mertens 1958; Ulrix 1959).[1] That both publications appeared around the same time seems not remarkable; the subject of Roman cadastration was quite a popular topic. All this gradually changed after the late 1970s. While some scholars, chiefly French and Italian, still focus on Roman cadastres, this seems more an exception than the rule. Due to several reasons, interest and believe in the existence of Roman cadastres outside the Mediterranean sphere gradually abandoned scholarly thinking.[2] This led to the many reservations about the possible existence of Roman cadastres in the Northwestern provinces, we might even say dispute their existence (e.g. Willems 1987: 50; Jones 1989: 129; Hart 1998: 112-113; Heimberg 2003: 127; van Enckevort *et al.* 2005: 3; Mattingly 2006b).

Several studies in the past 40 years, however, have demonstrated that Roman cadastres outside of the Mediterranean were not that uncommon as one might think (e.g. Legros 1970; Chouquer and Favory 1980; Peterson 1993; Chouquer 1996b). In continuation of this work, the aim of this book is to study the possibility of a Roman cadastre around Tongres, the capital of the *civitas Tungrorum* and one of Northern Gaul's most important cities.[3] As aforementioned, some have preceded this work (Mertens 1958; Ulrix 1959; Melard 1986). However, it appears that these studies are based on a methodological fallacy. The historical and spatial association of historical-geographical features like roads, ditches and other modern boundaries have been viewed as a pre-given here, while in fact this has to be determined. This results in the association of modern linear features with Roman boundaries without any evidence for it except for the conclusion

itself. As the direct relation between the Roman cadastre and the linear features in the modern landscape is not clearly present due to changes in this landscape or other means, the conclusion does not hold. This, therefore, asks for a new analysis in the case of Tongres. By associating historical-geographical evidence with the archaeological evidence from the region, I hope to find out if there is evidence for a cadastre in this area during the Roman period.

In addition to the analysis, attention will be paid to the consequences of the existence or non-existence of a cadastre on a socio-cultural level. The impact of Rome's conquest changed the landscape quite dramatically. Not only in environmental and economic terms, but also in socio-cultural spheres. Of course, cadastre's primal goal as a tax instrument assumingly would have been Rome's foremost conscious reason to implement cadastres. Yet, the act of socio-cultural change caused the native people to gradually integrate into the Empire. Some have stressed therefore more attention on cadastres as a socio-cultural actor (Clavel-Lévêque 1988; Purcell 1990; Campbell 1995; 1996; Cuomo 2000; Alcock 2002: 40-50). As studies on cultural interaction – whether termed Romanization or not – point out there was a constant negotiation between natives and Romans, which often is inscribed in their material culture. In light of this, it seems naïve to imply that cadastres were not affected by this negotiation (cf. Chouquer 1989: 96). Indeed, as described in the Dutch Research Agenda for Archaeology (NOaA), changes in agricultural systems can be used to analyse the nature of cultural interaction in a region (van Enckevort *et al.* 2005: 12; see also Roymans 1996: 100).

Here, we might add the concept of continuity. Recently, more emphasis has been placed on a more social, ideational and dynamical explanation of landscapes (Ingold 1993; Schama 1995; Lemaire 1997; Kolen 2005) and have shown that memory, often inscribed in landscapes, can play a large role in the transmission of culture, as well as in an eventual change (Rowlands 1993; Witcher 1998; Alcock 2002). That cadastres can show continuity can be deduced from evidence of the Orange cadastre and those in the French Saône plain. In the Orange cadastre (Southern France) large areas of land were given back to the Tricastini, an indigenous group of people inhabiting this area prior to the Romans (Piganiol 1962: 54-55, 139; Woolf 1998: 145). In the Saône plain traces of fields considered to be native, were after Roman conquest implemented within a Roman cadastre (Chouquer and De Klijn 1989: 282). As more factors affect the negotiation of cultural change in the case of Roman cadastration (see below), this example serves only as an illustration that the implementation of cadastres was affected (in some degree) by negotiation. Hence, playing a role in the transmission of culture.

Roman name	Length / Surface
Pes	0,2957 m
Actus	35,48 m (= 120 *pedes*)
Centuria	709,60 m (= 20 *actus*)
Iugerum	0,2518 ha
Heredium	0,5036 ha (= 2 *iugera*)
Centuria	50,3532 ha (= 200 *iugera*)

Table 1. Conversion table of Roman survey measurement units.

A static concept?

Studies on Roman land-surveying have extensively been published in the last 40 years.[4] Scholars have on the basis of historical evidence examined how surveys

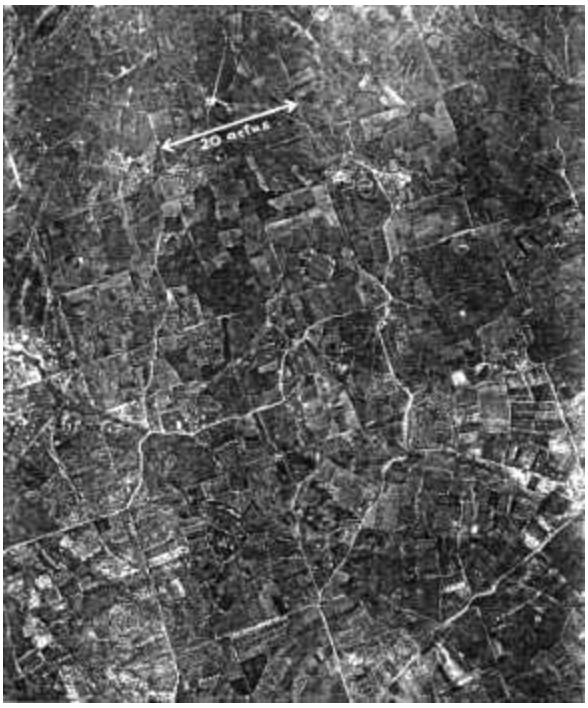


Figure 1. An obvious Roman cadastre in Croatia of 20 by 20 *actus* (Bradford 1957: 175).

were actually carried out in the field, what were the procedures and instruments involved and what the mathematical knowledge of the surveyors amounted to. They have speculated on their training, on the influence of Greek mathematics, on how the role of the surveyors changed over time and on their social composition. Therefore, we will not going to repeat all the basics here. However, the aforementioned lack of interest of other scholars in Roman cadastration is not without a reason, but seems to be based on several misconceptions regarding these basics. As will be explained below, this false idea lies within both its history of research and the Roman historical sources like the Corpus Agrimensorum.[5] It has formed and still forms, in the words of Peterson (1993: 6), "a conceptual barrier to the progress of research".

The earliest known discovery of a Roman cadastre was by the Danish naval Captain C. Falbe, who in 1833 noticed that the squares round ancient Carthage had sides of 708 m. He was the first to associate this with the 20 by 20 *actus* square known as a *centuria*. It was the first ever found *centuriatio* of the Roman world. Some years later, in respectively 1846 and 1848, the Italian E. Legnazzi and the German P. Kandler too identified a Roman centuriation. This time it was in the Italian Po valley and the area around Trieste. The reason why Falbe, Legnazzi and Kandler could identify these cadastres was because their boundaries were preserved in the form of roads, paths and stone walls. After these initial discoveries, also in other parts of the Mediterranean world – like Syria, Croatia and other parts of Northern Africa and Italy – such remains were identified as part of a Roman centuriation.[6]

But was a Roman cadastre always a visible and obvious chequerboard of squares within the landscape which even in our days was physically identifiable?

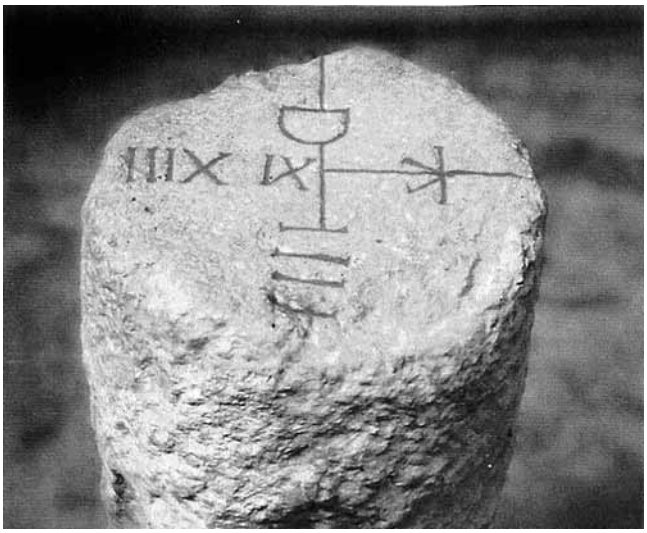


Figure 2. Boundary stone from a Roman cadastre at the 'Museo della Civiltà Romana', Rome (Rubini 2007: fig. 1).

The fact that the study of Roman cadastres to a large extend is based on the notion of physical boundaries has caused that modern scholars only tend to associate the obvious traces as clear proof for cadastres. All seem to have remained seated in their static notion on similarities and obviousness (e.g. Jones 1989: 129). Aerial photographs like those of Bradford (1957) may have strengthened this view, since his clearest examples tend to make the strongest impression (see figure 1). This assumption that cadastres were always obvious, however, is not true and has led to ignore the less obvious (and perhaps more typical) ones. Roman cadastres like those at Orange and Lacimurga (Spain) were, for instance, not known to us and not visible until numerous fragments of administrative tablets were discovered on which these cadastres were drawn (see Piganiol 1962; Clavel-Lévêque 1993).

In the same year Kandler found traces around Trieste, the first translation of the Corpus Agrimensorum, a (now fragmentary) collection of Roman land-surveyors' manuals, was published under the title *Die Schriften der römischen Feldmesser* (Blume *et al.* 1848). With this source the second problem of the obviousness of cadastres arises: the translation of the Latin concept of *limites*. Scholars oversimplified this concept by often translating the term with a 'road' or 'path', even when a *limes* signified a 'boundary' (e.g. Dilke 1971: 134; Chevallier 2001). As a result, a Roman cadastre would have been a visible orthogonal street network. Isaac (1988: 128) however noted that there are two different meanings for *limes*: 'military road' or 'boundary'. The latter meaning, a boundary, derives from surveyors' vocabulary and was in most cases used as a purely conceptual line (Isaac 1988). Thus, boundaries do not have to be necessarily associated with roads. This is also shown by writings in the Corpus Agrimensorum. Siculus Flaccus, for example, talks of cases in which villas may be placed on top of *limites* (Blume *et al.* 1848: 158). This could of course not been the case were these *limites* visible in the sense of a road. Furthermore, Faustus and Valerius mention that some *limites* were roads or walls, while on others they "put nothing but caused deep ditches to be dug" (Blume *et al.* 1848: 307-308). It seems as if the word 'nothing' in this sentence reveals the attitudes of these surveyors, since it were the symbols

of the cadastre that interested them and only very scanty physical structures were needed to symbolise its borders like stones, trees, or (small) mounds of earth (Peterson 1993: 13). A *limes* is therefore thought to be a conceptual boundary, which in some cases is made visible by, for instance, walls or roads, yet in others remained invisible (see Terrenato 2007: 153). This is of course troublesome for scholars studying material remains as archaeologists do, since immediate visibility cannot be used as the criterion for existence. It may explain therefore the refusal by some.

A false reading of the Corpus Agrimensorum also contributed to the oversimplification that *centuriatio* only was implemented around *coloniae* (e.g. Heimberg 2003: 127). On the first page of Frontinus' *De agrorum qualitate* in the Corpus Agrimensorum was written that "if the land is 'divided and assigned' (i.e. centuriated) it is the land of a *colonia*" (Peterson 1993: 7). However, as some have shown, Frontinus' phrase must be interpreted as a simplified statement (Dilke 1971: 88, 178; Peterson 1993: 7-8). Hinrichs (1974: 172-173) has argued that the Corpus Agrimensorum was a training manual for civilian land-surveyors who also had a quasi-judicial role. This makes it reasonable to assume that the more elementary texts were simplified, where detail was supplemented later by examples from real life, which could introduce apparent contradictions. We know, for example, of a Roman surveyor Hyginus, who reports in a later passage on centuriated, but non-colonial, land in the Roman province of Pannonia, present day Hungary (cf. Favory 1983: 126, n. 263). As Dilke (1971: 178) puts it: "the territory centuriated could be that of a *municipium*, a town incorporated into the Roman state with or without Roman citizenship".[7] This illustrates that centuriation would have not only been applied around *coloniae*.

Lastly, scholars seem to use the Latin term *centuriatio* signifying all regular Roman land planning (e.g. Ando 2006: 127; Mattingly 2006a: 288). However, as several scholars have argued not all Roman surveys had to be centuriations, but could also be of a different kind (e.g. Dilke 1971). It thus seems that scholars have pictured Roman cadastres too static by ignoring the less obvious and overlooking several important passages in and aspects of the Corpus Agrimensorum. Dilke's (1971) *The Roman land surveyors*, the sole general English publication on this topic, as well as the fact that the first English translation of the Corpus Agrimensorum was published only very recently (Campbell 2000), might in some way have contributed to these misconceptions.[8]

Figure 3. Boundary stone marking the end of the Roman city of Arles, France (*after* Chevallier 2001).

As an example from the Northwestern provinces this has created the tendency to confuse parcellation with cadastration (e.g. Renes 1988: 38-39; Van Londen 2006). The former is the division of land plots between different owners, while the latter means the surveying of land as aid for tax collection and the allocation of land. One does therefore not rule out the other. That Renes (1988: 39) views the parcellation found in the German Eiffel region and in England as evidence against the existence of Roman cadastres in these regions seems therefore a false conclusion, possibly created by the aforementioned misconceptions. Indeed,

when we take a closer look at the material evidence, we see that both could have operated together. For instance, in the Hambacher Forst in the German Rhineland, the land holdings all show a curtilage between three and ten *iugera*, which conforms to the size of a parcel as mentioned by Renes. Yet, if we look at the size of the land belonging to the land holdings by measuring the distance between these land holdings than it conforms to a size of 50 ha, e.g. one century of 20 by 20 *actus* (Gaitzsch 1986: 406-410; see also Compatangelo 1989: 170).

Evidence for surveyors

What is of importance when studying the possibility of a Roman cadastre are the questions why such attempts have been made by scholars and why others object to the notion of cadastres. In addition to the general aforementioned misconceptions, there is some regional criticism towards the possibility of Roman cadastres in the loess region of Northern Gaul. A recent study of Roman villas in Southern Limburg (the Netherlands) has argued that their location was influenced by the presence of water and favoured a location on top of the plateaus (Zandboer 2006). Some seem to have equated this evidence with the dismissal of the possibility for Roman cadastres (T. de Groot, pers. comm.), while others have viewed the region's hilly character as a reason for dismissal (Willems 1987). Both objections however are unfounded. The first is based on a false reasoning, since the influence of location does not rule out the possibility of a Roman cadastre. The second seems also unsubstantial, since many regions with prove of Roman cadastres like those around Florence, Valence and Orange share the same natural characteristics as Southern Limburg.

Is there then evidence other than the cadastres themselves for Roman land-surveyors in Northern Gaul? The Mediterranean region has given us boundary stones indicating a particular cadastral boundary (see figure 2), as well as tablets, grave stones and instruments that relate to land-surveyors. No boundary stones, however, have so far been found in Northern Gaul. But near the town of Rindern (Germany), close to Nijmegen, a stone was found on which was inscribed *fines vici*, meaning 'end of the vicus' (for a possible resembling stone from Arles, see figure 3). Furthermore, also evidence for the tools of a land-surveyor has been found. Recently, in the Roman settlement of Schiedam-Polderweg (the Netherlands), which lays in the northern frontier zone, a pair of dividers has been found that is dated to the second or third century AD (Van Londen 2006: 187). This pair of dividers closely resembles the bronze ones found in an excavated Pompeian surveyor workshop. More to the south, in the Bavarian village of Pfünz, another survey instrument has been found. This so-called *groma* was the principal survey instrument for the Romans and is one of the most complete examples found in the Empire (Dilke 1971: 69). These finds show that land-surveyors, which would have arrived together with the Roman army, seem to have been present in the region (Mattingly 2006b).

Structure of book

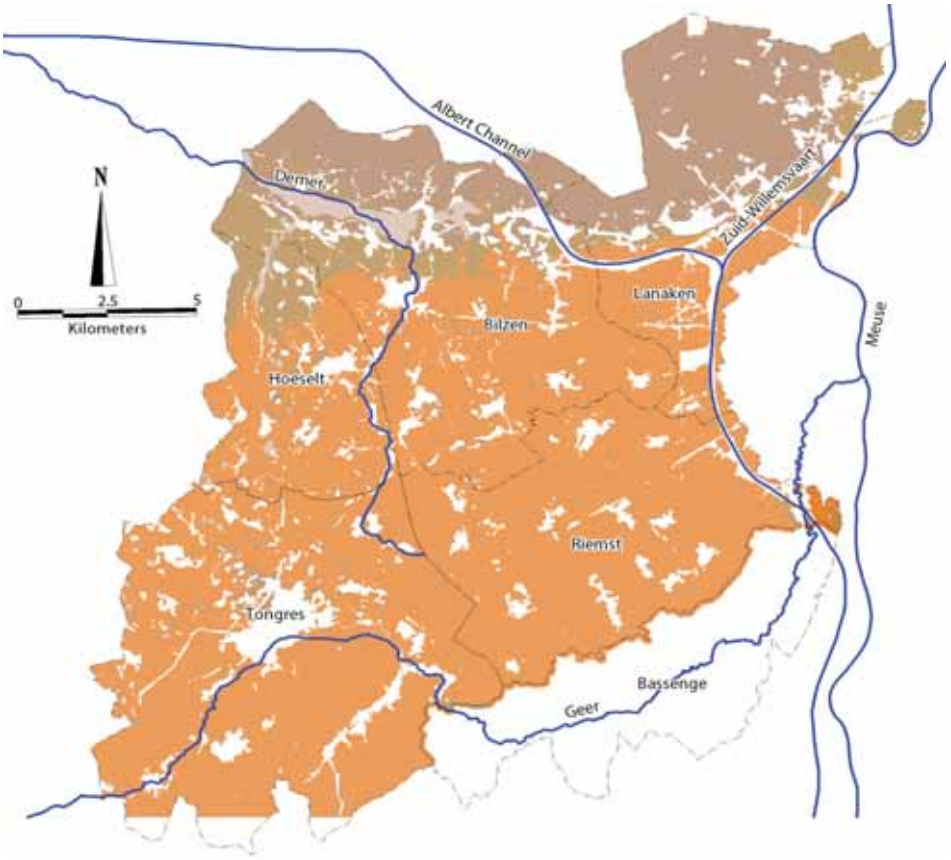
We will start in chapter 2 by introducing our study area, the Tongres-Maastricht area, with a focus on its setting and physical geography. The following chapter (3) sets the region into a broader framework of the history and archaeology of the Roman Empire, most notably the Northwestern provinces. The Roman period finds and sites around Tongres have in the past been synthesized by several people (Bauwens-Lesenne 1968; Lux 1970; A. Claassen 1973; Duurland 2000; Knaepen 2001). However, to my knowledge few have tried to put them in a broader framework and discussion concerning Roman cultural interaction in Northern Gaul. Moreover, of the three studies that try to put the region into a broader framework of the Northwestern provinces (Mertens 1964; A. Vanderhoeven 1996; 2002), the two most recent ones focus predominantly on Tongres' Early Roman period. Therefore, this chapter is larger in size than might have been expected.

Chapter 4 focuses its attention upon the methods and techniques applied to identify Roman cadastres, most notably aerial photography and maps. A lot of criticism has been given towards these techniques. However, in the last 20 to 30 years many new methods and techniques have been introduced, what makes the criticism nowadays unfounded. After this, we will briefly set out earlier proposals for a Roman cadastre in the Tongres-Maastricht area and adjacent regions and explain in detail the methodological fallacies on which the arguments are based that support the proposals.

Chapters 5 and 6 are the focal points of this book, where we will examine the possibility of a Roman cadastre in the Tongres-Maastricht area. In chapter 5, the theory and methodology of the analysis will be explained and a relationship between the modern and Roman features will be established. In chapter 6, the latter analysis will be tested and it will be tried to define the size of the squares within the cadastre, as well as the size of the cadastre itself.

The next chapter (7) will use the proposed Roman cadastre from chapters 5 and 6 and will study the socio-political ownership of the rural landscape of the Tongres-Maastricht area. Stated differently, who owned the rural settlement sites and its land and how does it seem to develop during the Roman period? The conclusion (chapter 8), finally, will repeat the general conclusions and, in addition, will set the proposed cadastre against a socio-cultural development of the area. The main question that will be considered here is to what extend an imposed cadastre could have contributed to socio-cultural changes in the region.


N
0
40
80
Kilometers
Amsterdam
Netherlands
Germany
Cologne
Brussels
Tongres
Belgium
Lux.
France


N
0
2.5
5
Kilometers
Albert Channel
Demer
Zuid-Willemsvaart
Lanaken
Bilzen
Meuse
Hoeselt
Riemst
Tongres
Bassenge
Geer

2

Setting and Physical Geography

The Tongres-Maastricht area is situated in the east of modern Belgium covering an area of approximately 350 km^2. It follows mainly the route of the most prominent Roman road in Northwestern Europe, which stretched from Boulogne-sur-Mer on the Atlantic coast to Cologne in the German Rhineland. Except for Tongres, also the municipalities of Bilzen, Hoeselt, Lanaken, Riemst (all prov. of Limburg) and Bassenge (prov. of Liege) are included in this study (see figure 4). The study area follows municipal boundaries rather than natural ones for three reasons: (1) due to problems with overlapping national maps and different coordinate systems, an integration of a Belgian and Dutch area within the Tongres-Maastricht area was not possible; (2) the study area falls almost entirely within one specific natural region, the Hesbaye; (3) the most southern municipality, Bassenge, is included because it follows the course of the river Geer, which can act as a southern border between the Hesbaye and the Condroz (see below). Of course, present day national and communal borders need to be overlooked when studying the Roman period. Therefore, comparisons with and examples of other neighbouring areas will be implemented in this study.

In Roman days, the Hesbaye was part of the so-called 'villa landscape', a belt to the south of the Roman frontier zone that stretched from Northern France to the German Rhineland (see figure 4). The belt's name is because of its shared characteristics of house architecture, type of soil and economic subsistence. In the past, this 'villa landscape' has been the subject of several discussions regarding the possibility of Roman cadastres (see chapter 4). Yet, the choice for the Tongres-Maastricht area above other adjacent areas is because of several reasons. First, in contrast to certain neighbouring 'villa' areas (see Van Enckevort *et al.* 2005), there is a relatively loose discussion on cultural interaction and the Rome's influence. Its discussion seems to be mostly focused on the Early Roman development and the city of Tongres (e.g. Vanvinckenroye 1996; Nouwen 1997; A. Vanderhoeven 1996; 2001; 2002). The countryside, on the other hand, seems often forgotten (exceptions are Duurland 2000; Knaepen 2001), although its abundant Roman findings. Secondly, while land allocation in the 1950s and '60s also changed this area's landscape, it seems that the rapid urbanization, industrialization and land allocation changing the West's landscape during the 19th and 20th centuries

Figure 4 (previous page; above). Overview map of Northwestern Europe. The dotted square represents the Tongres-Maastricht area.

Figure 5 (previous page; below). Soil map of the Tongres-Maastricht area.

had less impact here as in other 'villa' areas (see chapters 3 and 4). For example, compared to the southeastern part of the Dutch province of Limburg, it becomes clear that, although in terms of geography and pre-industrial landscape it may have closely resembled each other, this landscape has suffered much more from these changes.

Physical geography

The most prominent river running through and connecting this area with Roman settlements like Nijmegen, Xanten and Voorburg and military camps along the northern *Limes* is the river Meuse. It practically follows the eastern border of the Tongres-Maastricht area from south to north with only a minor interruption at Maastricht, where the river runs through the city centre rather than following the Dutch-Belgian border (see figure 5). At Ketsingen (municipality of Tongres) the river Demer, a sub-river of the river Scheldt, rises and flows in a southeast-northwest direction out of the study area. Lastly, just south of Tongres a smaller river, the Geer, flows along the southern border of the Tongres-Maastricht area in the direction of Maastricht where it flows into the river Meuse. It rises at Lens-Saint-Servais, from where it flows in a mostly southwest-northeast direction. Like the river Meuse, the Demer and Geer could have been used as trade routes during Roman times (see Eckholdt 1980). Although the Geer is now a fast-flowing river which is unnavigable, it is known that until the 17th century this river was still navigable for ships (Vanvinckenroye 1985: 50-52). The watershed between the rivers Scheldt and Meuse appears to run in a linear line from Tongres to Maastricht. It has been proposed that the Roman road between Tongres and Maastricht on purpose followed this watershed in order to cross no unnecessary rivers (Mertens 1987: 16). Apart from these larger rivers, there are several smaller ones that would have been unsuitable for navigation.

Geomorphologically, three distinctive zones within the Tongres-Maastricht area can be separated using the rivers Demer and Meuse as guidelines; the Campine region, the Hesbaye and the Meuse valley. North of the river Demer, if we draw an imaginable line from where the river leaves the study area to the Meuse, the gently undulating sandy plateau of the Campine region forms the most northern part of the Tongres-Maastricht area. The Campine plateau is part of a chain of sandy plateaus situated along the southern part of the North Sea. This chain is separated from the sea by a belt of Holocene peat and clay areas. It developed in the Late Pleistocene, under the relatively dry conditions of the Late Glacial period, when a layer of fine sands was deposited by the wind covering the older fluvial deposits. Due to several constraints concerning physical conditions of soil and climate, this area "is dominated in all phases by mixed agrarian strategies, often with an emphasis on extensive animal husbandry" (Roymans and Theuws 1999: 4). Intensive cereal production was not realized here until the introduction of artificial fertilizer in the 19th century. This and the fact that it was not part of the active Roman frontier zone caused the region to be seemingly less interesting for the Romans (see Slofstra 1991; Roymans 1996: 58-88; Roymans and Theuws

Figure 6. Painting by Charles Wellens (ca. 1900) of a small road in the Belgian Hesbaye region (courtesy of Genootschap Charles Wellens).

1999: 2-5). Only some sites like Hoogeloon developed into Roman villas (Slofstra 1991: 161-165). Moreover, this development happened only during the third century AD, what is later as in the adjoining 'villa landscape' to the south.

South of the imaginable line of the river Demer starts the Hesbaye. The Tongres-Maastricht area lies for 80 to 90 percent within this sloping landscape that stretches out over the entire southern part of the province of Limburg, the eastern part of the provinces of Flemish and Walloon Brabant and the northwestern part of the province of Liege (see figure 6). The height in general is remarkably higher than the Campine region and varies between 50 m in the east up to 220 meters on the plateaus in the southwest. Its name derived from the Carolingian shire *Haspinga* situated here during the late-ninth and tenth century AD. In addition to the Campine in the north, the region borders off to the Dutch province of Limburg and the Herve region in the east, the sandy Flemish lowlands in the west and the Condroz in the south.

The Hesbaye, as the rest of the 'villa landscape', derives its suitability as a farming region by its geomorphologic characteristics. Loess, which covers this region, stands out as a soil because of its fertility. As with the coversand region of the Campine, it was formed during the Late Glacial period of the Late Pleistocene. The very fine, light material was swept from bare regions on the edges of the glaciers and deposited in regions with denser vegetation like Northwestern Europe (Lebret and Lautridou 1991: 152). Loess consists largely of quartz grains and lime. The very fine grains ensure good aeration, water storage and mineral levels, which creates the loess' fertility (Mücher 1973; Haase *et al.* 2007). As a result of this fertility, the region has attracted farming communities for several millennia starting with the so-called *Linearbandkeramik* people around 5000 BC. Yet, loess is also particularly susceptible to erosion (see Bouten *et al.* 1985; Berendsen 1998: 23-24; Rommens *et al.* 2005). The development of farming land aggravates the erosion of the soil even more. It seems not strange, therefore, that

farmers in the area create ways to stop this erosion by planting trees and bushes which results in the creation of talus (Breteler and van den Broek 1968: 119-121; see chapter 5).

Within the Hesbaye the loess deposition can be divided into two distinct zones: the 'dry Hesbaye' and 'wet Hesbaye' (see Dudal and Baeyens 1957; 1958; Baeyens 1968). The first zone is the largest and stretches out over most of the study area. It is characteristic for its open fields and an almost total absence of wooded terrain. It is, moreover, more suitable for agriculture than the 'wet Hesbaye'. The fact that the 'dry Hesbaye' exists out of one large loess plateau slanting in a northeastern direction, causes that most of the valleys and streams also flow in this direction. In order to improve the agricultural structure, a large-scale land reallotment during the 1950s and '60s has taken place here (Anonymous 2000: esp. 7). Due to this, many traces of the historical landscape and archaeological sites have gone lost (Spits 1963; Breteler and van den Broek 1968: 127; Anonymous 2000: 20-23; Duurland 2000: 4). The 'wet Hesbaye' is located in the north of the study area, in the north of Hoeselt. It forms a transitional zone from the Campine coversand to the 'dry Hesbaye'. This is a result of along-track size sorting by northerly winds (see Dudal and Baeyens 1957; Schwan 1986). It is more wooded and less fertile than the 'dry Hesbaye' because it is even more susceptible to erosion than loess soils in general. This is caused by the impermeability of the tertiary clay and grind layers underneath the loess, as well as the thinner loess deposition.

The last geomorphologic region is the Meuse valley, a riverine sediment only found along the river Meuse in the municipality of Lanaken (see Paulissen 1973; Heeren 1976; Vleeshouwer and Damoiseaux 1990: 51-54, 79-90). Its soil has in general a good drainage quality and is, therefore, suited for all sorts of cultivation. One needs to be precautious, however, with floods caused by an increase of water in the river Meuse. There are two sorts of depositions, occurring in different periods, that need to be distinguished. First, old riverine clay is deposited in the Late Pleistocene, what causes a coarse deposition of sand, grind and boulders. Much more important, however, is the younger riverine clay deposited during or after the Roman period, which is much finer than the older clay (Duurland 2000: 4; Vleeshouwer and Damoiseaux 1990: 79-90). In most areas the younger is deposited on top of the older clay. Yet, old riverine depositions can still be visible above ground.

3

Historical and Archaeological Framework

The previous chapter focused on the setting and physical geography of the Tongres-Maastricht area. We have seen that especially the loess zone was a favourable region to settle. This chapter will give a historical and archaeological overview of the Tongres-Maastricht area starting from the Late Iron Age to the Late Roman period (see table 2). The overview will be set in a context of the development of the Northwestern provinces.Attention will particularly be paid to the development of house types, its surroundings and the socio-cultural interaction. Furthermore, we want to examine how the favourable condition of the fertile soil, in addition to the closeness of trade routes like the route from Bavay to Cologne and the Meuse, was exploited during the Roman period.

Table 2. Periodization discussed in this book.

Period	Date
Middle Iron Age	475 - 250 BC
Late Iron Age	250 - 57 BC
Early Roman	57 BC - 70 AD
Middle Roman	70 - 270 AD
Late Roman	270 - 450 AD
Merovingian	450 - 800 AD

It is chosen to include the period prior to Caesar's arrival in the discussion for several reasons. First, the Tongres-Maastricht area does not provide a precise chronology for the Late Iron Age as in other areas like the German Rhineland, Northern France and the Trier area (Roymans 1990: 5-7; see also Haselgrove 1996: 135-138). Especially the Late Iron Age-Early Roman transitional phase is a matter of debate. This causes difficulties with the dating of sites. Secondly, because a study focusing on socio-cultural interaction enhanced by the Romans requires background knowledge of the pre-Conquest situation in the region.

Late Iron Age (250 - 57 BC)[9]

According to Caesar (*BG* 2.3.4; 2.4.10; 6.2.3; 6.32.1) the Tongres-Maastricht area was part of the land of the *Germani Cisrhenani*. They were a Germanic group of people "living on this side of the Rhine", which could be subdivided into five smaller tribes (i.e. Caesar and Tacitus' *civitates*): the Eburones, Aduatuci, Condrusi, Paemani and Segni (see figure 7). Later Roman historians adopted Caesar's stance. Only Tacitus (*Germ.* 28) considered Caesar's commentary as doubtful and viewed the name *Germani Cisrhenani* as a fabrication that later was adopted by the people themselves.

Caesar seemed right in concluding that the five 'Germanic' tribes were different from the 'Celtic' to the South. They probably did not belong to the actual

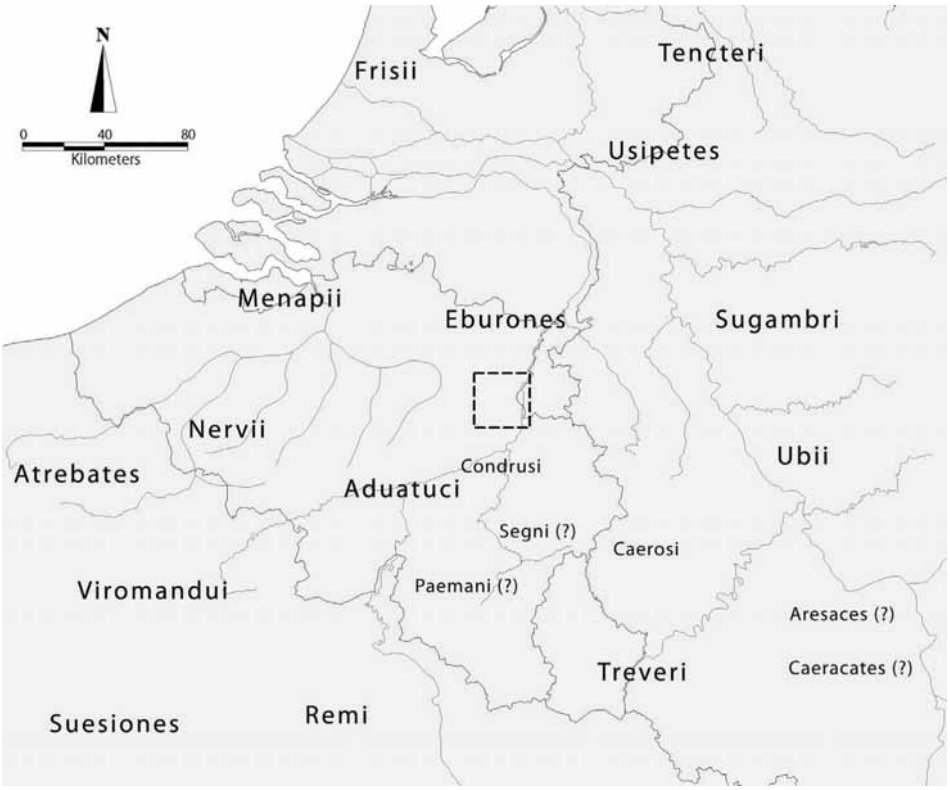


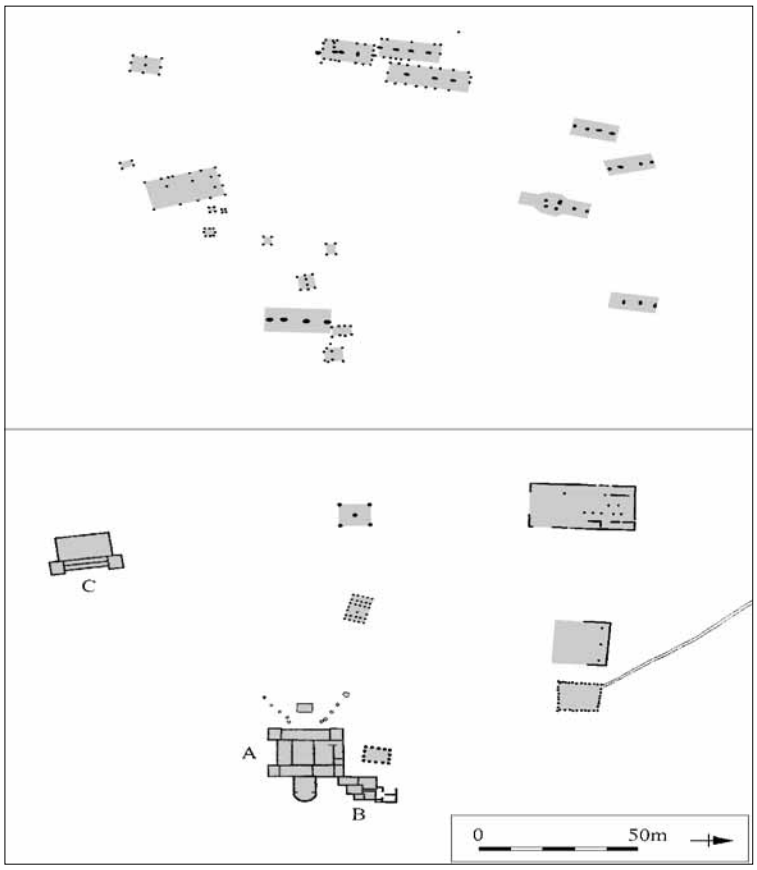
Figure 7 (above). Tribes inhabiting Northern Gaul prior to the Roman conquest (*after* Roymans 1990).

Figure 8 (next page). The Middle Iron Age to Early Roman period hamlet (top) and the Middle Roman period villa at Neerharen-Rekem (*after* Caroll 2001; adapted from De Boe 1986). A. main house; B. bathhouse; C. secondary house.

'Germanic' tribes, who according to linguistic studies in the first half of the first century BC still lived in Scandinavia and North and Central Germany (Roymans 1990: 12). Hachmann *et al.* (1962) have attested that the language of the people living in the most northern part of Gaul, where the *Germani Cisrhenani* lived, and the adjacent areas in Northwestern Germany relate to both the Germanic and Celtic language, but could not be definitively ascribed to one of these language groups. Roymans (1990: 264-265; cf. Nouwen 1997: 33) has argued, therefore, that the *Germani Cisrhenani* were part of the peripheral zone of both the Celtic and Germanic core areas. Societies living in this zone seem to have been less complex and less stratified than those in the core areas.

Such less complex and less stratified societies seem to have had a segmented structure that could be subdivided into four levels: *civitas*, *pagus*, local group and household (see Roymans 1990: 18-23). Since it is unknown if these people regarded themselves as belonging to one of the higher socio-political levels (e.g. Germans, Eburones or even that of a *pagus*), it cannot be regarded as a state like society (see Roymans 1983; 1990; see below). Life was probably focused on a lower socio-political levels as the local group, which Caesar and Tacitus assimilated with their *familia* and *domus*.

The social groups lived in small settlements with several houses, granaries, trash and storage pits, and (sometimes) wells and had a primary agricultural function (see Roymans 1990: 171-174 for a list of sites). An example of such a settlement in the Tongres-Maastricht area is Neerharen-Rekem (De Boe 1982;



1985; 1987). Its occupation period is dated from the Middle Iron Age to the Early Roman period. The 1980s excavation uncovered amongst other things, some eleven two-aisled house plans (i.e. *wohnstallhaüser*) probably constructed in a wattle-and-daub technique (see figure 8). Yet, not all of them date to the Iron Age. Slofstra (1991: 149) places some six or seven of these houses in the Early Roman period.

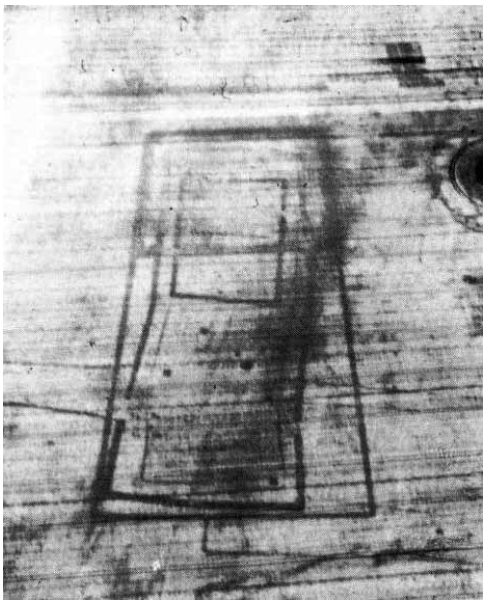
As noticed with the Neerharen-Rekem's two-aisled houses, it is hard to recognize different occupation phases in Late Iron Age (and Early Roman) settlements. We do know, however, that the two-aisled house plans succeeded the three-aisled ones. This transition took place around the start of the Middle Iron Age period, when the Hallstatt period became the La Tène period. Burials do attest this transition period too. Where the Hallstatt period is known for its urnfields with ditches surrounding the mounds, the La Tène period sees a remarkable absence of these surrounding ditches while inhumation starts to replace cremation (Roymans 1990: 255). Evidence from the burial sites of Neerharen-Rekem and Maaseik, just north of the Tongres-Maastricht area, show this (De Boe 1986; Janssens 1977).

Roymans (1996: 42-58; cf. Joachim 1982: 158) recently argued that the type of Late Iron Age houses in Northern Gaul relate to the type of subsistence economy. He points to a remarkable difference between the clay, peat and sandy areas of the northern frontier zone of Northern Gaul, where an emphasis was laid upon pastoral farming, and the loess regions of Northern France, central

Belgium and the German Rhineland, which was due to its fertility extremely suitable for corn production. The former region was characterized by the so-called Northwest European *wohnstallhaüser* like those of Neerharen-Rekem, while in the loess region sites like Eschweiler, Niederzier and Voerendaal only seem to show evidence for granaries and pits (Joachim 1980; Göbel 1992; Willems and Kooistra 1987: 31). While the smaller granaries of these sites are interpreted as outbuildings, the larger ones would be the houses. The difference in agrarian production seems, therefore, to be expressed in the tradition of house building.

Following Roymans, the Tongres-Maastricht area would be situated precisely on the border of these two zones (see chapter 2). Neerharen-Rekem, which is situated on the sand, features the Northwest European *wohnstallhaüser*, while the sites Valmeer-Boven het Kruis and Valmeer-Meerberg, which are situated on the loess, may tentatively be compared to the type of site like Eschweiler (Pauwels *et al.* 2000; 2002; Duurland 2000: 41). However, this pattern is not as compelling as it seems. The site of Rosmeer, for instance, still features a so-called *wohnstallhaus*, while situated on the loess (De Boe and Van Impe 1979: 5-26; De Boe 1989). Furthermore, two other sites Roymans identified as belonging to the northern zone are situated in the southern zone (one even in Luxemburg). Additionally, underneath several Roman *villae* found on the loess, a house type that developed from the *wohnstallhaus* has been found (see below). Lastly, the small sample of southern house types compared to the numerous Northwest European *wohnstallhaüser* may argue for a more moderate view too.

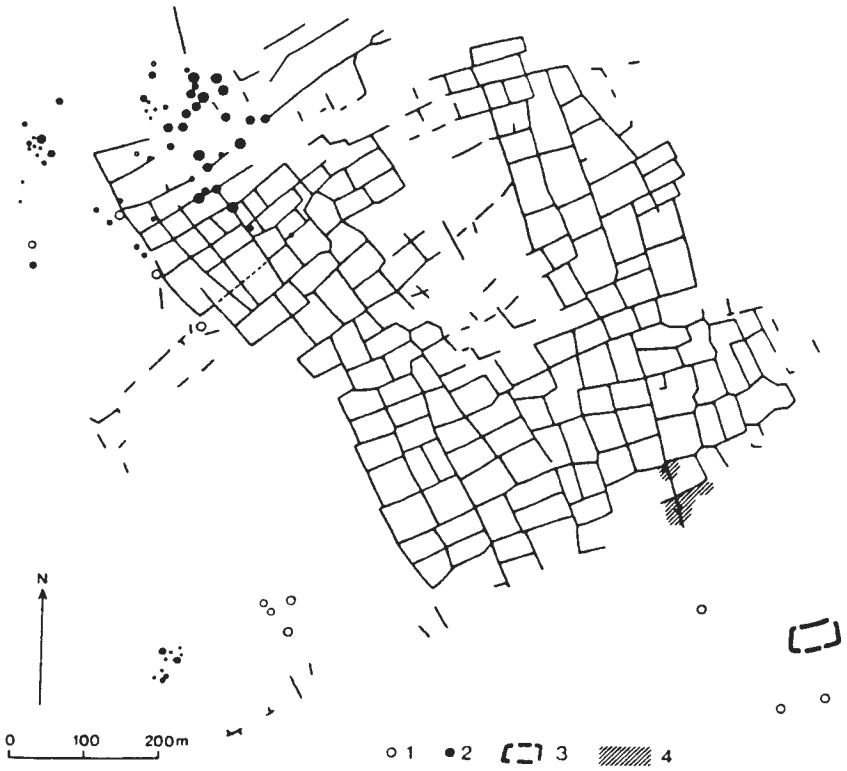
These are not the only drawbacks. Already Roymans' interpretation of the southern house type as different from the northern type seems questionable. For example, it has been suggested that the actual house plans, which had postholes less deep than those of the granaries, seem to have been more vulnerable to soil erosion than those of the granaries and therefore are lacking (Brongers and Woltering 1978: 24).[10] Furthermore, at both sites in Eschweiler, even in the largest granaries, large quantities of carbonized grain have been found, expecting a function of granary over that of house (Knörzer 1980: 452). Lastly, both Niederzier and Eschweiler-Laurenzberg seem to have been fortified settlements with a function as central deposit (Roymans 1990: 179). This function appears to rule out the possibility for houses at these sites. For the moment, therefore, there seems no reason to believe that the Tongres-Maastricht area and adjacent regions on the loess belonged to some kind of border region between Roymans' two zones. We, thus, must place the Tongres-Maastricht area within the Northwest European *wohnstallhaüser* region.



In several regions in Northwestern Europe we have evidence that such farmhouses were separated from their neighbours by enclosures. For example, south of the Tongres-Maastricht area, in the Aisne valley (Northern France), Haselgrove (1996: 152-155) has shown that from the late second century BC

Figure 9 (previous page). The site of La Theurace, Levroux, on an aerial photograph illustrating a *ferme indigène* around a farmstead (Buchsenschutz 1988).

Figure 10 (right). Celtic field-complex at Zeijen, Noordse Veld (prov. of Drenthe, the Netherlands). 1. late Neolithic-Bronze Age burial mound; 2. Iron Age burial mound; 3. Iron Age settlement (*after* Müller-Wille 1979).



the use of enclosure ditches around farmhouses seem to have been increasing (see figure 9). Over 65 of these so-called *fermes indigènes* that date to this period have been identified thus far by aerial photography or excavation. Also in other regions like Picardy and Somme these *fermes indigènes* can be found (Agache 1978: 93-197; Bayard and Collart 1996). It appears that some of these enclosures have been used for drainage of unsuitable land to settle. Haselgrove (1996: 152) relates this kind of field boundary, therefore, to the less fertile areas in the region, thereby suggesting that the spread of this boundary type is because of the rising population density during that time. Note, however, that some *fermes indigènes* have also been found on more fertile grounds, what may object this hypothesis.

To the north of the Tongres-Maastricht area, in the Dutch province of Gelderland, Brongers (1976) was the first in the Netherlands to find traces of a field system known as 'Celtic fields' (see figure 10).[11] These fields have been dated to the period of 600 BC to 200 AD (Brongers 1976: 63-64; Behre 2000), while some link them to the phase of demographic expansion from the Late Bronze Age onwards until around the Early Roman period (Gerritsen 2003: 180 and n. 194). Because these Celtic fields only slowly developed into the kind of networks we recognize by aerial photography today, it seems that – in the case of both dates – the heyday of the Celtic fields probably was during the later stage of their development, i.e. around the Middle and Late Iron Age (see Gerritsen 2003: 188-189). This network of square and rectangular fields was bounded by embankments, ditches or walls.

Also the Celtic fields seem to have arisen on those lands which did not seem

very fruitful for agriculture (see Gerritsen 2003: 246). Not only in the province of Gelderland, but also in many other peat and sandy areas throughout Northwestern Europe these kinds of field systems have been found (e.g. Müller-Wille 1979). The closest to the Tongres-Maastricht area are found in the Campine region (Van Impe 1977; Milikowski 1985; Vandekerckhove 1996; Gerritsen 2003: table 4.11).

If the Celtic fields can be related to the *fermes indigènes* of Northern France seems doubtful. First, although some of the *fermes indigènes* found in Northern France are connected to one another, most remain separate. Secondly, the *fermes indigènes* show different types of enclosures like a double ditch-system, and differed in shape (see Haselgrove 1996: 152-153). Lastly, *fermes indigènes* have an occupation site within the enclosed area, while in the case of Celtic fields the occupation sites were situated outside of the Celtic field. However, that they have something in common seems evident from the fact that both have been related to the less fertile lands (see Brongers 1976; Haselgrove 1996: 152). This may also explain why in the Tongres-Maastricht area and adjacent areas on the fertile loess thus far show no traces of Late Iron Age field systems. Only Neerharen-Rekem has ditches. Yet, when compared to other sites like Hoogeloon, it may be argued that these ditches more likely date to the Roman period than to the Late Iron Age (see Slofstra 1987; 1991: 148-150).

Another argument in favour of no Late Iron Age field system in the Tongres-Maastricht area would be that this area was part of the larger zone Roymans identified as a less complex and less stratified society (see above). Field systems like the Celtic fields and *fermes indigènes* suggest a development of social stratification (see Hingley 1984; 1990; Gerritsen 2003: 192). Since the Tongres-Maastricht area belonged to the less stratified and complex peripheral zones of the Celtic and Germanic heartlands, we may assume that a development of field systems would have occurred later than in other, less marginal regions. It seems likely that the idea of field systems would have slowly spread from the heartlands to its peripheries. Since – as will be shown below – Roman intervention changed the development of these communities considerably, it might even be that there never came such a particular field system.

That Iron Age communities in Western Europe were gradually becoming more stratified – in some areas maybe more than in others (see above) – is attested by the genesis of large enclosed fortifications around the third century BC throughout present day Belgium, Germany and France (see Nash 1976: fig. 1; Roymans 1990: fig. 8.12). The rise of these earthworks, or *oppida*, marks the start of urban development in Western Europe. However, what their exact function was seems to be a difficult matter. Due to the *oppida*'s differences, many different functions have been ascribed to these sites (Brunaux 1986: 9-11; Woolf 1993). Were they hiding places in times of unrest or places where commercial transactions took place? Nevertheless, despite the uncertainty if these pre-Roman communities identified themselves with cultural groups, states or individual smaller chiefdoms (see above), at least, these *oppida* seem to suggest a developing centralization (Brun 1995; Derks 1998: 183-185).

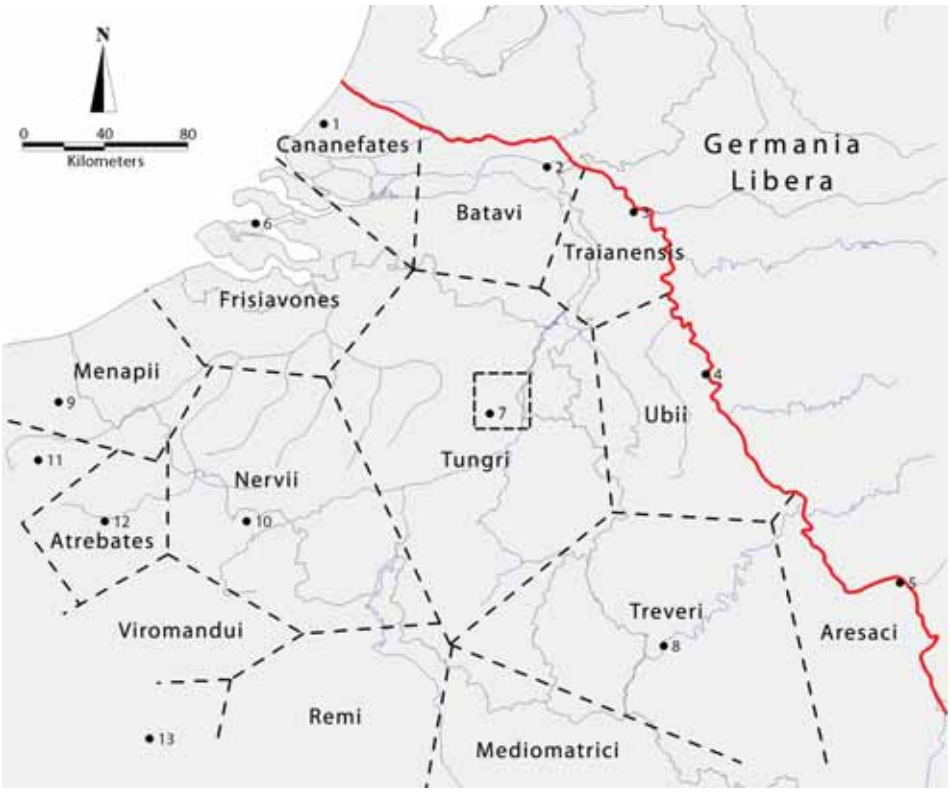
The largest enclosed fortification found in the surroundings of the Tongres-Maastricht area was Kanne-Caster, situated on the eastern flank. It is ca. 20 ha large and is situated between the rivers Meuse and Geer. The site has brought up some discussion on the fact if it is actually a pre-Roman fortification. Both Vanvinckenroye (1994a: 63-64; 2001) and Panhuysen (1996: 30) identified it as a Roman military camp. This is based on the dendrochronological dating around the time of the Roman conquest and on indications of Roman occupation at nearby fortifications as Trier-Petrisberg, Lamadelaine-Titelberg and La Chaussée-Tirancourt-Camp César (Binsfeld 1984: 174; Metzler 1984: 76-78; Brunaux *et al.* 1990).[12] Yet, Duurland's (2000: 11) proposition to view it as a native fortification seems more plausible. First, its setting close to the Meuse and Geer is something common for Late Iron Age fortifications (cf. Nash 1976: 99). Secondly, the site lacks Roman finds, while pre-Roman finds have been attested here (H. Roosens 1975: 36). Lastly, the dendrochronological dating is highly uncertain, since it is unknown from which construction phase the dated material came from.

In sum, it seems that during the course of the Iron Age, the communities inhabiting Northwestern Europe gradually were developing into a more complex, stratified and urbanized society (cf. Roymans 1983). The distinct La Tène bracelets found in the Tongres-Maastricht area (Duurland 2000: 15), as well as the Celtic coin hoards like recently found at Beringen, Echt and Heers, may serve as another illustration for these phenomena. However, Rome's contribution to this region's development by trade links must not be underestimated as seen in, for instance, the Roman republican pottery and bronze finds throughout Gaul (Fulford 1985; Roymans 1990: 147-168). Although these Roman finds did not seem to have reached the Tongres-Maastricht area during the pre-Roman period, the fact that more southern-based communities were accustomed to these imports serves as an indication for Rome's spreading power. During the Early Roman period, this power also reached the Tongres-Maastricht area.

Early Roman Period (57 BC - 70 AD)

Julius Caesar's march of conquest through Western Europe brought him eventually to the Tongres-Maastricht area. After some severe troubles with the Eburones in particular, the Roman army fought back in 53 and 51 BC. During these battles, the Eburones were not only defeated; they seem to have been virtually annihilated. In the aftermath of the conquest, a new name appears: the Tungri, a tribe supposedly consisting of 'remnants' of the Eburones, Aduatuci, Condrusi and others (Drinkwater 1983: 94; cf. Timpe 1993).

Despite Rome's conquest, the people from Northern Gaul were relatively autonomous until well into the first century AD, as shown by client treaties between Rome and several tribes (Slofstra 1991: 135; see also Tacitus, *Germ.* 29; Will 1987). Still, the Early Roman period in Gaul was a turbulent period with a lot of unrest, revolts and conquests from both sides; particularly during the first decades after the conquest, when Rome was in a civil war. Among the numerous revolts and conquests we may name, for example, the intruding Germanic tribes


N
0
40
80
Kilometers
Cananefates
Batavi
Germania
Libera
Traianensis
Frisiavones
Menapii
Ubii
Tungri
Nervii
Atrebates
Viromandui
Treveri
Aresaci
Remi
Mediomatrici
1
2
3
4
5
6
7
8
9
10
11
12
13

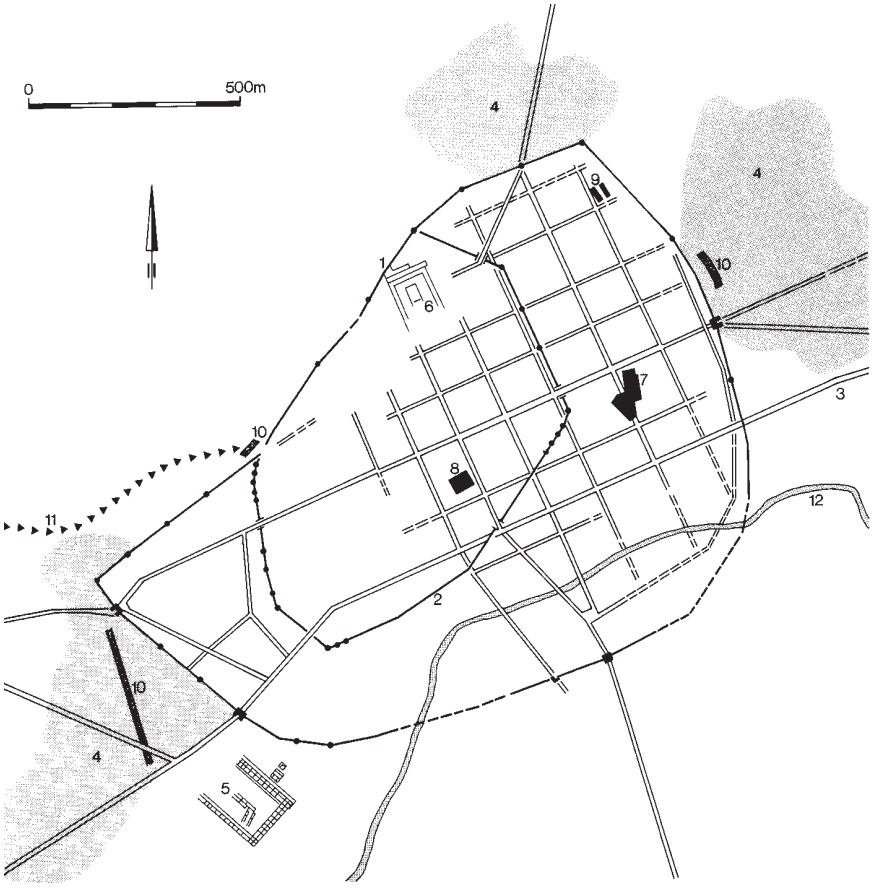

0
500m
1
2
3
4
5
6
7
8
9
10
11
12

Figure 11 (previous page; above). Polygon reconstruction of Augustus' civitates division in Northern Gaul (*after* Bloemers 1983). Note that they do not represent the actual civitates. 1. Forum Hadriani; 2. Ulpia Noviomagus Batavorum; 3. Colonia Ulpia Traiana; 4. Colonia Claudia Ara Agrippinensium; 5. Mogontiacum; 6. Ganuenta; 7. Atuatuca Tungrorum; 8. Colonia Augusta Treverorum; 9. Castellum Menapiorum; 10. Bagacum; 11. Tarvanna; 12. Nemetacum; 13. Augusta Suessionum.

Figure 12 (previous page; below). Roman Tongres (*after* Vanderhoeven 1996). 1. second-century town wall; 2. fourth-century town wall; 3. Bavay-Cologne road; 4. cemeteries; 5. horreum; 6. temple; 7. Kielenstraat; 8. Hondsstraat; 9. Sacramentstraat; 10. early first-century V-shaped ditches; 11. aqueduct; 12. Geer.

around 39/38 BC and a revolt of ca. 30/29 BC by the Suebi tribe along the banks of the Rhine (Nouwen 1997: 45-52, esp. 46; Drinkwater 1983: 5-53). To stop the unrest, Augustus introduced after the civil war a formal, Roman-style type of administration in Gaul (ca. 27-12 BC). He divided Gaul into three provinces that, in turn, were subdivided into several *civitates*, to be administered from a new urban centre.[13] The *civitas* in which the Tongres-Maastricht area was located, the *civitas Tungrorum*, adopted the Tungri's name (see figure 11). Rome, furthermore, began to place several armies along the northern frontier zone to stabilize the region like at Xanten, Neuss, Cologne and Mainz. Also in the hinterland Roman forces guaranteed the relative peace as the site of Trier-Petrisberg shows (Binsfeld 1984).

In and near Tongres there are indications as well that a military site was set up around the transition from the first century BC to AD. First, part of its Roman name, 'Atuatuca', meaning fortification, supposes some sort of fortification at this site (Vanvinckenroye 1985: 15-22). Second, archaeological findings of ditches, trash pits, postholes and Roman artefacts from the Augustan period strengthen this suggestion. Recent excavations at Tongres-Kielenstraat and Tongres-Hondsstraat (see figure 12) have given new insights on the dating and Early Roman development of Tongres (A. Vanderhoeven 1996: 193-215). Ditches, Roman coins and Samian ware date the earliest occupation phase to ca. 10 BC . The wealth of the import finds and the long distance from its manufacturing spot supposes a Roman military camp.

Following the road from Tongres to Maastricht, which was constructed in the last decades BC or the early-first century AD (Mertens 1983; 1987; Vanvinckenroye 1985: 35), other indications for military occupation can be found. Just east of Tongres, at Berg-Tomveld, a lot of Early Roman import material (Samian ware and republican coins) has been found. Also at the nearby site of Berg-Trappenberg, with a perfect outlook over Tongres, many republican coins were found. This evidence suggests some kind of Roman occupation here, most probably of a military nature. However, if these sites still belonged to the camp at Tongres or indicate some military outlook post cannot be attested.

The Roman army seems to have brought some stability to the region in the first decades AD, which led to the first signs of urbanization at Atuatuca Tungrorum. Under emperor Tiberius, there appears to have been a military decampment at Tongres. Where these soldiers went to is however unknown. Some suggested to the Rhine zone to defend the still unstable northern frontier. Yet, also Maastricht, only 20 km from Tongres, could have been a possible residing place for, at least, some of the soldiers from Tongres. Maastricht is strategically located where the road to Cologne crossed the river Meuse. The first signs of military activity was around 40 AD, which relates to the decampment at Tongres, after which the site gradually expanded until ca. 70 AD (Panhuysen 1996: 32-33).

At Tongres, after the military left, several two-aisled farmhouses dating to the Tiberian and early-Claudian period show up in the archaeological record (see Vanvinckenroye 1985: 26-27; A. Vanderhoeven *et al.* 1991: 109-110; A. Vanderhoeven 1996). They are oriented towards the still existing orthogonal

street plan laid out by the army. That a town like Tongres still depended upon its agrarian function is shown by the marks of hoofprints inside one of these farmhouses that indicate the presence of cattle (A. Vanderhoeven *et al.* 1991; Slofstra 1991: 141, 157). Already during this period, the period of Tiberius and Claudius, Tongres was the *civitas* capital of the *civitas Tungrorum*. This, however, is not shown by the archaeological material; it was a town in the making, or as Bloemers (1990: esp. 83) has argued, a proto-urban centre.

Farmhouses like those at Tongres also existed in the surrounding countryside, as well as the Campine region (see Slofstra 1991). In the Tongres-Maastricht area, sites like Smeermaas-Dukatonweg (Pauwels and Creemers 2006) and Neerharen-Rekem (De Boe 1985) illustrate this, while other sites, though no house plans, also show evidence for Early Roman occupation (see figures 8 and 13). Exact occupation dates of these so-called Alphen-Ekeren type of houses could not be deduced from the findings. Yet, the first house plans of this type, which is characterized by a row of three or more heavy, square, central posts, already appear around the first half of the first century BC (Van der Sanden 1987: 58-59). The Alphen-Ekeren type seems to supersede the earlier Oss-Ussen type, which was a transition type between the Iron Age Haps house and Alphen-Ekeren house (De Boe 1988; see also Slofstra 1991: fig. 7a). Like Tongres, these Early Roman settlements in the countryside seem to have been associated with an agrarian function. Crop cultivation was the most likely source of food and income, though probably also some cattle was kept. It is unknown if during this period there was enough cultivation for a surplus that could be sold on the local markets or transported to the northern frontier, where most legions were stationed.

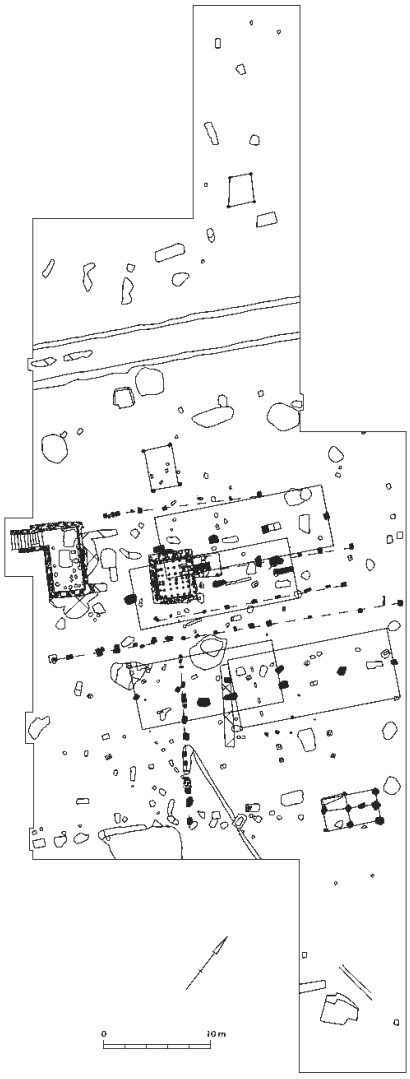


Figure 13. The site of Smeermaas-Dukatonweg (*after* Pauwels and Creemers 2006, fig. 3).

In the Roman town of Tongres, already very soon, around the time of Claudius and Nero, these farmhouses were replaced by larger courtyard houses (A. Vanderhoeven *et al.* 1991: 110-111; A. Vanderhoeven 1996). This illustrates the town's gradual developing urbanization. Additionally, the adoption of a Roman-style courtyard house, painted wall plaster, and the increasing Gallo-Belgic and Samian ware suggests a developing Roman influence (see A. Vanderhoeven 2001: fig. 2). Scholars have argued that this Early Roman cultural transition was initialized by native elites (Brandt and Slofstra 1983; Millett 1990; Woolf 1998). The courtyard houses, therefore, could have been the elites' home. However, since some decades earlier Roman military was stationed here, this does not necessarily have to be the case. Nevertheless, this change seems to be a first start in the transition to the Middle Roman period.

It thus seems as if the Early Roman period can be defined as one in which the influence of Rome and the development to a Roman style was only marginally

felt in Northern Gaul. Until the end of the Early Roman period no evidence for a large influx of Roman people and material has been found. Slofstra (1991; see also 1995: 87) has argued for the sandy Campine region that tribal traditions continued after the Roman conquest, well into the first century (certainly until the Batavian revolt), what explains, amongst other things, the specific development of the settlement system. This continuing of traditions, as Slofstra argued, may also be assumed for the Tongres-Maastricht area, because it is not really different from the sandy Campine region. This is also shown in the burial evidence from Northern Gaul (and the Tongres-Maastricht area in particular), which shows continuation with the previous Late Iron Age (see Hiddink 2003: 1-76). In the Tongres-Maastricht area, only the suggested burials at Berg stand out for their differences compared to the other burials. These, however, seem to have been related to the aforementioned, nearby military presence. This Roman military (and later civilian) occupation in and near Tongres causes the only cultural difference with the Campine region.

Those inhabiting Tongres' courtyard houses did not enjoy the house for long. Only one generation after the first houses were built, destruction hit. The date, ca. 69 AD, concurs with the year the Batavian revolt struck large parts of Northern Gaul. Not only the courtyard houses were doomed; all over Tongres a layer of ashes can be found that dates to 69 AD (Vanvinckenroye 1985: 40). It thus seems that this revolt also spread into the Tongres-Maastricht area and its central place Tongres. It marks the transition from the Early to the Middle Roman period.

Middle Roman Period (70 - 270 AD)

During the Middle Roman period, a *Pax Romana* was established in Northern Gaul under which prosperity, growth and cultural integration arose. This is evident from the archaeological material from that period. The heavily debated architectural form of the Roman villa is to be seen everywhere in the fertile region. Additionally, the northern frontier zone gets an official *civitates* division (Slofstra 1991: 137). Because of this, a new province was established in this zone, *Germania Inferior*. While some still doubt it (Nouwen 1997; Bérard 1999), scholars now seem to agree that the *civitas Tungrorum* from the Middle Roman period onwards becomes part of this new province (Vanvinckenroye 1994b; Raepsaet-Charlier 1995; 1999; 2003; A. Vanderhoeven 2001; 2002).

After the Batavian revolt, there is a rapid urbanization spreading across the loess region of Northwestern Europe. The number of sites seem to rise enormously in this period compared to the Early Roman occupation phase (cf. maps 2 and 3). This has also been argued by Duurland (2000: 26-27), who in addition has tried to give a more detailed development and eventual decline during the Middle Roman period. Following his work, there was a gradual growth in sites until around the mid-second century AD. After ca. 190 AD, the number of sites seems to decline, caused by the economic and military crisis that culminated into the Frankish invasions during the late-third century AD. Other Regions on the loess adjoining the Tongres-Maastricht area like the German Rhineland show this

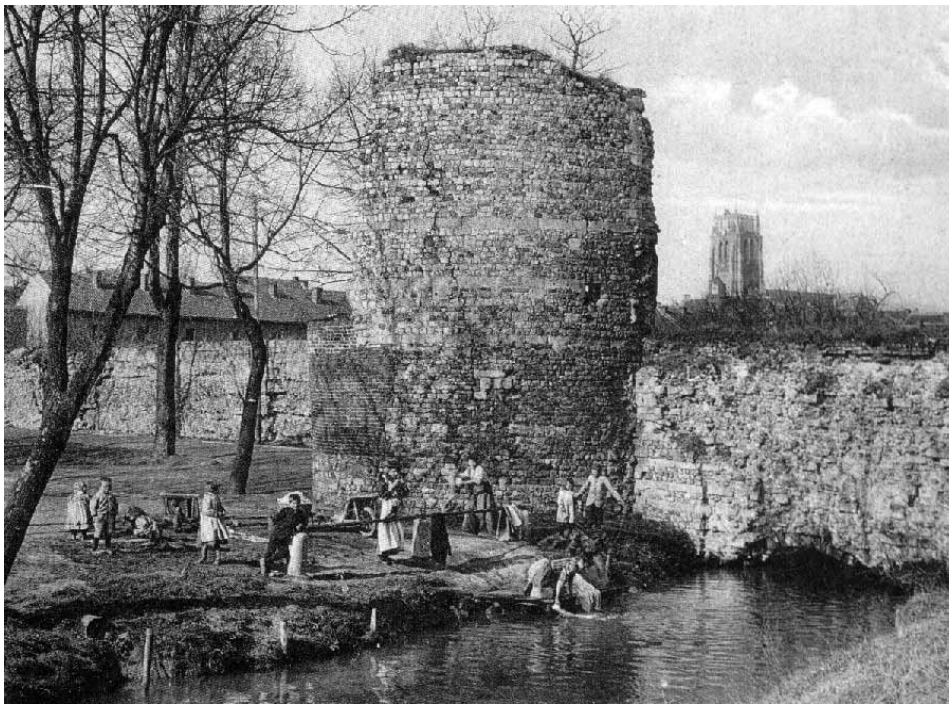


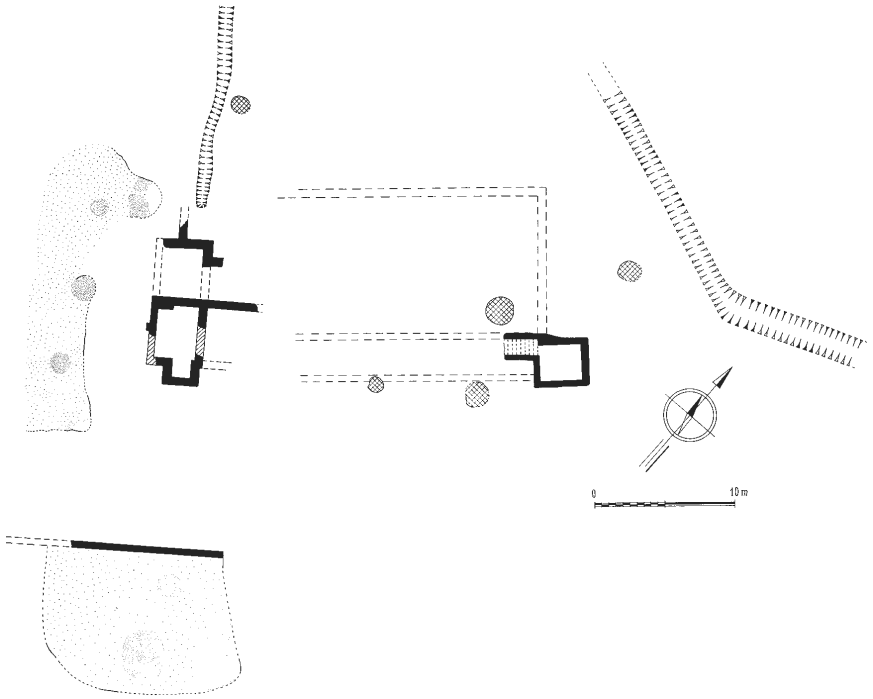
Figure 14 (left). Remains of the Roman city wall of Tongres around 1900 AD (courtesy of Koninklijk Limburgs Geschied- en Oudheidkundig Genootschap, Tongeren).

Figure 15 (next page). The Roman villa of Valmeer-Meerberg (*after* De Boe 1971).

same development (see Gechter and Kunow 1986; Lenz 1999: 71-74).

Cities such as Tongres, Cologne, Nijmegen, Bavay and Xanten rose enormously in dimensions and demography during this period, as well as Rome's influence on their appearance in the sense of architecture, arts, layout and artefacts (see figure 12). In Tongres this is, for example, attested by a bath house, a temple, its street layout, house types (already noticeable during the later phases of the Early Roman period), burial stones, city wall and the *horrea* to the southeast of the city (see figure 14).[14] Moreover, it needs to be mentioned that Tongres, which eventually was granted the status of *municipium* (Vanvinckenroye 1994b; Raepsaet-Charlier 1995), had city walls larger than the *colonia* of Cologne, the largest city north of the Alps.[15] This demonstrates that the status of Tongres, like cities in neighbouring regions, was rising during the first part of the Middle Roman period. In the first place, this was caused by Tongres being the capital of the *civitas Tungrorum* and the *Pax Romana* in Northwestern Europe during the second century (see Nouwen 1997: 124-131).

It was, nevertheless, another regional factor – partly related to the *Pax Romana* – that additionally played a major role in the development of Tongres and its surrounding countryside: the region's socio-economic nature. The land had a high potential for large-scale arable production, urban and military markets were nearby, the infrastructure to more distant markets was good and there seems to have been enough rural labour potential. These favourable conditions led to the emergence of the 'villa landscape'.[16] Throughout the region, large stone buildings including subsidiary farm buildings and (sometimes) baths have been found. In the Tongres-Maastricht area, several of these *villae* like Piringen-Mulkenveld, Millen-Mierenweg, Millen-Honsberg, Valmeer-Meerberg have been (partly) excavated (see map 3). But also in adjacent regions this house type



began to dominate the landscape during this time (e.g. De Boe 1976; Willems 1987; Vanvinckenroye 1988a; Opsteyn and Lodewijckx 2001; Heimberg 2003; Tichelman 2005).

The most common type of villa was the winged corridor house which had a portico and two projecting wings on the front (see figure 15). The villa of Valmeer-Meerberg may serve as an example of this type (De Boe 1971a). The Northwest European *villae* seem to have had a stone foundation with walls half-timbered with daub between the timbers. Most, furthermore, had plastered and painted walls, window glass and tiled roofs (see Heimberg 2003: 109-110). Subsidiary buildings were mostly timber-built of which only postholes remain in the archaeological record, although examples entirely out of stone have also been found.

This type of house architecture had a very distinctive character. It was the first time that stone was used in house construction, as well as the first evidence of Roman architectural forms in the Northwest European countryside. In the past, these *villae* therefore have often been associated with the settling of Roman veteran soldiers in the region, gradually forcing the natives out (see De Maeyer 1937). However, from around the 1950s scholars detected Late Iron Age/Early Roman postholes underneath Roman villas that were 'invisible' before (De Boe 1971b; Woolf 1998: 151; Heimberg 2003: 64-77).[17] This association between Late Iron Age/Early Roman 'native' building style and the Roman villas led to a consideration of continuation in the community's occupation. This continuation has also been attested by the finds relating to the *matronae*, an ancestral mother goddesses cult of which well over 500 votive altars have been found in the German Rhineland. Altars belonging to this cult were often mounted in niches within villas. The epithets on some of these altars mention Celtic and Germanic names,

thereby linking it to pre-Conquest roots of its inhabitants (Derks 1998: 119-130; Carroll 2001: 117-119). On the other hand however, the way the altars were shaped, the conventional epigraphic Latin being used and the time of appearance (second century AD), argue at the same time for a view of integration with Roman social forms and practices (Woolf 2003). Consequently, scholars are nowadays of the opinion that the process of cultural interaction between natives and Romans together with economic motives led to the gradual development and introduction of the villas (e.g. Slofstra 1983).

This may also have played a role in the differences in shape and size of the *villae*; not only between regions, but also within one. It has been demonstrated, for example, that the northern sandy region developed slower than the loess zone. This can be illustrated by the development of the small settlement of Hoogeloon (the Netherlands), where it has been attested that the most central building developed and expanded into a villa only in the third century AD (Slofstra 1987; 1991). Most *villae* on the loess existed by that time already more than a century.

The difference within one region is demonstrated through a comparison of the second century AD *villae* of Valmeer-Meerberg (ca. 472,5 m^2), a more common size, with that of Haccourt (ca. 5.000 m^2), just south of the Tongres-Maastricht area, or that of Voerendaal (ca. 540-3.000 m^2).[18] What caused this size difference mostly has been explained in terms of wealth and power; the larger *villae* would have dominated the smaller ones in the neighbourhood. Archaeological nor historical sources, nonetheless, have thus far demonstrated this. Size has also been related to the rank of a person owning the villa. Three inscriptions found at the villa Ravensbosch (the Netherlands), however, seem to object this assumption. All mention the person Titus Tertinius, a high-ranked person from Xanten, which could be considered as the owner of the villa (Remouchamps 1925; Slofstra 1983: 93-94). The fact that this villa was of a normal size, while the person probably owning the villa seems rather powerful, may suggest that the size of a villa is not related to a person's status (see also chapter 7).

Size calculations of the land belonging to a villa tend to a remarkable correspondence between the villas in this region.[19] On the basis of the distances between villa-complexes in the region between the rivers Rhine and Meuse, scholars have calculated that most complexes would have had around 50 ha of arable land (Gaitzsch 1986: 407-408; Heimberg 2003: 127-129).[20] This size corresponds to observations in the Somme basin (France), which would "have been heavily exploited for their grain-bearing propensities" (Wightman 1975: 639). Remarkably, a land size of 50 ha equals the size of one Roman century (50,12 ha). Though, it also seems that some of the larger villa-complexes were surrounded by larger land plots. Heimberg (2003: 129) therefore has argued that a villa's land size could relate to the size of the villa itself. None of the *villae* in the Northwestern provinces, however, come close to villa sizes observed in, for example, Switzerland, Southern Germany and France of 3.000 to 6.000 ha (Heimberg 2003: 129).

The villas on the Northwest European loess zone were probably mixed farms where people lived of agriculture and animal husbandry. In order to make a surplus

production that could be sold on the market, it needed to lay its focus on the production of cereals (Kooistra 1996: 85-116; Kreuz 1999: 95). Kooistra (1996: 63-72) doubts if these *villae* on the loess would have supplied the markets of the northern frontier along the Rhine, since evidence from the 'Kromme Rijn' also suggests some possibilities for surplus production in the northern frontier zone. However, the study by Pals and Hakbijl (1992: 298) of botanical remains from a grain cargo found at Woerden demonstrates that the ship's grain originated from the Belgian loess area. Furthermore, evidence from Tongres shows that grain becomes more important as a food source during the the Roman period (A. Vanderhoeven *et al.* 1991: 117-118). Lastly, Kreuz (1999: 91-94) has shown that an area within the 'villa landscape' could easily produce enough food to feed the Roman army. Thus, it seems that, although it not directly has been attested at villa sites, these *villae* did seem to have produced a surplus of cereals to supply – at least, partly – the cities and the Roman legions in the frontier zone.

Figure 16. Still visible Roman burial mound in the Tongres-Maastricht area (photo by T. Vanderbeken, courtesy of ZOLAD).

Who, then, were the inhabitants of these *villae*? Inscriptions from the villa Ravensbosch have shown that relatively high-ranked persons might have lived here (see above). In the past, scholars assumed that it were mostly Romans retired from nearby military camps who settled in *villae* throughout this region. Lenz (2006), nevertheless, has recently demonstrated by archaeological traces of these retired soldiers that they mainly remained in central towns like Cologne or in its immediate hinterland, a day's ride to the nearest central town. This suggests that mostly 'native' people would have occupied the *villae* away from the central towns. Yet, while the above and the aforementioned continuation from 'native' house types to Roman *villae* strengthen this view, these people gradually would have become more familiar with Roman cultural forms in terms of material and architecture during the course of the Roman period. This development in style becomes more obvious from the evidence of new, imported, exotic food, of which the numbers rise during the Middle Roman period, especially at Roman *villae* (Bakels and Jacomet 2003).

Burials, too, seem to demonstrate a gradual socio-cultural change in Northwestern Europe. During the Middle Roman period, all over the area large burial mounds, i.e. tumuli, are set up in the vicinity of *villae*. In the Tongres-Maastricht area, amongst others, some of these mounds are still visible (see figure 16).[21] Based on continuity with the Bronze and Iron Age burial mounds, some have argued that these tumuli were cultural signs of pre-Conquest indigenous people (Ferdière 2004). However, it not necessarily reflects this continuation of pre-Roman habits, since also in Roman Italy and other areas burial mounds are found. Therefore, most scholars argue that these burial mounds reflect a change towards Roman values and customs of the native inhabitants of the countryside (most recently Massart 2007). This has been concluded from grave goods buried

along with the deceased's body, which conforms to the Roman standard of burying. Thus, it seems to be a regional adoption of Roman cultural praxis.

However, arguing against a 'Romanization' of the countryside, in recent years a remarkable discovery has been found on the loess. At the sites Kerkrade-Winckelen (the Netherlands) and Veldwezelt (Tongres-Maastricht area; see figure 17), several 'native' farmsteads (Alphen-Ekeren type) have been found which, in contrast to all other, did not disappear after the first century AD, but remained inhabited until the third century AD (Dijkstra 1997; Wesemael 2006).[22] This dating has been based on the extending size of 'native' farmsteads through time. Some even attained lengths of ca. 26 m in the third century AD (Slofstra 1991: 137-145). Before Kerkrade-Winckelen and Veldwezelt were discovered, such second and third century farmsteads only were found in the northern sandy region like at Hoogeloon and Oss-Ussen. It has been thought for a long time that these farmsteads were indications of the 'lack' of cultural interaction between Romans and natives. However, the fact that on the loess these farmsteads co-existed with the Roman *villae*, which had a totally different repertoire of material culture, seems not to support this thought. More remarkably so, is that at Veldwezelt, the excavators have found evidence for two drink pools for animals, while it has been thought that this region would have had a predominant agricultural basis. Animal husbandry was thought to have had only a minor role (see above). The implications of these finds on our view of this region is something that based on only two sites is difficult, maybe even impossible, to predict, however.

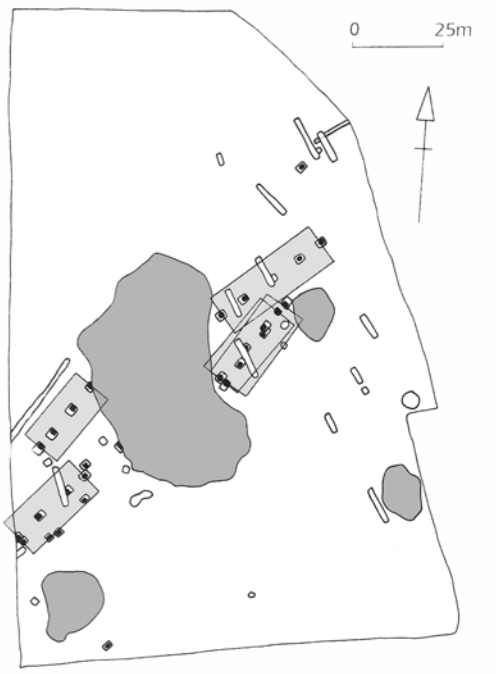


Figure 17 (above). The site of Veldwezelt (*after* Wesemael 2006).

Figure 18 (next page). The Late Roman settlement of Neerharen-Rekem; Germanic longhouses (grey) and sunken huts (black) (*after* Carroll 2001; adopted from De Boe 1985).

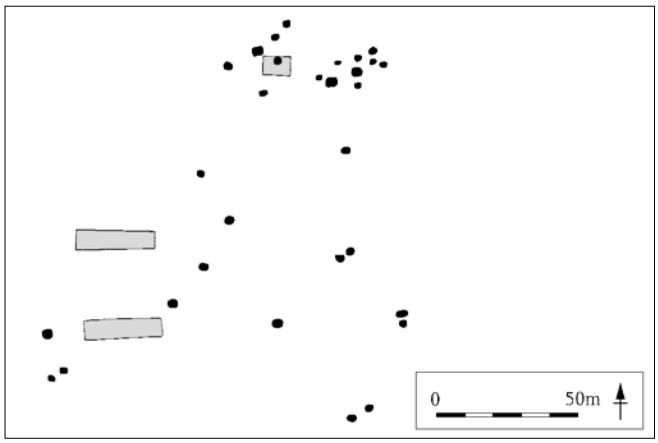
In sum, the Middle Roman period in the Tongres-Maastricht area – like in adjacent areas – is a period of development towards a picture that conforms to Roman values, customs and style. This is evident from architecture, art, city planning, artefacts, burials and maybe even habits. On the latter, we already have mentioned the Roman temple and the votive altar dedicated to Jupiter at Tongres. However, also indications in Tongres' hinterland show evidence for Roman praxis. For example, at Hoeselt a Mercurius statue with inscription has been found and at Zichen-Zussen-Bolder two fragments belonging to a statue depicting a seated Roman goddess Iuno have been found (Capenberghs 1985: 149-150; Nouwen 1991; see also Mertens 1964: 28-34; Vanvinckenroye 1985: 69-75; De Beenhouwer 1991: 62, for other examples from the region). However, at the beginning of the third century AD things again seem to change for the Tongres-Maastricht area.

Late Roman Period (270 - 450 AD)

Near an intersection in Riemst, that of the Maastrichtersteenweg with the Bilzersteenweg, a large hoard of ca. 200 coins was found in 1905 (Huybrigts 1905; Smeesters 1974; Hombroux 1982). This hoard, found on a spot where according to some sources also a Roman villa stood, has been dated to around 260-267 AD. It is generally interpreted as an abondaning of the house by its inhabitants in times of stress and unrest. Other sites where such coin hoards have been found like Eben-Emael, Vroenhoven and Koninksem date to the same period. As shown by Schulzki (2001: map 1), this was not a local phenomena, but is attested at numerous sites throughout the Northwestern provinces.

The date of these coin hoards coincide with the repeated civil wars and foreign invasions of Frankish and German tribes during the third century AD (Drinkwater 1983: 212-227; Carroll 2001: 132-133). In 260 AD, Postumus, a governor and high-ranking military official under emperor Gallienus, broke with the central government, establishing the 'Gallic Empire' consisting of Spain, Gaul, Britain and the German provinces. Although only thirteen years later this Empire was dissolved again into the Roman, it demarcates the change from the Middle to the Late Roman Empire in the Northwestern provinces, while at the same time suits as a characterization of the instability of Rome from this period onwards. The political, military and economic reforms under emperor Diocletian (284-305 AD) afterwards causes the Tongres-Maastricht area to be no longer part of the province of *Germania Inferior*, but of the newly established *Germania Secunda*.

The instability in the Northwestern provinces during this era seems to be reflected in the archaeological material. Not only do coin hoards attest this, also the food production becomes more regional in character. In contrast to the Middle Roman period, exotic food products are almost lacking in the Northwestern provinces (Bakels and Jacomet 2003). At the same time, there is also a drop in the number of sites during this period. This has been demonstrated for the Tongres-Maastricht area (Van Ossel 1983: 159-169; Duurland 2000: 31; see also map 4), as well as for other areas on the loess (Gechter and Kunow 1986: fig. 7; Van Ossel 1992; Lenz 1999: 71-74; Van Ossel and Ouzoulias 2000). Furthermore, cities such as Tongres, Nijmegen, Xanten and Jülich are contracting as noted, for instance, in the construction of a smaller city wall at Tongres (see figure 12). Also Roman villa sites seem to drop in number. Villas like Kerkrade-Holzkuil, Neerharen-Rekem, Haccourt-Ferme Collart, Haccourt-Froidmont and Valmeer-Meerberg are just some examples that were abandoned around the beginning of the Late Roman period (Tichelman 2005; Van Ossel 1983: 162; De Boe 1971a; 1985).



This 'degrading' landscape has been equated to a 'third century crisis' caused by an economic decline and an instable society due to consequent invading tribes. This so-called 'third century crisis' not only appeared in the Northwest, also in Italy, Spain and the rest of Gaul *villae* were abandoned (see Lewit 2003; Marzano 2007: fig. 19). The term 'crisis', however, has in the last 15 years heavily been criticized (Van Ossel 1992; Van Ossel and Ouzoulias 2000; Lewit 2003; Marzano 2007: 199-222).

First, not all sites perished. In Italy, Germany and Belgium only some 50 percent disappear at first during the 'crisis' period (see Van Ossel 1992: table 3; Lenz 1999: 71-74; Duurland 2000: 31; Marzano 2007: fig. 19). At several sites in (or near) the Tongres-Maastricht area, for instance, continuity in occupation has been shown. The villa Wange-Damekot (west of the Tongres-Maastricht area), after a third century fire, remained occupied into the fourth century AD, during which also two sunken huts (*grubenhaus*) were built (Opsteyn and Lodewijckx 2001: 223-226). The sites of Lixhe and Herstal, just south of the Tongres-Maastricht area, also demonstrate this continuity (Van Ossel 1983: 167). Lastly, at Neerharen-Rekem an entire settlement appears during the fourth century AD consisting out of 25 *grubenhäuser* (De Boe 1985: 60-62; fig. 18).

Secondly, scholars assimilate abandoned villas with abandoned lands. However, as Ward-Perkins (2000: 324-325) stated in the case of the apparent lack of site occupation in Italy in the seventh and eighth century AD, this is "self evidently nonsense: there must have been people living in these areas, and we just cannot find them." In the case of the Northwest this seems to have been caused by a lack of coins and friable, often undatable local pottery (Lewit 2003: 268), while also the gradual replacement of stone as building material must not be neglected. This lack of material for this period sets scholars in a strong position to speculate about how many people would have lived here and, consequently, can easily create a view of 'crisis'.

It seems more reasonable to view the major transformation in the Later Roman Empire not as 'crisis' but as a cause of the changed social, political and religious conditions in this part of the Empire (Lewit 2003: 270-271; Marzano 2007: 222). Germanic and Frankish tribes, which by now penetrated into the northern frontier region, would have (socio-culturally) influenced the people living on Roman territory considerably just as this was the case when the Romans took over control in this region some three hundred years before. It has been argued that the second 'cultural revolution' appeared around the fifth-sixth century AD (Lewit 2003: 270-271; see Woolf 1995, for the term 'cultural revolution'). However, in the Northwestern provinces this 'cultural revolution' happened earlier than, for example, in Italy and Southern Gaul, just as it was the other way around during the first 'cultural revolution' (see Woolf 1995). Moreover, such a socio-cultural transform would not appear out of nowhere and was probably already felt in the period before, though not as strongly.

Due to military reforms under Diocletian and Constantine, the Roman legion's strength declined considerably in the Northwestern provinces (from 6.000 to 1.000 men each). This and the fluctuating border of the Empire may

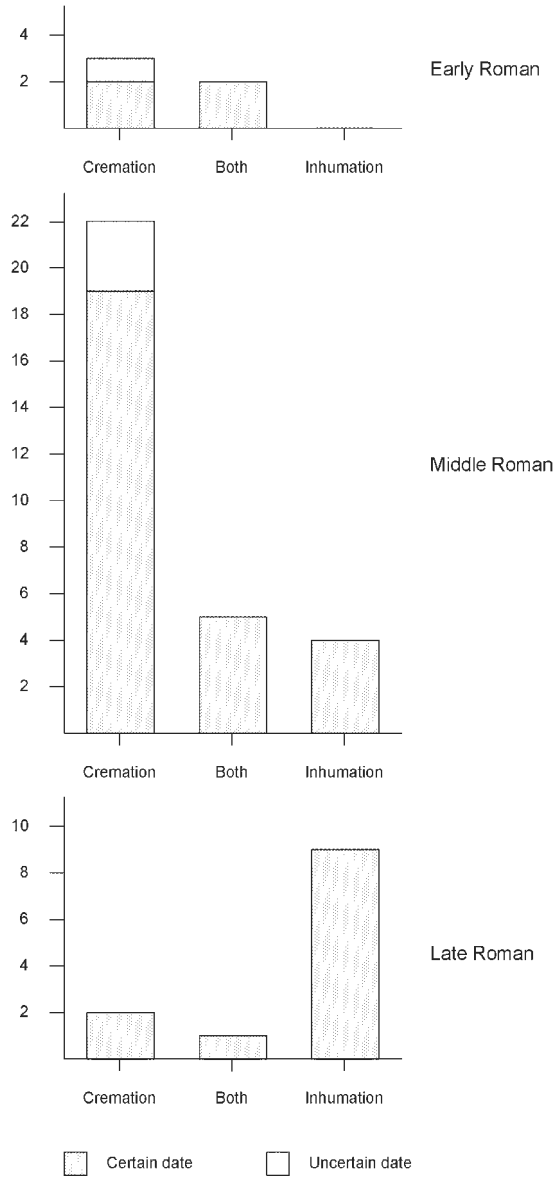


Figure 19. Roman burial practices in the Tongres-Maastricht area.

have cost the frontier zone's fertile hinterland, thus also the Tongres-Maastricht area, a considerable amount of its surplus market. As Marzano (2007: 210) noted for Central Italy, "product distribution patterns [changed] from provincial to regional markets". The study by Bakels and Jacomet (2003) seems to agree to this notion.

Lastly, Christianity seems to have influenced the reshaping of Late Antique attitudes in the Tongres-Maastricht area, where Saint Servatius was bishop during the mid-fourth century AD. A result of this reform was that villa buildings were transformed to serve new Christian functions. During recent excavations underneath Tongres' basilica, the excavators have found evidence for a fourth century AD predecessor bearing a tentative relationship with Christianity (A. Vanderhoeven, pers. comm.). The fact that earlier an urban villa stood on that spot may reflect a transformation in cultural circumstances. Also in the burial

evidence, this transformation is noticeable. No new burial mounds, which were interpreted as a local adaptation to Roman customs, were erected in the Late Roman period. Moreover, cremation gradually made way for inhumation during the Late Roman period in the Tongres-Maastricht area (see figure 19).

In conclusion, the Late Roman period was a time of change from a Roman style of material culture and customs to a new style and consequently customs. The Roman landscape, shaped in the Early Roman and matured during the Middle Roman period, seems to have transformed again into a new one. Burial practices, architecture and artefacts demonstrate this. However, the (non-melancholic) memory of the Romans remained inscribed into the landscape, though partially. Remains of once occupied, but now deserted, houses were stil part of the Merovingian landscape. This can be illustrated by the Merovingian burial site Rosmeer-Diepestraat, dated around ca. 550-700 AD, which lay partly on top of the remains of an older villa (H. Roosens and Janssens 1978). This was not a specific feature for the Tongres-Maastricht area, but something which happened throughout the Empire during its aftermath (see Lewit 2003: 262, esp. n. 6).

4

Studying Roman Cadastres

"La definition des limites de tous orders (propriétés privées, vici, pagi, civitates, provinciae) est un des principaux problèmes poses à la topographie historique."

Chevallier 2001: 13

As Raymond Chevallier has put it quite well, boundaries can be a difficult concept to grasp. Larger territories like *vici*, *pagi*, *civitates* and *provinciae* seem to have not been surrounded by visible boundaries such as hedges, roads, fences or ditches. As mentioned before, with certain Roman cadastres this was the opposite. People like Falbe, Legnazzi and Bradford easily recognized cadastres in the landscape because of their visibility and material remains. Chevallier's quote does not refer to this. What he meant were the 'invisible' lines in the modern landscape, often disappeared due to transformations of the landscape or which never even existed in the sense of concrete boundaries.

In the case of the ones that perished due to transformations of the landscape, the best method of study is of course excavation. When boundaries are attested at several spots on the same line this may suggest a boundary during some period in history. When, furthermore, dateable material is found related to that boundary, it provides a firm date for the period of the actual boundary. In several cases this method of enquiry has been used with success (Chouquer and Favory 1991; Berger and Jung 1999; Vermeulen and Antrop 2001; van der Leeuw *et al.* 2003). In general, excavations give clear evidence and a precise date for boundaries and seem therefore well accepted by scholars. There, however, are certain problems regarding the scale of cadastres, which could extend over more than 200 km as attested around Carthage. Applying the methodology of excavation to define all boundaries would seem as an impossible task.

In the case of boundaries that never have existed in a concrete form, excavation seems useless. Scholars therefore have been in need of new methods and techniques. Dating cadastres by these methods and techniques seems harder than in the case of excavation. As a result, many scholars have been doubtful

about these new methods and techniques that are applied to the study of ancient cadastres. The fact that there is often no archaeological material that can be used as hard evidence to firmly date a particular boundary makes it hard for them to accept the interpretation (King 1990: 99; Peterson 1993: 25-31; van Enckevort *et al.* 2005: 3; Palet Martínez 2005: 331-332). Indeed, as will be shown below, in the past certain scholars seem to have used techniques and methods other than excavation or field walking wrongly, making their theory mere speculation. However, in the last 40 years much has changed, the techniques and methods previously used have been improved and new have been introduced.

Aerial photography and maps

The introduction of aerial photography during the two World Wars was one of the most prominent changes in landscape archaeology and the study of cadastres. Regarding the latter, scholars could now try to identify cadastres that from ground level were not as obviously recognizable as those found by people like Falbe and Legnazzi. Studies by Bradford (1957) and others like more regional works by Mertens (1958) and Ulrix (1959) were a result of this technique. Yet, the rapidly changing landscape and the constant growth of cities and towns from the 19th century onwards obliterated the ancient traces increasingly (see figure 20). Consequently, modern aerial photographs' use in tracing ancient lines in the landscape decreased. To overcome this obstacle, scholars began to use older detailed maps from before the modern landscape change. From around the 18th century onwards, cartographers began to draw detailed maps of the landscape.[23] These details like land boundaries, trees, roads and paths make them suitable for the study of ancient land boundaries and roads.

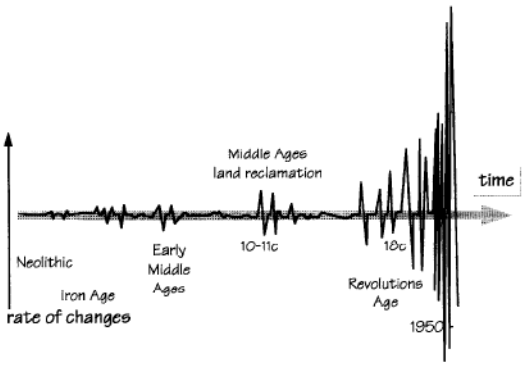


Figure 20. Conceptual graph of the speed, frequency and magnitude of landscape evolution in Western Europe (*after* Antrop 1997).

Yet, the shift in research from clearly recognizable cadastres to the less obvious ones created a lot of doubt and, consequently, criticism. Especially concerning the 'objectivity' of the methods being used examining maps and aerial photographs. One of the most recent critique is related to the shift from processual to postprocessual archaeology in the early-1980s. The postprocessual archaeology under the lead of scholars like Hodder, Tilley and Shanks shared a common dissatisfaction with processual archaeology's scientistic approach, particularly its focus on positivism and general laws of human behaviour. Thereby it began to eschew quantitative approaches as these were directly related to theory testing and Karl Popper's (1972) method of falsification. This shift has also been attested in the recent approaches to landscape study, which pay more attention to social and ideological reconstructions rather than quantitave ones (e.g. Knapp and Ashmore 1999; Ucko and Layton 1999). Because of the postprocessual criticism towards positivistic research, studies of cadastres tend to be largely criticized. To them, perhaps without articulating their feelings, quantitative approaches act as

barriers, since they view the world as a place that is too complex to be quantified. Due to mostly this association, quantitative approaches may therefore not aid the acceptance of a piece of work.

However, it is the interpretation of the aerial photographs and maps that has been criticized the most. Some argue that the orientation of the cadastres was always determined either astronomically or by main roads. Rackham (1986: 159) claims, for example, that centuriation is "oriented exactly north and south (occasionally at 45°)". And Van Londen (2006: 188) recently mentioned that "centuriation was absolute and not affected by local topography". These misconceptions seem to have been caused by several factors. For example, the drawings in the Corpus Agrimensorum and other tablets almost always appear as straight horizontal and vertical lines, easily assumed to relate to east-west and north-south (Peterson 1993: 8-10). Furthermore, Frontinus and Varro stated that the art of surveying originated from the Etruscan *haruspices*, who orientated the sides of a temple in the direction of the four cardinal points (Cuomo 2000: 191). The two main lines of a cadastre, the *decumanus* and *cardo*, are therefore commonly associated with their general orientation, respectively east-west and north-south. Others have viewed roads, chiefly the main road through a region, as a determinant for the orientation (Mertens 1958; Potter 1987: 121; Caravello and Michieletto 1999: 45). The Via Aemilia, the main road through the Po valley, may serve here as an example.

Chouquer (1981), however, has shown that not all cadastres around this road were aligned to the Via Aemilia. Furthermore, concerning the astronomical orientation, the orientation in the Corpus Agrimensorum and other tablets does not correspond with their actual orientation in the landscape. The cadastres of Orange, of which the tablets are displayed in a north-south/east-west manner for readability purposes, are in reality of a different orientation than this display assumes. Consequently, this 'static' view of scholars leads to the problem that other possibilities of orientations are excluded, what may result in a dismissal of certain traces of cadastres.

Despite the probability that some cadastres were based on main roads or astronomically determined, it is clear that not all were. In the Corpus Agrimensorum, one can find nine different factors that could determine the orientation of a cadastre (see table 3). Which factor the surveyors used would vary from case to case, and maybe even from time to time. They could stress emphasis on the geography in regions where this was helpful. Furthermore, different surveyors working in a region already surveyed before could stress other factors as more important as their predecessors did. Although Le Gall (1975: 301-308) argued that only one factor determined the orientation of a cadastre, in reality this might not always have been the case. Roman land-surveyors could use different factors together, combining for example cultural and natural ones (Peterson 1993: 12).

Nevertheless, as mentioned in the introduction, still the most often heard critique is that the scholars who study cadastres base their identification on a biased interpretation. The critics wonder how to identify a two millennia old

Environmental factors	
1.	The sea, parallel and perpendicular to the coast
2.	Relief, the general direction of drainage
3.	The maximum extent of the territory
4.	A via consularis, i.e. main road
5.	An orientation different to that of the cadastre of a neighbouring territory, to avoid confusion
Astronomical factors	
1.	Orientation towards the rising sun
2.	Orientation of kardines due north-south
3.	As 1, but with the decumani and cardines inverted
4.	As 2, but with the decumani and cardines inverted

Table 3. Factors theoretically affecting the orientation of Roman cadastres (*after* Peterson 1993: fig. 1.2 adapted from Le Gall 1975).

cadastre seemingly without any traces in the modern landscape. In their eyes, interpretations are biased towards a finding of such cadastres, i.e. 'optimistic proposals' (King 1990: 99). They argue that a landscape left far more traces of past human occupation than the features the scholars use to reconstruct the cadastre. The historical and spatial association of modern linear features like roads, ditches and other modern boundaries with Roman cadastres has been adopted as a pre-given, while in fact this has to be determined. Since the direct relation between the cadastre and the modern features in the landscape is often not clearly present due to changes in this landscape or due to other means, its conclusions do not hold according to these critics.

Since these first so-called 'optimistic proposals' though, many methodological developments have been introduced that challenge the critics' view on the methods by which scholars have studied cadastres. Already in the 1960s a technique called 'optical filtering' was used to establish a more secure and objective interpretation of aerial photographs (see Chevallier *et al.* 1970). This technique uses negatives of photos to construct a spectral image generated by laser light. Features in the spectrum will reflect the organisation of features in the original photograph. Parallel features will be shown by a line at right angles to the orientation of the original features. The clearer the line, the clearer the parallel features are. From the space between these lines, an interval can be calculated. By adding a special opaque filter, only features within a limited range of angles will be made visible, thereby enhancing the way of interpreting these aerial photographs. This technique, however, still favours theoretical, cultural and/or personal reasons; the choice why these features and lines are part of a Roman cadastre still has to be made clear.

To go beyond these constraints, the technique of 'directional filtering' has been applied to the identification of ancient cadastres. This technique identifies automatically those directions in which the greatest number of similarly orientated traces appear (Favory 1980: 373-382). It has been used in several cases, whether to detect Roman or medieval cadastres (Chouquer and Favory 1980; Clavel-Lévêque 1983b; Chouquer 1985). The technique introduces a greater degree of

objectivity, since no particular orientation is favoured for theoretical, cultural or personal reasons.

In addition to these techniques, computer applications have also found its way in the study of cadastres. From the late-1980s, mathematical studies and Geographical Information Systems (GIS) were applied to enhance the 'scientific' objectivity of the identification of cadastres. Compatangelo (1989; see also Peterson 1992b), for instance, applied the Fourier analysis to reveal underlying regularities in the field pattern to find a date and function of the cadastre through a comparison with other better known cadastres. Also more advanced techniques in remote sensing adopted from geosciences have now been introduced in Roman cadastre studies like Radon transforms (Bescoby 2006; see also Romano and Tolba 1995; Vermeulen and De Dapper 2000; Vermeulen and Antrop 2001: 41-66).[24]

But not only remote sensing techniques have been introduced, also the use of statistics and probability examination are increasing in the study of Roman cadastres. For instance, the Kolmogorov-Smirnov single sample test, applied by Peterson (1993: 68-78; 1996; see also Hodder and Orton 1976: 226-229) in the case of the Dutch province of Limburg, examines the distribution of distances of sites from the *limites*, when compared to the distribution of distances expected if the points are scattered uniform randomly. Peterson (1993: 79-87) has also pointed to the usefulness of Bayesian interference in which evidence or observations are used to update or to newly infer the probability that a hypothesis may be true.

Lastly, scholars interested in cadastres have incorporated (medieval) historical sources, to trace certain linear features historically back in time. This makes the plausibility of the boundaries of a cadastre higher since there is actual, absolute evidence that may date this feature to the Roman period (e.g. Chouquer 1996a: 9-10; Chevallier 2001; Palet Martínez 2005). All these new techniques makes the study of cadastres a more objective and absolute study, in which the separation between method, results and interpretation are better recognizable.

Regional research in Northern Gaul

As aforementioned, in the Tongres-Maastricht area several hypothetical cadastres have been considered to exist during the Roman period. But also in other neighbouring regions, such as the region around Cologne and the Dutch provinces of Limburg and Brabant, scholars have attempted to reconstruct Roman land systems (for an overview till the 1970s, see Raepsaet 1977). In this section, we will discuss the hypotheses and try to demonstrate their methodological fallacies.[25]

Region around Tongres

Two Belgian scholars have claimed in the past to have found a Roman cadastre in the region around Tongres (see Mertens 1958; 1964; Ulrix 1959). Both used regional aerial photographs and topographical maps. Ulrix' claimed to have found several cadastres of 20 by 20 *actus*, all of a different orientation and presumably of different periods (see table and map in Ulrix 1959: 37, 40-41). According to Ulrix

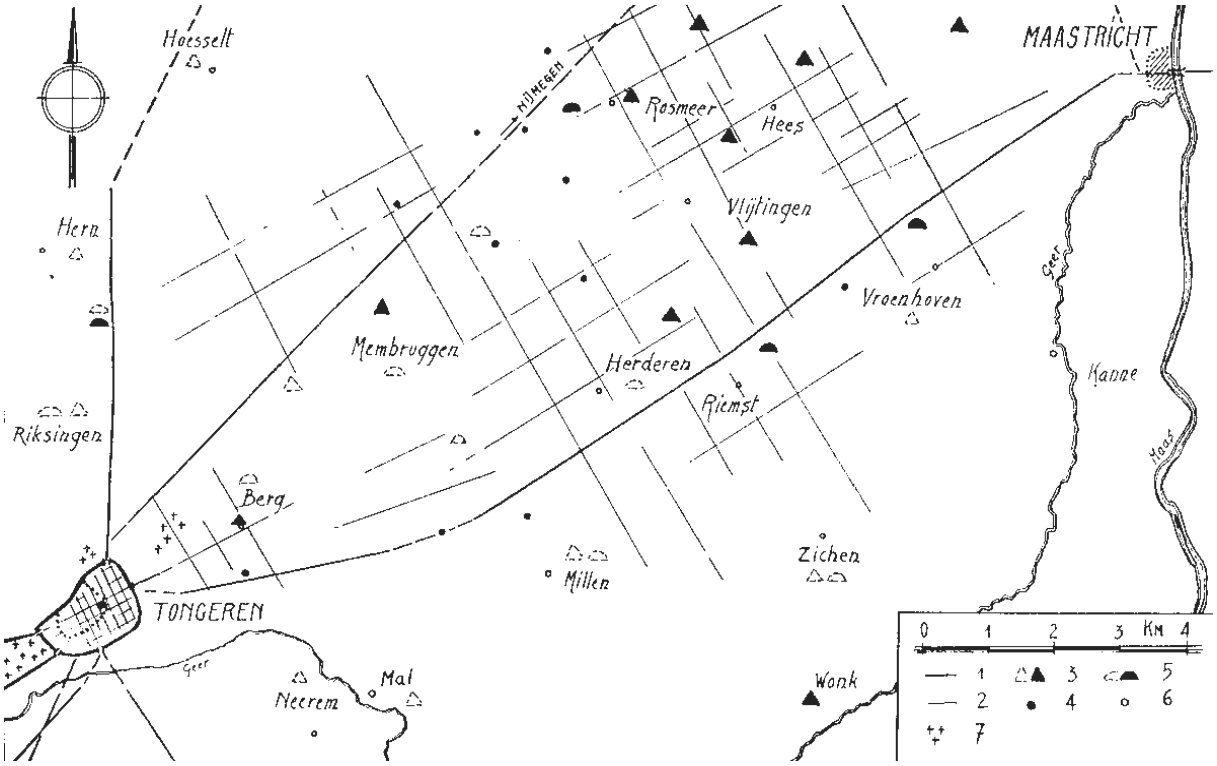


Figure 21. The proposed cadastre to the east of Tongres (*after* Mertens 1958). 1. Roman roads; 2. *limites*; 3. *villae* (unknown or known localisation); 4. Roman finds; 5. tumuli (unknown or known localisation); 6. modern village; 7. grave fields.

(1959: 39, 42-43), all cadastres ran through one central point on the modern 'Eeuwfeestwal', where one of Tongres' Roman gates is thought to have been located. He argued, therefore, that this was the point from which all cadastres were surveyed and laid out.

His claim for several differing orientations that dated to different periods of surveying in Roman times could have been plausible considering the cadastres from Orange and Béziers, where this also has been attested. However, in light of Ulrix' methodology, his suggestion seems very unlikely. Ulrix (1959: 36) used a transparent sheet of paper on which he had drawn a scaled 20 by 20 *actus* cadastre that he pushed over a map in order to correspond the *centuriae* with lines on the map (roads, land boundaries etc.). By doing this for the entire area, he was able to identify several blocks of *centuriae*, which he consequently associated with different Roman cadastres. However, Ulrix clarified nowhere the reason behind the using of these specific lines on the map as boundaries of the proposed cadastres; there is no relation between these 'boundaries' and a possible Roman date. Following this method, one could probably find Roman cadastres all over the world, even in China and the United States.

Mertens' first identified a cadastre to the east of Tongres that was aligned to the Roman road running from Tongres to Maastricht (see figure 21). This cadastre, of which the size of the different land plots was unknown, had an orientation of ca. 60° northeast (Mertens 1958: 259). He even related this cadastre to the one suggested for Cologne, which had almost the same orientation, 59° northeast (Klinkenberg 1936; see below). Later, he also found evidence for several other

cadastres near the earlier proposed cadastre – for instance, to the west of Tongres along the road to Bavay (Mertens 1964: afb. 14).

Mertens' proposal has gained more regional recognition than that of Ulrix (see Dilke 1971: 150; De Boe 1971b; 1973; Raepsaet 1977: 152; Vanvinckenroye 1985; 1988a). However, also Mertens can be accused of several methodological fallacies. The roads and other lines on the maps and aerial photographs he views as *limites* of the cadastres are actually just a guess in the sense that they are randomly picked. Although he aligns the cadastre to the Roman road running 60° northeast (Mertens 1958: 257), he does not substantiate why he leaves certain possible *limites* with the same orientation, as well as those with a different one, out of the sketch. Moreover, as stated above, cadastres not necessarily had to be aligned to a road. The fact that his cadastre does not correspond to any Roman measurement unit may reject an alignment with the road, since this was the only argument on which this alignment could have been based. Furthermore, the road between Tongres and Maastricht was an important connection throughout the region's history, not only the Roman. Hence, aligning the cadastre to the road does not *a priori* suggest a Roman date for the cadastre; it could just as well be medieval or modern.

Dutch province of Limburg

This region is situated to the east of the Tongres-Maastricht area. Edelman and Eeuwens (1959) have argued to have found evidence for a Roman cadastre of 710 by 710 m (one *centuria*, i.e. 20 by 20 *actus*) with an orientation of 42° northeast. This was based on the evidence of straight, still existing, roads running parallel or perpendicular of each other. In order to date the cadastre, they related it to old churches that were located near the intersections. It is known that post-Roman sites with religious significance could line up along the *limites*, most notably the *cardo* (Anonymous 1954; Dodinet *et al.* 1990). In Damascus, for example, mosques were aligned to the Roman *limites* of a long 'forgotten' cadastre. In Northwestern Europe these post-Roman sites would most likely then be churches. Yet, Edelman and Eeuwens did not found enough churches for their argument. Therefore, they moved consequently to excavated Roman sites that could be related to the grid. But as most of these remains were not well-documented, this too did not succeed (Edelman and Eeuwens 1959: 53). However, their initial methodology of studying straight, still existing, roads seems already doubtful. As with Mertens and Ulrix' proposal, in order to make fields of ca. 710 m they had to make a selection. However, like Mertens and Ulrix, nowhere were the reasons for using these lines, and neglecting others, clarified.

Many scholars, though, accepted the proposal at first (Huygen 1960; Müller-Wille 1970: 29; Dilke 1971: 149-150; Lambert 1971). Yet, due to the methodological fallacies, scholars gradually became more sceptic about it.[26] Peterson (1996), however, re-examined Edelman and Eeuwens' proposal and concluded that those sceptics too soon had abandoned the proposal for its methodological fallacies. He demonstrated using a Kolmogorov-Smirnov test that the distribution of Roman sites' distances to the proposed *limites* was

significant. The sites seem to have been distributed near the *limites* as would be expected in a cadastre, as will be shown in chapter 5. Peterson, however, still only demonstrated that the proposed cadastre by Edelman and Eeuwens *could have* existed. Thereby he incorporated one major drawback, namely the unproven assumption of Edelman and Eeuwens that the roads they identified as *limites* were the Roman boundaries belonging to the *centuriae*, while the rest of the roads that had the same orientation were just internal boundaries within the *centuriae*.

Recently, Zandboer (2006) has argued that the Roman villas in Dutch Southern Limburg were oriented towards the valleys, streams and rivers, thereby implying no orderly pattern of a cadastre (T. de Groot, pers. comm.). However, her conclusions have some drawbacks too. Firstly, they are drawn from a GIS analysis of the 'protected' villa sites by the Dutch government. With regard to some of these 'protected' sites, it remains uncertain if a Roman villa actually stood here. Moreover, most Roman villas in this region are not 'protexted' – and therefore not examined in this study. The second drawback is that her conclusions do not interfere with the possibility of a Roman cadastre. This may be evident from the fact that both Peterson and Zandboer in general made use of the same pool of Roman villa remains, yet based on their research question both draw different conclusions. This may suggest that the choice of a villa location could have been based on both conclusions, near a possible *limes* as well as towards the valleys, streams and rivers.

German Rhineland

East of the Dutch province of Limburg, lays the German part of the loess zone, the German Rhineland. Here lies along the Rhine the *colonia* of Cologne, the largest Roman city of Northwestern Europe. Despite its size, importance and the fact that it was a *colonia*, only few scholars have attempted to reveal evidence for a Roman cadastre. Actually thus far only Klinkenberg (1936: 268-285) seems to have tried this. He argued not to have found evidence of a normal 20 by 20 *actus* (2.400 by 2.400 *pedes*) cadastre, but one of 1.600 by 1.600 *pedes* (473,6 m) When tripled (4.800 by 4.800 *pedes*) this would give exactly four *centuriae*. Furthermore, he argued that there were three different cadastres with all different orientations (see Klinkenberg 1936: 277).

Klinkenberg based his proposal on certain streets like the *Venloer straße* and *Subbelratherstraße*, which could be traced back to at least the medieval period. Furthermore, he looked at villages that were distributed near the *limites* and the intersections of the cadastre. However, in his examination he left out many villages seemingly for no reason; perhaps they did not corresponded well with his findings. Moreover, as for Edelman and Eeuwens, Mertens and Ulrix, he seems to cannot explain why the roads he identified as *limites* were used as such. Lastly, according to historical sources, Roman land-surveyors used only integer *actus* when calculating cadastres. Klinkenberg's cadastre of 1.600 by 1.600 *pedes*, or 13,33 by 13,33 *actus*, could therefore not be surveyed by Roman land-surveyors. Due to these objections, few scholars accepted his interpretation (Edelman and Eeuwens 1959: 51; Müller-Wille 1970: 26; Hinz 1972: 14; Heimberg 2003).

5

Talus and Site Orientation

As noted in previous chapters, the earlier proposals for Roman cadastres in Northwestern Europe were largely dominated by preconceived associations of modern roads with ancient boundaries. The proposals, furthermore, were in most cases instigated by a general assumption of the existence of Roman cadastres all across the Empire, which was created by the clear visibility of some of these cadastres from the air. It, however, is important to keep in mind the issue of the relationship of these detected linear patterns with a Roman cadastre. How does one know that the linear patterns are Roman in date? And, is one able to identify the boundaries of these cadastres? The previous chapter already has given some ideas of how to overcome methodological fallacies that result in optimistic proposals. When excavation is not an option and one has to fall back on historical-geographical features, statistical analyses and historical and archaeological data is able to back the historical weaknesses of these features up. In this chapter, we will start with creating a hypothetical relationship between a historical-geographical linear pattern and the archaeological data by studying the orientation of both data.

Theory

A landscape can be defined as a kind of palimpsest with a complex 'cultural biography'. This has been acknowledged by many (e.g. Roymans 1995; Kolen 1995; 2005). All modern landscape features bear with them a narrative that adds to this biography and, hence, can tell us something about past cultural events. A building, for example, shows traces of earlier modifications, a cityscape tells us things about its planning, and bridges and roads can give evidence for intercultural networks. In the case of a Roman cadastre, one has to search for landscape elements that could have related to boundaries of the different regular land plots. This can and has been done by scholars through the study of (hollow) roads, ditches, hedges and modern field boundaries. All give evidence for linear patterns that can be studied for their regularity and conformity with a supposed Roman cadastre.

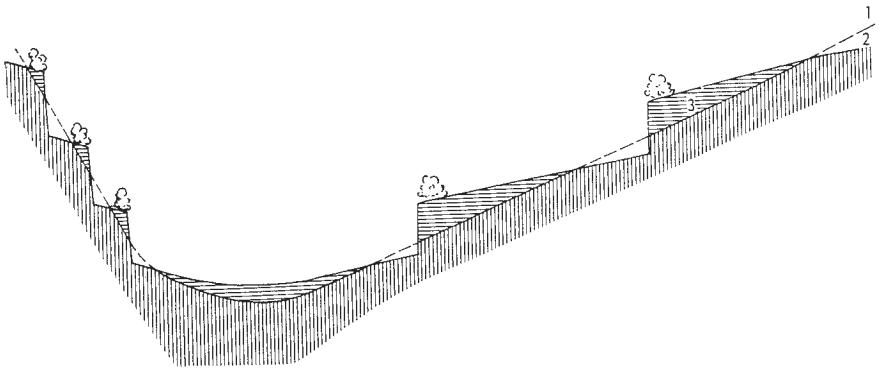


Figure 22 (left). Schematic representation of the formation of a talus (*after* Breteler and van den Broek 1968). 1. Original slope; 2. Slope affected by erosion; 3. Overgrown talus, sedimentation (colluvium) on the valley side of the slope.

Figure 23 (next page; above). The steepness of slopes in the Tongres-Maastricht area. Note that the Albert channel and its slopes in the East of the area was only dug in the 1930s.

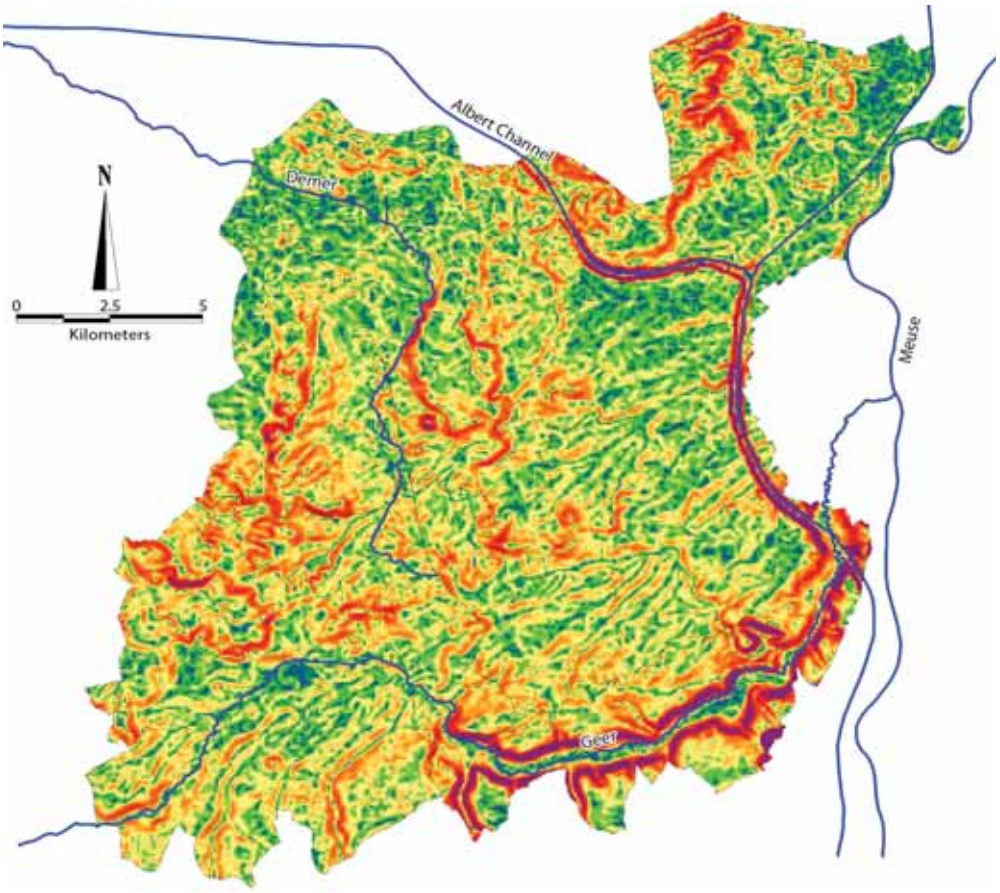
Figure 24 (next page; below). The sources, input and analysis.

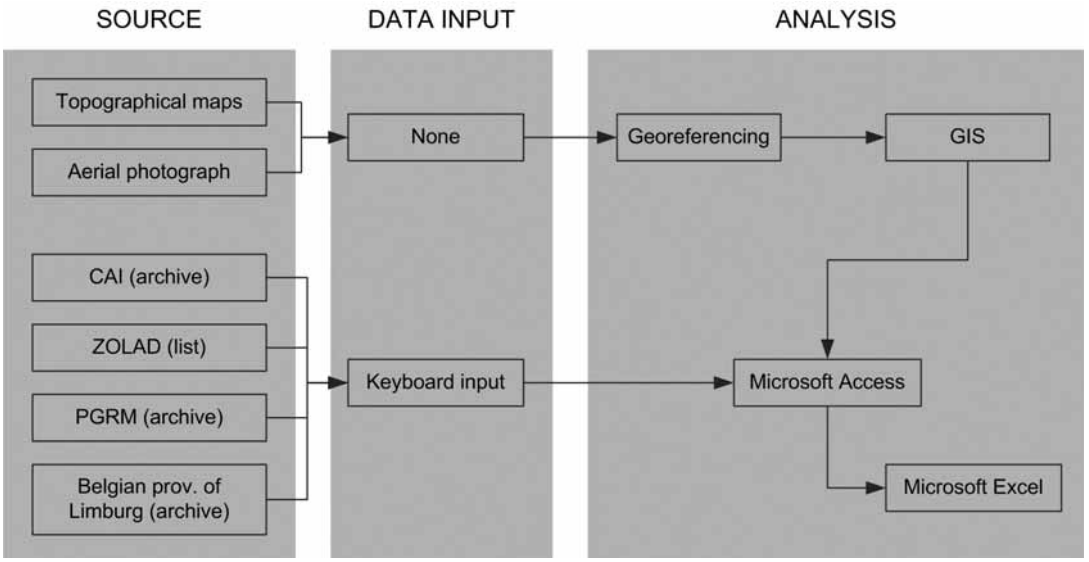
Here, a different kind of boundary feature will be studied that is characteristic for the sloping terrain of the loess region: the talus (*pl.* talus) or – as it is sometimes called – escarpment.[27] According to Witherick *et al.* (2001), a talus is "an accumulation of angular fragments on a slope". Although it seems that talus never have been studied as a historical-geographical feature relating to past geographical land systems, it suits all characteristics of a boundary and was due to its other function probably used for a long period.

The creation of talus is caused by erosion. As mentioned earlier, loess is, despite its fertility, very susceptible to erosion (see chapter 2). When the land was still covered with forests, this was not a problem. But as farming land began to be created and the slopes were deforested, the problem of erosion arose. Due to erosion the fertile top layer of the soil, the loess, is gradually washed of the slope, causing the slopes to become less fertile. In order to stop this process and preserve the fertility of the slopes, some precautions have to be made of which the most important is the creation of talus. By leaving a natural border of vegetation of the land plots intact, or by creating a boundary in the sense of hedges, fences or stone demarcations, the eroded soil accumulates against that demarcation (Breteler and Van den Broek 1968; Renes 1988). This creates on the hillside of the demarcation a sort of 'terrace', while at the valley side a steep slope arises. On the demarcated land plots, the side of the valley is covered by sedimentated colluvium, while towards the plateaus only the eroded soil is left (see figure 22). The demarcation with vegetation growing on top of it, of which the roots prevent further erosion, is what we call a talus or escarpment.

According to Breteler and Van den Broek (1968: 121), there are four types of talus: (1) along Pleistocene valleys and erosion gullies; (2) running across erosion gullies; (3) forming the boundaries of parcellation blocks; and (4) along hollow roads. In the Tongres-Maastricht area most talus are of the third type, which occur on the loess in areas with little relief. While it has been mentioned that the hilly landscape is characteristic for this area, it has to be noted that these hills are only outliers of the Ardennes to the south. The slopes are, as a result, less steep than imagined (see figure 23). This is especially well visible in the municipalities of Riemst, Bilzen and Lanaken. Note that other types of talus do occur in the area; however, in far less numbers than those of type three.

Thus, from what is stated above it may be argued that, because of the danger of erosion in the loess region, it is highly plausible that talus formed an important


N
0
2.5
5
Kilometers
Albert Channel
Demer
Meuse
Geer


SOURCE
DATA INPUT
ANALYSIS
Topographical maps
Aerial photograph
CAI (archive)
ZOLAD (list)
PGRM (archive)
Belgian prov. of Limburg (archive)
None
Keyboard input
Georeferencing
GIS
Microsoft Access
Microsoft Excel

Name	Date	Scale	Region covered
NGI (aerial photograph)	2003	1:20.000	Bilzen/Riemst
NGI (map)	1978 -1993	1:10.000	TM area
Depôt de la Guerre	1877 -1878	1:20.000	TM area, only Tongres half
Vandermaelen	1851	1:20.000	TM area

Table 4. The maps used in the GIS.

feature in the landscape. The landowners' harvest depended on it, as well as the safety of villages situated in the valleys, which otherwise could have been flooded by mud streams. Because of this function, they seem to have been of a high economic and social value to the community. It is therefore reasonable to assume that they were not so easily removed. Hence, talus may represent boundaries that have been used and created in the past; they are part of an historical landscape that still surrounds us today.

Of course, not all past talus have been preserved until this day. In South-Limburg (the Netherlands), for instance, of the 200 km of talus existing in 1910 already some 110 km was vanished in 1980 (Saris 1984: 98; Renes 1988: 29). This is probably caused by the enormous changes in the landscape during the last 150 years in Western Europe (see Antrop 1997). Also in the Tongres-Maastricht area such changes occurred. This becomes evident when comparing the landscape on modern maps with that on the Vandermaelen map from 1851. Furthermore, land reallotment starting in Belgium from the 1950s onwards changed the landscape scenery by creating new field boundaries and roads, while destroying old ones (see chapters 2 and 4).

Methodology

Thus, the talus historical significance has to be acknowledged. Yet, how can the talus' period of creation be dated? One way is by consulting historical sources to trace historical-geographical linear features back in time (see Palet Martínez 2005; see also chapter 4). This, however, will cause a problem, since (in constrast to roads, buildings etc.) talus are normally not being named and have – at least, through the eyes of outsiders – no special significance other than demarcation. Other than maybe in some boundary disputes, historical sources therefore will not have mentioned such features.

The other way – and the way that is used here – of relatively dating these features is by analyzing their relationship with the archaeological data from the Tongres-Maastricht area. This method has been explored by several scholars, most notably Clavel-Lévêque (1983a; 2000; 2002), Chouquer (1987; Chouquer and Favory 1980) and Peterson (1993; 1996). The aforementioned distribution of archaeological sites is the most well-known (see chapter 4). Site distribution studies the relative distribution of sites in accordance with a proposed cadastre. Another approach that will be undertaken is to study the relative size of the land of one Roman villa. It has been noted earlier that in Northern Gaul a supposed land size of 50 ha has been estimated, which is similar to the size of one century (see chapter 4; see also Gaitzsch 1986: 427; Heimberg 2003: 127-130). In the

next chapter, the land sizes of the settlements in the Tongres-Maastricht area are tried to be calculated in order to relate it to a proposed cadastre (see chapter 6).

Yet, prior to such analyses, a proposed cadastre needs to be established. This has in the past been done by studying the orientation of linear features in the landscape. Some scholars rejected this approach because of its highly biased results due to a great reliance on the interpretation of the scholar studying the cadastre (see chapter 4). The method of 'Directional filtering', however, has taken this bias out of the interpretations. This chapter, therefore, first analyses the orientation of the talus using specific GIS software. This orientation of the talus will, then, be set against the orientation of the excavated archaeological features found in the Tongres-Maastricht area. As will be explained below, this may suggest a possible historical relationship between the two. Lastly, the talus will be checked upon their spatial relationship with Roman measurement units. The Romans used different measurement units as nowadays (see table 1). The distribution of talus can therefore be tested upon their relation with these measurement units, since they do not interfere with measurement units used nowadays like meters and kilometers. This may give evidence for a possible Roman date.

To analyse the talus of the Tongres-Maastricht area, an inventory was made using topographical maps and aerial photographs of the area.[28] To overcome any landscape changes from the last 150 years, the inventory is not only based on modern maps and aerial photographs. The features on modern maps and photographs are compared to those on mid-nineteenth century maps, which are the earliest large scale topographical maps known for the Tongres-Maastricht area (see table 4). In addition to this inventory, also all Late Iron Age to Late Roman sites known for the Tongres-Maastricht area have been listed and mapped (maps 1-4 and catalogue).[29] This database has been created using Microsoft Access. For the inventory of the talus the GIS software ESRI ArcGIS 9.2 and Mapinfo 8.5 have been used to georeference the maps and aerial photographs according to the Belgian national coordinate system (NGI Lambert '72) and to identify the talus. All analyses have been done using these software, as well as Microsoft Excel (see figure 24).

Orientation of talus and Roman structures

Archaeological features from all periods tend to be influenced by its surroundings; this holds for the Roman, as well as any other period in time. One way of establishing an influence and thereby a suggestible relationship is by looking at the orientation. The orientation of structures and other features like cadastres seems to be influenced by many factors, whether cultural, cosmological, symbolical or environmental. Earlier in this book, some of the different ways by which Roman cadastres were orientated have already been mentioned (see chapter 4). Of course, one cannot start by arguing for one (or more) of these ways in the case of the Tongres-Maastricht area – e.g. it follows the orientation of the main Roman roads – before a look is taken upon the data. This would create a prejudiced view for one fixed orientation. To determine an orientation we need – as in the case of

Figure 25 (above). The talus along the valley of the Geer as viewed on different maps: a. Vandermaelen; b. *Depôt de la Guerre*; c. NGI (courtesy of NGI).

Table 5 (next page; above). Orientation classes.

Figure 26 (next page; below). Map of the distribution of talus.

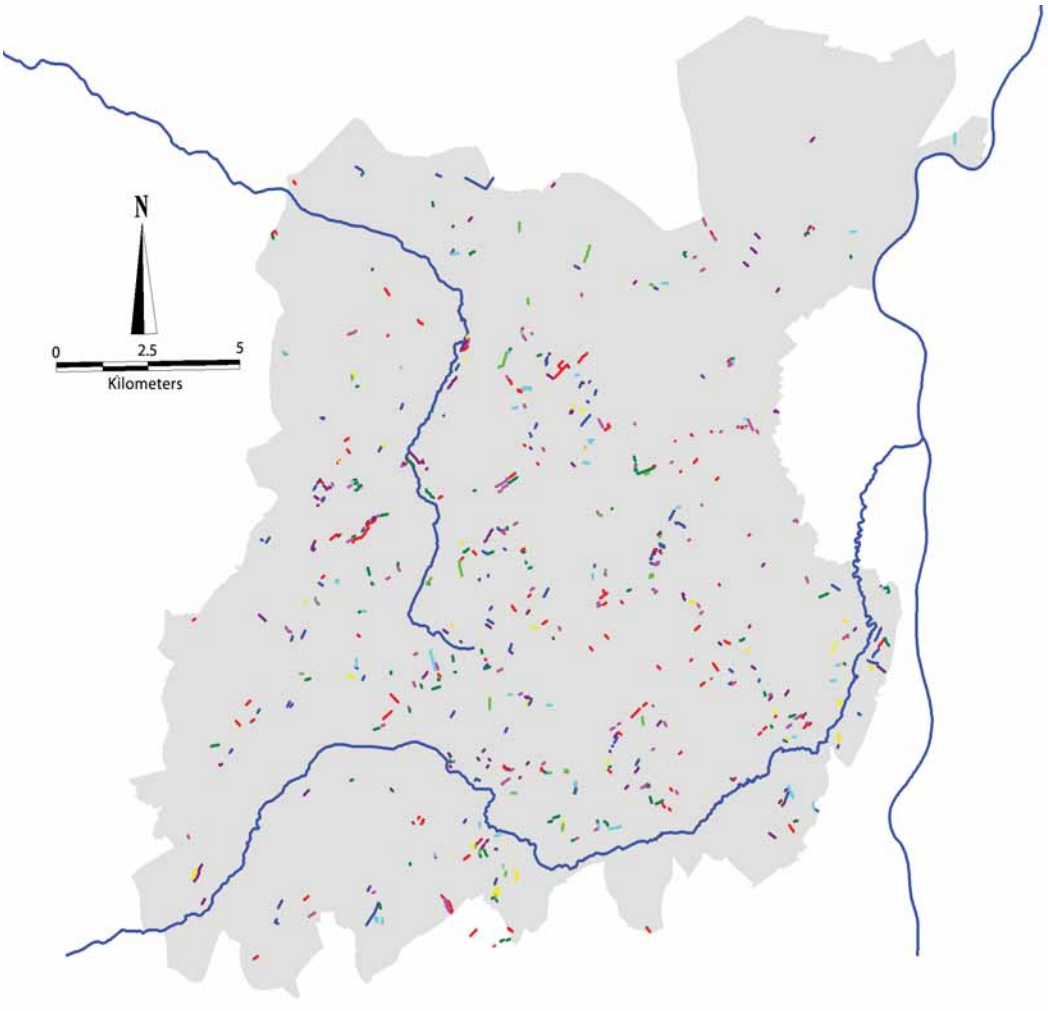
'Directional filtering' – to look unbiased towards the finding of the most common orientation.

The orientation of the talus has been calculated using GIS software. First, each talus has been traced, creating a line object which was stored in a separate database.[30] Note, however, that not all talus have been collected in this database. Along the valley through which the Geer flows, talus can hardly be separated from each other. In addition to this, they stand in direct relationship with the shaping of the valley by the river itself, which is evident from their shape (see figure 25). The orientation of each line object was then calculated by measuring its angle from grid north, the direction northwards along the grid lines of a map. Since the Lambert projection, which is used in Belgium, is a cylindrical projection, the grid north differs from true north, the direction of the North Pole. This however does not cause any problems, as all line objects are measured in this way (see also Peterson 1993: 37-38). This measurement is called the azimuth and is calculated in two decimal degrees, given the two points (x_1, y_1) and (x_2, y_2), by $\mathrm{Tan}^{-1}((x_2-x_1) / (y_2-y_1))$. Along with the orientation, the database also contained for each line object, the maps on which this line object was visible. As a result, it was possible to make separate databases of all talus for each map.

Measured clockwise, orientations can vary between 0° and 360°. This means that one line can have two different orientations, depending on the way you measure it. For example, a 15° line is the same as a 195° line. To overcome this double standard, all orientations had to be fixed between 0° and 180°. Now, in order to detect distinct clusters of orientations and to calculate for the accuracy error of the older digitized topographical maps, it was needed to classify them (see also Vermeulen and Antrop 2001: 117-118). Since Roman cadastres were always square or rectangular of shape, we can suppose that whenever there is a North-South-oriented line of, for instance, 2°, a West-East-oriented one of 92° would also have existed. In what follows, therefore only the eight classes between 0° and 90° are used in statistics, tables and histograms (see table 5).

The results are plotted in a histogram shown in figure 27 and placed on a map of the area in figure 26. It shows that the largest concentration of talus is situated in the class of 45° to 56,25°. When the orientations are filtered on those that were existing when the Vandermaelen (1851) and the *Depôt de la Guerre* map (1877-1878) were made, the results are almost the same.[31] The only difference is

Key orientation	Talus (NE)	Talus (ES)	Color
5,625˚	≥0˚ - <11,25˚	≥90˚ - <101,25˚	green
16,875˚	≥11,25˚ - <22,5˚	≥101,25˚ - <112.5˚	yellow
28,125˚	≥22,5˚ - <33,75˚	≥112,5˚ - <123,75˚	blue
39,375˚	≥33,75˚ - <45˚	≥123,75˚ - <135˚	purple
50,625˚	≥45˚ - <56,25˚	≥135˚ - <146,25˚	red
61,875˚	≥56.25˚ - <67,5˚	≥146,25˚ - <157,5˚	pink
73,125˚	≥67,5˚ - <78,75˚	≥157,5˚ - <168,75˚	dark green
84,437˚	≥78,75˚ - <90˚	≥168,75˚ - <180˚	light blue



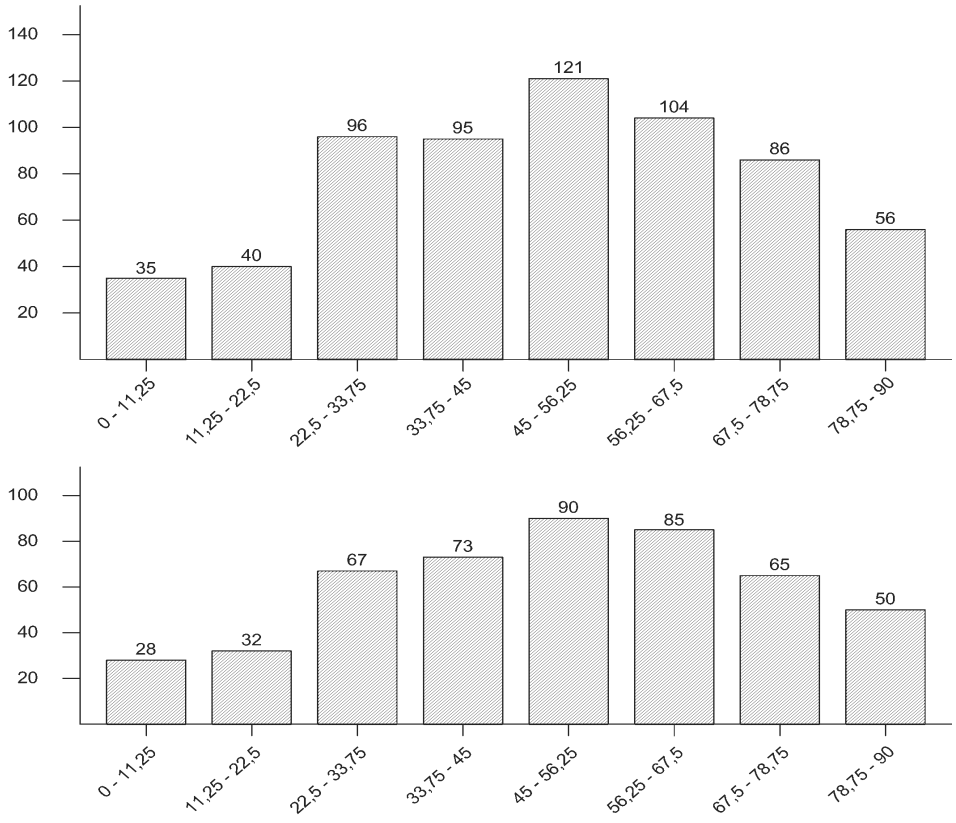


Figure 27 (above). Frequency of talus (n=633).

Figure 28 (below). The frequency of talus visible on the Vandermaelen (1851) and *Depôt de la Guerre* (1877-1878) topographical maps (n=470).

that the 56.25°-67.5° class has moved closer in terms of number to the 45°-56.25° class – 74:76.

Hence, a test of randomness has calculated the possibility that the talus were not randomly distributed over the range of 0° to 90° by using a Kolmogorov-Smirnov single sample test over the total number of observations (Fletcher and Lock 1991: 91-94). This test showed significant evidence that the talus were not randomly distributed ($\alpha = 0{,}01$). In the same way, a test for normality has been done using again a Kolmogorov-Smirnov single sample test. This test calculated the maximum absolute difference between the observed cumulative distribution and the expected one if the population from which the sample was taken had a normal distribution (Fletcher and Lock 1991: 94-100). Since the maximum absolute difference (8,96) is greater than the highest significance factor ($\alpha = 0{,}01$), namely 4,17, there is strong evidence that a normal distribution is a poor fit.

Thus, the orientation of the talus is nor randomly, nor normally distributed. This seems rather reasonable when knowing that talus (like other linear features) are bound by a specific period of creation, as well as a specific place of creation. Culturally, cosmologically, symbolically and environmentally influenced, different periods and places would have had different orientations. The latter does not only hold for archaeological features like buildings and roadways (see Parker Pearson and Richards 1993; Haselgrove 1995: 73-74), but also for their surroundings like agricultural fields (and in this respect the talus).

However, the influence of one factor needs to be stressed here, the environment. Due to its unpredictability and sometimes inaccessibility, the

environment can restrain all other factors. People had to cope with this fact and seem to have done so. It is, therefore, no surprise that half of Le Gall's (1975) list of factors that could determine the orientation of a Roman cadastre includes the environment. This seems also true for the orientation of talus in the Tongres-Maastricht area. It is known that the loess plateau in the area inclines in a Northeastern direction (e.g. Duurland 2000: 3-4). A look at the histogram of the talus (see figure 28) shows that the majority is orientated in this Northeastern direction. One could therefore dismiss the general orientation of the talus as being caused by the environment and not a cadastre as argued here. Hence, a relation between the observed environmental factor for the orientation of the talus and the factor that the Roman land-surveyors would have used the environment as the one determining the supposed cadastre is hard to prove.

On the other hand, assuming that the talus are directly related to boundaries of a cadastre or other fields, also talus perpendicular to the inclination of the loess plateau need to have existed. This seems to be the case in the Tongres-Maastricht area. The data shows that the class 45°-56,25° has 69 talus running North-East, while 52 talus are running perpendicular in a South-East direction. As the other orientation classes show quite similar results, there is thus only a small difference in number between the Northeastern talus and the perpendicular South-East direction. This argues that the talus were part of land plots running along the inclination of the loess plateau in the Tongres-Maastricht area as well as perpendicular. Thus, talus seem to have represented fields of which the orientation in large degrees was shaped by the Northeastern inclination of the loess plateau.

If a Roman cadastre may be assumed here, this general orientation coincides with the second factor on the list of Le Gall (1975). Yet, since this orientation may also have been favoured in periods other than the Roman, the question rises how to relate it to the Roman period? In order to answer this question, a close look at the orientation of the archaeological features needs to be taken. As has been stated, "there is no doubt that features of all periods, starting from the period when a cadastre is first established, tend to be influenced by […] its *limites*" (Peterson 1993: 67).[32] This is something common throughout time; modern (but also in Roman cities) houses are in most cases aligned to the streets, as well as to their gardens or fields, and *fermes indigènes* are orientated in the same way as the farms themselves (see chapter 3). Another example is a Roman house found to the south of Bergheim-Kenten, Germany, which runs parallel to a road (see Stuart and De Grooth 1987: 27).

One of the clearest examples, however, to illustrate the appropriateness of studying the orientation of the Roman features is from the countryside of the Roman town of Collatia near Rome (Quilici 1974). The central part of the *ager collatinus* shows that the orientation of the individual Roman houses conforms to the Roman 15 *actus* cadastre that has been observed there (see figure 29; Chouquer 1987: 286-288). Furthermore, closer to the study area, in the German Rhineland, it has been attested that five of the six excavated Roman villas had the same orientation (Gaitzsch 1986; see also chapters 3 and 4). It therefore can be

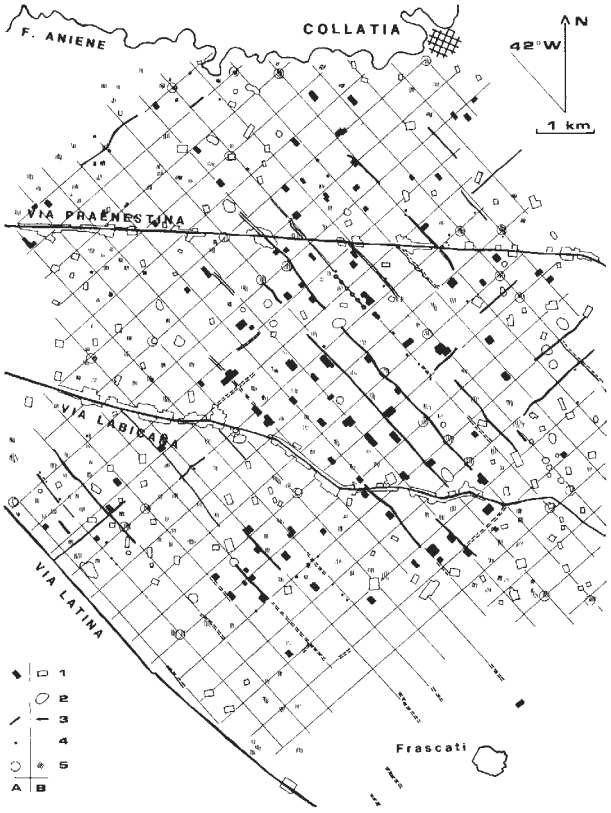


Figure 29 (left). The *ager collatinus* at Collatia (*after* Chouquer 1987). 1. sites whose boundary is known; 2. sites whose boundary is not known; 3. ancient roads and lines; 4. burial; 5. small rural deposit; A. sites orientated accord-ing to the cadastre; B. sites not orientated.

Figure 30 (next page; above). The frequency of archaeological features (incl. houses, ditches, fences) from the Tongres-Maastricht area. (a) All periods (n=113); (b) Late Iron Age (n=19); (c) Early Roman (n=52); (d) Middle Roman (n=37); (e) Late Roman (n=32).

Figure 31 (next page; below). Sites from which orientations have been measured. The number corresponds to that of the catalogue. The pie-chart indicates the number of observations per period (LIA = blue; ER = green; MR = red; LR = yellow).

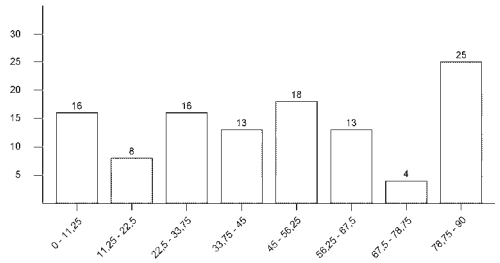
expected that Roman archaeological features show the same orientation as the cadastre in which they are placed.

As a result, the archaeological features in the Tongres-Maastricht area show through time – from Late Iron Age to Late Roman – a remarkable change in orientation (see figures 30 and 31). The result of a Spearman's rank correlation coefficient between the period of a structure and its orientation gives significant evidence (>99,5%) for a correlation between the two.[33] Comparing the different periods, it can be noticed that the Middle Roman period has more features (45,95%) agreeing to the orientation class 45°-56,25° than any other period (LIA = 0%; ER = 3,85%; LR = 6,25%). This orientation class, hence, corresponds to the most occurring orientation of the talus in this area and thereby assumes a relationship between this period and the talus.

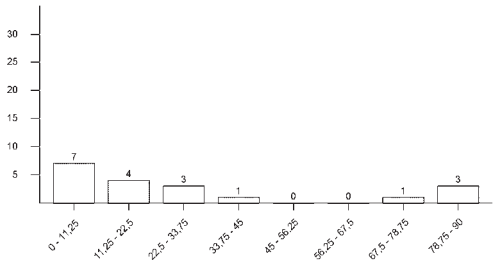
Some people may not be persuaded by this, since structures (and their orientation) from periods beyond that of the Romans are not included in it. Therefore, in addition to the Late Iron Age to Late Roman features, the construction date and orientation of all medieval castles and strongholds in and near the Tongres-Maastricht area have been assembled to see if there may have been a correlation between the orientation of post-Roman structures and that of the talus (see figure 32 and table 6). During the medieval period, many castles and strongholds have been constructed and maintained in the Belgian Hesbayen. A good example of this is the castle Alden Biesen at Rijkhoven (see figure 33).

The orientation of the castles in the Tongres-Maastricht area does not suggest a strong relation with the orientation of the talus, as it did with the Middle

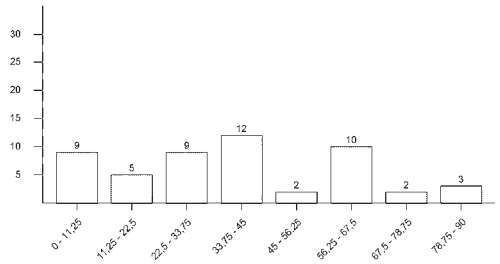
a.


30
25
20
15
10
5
16
8
16
13
18
13
4
25
0 - 11.25
11.25 - 22.5
22.5 - 33.75
33.75 - 45
45 - 56.25
56.25 - 67.5
67.5 - 78.75
78.75 - 90

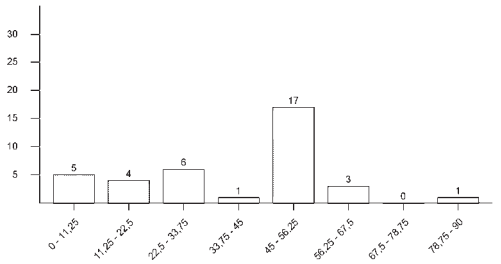
b.


30
25
20
15
10
5
7
4
3
1
0
0
1
3
0 - 11.25
11.25 - 22.5
22.5 - 33.75
33.75 - 45
45 - 56.25
56.25 - 67.5
67.5 - 78.75
78.75 - 90

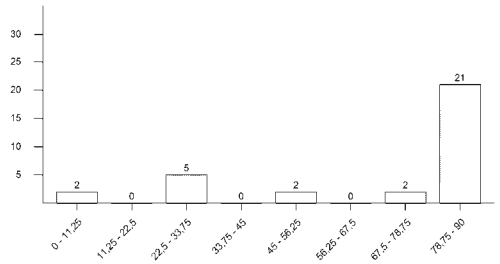
c.

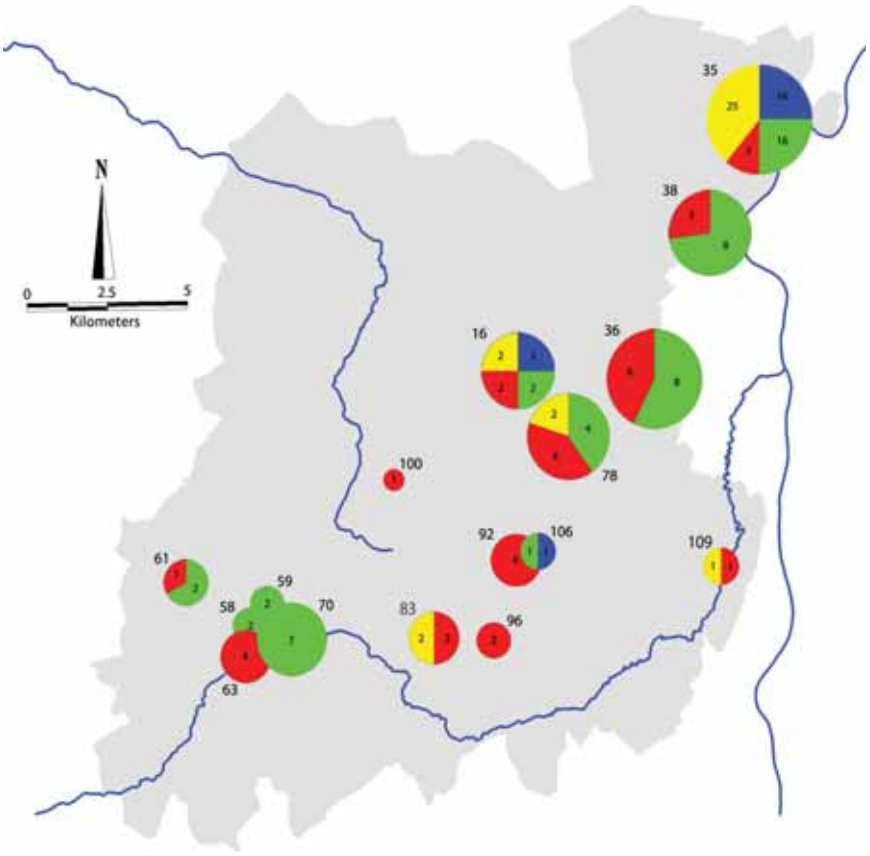

30
25
20
15
10
5
9
5
9
12
2
10
2
3
0 - 11.25
11.25 - 22.5
22.5 - 33.75
33.75 - 45
45 - 56.25
56.25 - 67.5
67.5 - 78.75
78.75 - 90

d.


30
25
20
15
10
5
5
4
6
1
17
3
0
1
0 - 11.25
11.25 - 22.5
22.5 - 33.75
33.75 - 45
45 - 56.25
56.25 - 67.5
67.5 - 78.75
78.75 - 90

e.


30
25
20
15
10
5
2
0
5
0
2
0
2
21
0 - 11.25
11.25 - 22.5
22.5 - 33.75
33.75 - 45
45 - 56.25
56.25 - 67.5
67.5 - 78.75
78.75 - 90


N
0
2.5
5
Kilometers
35
38
16
36
78
100
92
106
109
61
59
58
70
83
96
63

Class	Castle / stronghold	Place	Orientation	Date	References
0-11.25°	Stronghold Mulken	Mulken	0	ca. 1300 AD	Claassen 1970: 69-71
	Jonkholt	Hoelbeek	0	ca. 1300 AD	B. Roosens and Wouters 1986; Wouters and Roosens 1986; B. Roosens 1987
	Groenendaal	Munsterbilzen	0	ca. 1650 AD	
	Zangerhei	Eigenbilzen	5	1423 AD	
	Daalbroek	Rekem	7	1614 AD	J. Coenen 1948
	Stronghold Borgloon	Borgloon	8	1031 AD	Lux and Thyssen 1980a
11.25-22.5°	Schoonbeek	Beverst	15	1628 AD	
	Terwaart	Hoeselt	16	1862 AD	
	Alden Biesen	Rijkhoven	19	1220 AD	Lux and Thyssen 1977; 1978; 1979; 1980b
	Weyer	Hoeselt	20	1641 AD	
	Neerrepen	Neerrepen	21	1592 AD	
22.5-33.75°	Widooie	Widooie	25	1559 AD	
	Eggertingen	Millen	28	1367 AD	
	Rosmeulen	Nerem	31,5	1913 AD	
33.75-45°	De Kleine Graaf	's-Herenelderen	34,5	1840 AD	
	De Renesse	s-Herenelderen	36	ca. 1300 AD	Genicot 1976: 242-243
	Schalkhoven	Schalkhoven	41	ca. 1600 AD	A. Coenen 1989
	Betho	Mulken	44	1267 AD	Genicot 1976: 66
45-56.25°	Rooi	Neerrepen	45	1278 AD	Baillien 1949
	Ter Poorten	Alt-Hoeselt	48,5	ca. 1300 AD	
	Kiewit	Gellik	51,5	1798 AD	
	Stronghold Millen	Millen	52,5	1366 AD	Claassen 1970: 69
	De Brouckmans	Hoeselt	54	1622 AD	
56.25-67.5°	Pietersheim	Lanaken	58,5	ca. 1200 AD	J. Coenen 1944; Claassen 1970: 68
	Scherpenberg	Nerem	66,5	1285 AD	
	Stronghold Kolmont	Overrepen	67	ca. 1100 AD	Claassen 1970: 63-66; Genicot 1976: 160
67.5-78.75°	D'Aspremont-Lynden	Rekem	67,5	1108 AD	Van de Konijnenburg 1985; 1986; 1987
	Hocht	Lanaken	75	ca. 1180 AD	J. Coenen 1946
	Genoelselderen	Genoelselderen	75	1750 AD	
	Hamal	Rutten	76,5	1214 AD	Claassen 1970: 73-75; Genicot 1976: 130-131
78.75-90°	Terhove	Bommershoven	80	ca. 1100 AD	
	Kolmont	Overrepen	80	1840 AD	
	Bockrijck	Hoeselt	89	ca. 1400 AD	

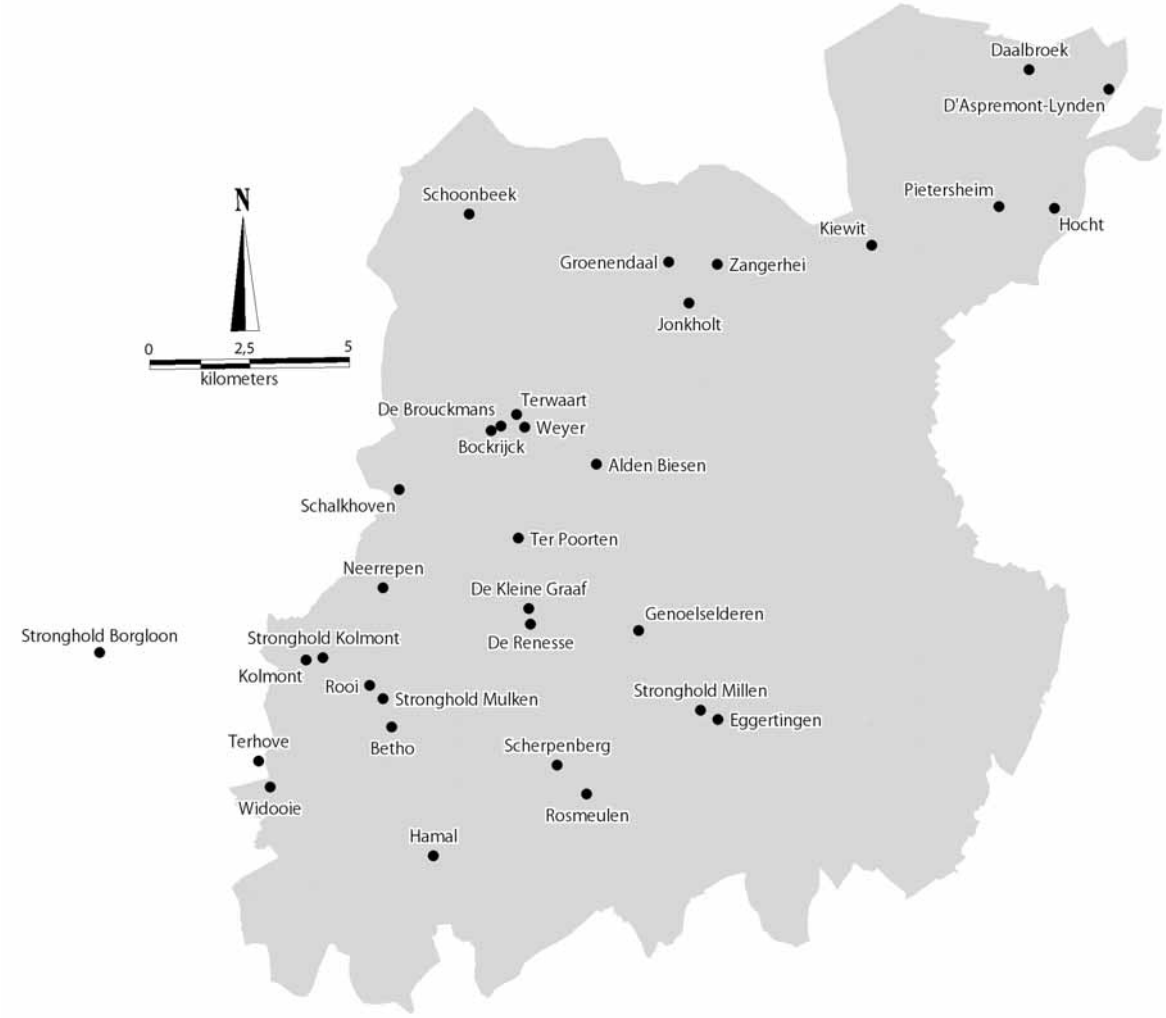


Figure 32 (above). Castles, castle ruins and strongholds in the Tongres-Maastricht area.

Table 6 (previous page). Orientation and construction date of castles, castle ruins and strongholds in and near the Tongres-Maastricht area.

Roman features. The castles' orientation seems rather randomly distributed and cannot be related to time or place. Even when the castles build after 1500 AD are excluded, this seems to be the case. This shows that, at least, certain post-Roman features, since castles would have not been the sole structure-type that would have been build in the medieval Tongres-Maastricht area, do not correspond to the general orientation of the talus. Castles or strongholds are, however, often associated with surrounding land plots belonging to the castle's owner. Hence, some type of boundary markers would be expected. Since the castles appear not to be all directed in a similar orientation, their boundary markers most likely would not either. Thus, as the talus *do* show a general orientation, the talus seem not to be related to the castles' boundary markers. A relationship between the talus and post-Roman features seems therefore weaker than with Roman features.

Going back to the Roman period, except for the relationship between the talus and Middle Roman period regarding orientation, are there more signs that could support the idea of the implementation of a Roman cadastre during this time. In other words, what may have been the context in which the cadastre was set up? In the last 20 years scholars have emphasized the continuity of Northern Gallic society from the Late Iron Age through the Roman period (e.g. Walthew

Figure 33. Castle of Alden Biesen (courtesy of Landcommanderij Alden Biesen, Bilzen).

1982; Slofstra 1991; Roymans 1996; Haselgrove 1996; Lenz 1998). Aside from some developments and changes during the Early Roman period, all seem to argue that life continued in relatively the same way as in the later Iron Age, politically, culturally and socially. True, in many cases there seems not to have been such a dramatic change when the Romans arrived and 'colonized' the land as sometimes has been assumed in the past. However, when one examines the archaeological features independently from the sites where they are found, some implications for this 'continuity' picture emerges.

There seems to have been a lack of continuity between the Early and Middle Roman period wit regard to the archaeological features (see table 7). Only 5,88 percent of the 78 Early Roman features continue to be occupied and/or used during the Middle Roman period. In contrast, of the 31 Early Roman sites, 26 seem to have been still in use during the Middle Roman period. Thus, the sites suggest continuity in the sense that people remained inhabiting the same spots in the landscape, while the features imply some sort of change whether social, cultural or political. Note, too, that during the Middle Roman period 50 new settlement sites (65,79% of all Middle Roman sites) emerged, what may suggest that the population in this area would have grown considerably.[34] Economic prosperity, the Pax Romana, and the urbanization in the city of Tongres and smaller *vici*, most likely caused this rural growth (see chapter 3). Hence, the fact that only four archaeological features from the Early Roman period remained intact during the Middle Roman period, while 106 new features were built, supposes a large-scale change in the rural landscape of the Tongres-Maastricht area during the transition from the Early to Middle Roman period.

From the features of which the orientation could be calculated, the 45°-56,25° orientation class shows even less continuity during the transition from the Early to Middle Roman period. Of the 17 features from the Middle Roman period (taken from 8 different sites) in that class, only one (5,88%), a ditch from the site Veldwezelt-Op de Schans, was already used during the previous Early

Roman period. The 16 other features were newly established during the Middle Roman period. It, thus, seems that the general orientation (45°-56,25°) that has been observed during the Middle Roman period, was only introduced during that period and not before.

Furthermore, an earlier date for the cadastre other than the Middle Roman period can be rejected by the orientation of Tongres' orthogonal street plan and some of its buildings, which was implemented during the reign of Augustus and continued by later emperors during the Early Roman period (see Vanvinckenroye 1985; A. Vanderhoeven 1996). This orthogonal street plan seems to have had a different orientation (60°) than that of the general orientation observed here (45°-56,25°). Considering the political and social changes in Northern Gaul occurring mostly under the reign of Augustus (see chapter 3), there seems to have been a tendency to view this as the most likely period in which a Roman cadastre could have been implemented in the Tongres-Maastricht area. However, would one expect an Early Roman date for the cadastre, it most likely would have had the same orientation as the orthogonal street plan of the military camp at Tongres, thus 60°. If they were founded around the same time, Roman cadastres seem to have had the same orientation as the city or military camp which it surrounded. This can be noted throughout the Empire like at Lugo (Italy), Orange, Corinth and Nicopolis (see Dilke 1971: fig. 41; Rizakis 1996: fig. 8; Romano 2006: fig. 6). Since this seems not the case, it disfavours an Early Roman date for the proposed cadastre.

a.

	LIA	ER	MR	LR
Newly occupied	-	17	50	1
Remained occupied	-	14	25	19
Total occupied	14	31	75	20

b.

	LIA	ER	MR	LR
New	-	40	106	29
Old	-	28	4	19
Total	30	68	110	48

Table 7. Site and archaeological feature distribution per period of the Tongres-Maastricht area: (a) sites; (b) archaeological features.

In light of the observations made above, as a context for the implementation of a Roman cadastre it seems reasonable to point to the aftermath of the Batavian Revolt, which is the conceptual boundary between the two periods and which acts have been attested in Tongres and other nearby cities (see chapter 3). This period was one of socio-cultural change with the emergence of reinforced hierarchical relations between the people. This can be seen in the emergence of stone-built Roman *villae* of different sizes and with different furnishings and burial mounds, as a supposed marker of their status and wealth, on their land plots. As Dyson (1975: 161) formulated this:

> "With the Flavian period, the evidence for major social discontent in Gaul disappears […]. The Flavians seem to have perceived the problems of Gaul and taken long range steps to improve conditions. Considerable investment was made in the Gallic countryside […]. These actions laid the foundations of the new prosperity in Gaul."

In light of this, it must be noted that during the Flavian period also many Roman cadastres were either resurveyed and newly established (often with a different orientation) or newly founded. This has been accounted, for instance, at Corinth, Orange, Béziers and for those in North Africa (Piganiol 1962: 77-90; Clavel-Lévêque 1989: 276-278; Peterson 1993: 239; Romano 2006: 71-81). The establishment of a Roman cadastre in the Tongres-Maastricht area during the Flavian period as proposed here coincides perfectly with these other cadastres. It can be argued, therefore, to be a matter of Rome interfering in local affairs in order to reshape order and loyalty in a region. In the case of the Tongres-Maastricht area, all this may have happened just after the Batavian revolt, during which this loyalty and order had to be reshaped and economic activity needed a new boost.

Still, one can see nonetheless remarkable changes, too, during other periods and transitions from one period to another. As an example of this, observe the Late Iron Age-Early Roman transition (see table 7). During the Early Roman period, 40 new features and 17 new sites have been attested in the Tongres-Maastricht area, which is respectively 58,82 percent of all features and 54,84 percent of all sites during that period. Considering the political and social changes under Augustus, pointed out above (see also chapter 3), these numbers seem not out of place.

However, more importantly, these numbers seem not that compelling as for the aforementioned Early Roman-Middle Roman period transition. There are some drawbacks to the Late Iron Age/Early Roman and Late Roman period numbers as presented here, which prevents the drawing of conclusions from this data. First, the Late Iron Age and Early Roman periods can often not be distinguished very clearly by the dating of artefacts and features and is therefore often taken as one period (e.g. Slofstra 1991; Duurland 2000: 20). Secondly, these two periods and the Late Roman period suffered much from a past scholarly focus on archaeological features from the Middle Roman period like *villae*, burial mounds and Roman-styled artefacts.[35] The result is that there is a smaller sample of sites and features for these periods. Hence, in the Tongres-Maastricht area, the number of features from the Late Iron Age/Early Roman and Late Roman period weighs heavily on the site Neerharen-Rekem. There, 16 features have been found for the Late Iron Age/Early Roman period, and even 25 features for the Late Roman period (see table 7 and figure 30).

In sum, there seems to be particular changes during the Roman period in the Tongres-Maastricht area that can be associated to the most common orientation of the talus (45°-56,25°) in this area and, therefore, may be seen as evidence for the implementation of a Roman cadastre. First, there is a significant correlation between the period of an archaeological feature and its orientation. Secondly, compared to other periods, the Middle Roman period has by far the most archaeological features running in the same direction, namely 45°-56,25°. Moreover, this 45°-56,25° orientation class is by far the most common class among all Middle Roman features of which the orientation has been measured. Furthermore, archaeological features show no continuity between the Early and

Middle Roman period, whether in general or specifically for the 45°-56,25° class. Lastly, the orientation of the Early Roman orthogonal street plan of Tongres and some of its buildings does not correlate to that of the general orientation of the talus. All this may support the idea of changes in the landscape made after the Batavian revolt in the Tongres-Maastricht area. Most remarkable is, in this case, the fact that the most common orientation of the Middle Roman period's features agrees exactly to the most common orientation of the talus. Hence, was there a Roman cadastre implemented in the aftermath of the Batavian revolt in order to control native society? This will be explored in the next chapter.

6

Site Distribution and Land Sizes

The last chapter examined the orientation of the archaeological features from the Late Iron Age to the Late Roman period, as well as that of the talus. It showed that the orientation of the talus as well as most of the archaeological features dating to the Middle Roman period was particularly similar towards 45°-56,25° from grid north. From this and other evidence, it has been argued that Rome interfered in local affair after the Batavian revolt of 69 AD and, in addition, causes an implementation of a Roman cadastre. To test a 'real' relationship between the Middle Roman period and the talus, no statistical approach can be used as was done in the previous chapter. This is due to the fact that talus are not solely assigned to the Roman period, but are being created and modified in other periods too. Since we are not (well) informed about archaeological features from all periods of the Tongres-Maastricht area, a statistical association test like a Spearman's rank correlation coefficient is not effective. Other means have to be used. To test the relation between the Middle Roman period and the talus orientation therefore, this chapter examines the site distribution in a supposed Roman cadastre and the hypothetical land size belonging to a settlement site.

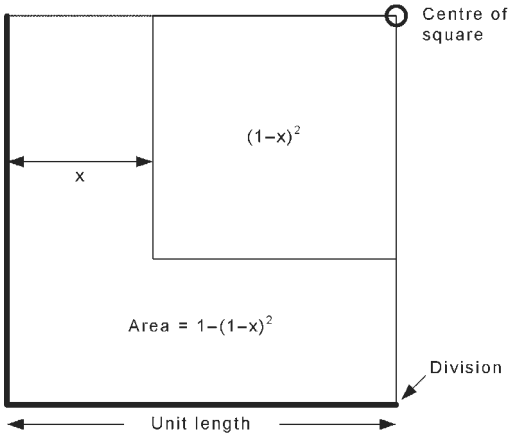


Figure 34. Expectation for distribution of distances of random points (*after* Peterson 1993).

Site distribution

The premise that a boundary would influence features from all periods, starting from the period when a cadastre is first established, has already been pointed out in the previous chapter in respect to its orientation. Yet, this premise also holds for the location of these features. We may assume that a site tends to be located near a boundary. This could be because of symbolical, as well as for economical reasons. Indeed, for the Roman period we have historical and archaeological proof that both factors had its effect on the location of sites in relation to cadastral *limites*.

Probability of rejection (α)	0,1	0,05	0,025	0,01	0,005	0,0025	0,001	0,0005
Numerator value	1,07	1,22	1,36	1,52	1,63	1,73	1,86	1,95
n = 29	0,1987	0,2265	0,2525	0,2823	0,3027	0,3213	0,3454	0,3621
n = 35	0,1809	0,2062	0,2299	0,2569	0,2755	0,2924	0,3144	0,3296
n = 105	0,1044	0,1190	0,1327	0,1483	0,1591	0,1688	0,1815	0,1903

Table 8 (above). Numerator values for calculating significance levels of D and the significance levels of D calculated for 29, 35 and 105 (*after* Peterson 1996).

Table 9 (next page). Tests for site distribution of all Middle Roman features (n=105) in a cadastre with an orientation of 50,625°.

First, boundaries had certain religious and symbolical connections for the Romans. Particular gods like Terminus and Silvanus were worshiped for their association with boundaries. Therefore, feasts, ceremonies and animal sacrifices were often held when a particular boundary was formally being established. For example, of the woodland god Silvanus we know that every estate had "three Silvani, one to guard the house, one for the country as shepherd's god and one called *orientalis* (eastern), who had a grove on the boundary" (Dilke 1971: 98-99). In light of this religious connotation, a boundary or crossing seemed also to be the perfect spot for an altar or temple. At Beaune (France), for instance, a Roman temple seems to have stood on the axis of a cadastre and, just east of the Tongres-Maastricht area, at Valkenburg maybe also a Roman temple would have stood near a boundary (see Peterson 1993: fig. 3.10 and 3.8).

Burials in most cases also belong to this symbolic world. It has, therefore, been argued by many scholars that some, most notably visible ones like tumuli, tend to be located near a boundary to demarcate a social space (Alcock 1993; Buikstra and Charles 1999; Parker Pearson 1999: 137; Hiddink 2003). This has also been argued for Northern Gaul (Wightman 1975: 649-650) and for the Tongres-Maastricht area specifically (Duurland 2000: 26). Post-Roman sites with religious and/or symbolic significance, too, could line up along the *limites*, most notably the *cardo*. This has been noted, for instance, in Tunisia and Damascus in the case of mosques that were aligned to the *limites* of a long forgotten cadastre (Anonymous 1954; Dodinet *et al.* 1990). In the case of Europe, this would most likely then be churches, chapels or other features related to the Catholic Church (see below). Peterson (1993: 42) noted in this respect that on the *quintarius* of one of the centuries of the Orange B cadastre at St. Gervais (Bel and Benoit 1986) modern crosses were situated.[36]

The economic reason is particularly liable when the *limites* of a cadastre are materialised as means of communication, i.e. roads, paths or canals. So, for example, sites in the northern *Ager Cosanus* dated to the 2nd century BC have been found "only on the major axes of the centuriation" (Attolini *et al.* 1990: 145). Also in the aforementioned Italian region of Collatia the sites seem to have been located near the boundaries of the 15 *actus* cadastre (Quilici 1974; Chouquer 1987: 287; Peterson 1993: 84-85).

However, as Peterson (1993: 75) has argued, some sites always would have been deliberately placed away from *limites*. Columella (*RR* I,v,7), for example, while admitting the value of access roads, advised gentlemen not to locate their dwelling near a busy main road, for fear of having to offer accommodation to passers-by. Also the often found curtilage of a Roman villa could be larger than normal, what would imply that even if the curtilage abutted a boundary the villa

Cadastre	Test no.	D	Near %	Significance level
15 actus	1	0,0382	46,67	n/s
	2	0,0796	44,76	n/s
	3	0,0644	49,52	n/s
	4	0,0376	48,57	n/s
	5	0,0421	46,67	n/s
16 actus	1	0,1268	51,43	0,05
	2	0,0515	44,76	n/s
	3	0,0735	51,43	n/s
	4	0,0737	44,76	n/s
	5	0,0591	49,52	n/s
17 actus	1	0,0818	52,38	n/s
	2	0,1097	57,14	0,1
	3	0,0936	54,29	n/s
	4	0,0732	42,86	n/s
	5	0,0977	47,62	n/s
18 actus	1	0,1029	42,86	n/s
	2	0,1645	62,86	0,005
	3	0,1184	60	0,1
	4	0,1444	62,86	0,025
	5	0,1578	63,8	0,01
19 actus	1	0,049	49,52	n/s
	2	0,072	53,33	n/s
	3	0,0666	53,33	n/s
	4	0,0685	51,43	n/s
	5	0,0789	43,81	n/s
20 actus	1	0,0608	44,8	n/s
	2	0,1431	43,8	0,025
	3	0,0534	46,7	n/s
	4	0,1040	39	n/s
	5	0,1204	41,9	0,05
21 actus	1	0,0711	50,48	n/s
	2	0,0720	44,76	n/s
	3	0,1103	55,24	0,1
	4	0,0836	49,52	n/s
	5	0,1072	43,81	0,1
22 actus	1	0,0555	50,48	n/s
	2	0,0992	58,09	n/s
	3	0,0625	49,52	n/s
	4	0,0537	52,38	n/s
	5	0,0352	50,48	n/s

Cadastre	Test no.	D	Near %	Significance level
16 actus	1	0,1815	60	0,1
	2	0,1113	54,29	n/s
18 actus	1	0,2043	65,71	0,1
	2	0,1253	45,71	n/s
20 actus	1	0,0915	48,57	n/s
	2	0,0910	48,57	n/s
22 actus	1	0,1832	54,29	0,1
	2	0,1616	48,57	n/s

Cadastre	Test no.	D	Near %	Significance level
16 actus	1	0,1705	58,62	n/s
	2	0,1239	51,72	n/s
18 actus	1	0,1371	51,72	n/s
	2	0,1238	51,72	n/s
20 actus	1	0,0850	55,17	n/s
	2	0,1991	51,72	0,1
22 actus	1	0,2251	65,52	0,1
	2	0,1713	41,38	n/s

would still be at some distance. While these examples can occur, the abundance of sites would still assumingly be located near the boundaries.

In order to test this hypothesis of near-boundary distribution on the Tongres-Maastricht area, a hypothetical cadastre needed to be overlaid to calculate the shortest distance of the sites towards them. It would be too easy if a hypothetical cadastre of the standard 20 by 20 *actus* would fit precisely with all the talus. One must be aware of the fact that not all talus represent the main boundaries of a cadastre; there may also have been internal boundaries within one cadastral square (see chapter 6), or there could have been a curtilage of a Roman villa responsible for a talus. Moreover, a cadastral grid will create only a very thin boundary line on a map, while an actual boundary in Roman times could have been up to 4 meters wide. Lastly, processes like erosion as well as later modifications can contribute to displacements of a talus from the actual boundary spot.

To overcome the problem that a talus not always has to represent the main boundary of a Roman cadastre, the possibility of a cadastre in a 45°-56,25° orientation is examined by analysing the near-boundary distribution of sites with cadastres of different sizes; from 15 (531 m) to 22 *actus* (778,8 m). The choice for these sizes in particular is because they seem to represent the most common ones, with regard to the sizes of other cadastres in the Empire. To get the best results, for each size a couple of tests were done. In every test, the cadastre was shifted over the map of talus in order to get the best connection with the talus from that orientation class (45°-56,25°). As an orientation for the cadastre the centre of the

Table 10 (previous page; above). Tests for site distribution of all Early Roman features (n=35) in a cadastre with an orientation of 50,625˚.

Table 11 (previous page; below). Tests for site distribution of all Late Roman features (n=29) in a cadastre with an orientation of 50,625˚.

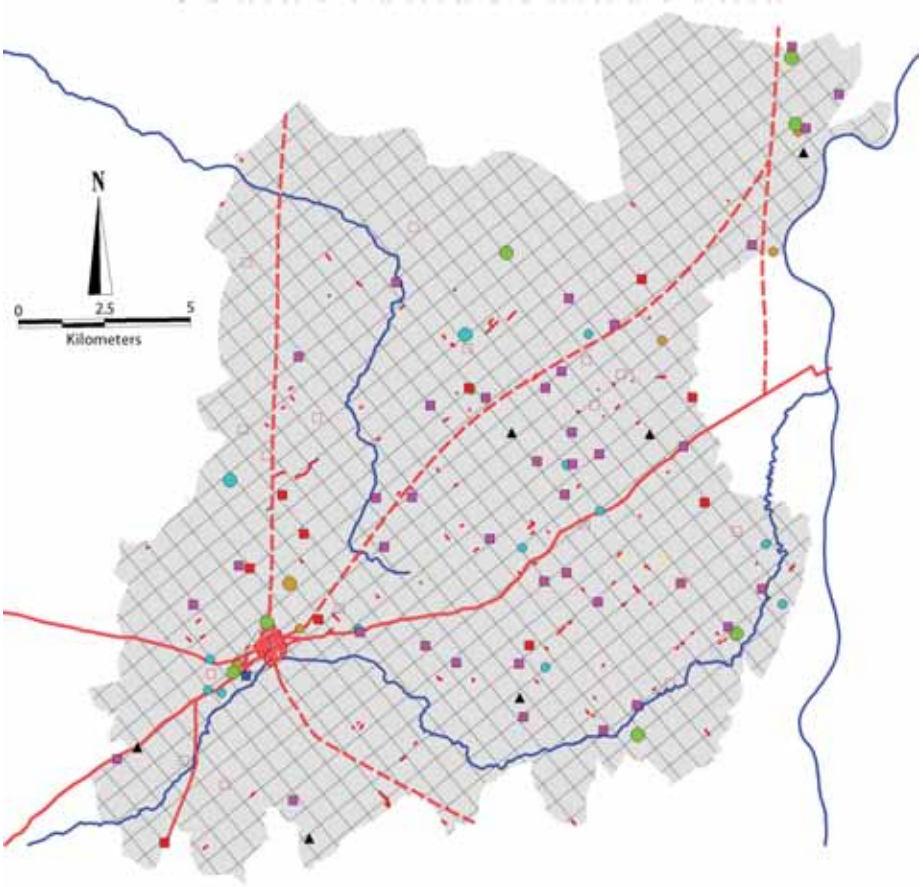


Figure 35 (right). The overlain 18 *actus* cadastre and the Middle Roman sites.

orientation class was taken, 50,625˚ from grid north. It remains unknown if an actual cadastre would have had precisely this orientation. If an orientation was chosen more to the edges of the class, i.e. 45˚ or 56,25˚, the results of the analyses could be profoundly different. Yet, as 50,625˚ is the average orientation of the class, the results from the analyses will have the least possible margin of error with regard to an actual cadastre in the Tongres-Maastricht area.

The sites are examined by its closeness (in meters) to the nearest boundary in the following way.[37] To collect all half the grid distances between 0 (or 0%) and 1 (or 100%), the formula x / (0,5c) is used, where 'x' is the nearest distance and 'c' is the size of one cadastral square (all in meters). For example, x = 50 and c = 708 (i.e. 20 *actus*) gives 50 / (354) or 0,14124. This shows that the particular site lies on a 14,12 percent distance from the boundary (0% or 0 m) and 85,88 percent distance from the centre of the grid (100% or 354). This number is then examined for its uniform random scatter within a square grid, which calculates how many sites will fall within an outer band of x wide when scattered at random. This is calculated by a continuous cumulative distribution, $1 - (1 - x)^2$, where x is the number that was calculated just above (see figure 34). "For example, for x = 0,5 we have the expectation that $1 - (1 - 0,5)^2$ or 75 percent of points scattered at random in any grid square will fall within the band so defined, i.e. at distances up to a quarter of the grid distance from a grid line" (Peterson 1993: 69). It is certain that any point will fall within half the grid distance, since the formula gives the expectation for this distance as 1 (or 100%). The list that these calculations will

Period	Precision of site	N	D	Near %	Significance level
Early Roman	Precise	33	0,2522	72,72	0,025
	Imprecise	5	0,1500	20	n/s
Middle Roman	Precise	78	0,1784	65,39	0,01
	Imprecise	27	0,1807	55,56	n/s
Late Roman	Precise	23	0,2132	56,52	n/s
	Imprecise	6	0,2836	16,67	n/s

Table 12 (above). Comparing the certainty of precision of a site and its effect on site distribution in an 18 *actus* cadastre with an orientation of 50,625˚.

Period	Continuity with former period	N	D	Near %	Significance level
Early Roman	Yes	14	0,2602	64,28	n/s
	No	24	0,2130	68	n/s
Middle Roman	Yes	32	0,2152	68,75	0,1
	No	75	0,1421	60	0,05
Late Roman	Yes	49	0,1583	59,18	0,1
	No	10	0,1519	60	n/s

Table 13 (below). Comparing the continuing and new archaeological sites and its effect on site distribution in an 18 *actus* cadastre with an orientation of 50,625˚.

Table 14 (next page; above). Test for site distribution of all Middle Roman features (n=105) corresponding to a cadastre with the same orientation class (56,25˚-67,5˚) as proposed by Mertens.

Table 15 (next page; below). Comparing the Spatial difference of a Middle Roman site and its effect on site distribution in an 18 *actus* cadastre with an orientation of 50,625˚.

create if one does this for every point on the map will then be sorted from low to high. In sum, this calculation will give the percentage of sites that fall within the 50 percent of grid surface that is nearest to the boundary line of the cadastre.

To test the significance if this test is non-random again the Kolmogorov-Smirnov single sample test is used. The results are set up against that of an expected random distribution from the population, i.e. x_i / n, where x is the 'i^{th}' number in the sorted list and 'n' is the total amount of numbers in the list. The test statistic, 'D', is the maximum deviation between the observed and the expected distributions. D_α / √n then calculates the probability of rejection (see table 8).

The results of the distribution analysis for the burial and settlement sites from the Middle Roman period are shown in table 9. They, first of all, show that from the 40 tests there seems in general to have been no tendency of the sites to be located near the *limites* as opposed to the centre of a cadastral grid. Secondly, the Kolmogorov-Smirnov single sample test (D) shows that the level of significance of most tests is below the minimum probability of rejection (α). However, when examined closer, the test for the cadastre of 18 *actus* shows that four out of the five tests show a significant non-random distribution and, in addition, that most of the sites in the zone are located nearest to the *limites*. Compared to the results from the other cadastral sizes, this seems a remarkable difference.

Yet, before drawing any conclusions from this, the Early and Late Roman site distribution also need to be examined in order to prove that the cadastre seems to be Middle Roman in date (see tables 10 and 11; see also chapter 5). The results of this somewhat smaller test are less obvious. In both periods, more sites tend to lay closer to the *limites*, disregarding the size of the cadastre and the location of that cadastre. The significance levels, however, in these periods are relatively low. Most of the tests are not significant, i.e. the distribution seems to have been random. Only three Kolmogorov-Smirnov tests from the Early Roman distribution of sites and two of the Late Roman distribution of sites, tend to

Cadastre	D	Near %	Significance level
16 actus	0,0912	49,52	n/s
18 actus	0,0740	49,52	n/s
20 actus	0,1052	56,19	0,1
22 actus	0,0923	58,09	n/s

Spatial difference	N	D	Near %	Significance level
Other soils	11	0,1357	45,46	n/s
Loess soil	94	0,1879	64,89	0,0025
Above road Tongres-Rekem	39	0,1274	56,41	n/s
Below road Tongres-Rekem	67	0,2279	66,67	0,001

give significant evidence, though small (α = 0,1), for rejecting the probability that this distribution is random. Compared to the Middle Roman results of, for instance, the tests of the 18 *actus* cadastre (see table 9), the Early and Late Roman probability levels seem however still relatively low. For example, the 18 *actus* cadastre test no. 2 (α = 0,005) is the same as the Early Roman test no. 1 (α = 0,1). In other words, the Middle Roman distribution is 20 times more likely. Nevertheless, the Early Roman 18 *actus* cadastre test no. 1 is still the best test result with regard to the closeness to the grid boundary with 65,71 percent of its sites in the zone nearest to the *limites*.

The results from the late Roman period are even less obvious, since here the 22 *actus* cadastre has one relatively plausible cadastre location which passes both the Kolmogorov-Smirnov test (α = 0,1) and the nearest-to-boundary test (65,52%). The 18 *actus* cadastre, on the other hand, shows remarkable low results compared to its results in other periods. However, using the hypothetical 18 *actus* cadastre of the Middle Roman test no. 2, which shows the best results (α = 0,005 and 62,86%), it gives quite remarkable results and also explains the lower results during the Late Roman period (see figure 35).

First, table 12 shows that when the sites are to be divided in 'precise' and 'imprecise' according to the degree of preciseness a particular site has been located by scholars, there is a clear difference between precise and imprecise located sites for each period. In general, the periods where the sites are located more precisely show higher percentages of sites closer to the boundary than when the exact site location is unknown. A reason for this result could be that, since the imprecise located sites are not accurately placed on the map, the actual site has to be closer located towards the boundary of a cadastre. Of course, in the case of the Early and Late Roman period sites the fact that the sample of imprecise located sites is particularly small may contribute to this outcome. However, as seen with the Middle Roman period sites, here also the imprecise located sites seem to have a

No.	Place	Name of church	Date
1	Zutendaal	Our Lady's	ca. 1300 AD
2	Opgrimbie	St Christopher	1905 AD
3	Rekem	St Francis	1708 AD
4	Rekem	St Peter's	989 AD
5	Neerharen	St Lambertus	ca. 1050 AD
6	Beverst	St Gertrudis	1896 AD
7	Munsterbilzen	Our Lady's Ascension	ca. 1050 AD
8	Gellik	St Laurentius	ca. 1000 AD
9	Lanaken	St Ursula	1860 AD
10	Bilzen	St Mauritius	ca. 800 AD
11	Hoelbeek	St Adrianus	1926 AD
12	Eigenbilzen	St Ursula	1250 AD
13	Waltwilder	St Remigius	1862 AD
14	Mopertingen	St Catherina	ca. 1400 AD
15	Veldwezelt	St Lambertus	1933 AD
16	Wintershoven	St Peter's exile	ca. 700 AD
17	Romershoven	St Jan Baptist	1845 AD
18	Hoeselt	St Stephan	ca. 950 AD
19	Martenslinde	St Martinus	ca. 1400 AD
20	Rosmeer	St Peter	<1140 AD
21	Hees	St Quintinus	ca. 1350 AD
22	Schalkhoven	St Brixius	ca. 1650 AD
23	Werm	St Domitianus	1638 AD
24	Rijkhoven	Our Lady's Birth	1220 AD
25	Kleine Spouwen	St Aldegondis	ca. 1350 AD
26	Grote Spouwen	St Lambertus	ca. 1450 AD
27	Vlijtingen	St Albanus	ca. 1000 AD
28	Kesselt	St Michael	<1000 AD?
29	Vroenhoven	St Peter and Paul	1936 AD
30	Sint-Huibechts-Hern	St Hubertus	1256 AD
31	Alt-Hoeselt	St Lambertus	1700 AD?
32	Membruggen	St Hubertus	1200 AD
33	Overrepen	St Laurentius	ca. 1100 AD
34	Neerrepen	St Ludgerus	ca. 1050 AD
35	Riksingen	St Gertrudis	1036 AD
36	Henis	St Hubertus	ca. 1250 AD
37	's Herenelderen	St Stephan	1261 AD
38	Berg	St Martinus	ca. 1050 AD
39	Genoelselderen	St Martinus	1673 AD
40	Herderen	St Jan Baptist	ca. 1450 AD
41	Riemst	St Martinus	ca. 1000 AD
42	Kanne	St Hubertus	ca. 1500 AD
43	Piringen	St Gertrudis	ca. 1100 AD
44	Mulken	St Gillis chapel	ca. 1050 AD
45	Tongeren	Our Lady's Basilica	<964 AD
46	Tongeren	St Jan-Baptist	<1390 AD

47	Tongeren	St Catherine	1294 AD
48	Millen	St Stephan	1000 AD
49	Meer	St Severinus chapel	ca. 1000 AD
50	Val	St Stephan	ca. 1300 AD
51	Zichen	St Peter's	ca. 1350 AD
52	Zussen	St Genoveva	1852 AD
53	Emael	Our Lady's	?
54	Widooie	St Pancratius	<1205 AD
55	Koninksem	St Servatius	ca. 1100 AD
56	Lauw	St Peter's	<1875 AD
57	Rutten	St Martinus	ca. 1150 AD
58	Rutten	St Evermarus chapel	1030 AD
59	Diets-Heur	St Cunibertus	ca. 1100 AD
60	Vreren	St Medardus	ca. 1050 AD
61	Nerem	St Nicholas chapel	ca. 1000 AD
62	Mal	H. Cross invention	ca. 1000 AD
63	Sluizen	St Servatius	ca. 1200 AD
64	Glons	St Victor	ca. 1200 AD
65	Boirs	St Lambertus	1900 AD?
66	Roclenge-sur-Geer	St Remy	ca. 1200 AD
67	Bassenge	St Peter	1741 AD
68	Wonck	St Lambertus	ca. 1200 AD
69	Eben	St Joris	?

Table 16. The churches and their suggested construction date assembled in and near the Tongres-Maastricht area.

tendency to a lower percentage. Moreover, the significance level of the precise located Early and Middle Roman sites show that the evidence for a non-random distribution is again remarkably high (in the case of the Early Roman sites it even increases ten times), where the Late Roman site distribution seems to be non significant.

Secondly, table 13 shows the percentages and Kolmogorov-Smirnov single sample test of the sites that show continuity with the former period against those of the newly established sites during that period.[38] The results of this show that again the Early and Middle Roman period have the highest percentages of sites close to the boundary. However, only in the case of the Middle Roman period the results seem significant. Regarding the Late Roman period, the fact that the sites that were already occupied in the period before is significantly non-random seems logical, since these are all sites that were already occupied (or, in the case of burials, constructed) during the Middle Roman period. The sample of Late Roman sites, which are newly constructed during that period, seems to be too small to say something significant about.

Thus, most notably the Middle Roman sites, but also the Early Roman ones, show a significant non-random distribution towards the nearest boundary and that around 60-65 percent of all sites are within ca. 93 m from the *limites*. Is this percentage, however, high enough as a convincing argument for a proposal of a possible 18 *actus* cadastre running in a 50,625° orientation from grid north?

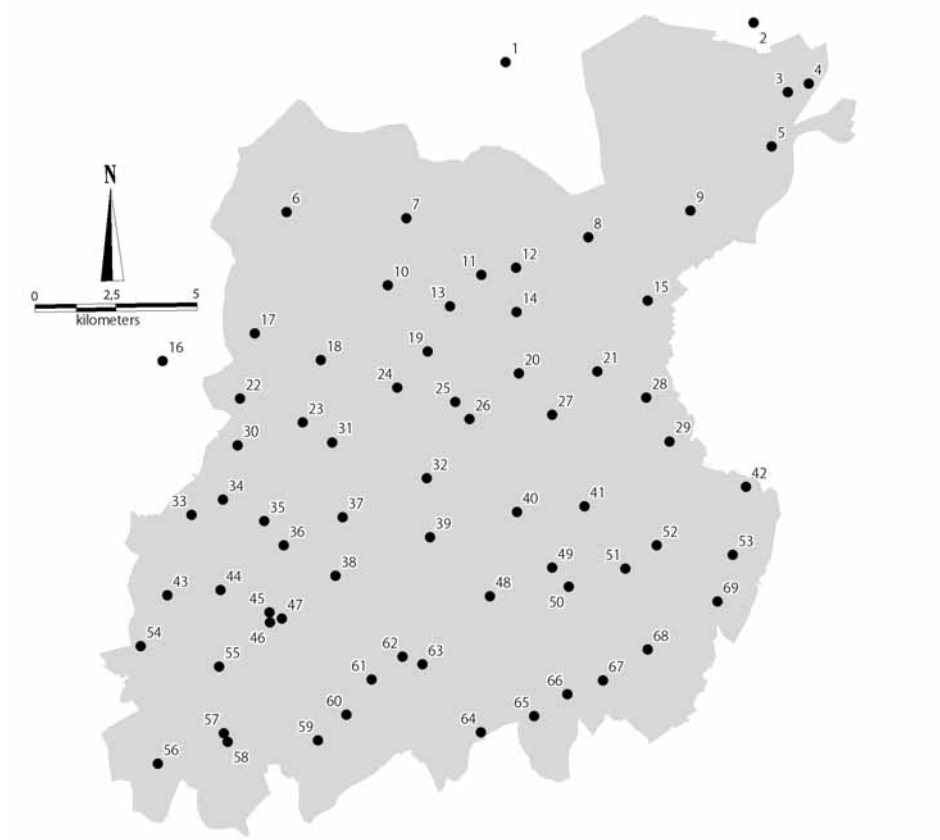


Figure 36. Churches in and near the Tongres-Maastricht area. The numbers on the map correspond to the numbers in table 16 (see previous page).

Why is the Early and Middle Roman site distribution relatively the same, while the Late Roman site distribution tends to have lower results? And would a site distribution test on the proposed cadastre by Mertens not give similar results?

Starting with the first question, this seems to be the most important and difficult one. Only from experience "a plausible value for the proportion of the sites which are likely to lie 'near' the *limites*" can be determined (Peterson 1993: 84). Therefore, Peterson has calculated that for the cadastre in Dutch southern Limburg around 55-60 percent of all sites would fall in the outer band of a cadastral grid. As aforementioned, the *ager collatinus* in Collatia has around the same percentage. That the percentage presented here is around 5 percent higher seems thus only to be a more convincing argument for a cadastre proposal, as the significance factors show relatively similar results of non-randomness.

The fact that the Early and Middle Roman site distribution is relatively the same and the Late Roman is not, seems because of site continuity. As table 13 shows, 32 of the 38 Early Roman sites remained to be occupied during the Middle Roman period. In light of the results of this site distribution, some may therefore suggest that the cadastre would have been surveyed during the Early Roman period, possibly when Augustus modified the socio-political structure in Northern Gaul. However, site continuity is different from feature continuity. The latter has shown that there is a clear demarcation between the Early and Middle Roman period (see chapter 4). In addition, there were in total (settlements and burials) 75 new sites established during the Middle Roman period, far more

than in any other period. This and the analyses from the previous chapter argue, therefore, that these changes in the landscape of the Tongres-Maastricht area are caused by the socio-political changes in the aftermath of the Batavian revolt.

Late Roman sites, on the other hand, have the tendency to have lower results. Only sites that demonstrate continuity with the former, Middle Roman period, tend to increase that percentage towards a level ca. 10-15 percent below that of the Middle Roman period. A possible reason for this difference seems historical as well as due to past scholarship. The historical reason is that the Late Roman period is seen as one of decline in which society – as with the period before the Romans – more tends to lean on local economy and characteristics (see chapter 3). It seems reasonable to assume that the Roman tax system and system of surplus production, therefore, would gradually decline in the Northwestern provinces. The Romans therefore no longer had a reason to maintain the cadastres. Yet, as argued in an earlier chapter, past scholarship has partly created this view of Late Roman decline and crisis due to the lack of finds from this period (see chapter 4). This lack of finds and, hence, sites may have contributed to the lower results compared to the Early and Middle Roman period.

Of course, this site distribution test is thus far only done for a cadastre based on a 50,625° orientation, corresponding to the 45°-56,25° orientation class. We remain ignorant of the site distribution if the suggested cadastre had a different orientation. To test if the same results could be obtained from a different orientation, the orientation class was used which corresponds to the proposed cadastre by Mertens (1958). This resulted in a cadastre with a 61,875° orientation, corresponding to the 56,25°-67,5° orientation class. The results for the Middle Roman sites show that only one cadastral size, 20 *actus*, shows evidence for non-randomness of the site distribution and which percentage of sites closest to the *limites* is above 50 percent (see table 14). However, the likelihood of 10:1 that this cadastre could have existed compared to the 200:1 likelihood that the 18 *actus* cadastre with a 50,625° orientation would have existed, favours the 18 *actus* cadastre as proposed above over that proposed by Mertens.

One of the most difficult tasks when analysing the possibility of a cadastre seems to be the establishing of a spatial layout: where does the cadastre begin and where does it end. In my opinion, the non-destructive methods used here and in other studies are not applicable in analysing the spatial layout of the cadastral plan. This has to do with the fact that historical-geographical lines in the landscape are not in a one-on-one relation with the boundaries belonging to a cadastre from a certain period as already mentioned above. It, hence, would remain unknown how far a cadastre would extend. Site distribution could calculate, however, the probability that a cadastre is associated with a particular soil type or part of the land under question. By doing this, the extension of a cadastre can be more or less demonstrated.

Consequently, the Middle Roman sites were divided into two groups: the ones on the loess soil and the ones on the sandy and riverine clay soils in the north of the Tongres-Maastricht area. For both groups a distribution test was done and the results were compared to one another. In this analysis, the loess soil should

Period	Churches	N	D	Near %	Significance level
All	All churches	69	0,1568	56,52	0,05
	Above road Tongres-Rekem	29	0,1949	55,17	n/s
	Below road Tongres-Rekem	40	0,1670	57,5	n/s
	Other soils	9	0,1321	44,44	n/s
	Loess soil	60	0,1641	58,33	0,05
≤1500 AD	All churches	50	0,2562	64	0,0025
	Above road Tongres-Rekem	20	0,3578	70	0,01
	Below road Tongres-Rekem	30	0,2139	60	0,1
	Other soils	5	0,3974	60	n/s
	Loess soil	45	0,2518	64,44	0,005
≤1300 AD	All churches	41	0,2468	63,41	0,01
	Above road Tongres-Rekem	17	0,4137	76,47	0,005
	Below road Tongres-Rekem	24	0,1841	54,17	n/s
	Other soils	5	0,3974	60	n/s
	Loess soil	36	0,2356	63,89	0,025
≤1200 AD	All churches	32	0,2078	62,5	0,1
	Above road Tongres-Rekem	10	0,3078	70	n/s
	Below road Tongres-Rekem	22	0,2257	59,09	n/s
	Other soils	4	0,2974	50	n/s
	Loess soil	28	0,2566	64,28	0,05
≤1100 AD	All churches	25	0,2049	64	n/s
	Above road Tongres-Rekem	10	0,3078	70	n/s
	Below road Tongres-Rekem	15	0,2257	60	n/s
	Other soils	4	0,2974	50	n/s
	Loess soil	21	0,2501	66,67	0,1
≤1050 AD	All churches	21	0,2786	71,42	0,05
	Above road Tongres-Rekem	8	0,3328	75,00	n/s
	Below road Tongres-Rekem	13	0,2665	69,23	n/s
	Other soils	4	0,2974	50	n/s
	Loess soil	17	0,3289	76,47	0,05
≤1000 AD	All churches	13	0,3604	76,92	0,05
	Above road Tongres-Rekem	4	0,5634	75	0,1
	Below road Tongres-Rekem	9	0,3520	77,78	n/s
	Other soils	2	0,7974	100	0,1
	Loess soil	11	0,3015	72,72	n/s

Table 17 (previous page). Test for site distribution of the churches in the Tongres-Maastricht area in an 18 *actus* cadastre with an orientation of 50,625°.

reveal highest results, as it seems to have been more favourable for a cadastre since it is a more fertile soil type and therefore better to use for agriculture and surplus production. Furthermore, another test splits the Tongres-Maastricht area in two at the line of the suggested road from Tongres to Rekem (which probably ran to Nijmegen). Such a road would be a good constructed upper boundary for a cadastre, since the favourable loess soil would lay to the south of this road, while the sandy soil of the Campine area is situated north of this road.

Table 15 indicates a spatial difference in site distribution regarding the loess soil and the sandy and riverine clay soils in the north of the Tongres-Maastricht area. Not only is the percentage of sites closest to the boundary particularly different (64,89% against 45,46%), also shows the loess soil significant evidence for non-randomness, while the sites on the other soils seem to have been randomly placed. The latter can be the result of the low number of sites on the sandy and riverine clay area. However, the results from the other distribution test reject this. The results from this test with regard to the road Tongres-Rekem as a dividing line are remarkable. Although the percentage of sites closest to the *limites* is closer to one another (66,67% against 56,41%), the significance level is now more reliable because of the higher frequency of sites. The 39 sites located to the north of the road give no significant evidence for non-randomness, while the 67 sites to the south give even higher significance level for non-randomness with a chance of 1000:1 that the sites are randomly distributed. This result is higher than the test with the different soil types as well as with the cadastral plan in general as shown in table 9.

In addition to the site distribution test of all Roman settlement sites in the Tongres-Maastricht area, also a site distribution has been calculated for later Catholic churches in the area. As mentioned above and in chapter 4, later post-Roman sites with religious and/or symbolic significance could line up along the *limites* of a Roman cadastre. Therefore, all churches in the area have been mapped. In addition, they have been dated according to the oldest construction markers and textual evidence mentioning its existence to get a chronological view of the rise of the churches in the area (see table 16 and figure 36). The site distribution test has been calculated for the closeness of the churches to the 18 *actus* cadastre proposed above. Furthermore, just as done for the Roman sites above, the churches have been divided between those located on the loess and those on other soils, and between those located north of the Tongres-Rekem road and those located south of it (see table 17).

The results seem to be very diverse, but show still some remarkable results that can be related to the cadastre. First, the result from all churches shows that there is a 95 percent chance that their distribution is non-random and that 56,52 percent are located close to the cadastral *limites*. The churches on the sandy and riverine clay soil, as well as the other churches north of the Tongres-Rekem road, have, in contrast, lower results qua percentage closest to the *limites* and seem to have been randomly distributed. Those on the loess, however, have even a higher percentage (58,33%) and are – as in the case of all churches – non-randomly distributed ($\alpha = 0,05$).

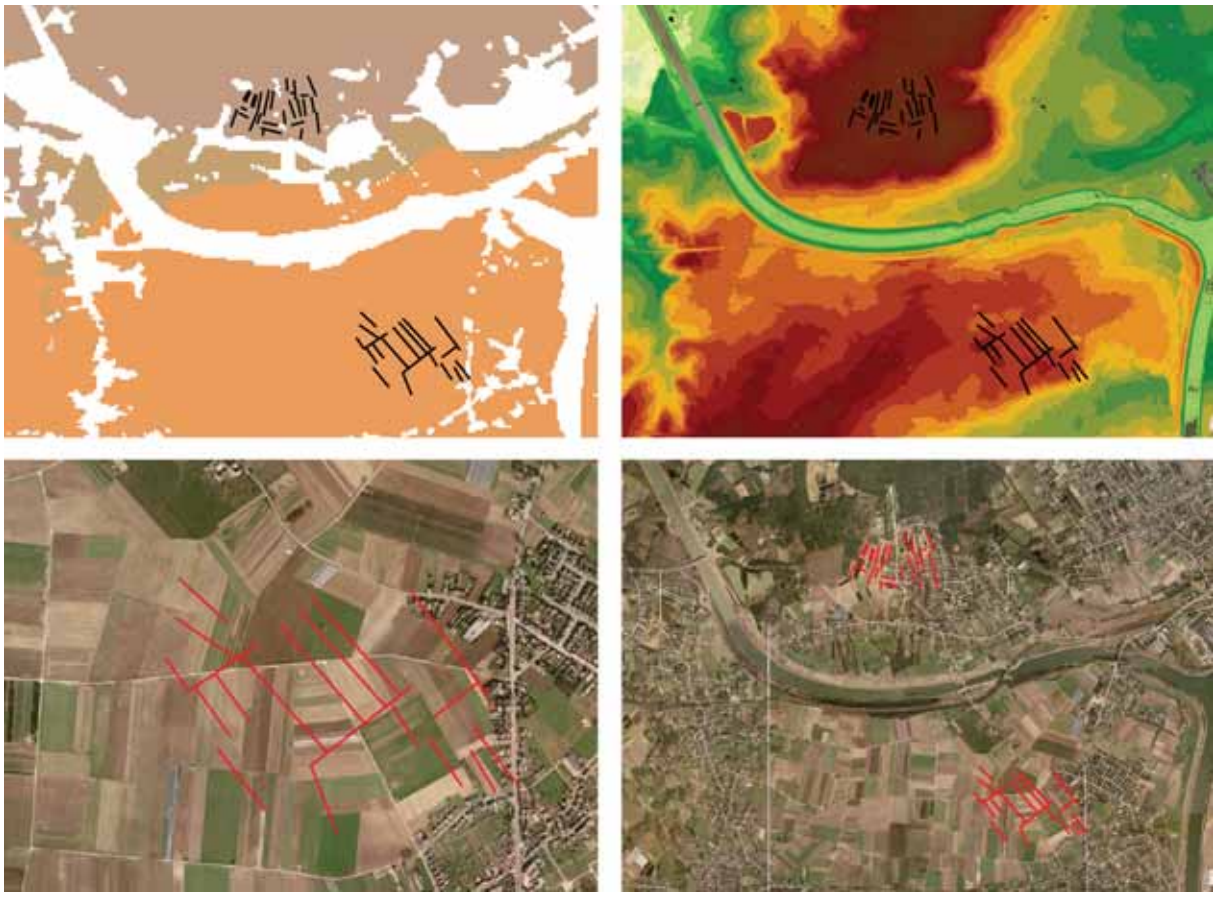


Figure 37 (above). Lines of the field boundaries from the *Atlas der Buurtwegen* (1842-1845) plotted on several maps (courtesy of ZOLAD). Clockwise: 1. Soil map showing the different soil types. The field boundaries to the north are on the sand, while those to the south are located on the loess; 2. The Digital Height Model (DHM) shows that the cadastre disregards the change in relief; 3. Aerial photograph; 4. Detail of the loess part.

When the focus shifts to the construction date of each church, it can be observed that the results of the distribution test changes through time. Of all churches constructed before 1500 AD, 64 percent was located close to the *limites* of the earlier Roman cadastre and the significance level for non-randomness increases (99,75% or $\alpha = 0{,}0025$). As one can see, the significance factor for non-randomness, as well as the percentage close to the earlier Roman cadastre, seems to increase too for the other results for churches before 1500 AD. Note, however, that the number of churches on the sand and riverine clay is too low for drawing conclusions on its result. Yet, regarding the churches before 1500 AD north of the Tongres-Rekem road, it seems remarkable that the significance level for non-randomness is relatively high (99%) and that the percentage close to the *limites* is even higher than those for the loess (70% against 64,44%).

When moving back in time, these results seem to persist. While not focusing on the results from the sand and riverine clay group because of the small number of observations, it seems remarkable that the results belonging to the group of churches north of the Tongres-Rekem road are rather similar and sometimes even higher than for the group of churches on the loess and the other two groups. Moreover, note that the percentage belonging to the group of all churches and that of churches on the loess that are close to the *limites* is gradually rising when setting the construction date back in time. It must be remembered hereby that the results for the churches' construction date before 1000 AD must be left out of

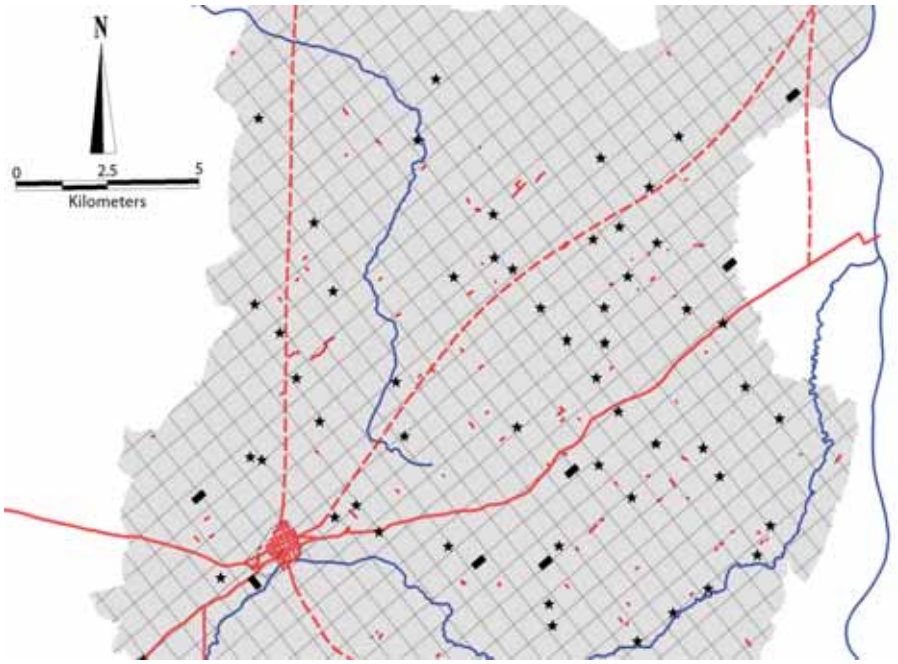


Figure 38. The orientation of the Middle Roman sites that fall in the 45°-56,25° orientation class.

this observation since the number of churches are then becoming too small to be representative and may enhance false interpretations.

Thus, from the results of this distribution test of post-Roman churches in the area it may be argued that they do not reject a possible Roman cadastre in the Tongres-Maastricht area. In contrast, especially from the results for the churches on the loess, it can be observed that such a cadastre could indeed have existed during Roman times. Furthermore, regarding a possible northern border of the Roman cadastre, the distribution test of churches together with the results from table 15 for the distribution test of the Middle Roman sites shows that the cadastre probably would have extended beyond the Tongres-Rekem road. Hence, it seems from the low percentage of Middle Roman sites (45,46%) on the sand and riverine clay that were located close to the hypothetical cadastre, that the actual Roman cadastre probably would not have extended this far. Thus, from this it can be reasoned that the transition zone from loess to sand and riverine clay may have possibly acted as a northern boundary for the Roman cadastre of the Tongres-Maastricht area. A look at the cadastral plan of the municipality of Lanaken drawn from the *Atlas der Buurtwegen* (1842-1845) seems to show this too (see figure 37). This cadastral plan illustrates how the fields on the loess are still oriented in a regular 50° orientation disregarding the changes in relief, while the orientation of fields on the sand seems irregular without a general orientation to be discovered.

How far the Roman cadastre would have extended in other directions cannot be examined from the samples collected in the Tongres-Maastricht area. A reasonable boundary would seem to be the river Meuse. The possibility exists that it is the boundary between the *civitas Tungrorum* and the *civitas Traianensis*. Although on figure 11 (see chapter 3) this is not immediately clear, the aforementioned inscriptions mentioning a high-ranked person from Xanten,

the capital of the *civitas Traianensis*, that were found in the Roman villa of Ravensbosch (the Netherlands), which lay to the east of the river Meuse, may suggest that this *civitas* would have extended this far south. The Thiessen-polygon calculated by Bloemers (1983) would not account for such evidence and therefore puts the boundary more to the North (see figure 10). Even if the evidence from Ravensbosch would be rejected, then it is likely that the river Meuse was the boundary between the *civitas Tungrorum* and *Ubiorum*. At least, as a natural boundary the river Meuse would suit best in comparison to other possible natural boundaries. The growing importance of Maastricht during the Middle Roman period may illustrate this too (Panhuysen 1996).

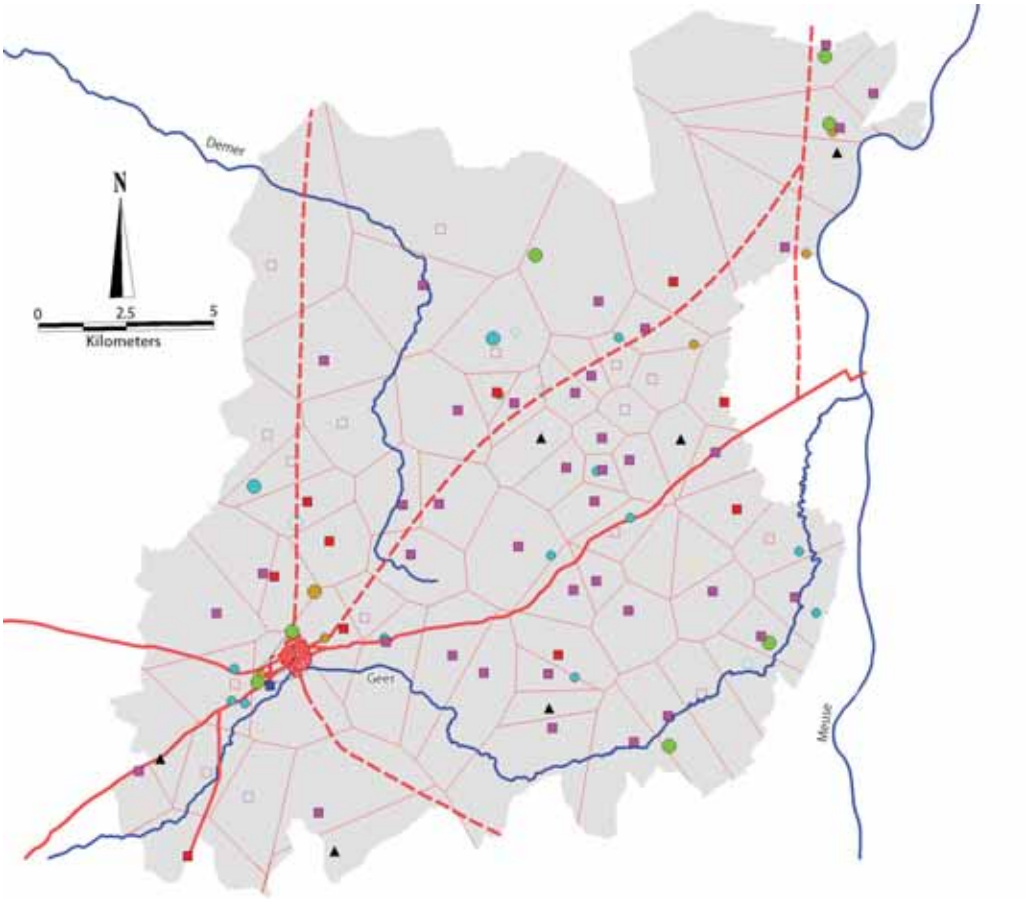
In sum, the proposed 18 *actus* cadastre with an orientation of 50,625° from north grid has been constructed based on examining the site distribution in the Tongres-Maastricht area (see figure 38). The results from this may argue for this kind of Roman cadastre (in the case of the last test even 99.9%, see table 15). The fact that all sites seem also to be associated with the Roman roads running through the Tongres-Maastricht area (60% within 1,2 km distance of a site) does not reject this proposal. It seems logical that people based the location of their settlements – at least, partly – on the closeness of main roads, just as it may have been logical that they would have located their sites near the cadastral *limites*. The purpose of this site distribution test was, furthermore, to find an association for the talus and Roman sites examined in the previous chapter. This seems to be the case regarding the results that show that many talus are located near the boundaries of the proposed cadastre. In order to demonstrate that the 18 *actus* cadastre can be associated with a Roman cadastre, the land sizes of the sites found in the Tongres-Maastricht area, most notably the Middle Roman period, will be examined below.

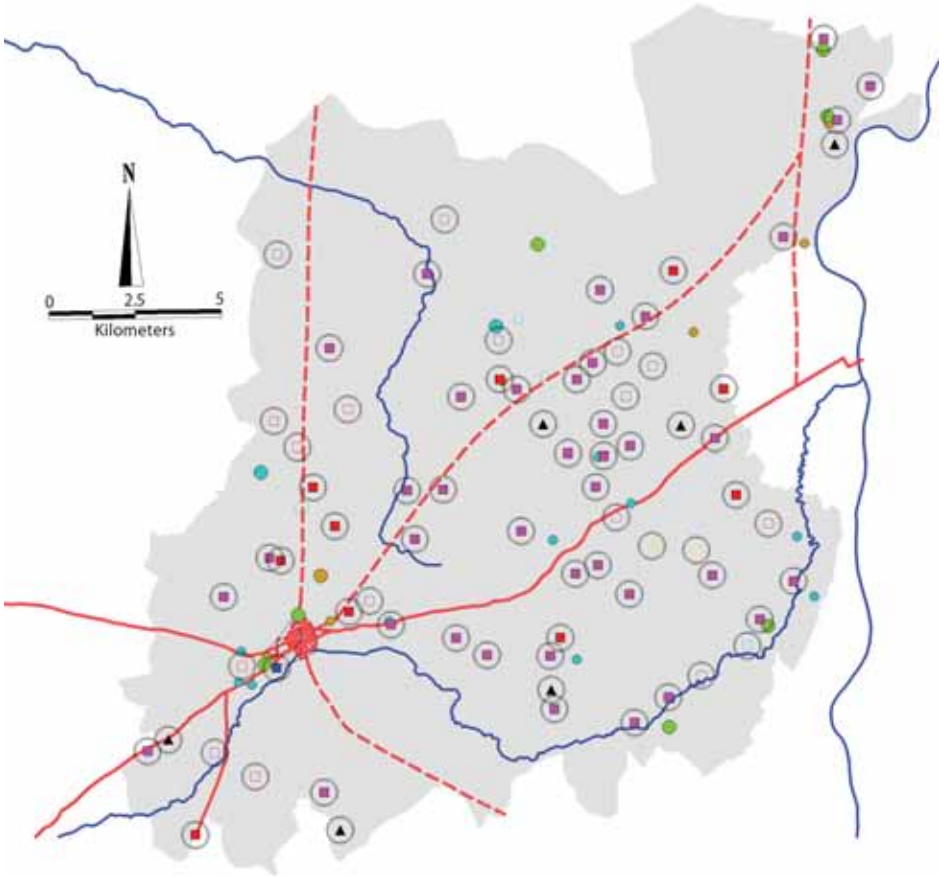
Figure 39 (next page; above). Thiessen-polygon around the Middle Roman occupation features. Also marked here are the Middle Roman burial sites.

Figure 40 (next page; below). Ring buffers around the Middle Roman sites representing the area of an 18 and 20 *actus* cadastral grid (the radii are respectively 359,5 and 399,5 m): a. 18 *actus* ring buffers; b. 20 *actus* ring buffers.

Calculating hypothetical land sizes

In chapter 3 it was already mentioned that in the German Rhineland scholars have found evidence for the land plots around *villae* to be around 50 ha in size (see Wightman 1975: 639; Gaitzsch 1986: 407-408; Heimberg 2003: 127-129).[39] While especially Heimberg seems doubtful about relating this evidence to the possibility of a Roman cadastre in the neighbourhood of Cologne, it remains remarkable that a Roman century of 20 *actus* corresponds almost exactly to the 50 ha of a normal-size villa encountered (see table 1).[40] This paragraph will examine the land sizes for the Middle Roman sites in the Tongres-Maastricht area. It has to be noted in this respect that the Tongres-Maastricht area is not entirely excavated and, hence, new sites will change the picture and may alter the results of this land size examination. However, to overcome this problem the examination will not solely depend on a Thiessen-polygon, but also on ring buffers of the sizes of 18 and 20 *actus* (respectively 40,6 and 50,1 ha) which are placed around each settlement site. The latter may demonstrate in areas of intensive examination and where many sites have been found, if a land size of 40 or 50 ha for one settlement site seems plausible.


Demer
N
0
2.5
5
Kilometers
Geer
Meuse


N
0
2.5
5
Kilometers

The Thiessen-polygon for the Middle Roman period shows unfortunately no clear outcome (see figure 39). This is probably caused by the problem that in contrast to the study area of Hambach Forst and other areas in the German Rhineland, in the Tongres-Maastricht area no large-scale excavation work has been carried out revealing entire Roman landscapes. Due to this only the *known* sites can be taken into account in a Thiessen-polygon analysis and not *all* sites in the Tongres-Maastricht area. If there is one thing that could be observed from this analysis, it is that the sites to the south of the Tongres-Rekem road tend to have smaller land plots than the sites north of this road. However, this differentiation is not necessarily caused by the difference in soil type, but also by earlier scholarship and the history of excavation in the area.

Overcoming the issue that an analysis can only be based on known sites in the area (and not all sites) seems hard. One possible way is by drawing ring buffers whose area represents one cadastral grid around the sites (see figure 40). When comparing both maps, it can be observed that in certain cases the ring buffers just overlap slightly. This may suggest that during the Middle Roman period both land plots were placed alongside one another. Hence, it may be argued from this that in these cases the ring buffer method has found the more or less, actual land size of a Middle Roman settlement site, though it has to be kept in mind that not all sites in the area are known and that new findings can therefore alter these results. It seems that the slight overlap in the case of 18 *actus* ring buffers is less than in the case of the 20 *actus* ring buffers (see figure 41). Compare, for example, the sites Rosmeer-Diepestraat (cat. no. 16) with Rosmeer-Staberg (cat.no. 15), Valmeer-Meerberg (cat.no. 92) with Valmeer-Boven het Kruis (cat.no. 106), Berg-Trappenberg (cat.no. 49) with Berg-Kerk (cat.no. 52), Lauw-Onder de Roomsche Katzij (cat.no. 40) with Lauw-Aen het Kruis (cat.no. 65) and Neerharen/Rekem-Het Kamp (cat.no. 35) with Neerharen-Kerk (cat.no. 32). Only in two cases, the 20 *actus* ring buffers seem to fit perfectly: Rosmeer-Staberg (cat.no. 15) with Rosmeer-Achter de Staberg (cat. no. 22) and Vlijtingen-Het Kappelletje (cat.no. 79) with Vlijtingen-Keyberg/Op de Alderen Berg (cat.no. 78). Furthermore, looking at the cadastral grid it seems remarkable that there is only one cadastral grid with more than one settlement site located in it. These sites, Sint-Huibrechts-Hern-Papenberg/Steenbroeck (cat.no. 13) and Riksingen-Keiberg (cat.no. 45), lie some 2 km north of Tongres and, if the proposed cadastre is correct, lie outside the cadastre.

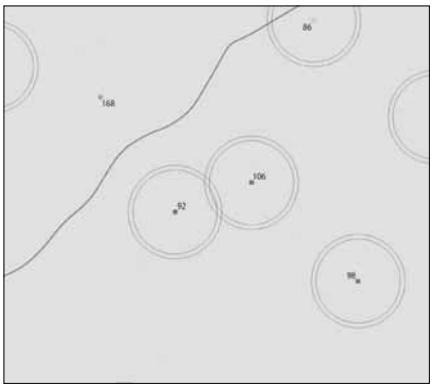


Figure 41. Comparison of the 18 and 20 *actus* ring buffer around the sites Valmeer-Meerberg and Valmeer-Boven het Kruis.

Although the calculation of land sizes is still only tentative due to the problems that are stated above, there are some indications that may favour an 18 *actus* cadastre above a 20 *actus* one. This may tentatively be used as an argument for an 18 *actus* cadastre as we have demonstrated above and in the previous chapter.

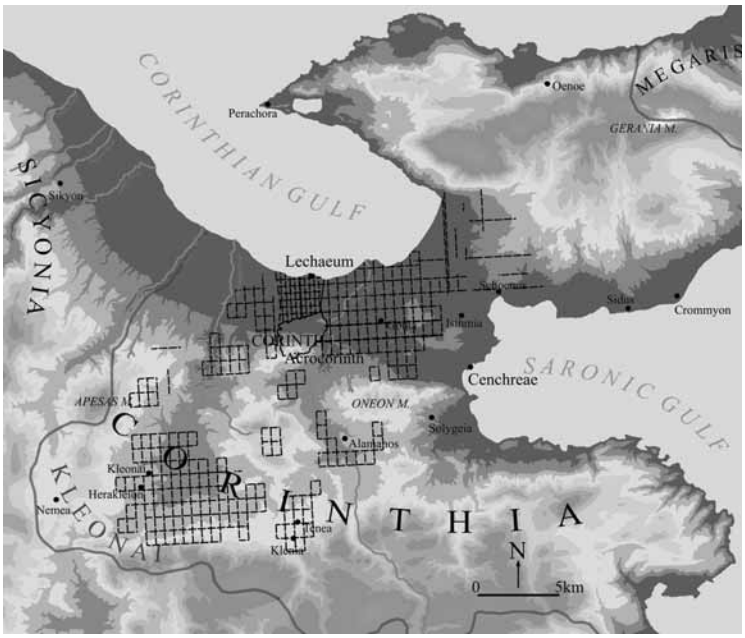
7

Ownership of Land and Villas

In the introduction, it has been stressed already that scholars often seem to have had a tendency to relate Roman cadastration to the establishment of *coloniae*. The fact that the Latin word *colonia* lies at the heart of the modern words 'colony' and 'colonialism' (see Gosden 2004: 1-2), seems to have linked Roman cadastres to this idea too. The view of cadastres as being a rigid and visible chequerboard of squares has boosted this impression.[41] The same applies to Roman villas. The (what has been though of as a sudden) introduction of stone-building and the adoption of Roman styles has been seen as the creation of a dominant power, the Romans. However, as Gosden (2004: 2) already noted, in the last decades scholars have given the native people more agency. This dichotomy between these two views raises the question which will be explored in this chapter: how can one define the socio-political ownership of the rural land and settlement sites in the Tongres-Maastricht area. In other words, after the Romans conquered the region, who were the people settling in the rural settlements and owning the land? This question instigates new questions like the relationship between cadastres and Roman villas and the specific development of the villa-landscape during the Roman period, which will be explored later on in this chapter.

Cadastres and the supposed settlement of new people

The Greek city of Corinth was an important city in ntiquity due to its strategic geographical location. During the second century BC, as the head of the Achaean League, it led the opposition to the Roman takeover of Greece. As a result, the city was sacked by the consul Lucius Mummius in 146 BC, after which the city was left largely uninhabited without civic, commercial, or political activity (Romano 2006: 65). In 44 BC, 102 years after the sack, a new colony was founded at Corinth under Julius Caesar. However, prior to the foundation of this colony, Roman land-surveyors had been busy with dividing up the land of the countryside around Corinth. The *lex agraria* of 111 BC indicates that some parts of Corinthian territory were measured out for sale, and boundary stones were erected (Romano 2006: 71). Thus, after Corinth was deserted for some time, a Roman cadastre was eventually laid out of 16 by 24 *actus* at the same orientation as the new colony



(see figure 42). This new foundation of Corinth and its hinterland instigated a resettlement by new people, since the older abandoned the region after 146 BC.[42]

The re-allocation of people to conquered and surveyed land around a newly founded city was also seen in other areas of the Roman world like North Africa, Italy, Spain and France (e.g. Dilke 1971: 178-187; Rizakis 1996; Broadhead 2007: 160-161). This re-allocation of people from Rome's centre to its edges was something that was done already early on in Roman history around the early fourth century BC. This settling of new people that were loyal to Rome had a military defence function, as well as it was a method to socially and economically stabilize the region (Dilke 1971: 178). The Roman author Suetonius (*Jul.* 42), for instance, claims that Caesar settled 80.000 colonists, of which at least 20.000 were veterans, in the provinces (Broadhead 2007: 160). It must, however, be noted that sometimes part of the cadastre´s land was given back to its former inhabitants, as mentioned in the introduction. This happened, for example, in the case of the Tricastini, who received land in the newly established cadastre around Orange (Piganiol 1962: 54-55, 139; Woolf 1998: 145).

Mostly during the time of the Empire, these new people have been often thought to have been Roman veteran soldiers, who, after their military life, were given a piece of land to settle and live (see Wesch-Klein 2007: 439-449; Broadhead 2007). The size of a received land changed during the course of the Roman period. Where the oldest accounts tell us of holdings with a size of 2 *iugera* at Anxur-Tarracina (Italy), we know from the early Empire that it rose at least to some 66 *iugera* per holding (Dilke 1971: 179, 184; Broadhead 2007: 155; see below**)**. Thus, from this, it may be argued that the supposed relationship between Roman cadastres and the settlement of new people in the region, chiefly veterans, is grounded.

Figure 42 (previous page). Extents of Caesarian cadastre around Corinth (*after* Romano 2006: fig. 6).

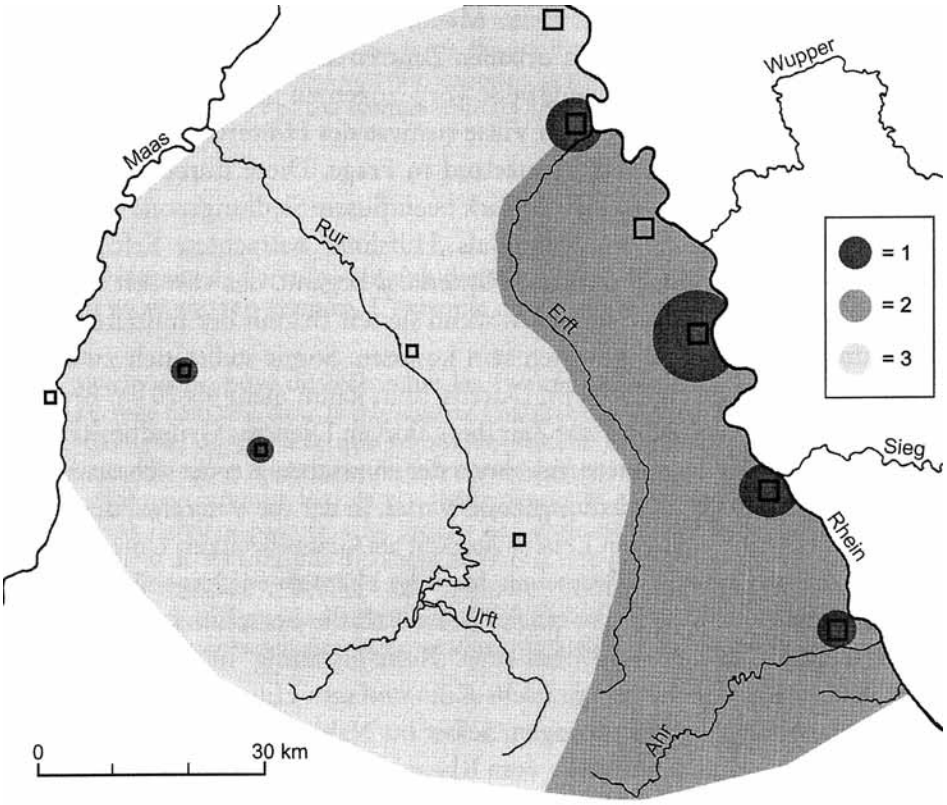


Figure 43 (right). A schematic representation of the veteran distribution in Roman Cologne and its hinterland (*after* Lenz 2006: fig. 10). 1. Centres with veterans; 2. Nearest hinterland with veterans; 3. More distant hinterland without veterans.

Moving to Northern Gaul, the historical information for the settling of colonists or veterans of the Roman army disappears. There seems to have been no historical accounts for the re-allocation of people in this region. Hence, if one wants to study the socio-political ownership of settlement and land in the Tongres-Maastricht area, one can use only archaeological evidence to attest if the picture as stated above is true for this area. Finding material in the Tongres-Maastricht area that can be significantly ascribed to new Roman settlers coming from other regions seems problematic. The material in the Roman Empire (this holds thus also for this region) is culturally too hybrid and at the same time too homogenous in style that it becomes difficult to divide the material up in groups of 'indigenous' and 'new' people.

Nonetheless, one group of people which often is attributed to the re-allocation of new people in a region are the veteran soldiers. This group can be distinguished by its material remains, since Roman soldiers and veterans received certain attributes which are seen as characteristic for their function. Although not all of these attributes were kept by the veterans when leaving the army, some would have had a particular value for a veteran that caused the veterans to take it with them. One can think of, for instance, their outfit, their weapons and the diploma they received when leaving the army. Furthermore, tombstones and votive inscriptions can also belong to their corpus of evidence. As Nouwen (1997: 237 and also 165-237) noted, "the find spots of the diplomas show that numerous soldiers stayed in the provinces after completing their military duty. Often they got married here and founded a family".

Site	Site type	Finds	Reference
Maaseik	Grave field	A spearhead; an arrow head; three iron knifes	Janssens 1977
Berlingen	Tumulus	An iron spearhead; an iron axe; small knife; Iron chisel	H. Roosens and Lux 1973
Opgrimbie	Burial	An iron spearhead; an iron axe	De Boe 1981
Rosmeer	Villa	An iron spearhead; an iron knife	De Boe and Van Impe 1979

Table 18. Sites with evidence of Roman weaponry.

A recent archaeological study of the veteran soldiers in the hinterland of Cologne has shown that it seems that most veterans, after their duty, stayed living near the central places, i.e. the towns and cities like Cologne, Bonn and Xanten (Lenz 2006; see figure 43; see also chapter 3). This has been argued from the distribution of tombstones, votive inscriptions and weapons of Roman veterans, which did not exceed beyond the river Erft. Votive inscriptions of active soldiers in the army dedicated to native deities, however, have been found throughout the German Rhineland, not specifically near the central places where they were stationed. From this, Lenz (2006: 82-83) suggested that many of the stationed soldiers originated not from more distant regions like Spain, Britain or the Near East, but had their homeland in this region. But after the veterans retreated out of the army after 25 years, they seem to have stayed near the central places in their *villae*. That the *villae* found in the more distant hinterland of Cologne, Bonn and Neuss are smaller and show less Roman style influences than those near the central places, has led Lenz (2006: 85) to argue that these would have been the homes of tenant farmers of probably a native origin.

In sum, Lenz has shown that most new people (i.e. veterans) stayed in the central places or its immediate hinterland. Land further away from these central places seem to have belonged to the native people from that region, no new people were re-allocated here. However, it could well be that these natives in the more distant hinterland were tenant farmers for the veterans living in the central places which were the actual owners of that land. This may suggest that in the German Rhineland, at least, most of the people were not new and were not re-allocated. Although in this region thus far no evidence for a Roman cadastre has been found, this conclusion may come as a surprise since the numerous *villae* found in this so-called villa-landscape are often being associated with newcomers. Thus, adopting this analysis for the Tongres-Maastricht area, can this give the same results?

In the hinterland of Tongres, only two direct indications for a Roman veteran has thus far been found. At Sint-Huisbrechts-Hern a soldier from the third Cyrenaica legion dedicated a votive inscription and his weapons to the Germanic goddess Vihansa (Mertens 1964: fig. 18, p. 33-34). Since he dedicated his weapons and offered them to a Germanic goddess, it may be assumed that the soldier was retired from the army and settled (with his family) in his homeland. At Flémalle, southwest of Liege, near the river Meuse and outside the Tongres-Maastricht area, a bronze soldier diploma of a veteran who served in Britain under the reign of Trajan has been found (Mertens 1964: 35).

Other indirect finds that may have been related to the Roman army are weaponry. The question rises however, if weapons were only used by soldiers from the army. It can be imagined that other people like, for instance, farmers would have had weaponry in order to protect themselves. Yet, if this would have been the case, then it would be expected that there would have been far more weapons found at sites than now is the case. Thus, it can therefore be stated that, although some people other than soldiers would have had weapons, most can be associated with a military function. In the hinterland of Tongres, weapons have been found at Maaseik, Berlingen, Opgrimbie and Rosmeer (see table 18). Furthermore, the sudden change in building style during the Neronian period attested at several sites in Tongres from native farmsteads to Roman courtyard houses, though still constructed out of wood, may serve as an indication for the presence of new people (see A. Vanderhoeven 1996). However, the majority of the Roman sites in the surrounding region of Tongres show no evidence that could suggest a relationship with the Roman army or suggest the arrival of new people in the area. For instance, the tumulus of Helshoven and the enormous villa of Haccourt show no indication that one of the inhabitants served as a soldier or was new to the region (H. Roosens and Lux 1974; De Boe 1974).[43]

Thus, as one relates this picture to that of the German Rhineland as studied by Lenz, it may be observed that all sites except one with an indication of a veteran presence would fall in the category 'nearest hinterland with veterans' (see figure 43: 2). Only the grave field of Maaseik lies outside this category, but here the river Meuse runs nearby. This site therefore probably was not oriented towards Tongres but towards the Meuse as a communication route. This does not however securely relate the Tongres-Maastricht area with the re-allocation of land to new people. There is far too few evidence for this. It may even be argued that this lack of evidence is caused by the fact that there actually would have not been only new people in the form of veterans in the area residing, but also the so-called 'natives'. Because when there would have lived only new people in the area, it would not explain the small corpus of evidence for them. Moreover, it has been attested recently that native-styled farmsteads in the Tongres-Maastricht area and in other places of the villa-landscape remained occupied throughout the Roman period (see chapter 3; see also Dijkstra 1997; Louis 2004; Wesemael 2006). Even when villas emerged close to these sites, these people continued building in a native-tradition.[44] Furthermore, many Middle Roman villas seem to emerge out of a Late Iron Age and Early Roman period occupation phase (see Lenz 1998; Heimberg 2003; see also below).

In sum, the corpus of evidence for the assumption that there was a re-allocation of people seems too small. Nevertheless, there is some evidence for the presence of veteran soldiers, as well as there are some clear signs that some of the sites would have had a native origin. Thus, as a conclusion one might state that there seems to have been a mix of new people, probably chiefly veterans, in the Tongres-Maastricht area and people that already lived their prior to the arrival of newcomers. Yet, this conclusion, in light of the little archaeological and historical evidence, must remain tentative.

Relationship between villas and cadastres

The piece of land from a Roman cadastre which veterans and other new people transported to an area received was not as straightforward as it might seem. The number of cells a regular spaced chequerboard contained was not similar to the number of families that lived in a cadastre. Put differently, a veteran or other people did not receive one 20 by 20 *actus* plot (or in our case a 18 by 18 *actus* plot) to live on. At least in theory this seems to have been much smaller, as already has been stated above. For instance, the Latin word *centuria* or 'century' in English stands actually for the number of plots which one 20 by 20 *actus* square was divided into. Such a 20 by 20 *actus* square contained 200 *iugera*. Since the early republican size of a smallholding given to the new people was 2 *iugera*, a *centuria* could – hence its name – contain 100 plots (Dilke 1971: 15).

The confusion that could result by ignoring this difference, has created a tendency among some scholars to confuse parcellation with cadastration as mentioned before in the introduction (e.g. Renes 1988: 38-39; Van Londen 2006). The existence of the former does not however exclude the existence of the latter (see figure 44). The parcellation Renes (1988: 39) has found in the German Eiffel region and in England could, in light of this, just as well have been part of a Roman cadastre. Although in the Eiffel region there seems thus far to be no reason to suggest such a Roman cadastre, from other countries like Italy and France it is known that small landholdings were part of a larger cadastral system (see Dilke 1971: 178-187).

The size of a landholding, though, was not fixed through time. During the late-fourth century BC, when the first colonies with cadastres surrounding them were being established, a size of 2 *iugera* per settler was normal. In later colonies the size of the plots in certain cases became larger to attract settlers to the region. For instance, lands taken from the Bruttii, had sizes of 15 to 20 *iugera* each. In Cisalpine Gaul, Bononia (Bologna) was founded in 189 BC with allotments of 50 *iugera*. And during the late-second century BC in Northern Africa plots of up to 200 *iugera* (one century) were given to each immigrant, although the largest sizes were only given to *equites*, i.e. cavalry (Dilke 1971: 179-182). In general, it can thus be stated that the first allotments were pretty small but that during the course of the Roman Empire the plots provided to the settlers got larger.

Nonetheless, these settlers, once settled, could expand their landholding by incorporating or buying other surrounding land from other people. Thereby they created vast estates called *latifundia* in Italy and which can be related to the villa development in Northern Gaul (see below). Yet, to keep the expansion of estates under control, as Dilke (1971: 181-182) mentions, "Tiberius Gracchus, tribune in 133 BC, passed an agrarian law limiting the extent of state domains which could be held by a *possessor* [owner] to 500 *iugera*, with 250 extra for each of two children".

The size of one landholding in the Tongres-Maastricht area has not been investigated thoroughly and seems to be a difficult task due to the fact that not all *villae* are known for the area. However, like Gaitzsch (1986) has studied for

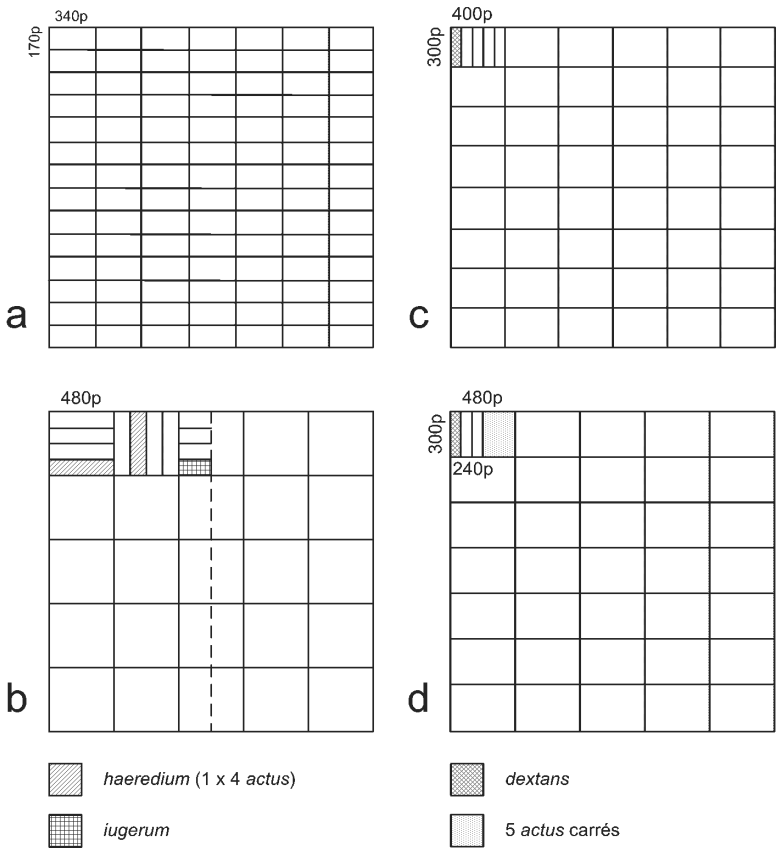


Figure 44. Theoretical division of a 20 by 20 *actus* cadastre (*after* Compatangelo 1989: fig. 20). 'P' stands for *pedes* (0,295 m).

the Hambacher Forst in the German Rhineland, it seems that in the Tongres-Maastricht area at least some settlements owned an area the size of one square within a cadastre, here 18 by 18 *actus* (see chapter 5). Furthermore, the remarkable result arose that within the proposed cadastre there seems to have been only one settlement site per square. Only the two sites Sint-Huibrechts-Hern-Papenberg/ Steenbroeck (cat.no. 13) and Riksingen-Keiberg (cat.no. 45) seem to would have fallen within one square, though the latter site may have been located more to the east just outside this square. This shows, as concluded in the previous chapter, that there is a plausible chance that the land per villa was around one square of a cadastre, i.e. 18 by 18 *actus* or 160 *iugera*. In light of the land sizes given to settlers in other regions of the Empire, this size would not have been extraordinary and seems therefore reasonable.

Yet, we must remain cautious. First of all, as stated above, the results are based on only the *known* archaeological sites found in the Tongres-Maastricht area and not *all* sites in the area. Future excavations and field surveys must prove if this suggestion remains plausible. Secondly, as just has been mentioned, lands acquired by settlers could be expanded during the course of time (see also below). Since in most cases the development of a settlement site, including its arable land, remains unknown due to the fact that it has not been thoroughly examined, it remains a mystery if this 160 *iugera* was something caused by the expansion of land sizes through time or that this was the actual land size a settler was given. Lastly, it also remains unknown if this 160 *iugera* was given to every settler. As still many

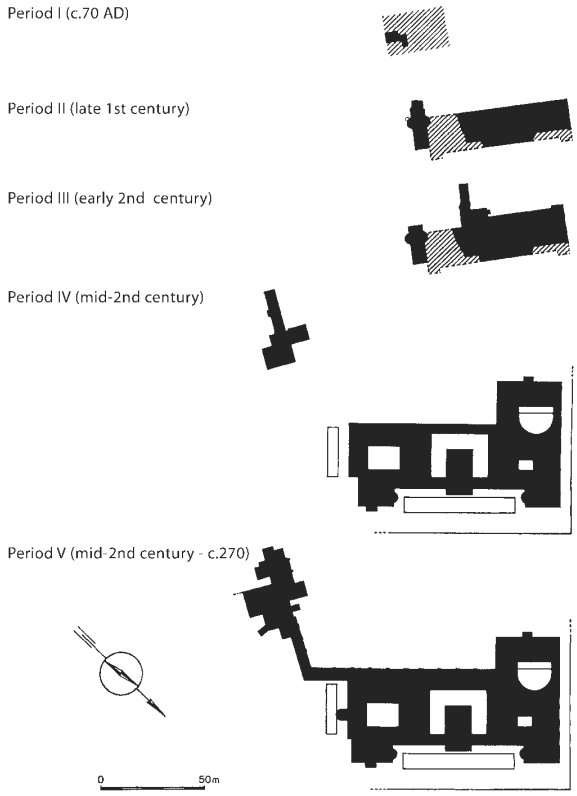


Figure 45. The Roman villa of Haccourt (*after* De Boe 1976: fig. 18). A schematic representation of the different chronological phases of construction.

squares of the cadastre are left with no indication of a settlement site, it remains a guess to argue that every settler was given the same size of land (maybe higher-ranked persons got more land than lower-ranked people) and how this would have developed during the course of time, i.e. the expanding of some estates while others decreased (see below; see also figure 47).

Development of the villa landscape

In conclusion of this chapter, we will return to the discussion on the development of the villa landscape in the Tongres-Maastricht area (see also chapter 3). As has already been stated, in the last decades a large amount of scholarship has been devoted to this and has demonstrated that – at least, the majority of – Roman *villae* seem to have developed during the start of the Middle Roman period out of Iron Age and Early Roman native farmsteads due to the favourable conditions of agriculture (e.g. Lenz 1998; Heimberg 2003). Yet, the development trend was not everywhere the same and seems to have been different per *villae*. For instance, the villa Haccourt developed into an enormous estate in just over 150 years (see figure 45), while a villa like Valmeer-Meerberg, Voerendaal or Kerkrade-Holzkuil developed much more gradually and a site like Veldwezelt or Kerkrade-Winckelen did not develop at all but stayed operating in a 'native' style (De Boe 1976; Willems 1987; Tichelman 2005; Wesemael 2006; Dijkstra 1997). This sort of difference in development was not only common for the Tongres-Maastricht

area, but can be found in other areas too (see Heimberg 2003; Louis 2004: fig. 2). A good explanation for this has however not been given thus far.

There could be a difference in hierarchical ranking between people which could result in a difference in size. Besides the inscriptions at Ravensbosch (see chapter 3), there is one other indication of a high-ranked person in the hinterland of Tongres. At Gors-Opleeuw, just to the west of the Tongres-Maastricht area, an inscription has been found in a burial on his landholding of one Caius Gracileius Similis. His function seem to have been *Aedil(is) C(ivitatis) Tungrorum*, what was a public function as police in the *civitas* (Vanvinckenroye 1985; *CIL* XIII, 3599**)**. As stated above, such high-ranked persons may have been given more lands or could buy more lands than others. This difference in size due to the status of people, though, would have not been a precondition (see chapter 3). Some people with allure would not have been given more land or choose not to make an economic profit to expand their estate. On the other hand, 'normal' people which did not belong to the so-called 'elites' still had a chance to be economically successful; the so-called 'American dream'.

Thus, although 'status' could play a role, the answer on the question what caused the difference in sizes of *villae* mostly needs to be sought in terms of wealth, which was the result of a difference in production and distribution capacity of goods. Some landholders probably could and wanted to expand their landholdings during time in order to make more profit (which hence could result in a more prosperous villa), while others did not have the will, money, time, network of people, location, luck or effort to accomplish this. As Tiberius Gracchus law suggests, this was not something characteristic for this area, but was seen in other regions of the Empire too (see above). These different choices and chances hence resulted in a diverse landscape of house types (not only *villae*), burials and landholdings of different sizes.

For instance, the possible villa site of Smeermaas-Dukatonweg is situated close to the river Meuse, probably one of the most important trade routes in the area. At this site 'CISSI' tile stamps have been found (Pauwels and Creemers 2006: 82). Thus far these have mostly been attested at villa sites more to the south between Liege and Namur (De Poorter and Claeys 1989). Since this is the only site in the Tongres-Maastricht area where these stamps have been found, it may suggest that its owners took part in a trade network which resulted out of their favourable location near the river Meuse. This was a benefit other people would not have from which the inhabitants of Smeermaas-Dukatonweg could have profited in terms of wealth and expansion.

On the other hand, the site of Veldwezelt, at some distance from the river Meuse, was a settlement site that continued to be constructed in a 'native' style during the Middle Roman period (Wesemael 2006). An actual explanation for the occurrence of this type of settlement (it is the first actual non-villa site attested in the Tongres-Maastricht area, see chapter 3) during the Middle Roman period cannot be given at the moment. It was located only ca. 1 km from the main road to Cologne. Thus, a lack of communication could not be the cause. A tentative explanation which has been heard is that it were actual 'native' people living here,

while the villa-owners were settlers who came from other regions of the Empire. This however is quite hard to prove from the archaeological remains as mentioned above. For now, it may therefore serve as an illustration of the different choices and chances of a person leading to an expansion to a villa estate or, as in this case, could prevent it.

Lastly, except for the economic prosperity of an inhabitant, there is also a different factor that could result in an expansion of the land and the accompanied growth of the villa. It seems reasonable that with a lifespan of around 200 years, *villae* (at least, some) would have not been inhabited by the same family during its entire history. There is reason to believe that some families moved out, while others moved in. For instance, compare Haccourt's earliest three phases of construction with the later two (see figure 45). It may be noticed that the mid-second century villa does not look anything like the early-second century AD villa. Not only is the villa in ca. 40-50 years grown twice as large, also the orientation changed quite dramatically, as well as its layout. If one would expect the same inhabitants or family, one would not expect the development to be such a dramatic break with the past, but rather a development continuing more in line with the earlier visual appearance of the villa. This may show that change of inhabitants of a site could cause growth as well as it could cause decline in certain cases.

In sum, the development of the Roman villa landscape in the Tongres-Maastricht area seems to have been caused by several factors. Most notably is the factor of an individual's choice and chance to become economically prosperous and show this in the style and size of his/her house, burial and land. Although the status of an individual could contribute to the chance to be economically successful, this was (and still is) not self evident; there is always a choice. Furthermore, changes in the social sphere of a house like, for instance, new owners in the form of a different family probably led to developments not related to earlier construction phases. Lastly, as already stated above, a difference between new settlers and socio-culturally 'Romanized' old inhabitants is still difficult to spot. Hence, finding a relationship between this discussion and the development of the so-called 'villa landscape' seemed impossible.

8

Conclusions

"The imposition of order is a dialectic, dynamic process through which a model of administrative control is applied to the specific nature of a place."

Cuomo 2000: 198

The subject of Roman cadastres is a heavily discussed issue within the study of the Roman Empire, both for its research methodology – whether historical or archaeological –, its nature and the implications it may have had upon the interaction between locals and Romans. It is also a subject in which processual and postprocessual viewpoints seem to merge; on the one hand the square-ordered cadastral plan serves a processual methodology of statistics, while on the other the outcome of such a square-ordered cadastre must not be seen, as Cuomo's quote above illustrates, as an evident imposition of order from the Roman side with a passive local influence. In the case of, for instance, Northern Gaul, these discussions appear to have contributed to the notion of an absence of cadastres. Scholars seem to follow the thought that only around the Mediterranean Sea cadastres would have existed. Examples of such can be found in Tunisia, Croatia, Syria, Spain and Italy itself.

In this book, I have tried to argue that this reasoning is largely based on prevailing misconceptions regarding the nature of Roman cadastres as static squares whose boundaries would have been visible lines in the landscape separating one plot from another which orientation is mainly determined by astronomy and main roads (see chapters 1 and 4). Or, as Van Londen (2006: 188) recently put it: "centuriation was absolute and not affected by local topography". Moreover, I have tried to show that its research methodology developed extensively after the first big wave of Roman cadastre-studies during the 1950s, most notably caused by the evolution of computer applications. The implementation of such applications, as well as an awareness of the historical nature of modern landscape features and their relationship with the past, created more advanced methods for studying the cadastres (see chapter 4). Therefore, opposing the view held by others (e.g. Jones 1989: 129; Hart 1998: 112-113; Heimberg 2003: 127), some scholars already

have shown that in the case of Northern Gaul, Roman land-surveyors seem to have visited the region and 'shaped' certain land into cadastral plans (e.g. Legros 1970; Chouquer and Favory 1980; Peterson 1993; Chouquer 1996b).

The Hesbaye region, situated in modern East-Belgium, is part of the loess belt which runs through Northwestern Europe. Among other regions in this belt, the soil of this region stands out for its fertility. Because of this, a so-called villa landscape developed here during the Roman period. In addition, this villa landscape and the fertile soil on which it was built served as background for the growing believe of the existence of a Roman cadastre (see Mertens 1958; Ulrix 1959; De Boe 1971b; 1973; Raepsaet 1977; Vanvinckenroye 1985; Melard 1986). Therefore, an area within the Belgian Hesbaye region, the Tongres-Maastricht area served in this book as a case study, for which I have tried to examine the possibility of the existence of a Roman cadastre.

A Roman cadastre in the Tongres-Maastricht area

Starting point for the examination was the hypothesis that certain linear features in the modern landscape could have evolved from Roman *limites* (see chapter 5). As shown in, for instance, Italy, Croatia and Tunisia this hypothesis was in certain cases very evident. And even in cases like Orange (France) and Lacimurga (Spain), where on first sight it not seemed so evident, the hypothesis was true. In the hinterland of the city of Orange, for instance, one had never thought the existence of a Roman cadastre could be demonstrated from a look upon the modern landscape until the finding of the famous tablets of Orange in the 1950s. A detailed comparison of these tablets with the modern landscape showed that certain linear features could be traced back to the times of the Roman cadastre (Chouquer 1983a; 1983b; Bel and Benoit 1986; Peterson 1992a).

In our examination, talus, which are seen all over the Tongres-Maastricht area because of its rugged nature, were used (see figure 46). Several maps and one aerial photograph of the area were used to identify them. From the dominant orientation of these talus it could, then, be suggested that this may have been the orientation on which the Roman cadastre was aligned. This makes sense in the fact that this was also the general inclination of the valleys of the Tongres-Maastricht area (Duurland 2000: 3-4), which corresponds to on of the list of theoretical factors determining the orientation of a Roman cadastre (Le Gall 1975; see chapter 4**)**. In order to relate this evidence to the Roman occupation phase also the orientation of Roman structures found in the area was determined. The gained results were rather similar as for the talus. The most striking result was that the structures during the Middle Roman period showed a dominant inclination in the direction of 45°-56,25° from north grid, while the structures from the Late Iron Age and the Early and Late Roman period showed a different dominant orientation.

Since no correlation can be calculated statistically between the talus and Roman structures due to the fact that the talus' construction date cannot be fixed to any particular period while the structures construction date is fixed within

Figure 46. Modern talus in the Tongres-Maastricht area (photos by T. Vanderbeken, courtesy of ZOLAD).

the Roman period, another method to predict the chance for this cadastre to be Roman needed to be found. As Chouquer and Peterson already demonstrated before, there seems to be an association between Roman structures and the *limites* of a Roman cadastre (Chouquer 1987; Peterson 1996). For several reasons, structures appear to be located within the vicinity of a boundary (see chapter 5). This association, hence, gives the possibility to find a correlation between the talus as boundaries of the cadastre and the Roman sites. Since the dominant orientation was already set, only the size of one square within the cadastre and an exact location of its boundaries had to be established.

To do this, several sizes of a hypothetical cadastre were tested on several locations in the Tongres-Maastricht area. The locations were chosen for their correspondence with the talus. Since not all talus of the 45°-56,25° orientation class would have been Roman or belonging to one of the main *limites* (they possibly could also have been interior boundaries, see chapter 5), not all talus would necessarily correspond to the boundaries of the hypothetical cadastre.

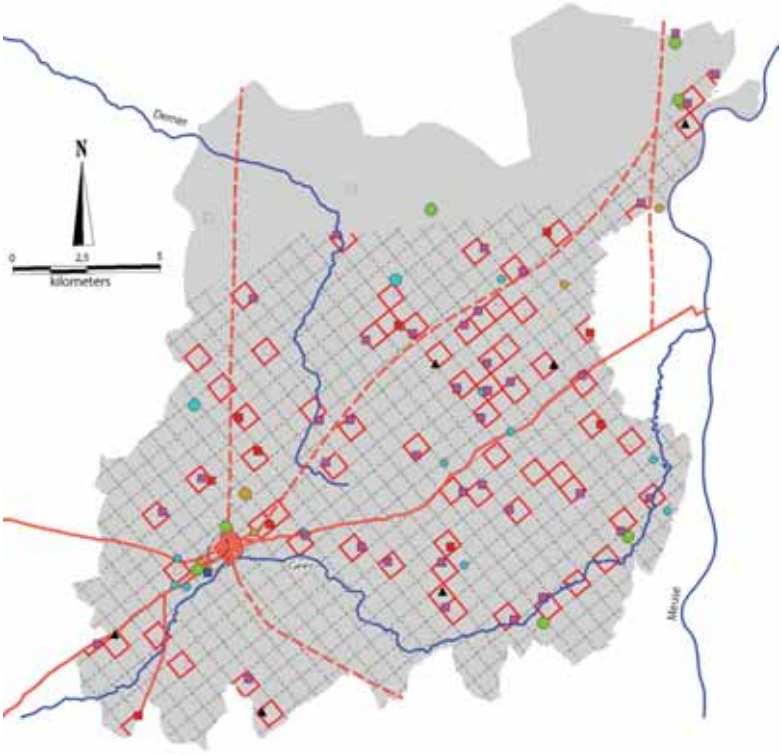


Figure 47. The proposed hypothetical Roman cadastre of 18 *actus* in size and with an orientation of 50,625˚.

The location of the hypothetical cadastre was thus based on the most dominant correspondence with talus from the orientation class 45˚-56,25˚.

The result was that one hypothetical cadastre of 18 *actus* in size stood out from the rest. It showed a significant (99,5%) non-random distribution towards the *limites* of that cadastre (62,86% of all Middle Roman sites fall within the area nearest to the boundaries). Furthermore, it could be observed that no cadastral square has more than one settlement site within its boundaries, except for one. Lastly, a calculation of the hypothetical land sizes of the different settlement sites seems to favour an 18 *actus* over a 20 *actus* size (see chapter 6).

I, therefore, would like to argue for the existence of a Roman cadastre in the Tongres-Maastricht area (see figure 47). The hypothetical 18 *actus* cadastre with an orientation of 50,625˚ can be plotted on top of the Tongres-Maastricht area with a certain degree of confidence. If one would compare it with Mertens' proposal from 1958, which is the most widely cited proposal for the Tongres-Maastricht area, the 18 *actus* cadastre proposed here shows more correspondence with the landscape of the Tongres-Maastricht area as well as with the Roman period finds found in the region.

However, that we still call it a *hypothetical* Roman cadastre has a reason. Of course, excavations in certain cases could take away the doubt and the adjective 'hypothetical', thus future fieldwork could discard or affirm this proposal. Nevertheless, as described in the introduction, Roman cadastres were not always obviously visible and could well have left almost no traces in the archaeological record except for maybe certain roads, burial mounds and some boundaries in order to prevent disputes. At least, we must not maintain the mental picture

of a superimposed chequerboard of squares stretching out over the landscape. That archaeological studies have found such squared, visible squares bounded off from their adjoining squares in parts of Tunisia, Italy and Croatia, does not imply that everywhere across the Empire cadastres had to be like that. Cadastres were regulated by the Roman Empire, as governments nowadays still do. Most countries have a certain cadastre that registers which land belongs to who. In many cases, this cadastre leaves no traces in the modern landscape (see Peterson 1993: 242-243). Therefore, I assume (as it is hard to prove) that in the Tongres-Maastricht area, and probably in other region of Northern Gaul and the rest of the Empire too, the Romans would have had cadastres that were not obviously visible within that landscape but which were registered and kept within the institutions for reasons of tax collection, disputes and land allocation. Therefore, the proposed cadastre is shown by a dotted line rather than a continuous one (see figure 47).

This invisibility also implies that the orientation of 50,625° must not be taken at face value. After all, it is just the middle of the orientation class with the highest value of talus and Middle Roman structures. Nor must the location of the cadastre be viewed as exact. In both cases there might have been a slight change in its orientation and the exact location. However, in light of the invisibility it seems almost impossible to reveal its exact location and orientation. Even excavations will not help here, I think. Nevertheless, the proposed 18 *actus* cadastre serves as a general idea of the Roman cadastre that would have existed in the Tongres-Maastricht area.

Dating the cadastre

Finding a possible starting, as well as ending, date for a Roman cadastre is hard. As seen in the introduction, a cadastre was for a long time seen as a static, not changing grid of squares. Contemporary scholarship has shown the contrary, the same land would have been surveyed for several times throughout the Roman period. This new insight leaves us with numerous questions when a cadastre is being identified. How do we know, for instance, if there were more than one cadastre? And if there were more, which one have we identified? All these questions seem difficult to answer in light of the sparse remains left to identify a cadastre. In light of this, in this study it has not been tried to identify several cadastres and thereby proving the dynamic nature of cadastres during 400 years of Roman occupation in some regions. What, however, has been tried to do is to show the period in which a Roman cadastre is most plausible. In light of the evidence, this would have been the Middle Roman period which, following modern conventional dating, dates from 70 to 270 AD.

During the transition from the Early to Middle Roman period, many of the features found on the Early Roman sites that continued to be occupied during the Middle Roman period show a discontinuity or, put differently, a break with the past. Moreover, during the Middle Roman period 50 new settlement and burial sites seem to emerge (see chapter 5). For the Late Roman period evidence is marginal as there seems to be a lack of good sites. However, still some evidence suggests that there probably was a gradual abandonment of the cadastral system by

the Romans. The new sites that became inhabited during the Late Roman period were, for instance, not as closely associated with the boundaries of the grid as the Late Roman sites which showed continuation with the Middle Roman period (see chapter 6). Lastly, the only period in which the orientation of the structures corresponded to those of the talus is during the Middle Roman period.

Look for an historical justification for this dating, it immediately becomes obvious that the Middle Roman period was a relatively peaceful period in comparison to the ones before and after. This already has been attested by Dyson (1975: 152-161) who noted that native revolts throughout Gaul only happened during the Early or Late Roman period. In the Tongres-Maastricht area and surrounding regions the aftermath of one revolt in particular set the scene for this so-called *Pax Romana*. This Batavian revolt of 69-70 AD is also the conventional boundary used between the Early and Middle Roman period for this region (see figure 48). From excavations at Bavay, Metz, Trier and Tongres it is known that destruction hit these towns during this revolt (Walthew 1982: 231). Whilst Walthew (1982: 232) argues that this not seemed the case with the countryside of the province of Gallia Belgica, it has been proposed here and by others that it does (see chapters 3 and 5; Slofstra 1991). Furthermore, the *civitas Tungrorum* becomes part of the new-established province *Germania Inferior*. With a new province being established, a lot of changes seem to appear like rapid urbanization and growing exploitation of the countryside in the form of villa estates.

In light of the changes in society, landscape and the relationship between Romans and natives due to this revolt, it may quite well be possible to link this change with the establishment of a Roman cadastre in the area as some kind of power-statement of the Romans. Indeed, Slofstra (1991: 136-137) has argued that tribal traditions survived during the Roman period at least until the Batavian revolt, but not longer than the end of the first century AD. This suggests that society must have changed quite rapidly during the aftermath of the Batavian revolt. An explanation for this must, in my opinion, be sought in the relationship between natives and Romans, which had to be re-established by the Romans after the revolt.

During the transition from the Middle to Late Roman period, again society was in revolt, culminating in the temporary separation of the Gallic Empire and eventually leading to the end of the Roman Empire in Gaul. It is this setting that would have created 'crisis' and political changes in the Empire. Armies were restructured and displaced, the *limes* from now on was no static boundary anymore but fluctuated much more dynamic, new groups of people settled in the Empire's Northern region and Christianity gradually gained more power in the internal affairs (see chapter 3). For the Tongres-Maastricht area this meant that assumingly population, as well as its economic motor, the grain exploitation, would have declined. It gradually became a border zone of the Empire, in which the important routes of the river Meuse and the Bavay-Cologne road became of no economic use anymore. This may have been the historical causes that led to an abandonment of Roman administration and with it the Roman cadastre. It probably would not have been deleted from the landscape immediately, but

during the course of decades, maybe centuries, when other Empires incorporated the region. All with their own way of dealing with newly embodied groups of people.

This historical shift may also be detected from the material and examinations in chapters 4 and 5. Different settlement systems were adopted as seen in the Late Roman 'Germanic' settlement of Neerharen-Rekem and the strong association with the *limites* of the 18 *actus* cadastre during the Middle Roman period gradually diminished.

The cadastre's size

The extent to which a cadastre would have spread out over the Tongres-Maastricht area and surrounding regions is maybe even more difficult to examine than the date of that cadastre. At least, in the case when the size of a cadastre falls outside the region under study it cannot be demonstrated. This seems to be the case in regard to several directions of the cadastre.

A cadastre's size could have stretched out for hundreds of kilometres as has been shown in Tunisia (Trousset 1977). The fact that this size is only known because boundary stones have been found on which the number of a particular cadastral square more than hundred kilometres away from the point where a land-surveyor started with surveying, does suggest that in cases where cadastres have been studied by their visibility in the modern landscapes, the size could well have been larger than previously thought (see chapter 1). Yet, this faces no problem in our case where only a small region has been studied, but should make us aware of the fact that there is a good reason to believe that the cadastre would have extended beyond the Tongres-Maastricht area.

Rivers played often the role as natural boundary for a cadastre as it would also do for a *pagus*, *civitas* and even provinces. Nevertheless, in some cases a river would have been incorporated within a cadastre. The river Meuse in regard to this may have also played this role. Yet, since the Tongres-Maastricht area is situated west of this river, this could not be examined. But in light of the importance as transport route and as the possible administrative border of the *civitas Tungrorum* it can be assumed.

Another boundary of the cadastre in the Tongres-Maastricht area could be the change in soil type and with it the change in economic exploitation of that soil. As mentioned in chapter 1, the Tongres-Maastricht area has a predominant loess soil with only in the North the beginning of the less-fertile sandy soil. Since both types of soil fall within the study area, we could examine the possibility that the cadastre would have ended here by calculating the significance of the association of sites with the *limites* of the cadastre for each soil type. The results were remarkably different. The sandy soil type showed no significant evidence for the sites to be non-randomly distributed, while those on the loess soil did show this. Furthermore, the percentage of sites closest to the *limites* was remarkably lower in the case of sites on the sandy soil of the Campine region. This seems to argue that the sandy soil would fall outside the Roman cadastre as proposed here (see figure 47). Thus, as Roymans (1996: 100) already has argued, "even within

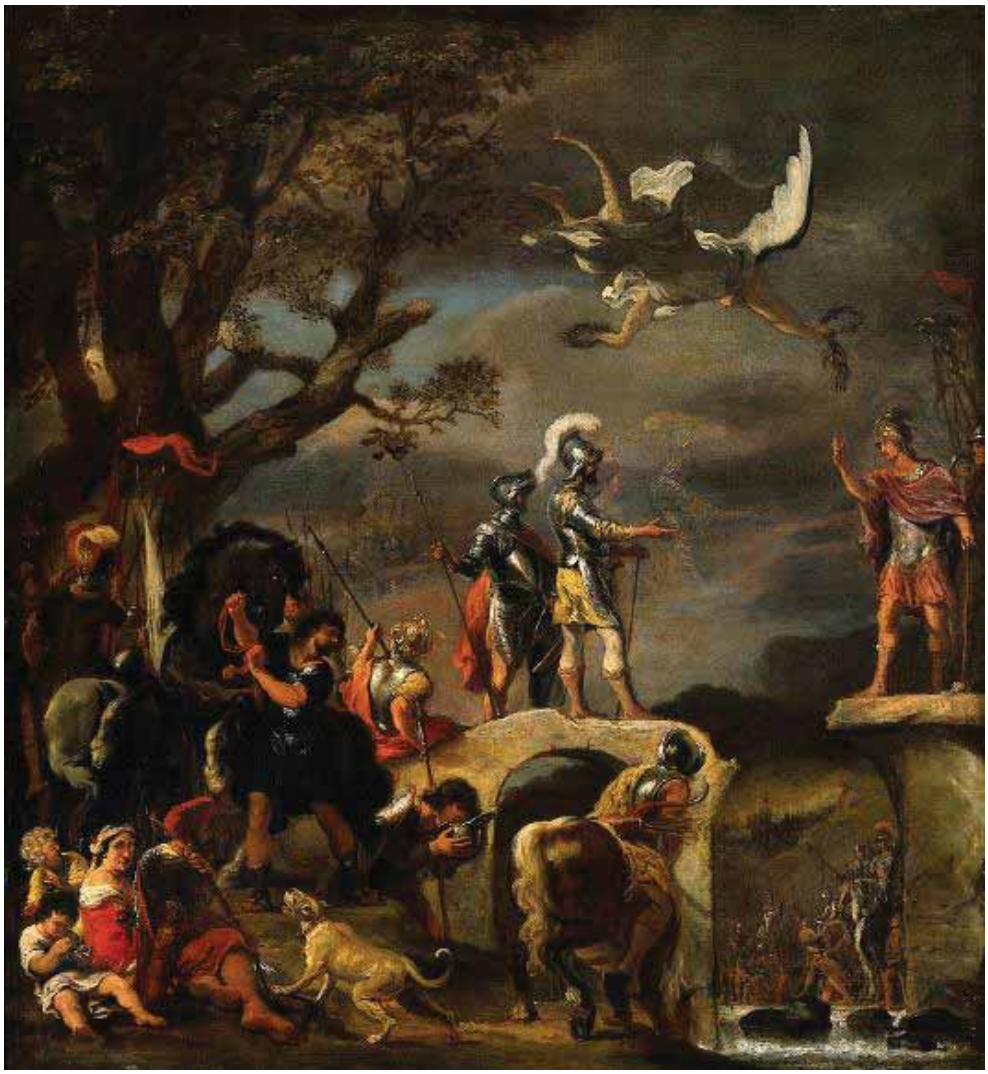


Figure 48 (previous page). Painting by Ferdinand Bol (1658) depicting the negotiation between Romans and Claudius Civilis (courtesy of Rijksmuseum).

one *civitas* (such as that of the Tungri) there are sometimes considerable regional differences in [cultural interaction] which may be easily understood when seen against the background of landscape variations". This may be considered as one of them.

Socio-cultural impact

In the introduction it already was mentioned that we would return to the question of the socio-cultural impact of a cadastre. It was mentioned there that many scholars nowadays are stressing more attention on cadastres as a social and cultural actor within the landscape because of the 'obviousness' of the implementation of it within the landscape. Alcock (2002: 46), for example, stated that "land division was a pragmatic economic step, but one that simultaneously packed a substantial symbolic punch through its fundamental reordering of territory". Purcell (1990: 16), in addition, argues that "doing this to a landscape is a spectacular display of the conqueror's power […] the former inhabitants remain, demoted, humiliated and dependent". Peterson seems to go even further with this statement by suggesting that scholars doubt the existence of cadastres in regions where they are not obviously recognizable (see chapter 1) is due to the fact that it "would probably entail a revision of views about major characteristics of the province, such as the nature of relationships between its native and 'foreign' inhabitants" (Peterson 1993: 237-238).

Of course, as these scholars stated, an administrative decision to implement a cadastre in a region would have caused certain changes within the socio-cultural sphere. The question remains however in which degree things would have changed. As Gosden (2004: 2) mentioned, "older views of colonies saw the colonists as dominant; now, of course, we are more inclined to credit local people with agency". However, from the quotes above one may assume that the socio-cultural effect of the implementation of a cadastre would have been one-way, directed by the Romans against the 'natives', and particularly large. But does this hold in every case? Would, as Peterson argues, a relatively unrecognizable cadastre that is more administrative in its nature (e.g. the Orange cadastre, the one in Tunisia or the Tongres-Maastricht area) have had the same effect as one regular chequerboard of squares recognizable by its parallel and perpendicular routes leading to a main axis? And would as in certain historically known cases, the migration of a people into a newly created cadastre like in Corinthia was the case have had the same effect as when the cadastre was implemented upon a landscape without moving groups of people (see chapter 7)?

Surely the answer must be 'no' in both cases. Different events, periods, people and implementation would most likely have caused different sorts of changes and reactions. This however does not imply that the implementation of cadastres would not have caused any change. Whether directly recognizable or not, cadastres would have created controlled space to reinforce hierarchical relationships between the Empire and its people. In the case of cadastres, this would after a while cause a competition for hegemony among certain landowners,

which would explain the re-surveying of cadastres by land-surveyors in certain cases or an abandonment of the ordered structure of cadastres (Kealhofer 1999). The Tongres-Maastricht area might tentatively have suffered the latter during the Late Roman period. For instance, *villae* like Haccourt show a constant, though not within a single flow (see chapter 7), expansion through the Middle Roman period that seems to stop during the later period (De Boe 1976). This is something which is common throughout the villa landscape where some *villae* would remain small and others expanded to enormous proportions (see chapter 7). It can be argued therefore that there seems to have been some sort of competition for hegemony between certain economically successful landowners, which may have resulted in the abandonment of order and perhaps the start of 'crisis' during the third century AD.

To what extend then could these imposed cadastres which newly defined the hierarchical relationships in the area have contributed to socio-cultural changes?

> "That what is significant about the adoption of alien objects – as of alien ideas – is not the fact that they are adopted, but the way they are culturally redefined and put to use."
>
> Kopytoff 1986: 67

In some sense Kopytoff's quote fits here quite well. In regard to cadastres, it is not the fact that these chequerboards of squares are imposed, but the way people would – physically and mentally – see them and adapted themselves to this circumstance. The 'controlled power' what these cadastres suppose must not be seen as the outcome of a one-way process by the Romans, as the above quotes from Alcock, Purcell and Peterson seem to imply. This view may have been partially shaped by an influential definition of power.

Max Weber (1978 [1919]: 53) defined power as "the probability that one actor within a […] relationship will be in a position to carry out his own will despite resistance, regardless of the basis on which this probability rests". The problem with this definition is that its primary focus on institutional forms creates a wide conceptual gap between the larger structures and the actual individuals interacting within them. It implies that larger social structures, where a dominating (elite) group of society *consciously* authors the ideological conditions and institutions, affect individual behaviour.[45] Thereby, these larger social structures control the power relation and, with it, the manner and direction of socio-cultural change (Sweely 1999: 2). However, this does not acknowledge individual behaviour, what seems necessary if one is willing to understand how power among Romans and natives would have worked. Furthermore, it stereotypes individuals as passive, unthinking machines (see Given 2004).

To best describe this balancing of power, then, without marginalizing the ones with supposed 'least' power and yet acknowledges power's craving to unilateralism, we may use the concept of 'negotiation' (see figure 48). Cultural power is a constant dynamic process along a continuum of negotiated relations between the parties involved, whether through institutional or individual actions.

Nevertheless, we must keep in mind that although power almost always operates reciprocally, in the end it usually is without equal reciprocity.

In light of this theoretical outline, cadastres are not as static symbol of power as some might have thought. In the case of the Tongres-Maastricht area it seems that it was predominantly the economic reason, the fertility of the land and the good connection with the armies on the northern frontier zone which may have led to the establishment of a cadastre in the area. Still, in the aftermath of the Batavian revolt, socio-cultural change would have been necessary in order to sustain control and peace, as Dyson's (1975: 161) aforementioned quote quite good captures.

Of course the cadastration may have contributed to this age of *Pax Romana*. However, it seems not to have had an effect on the socio-cultural development of the people in a short-term vision. The fact that the cadastre seems to have not been immediately physically recognizable as such diminished the effect on people in forms of physically separating the past from present. Certain older ideologies stayed with the people (Roymans 1996), while a large-scale detachment with the previous period was also not visible in the area. The people rather continued to live on the same location as sites like Neerharen-Rekem, Haccourt and a rebuilding of the town of Tongres illustrates. Furthermore, Roman material and the fact that native building styles mixed with some Roman elements already in the course of the Early Roman period, prior to the revolt, as seen for instance in the occupation development of Tongres-Hondsstraat and Tongres-Kielenstraat, suggests that socio-cultural change in the Tongres-Maastricht area was already begun before the revolt (see A. Vanderhoeven 1996; 2001; 2002).

Rather the long-term reinforced hierarchical relationships caused by the implementation of this cadastre (see above) seem to have given rise to some new developments within the socio-cultural sphere. The local economy flourished, leading to the emergence of Roman *villae* that seem to have competed against one another. Furthermore, towns as Tongres developed into cities and new forms of showing your wealth and status by burial mounds came to existence. In the case of the Tongres-Maastricht area, it is thus my idea that not so much socio-cultural order led to an implementation of a cadastre, but rather its location within the Empire as grain-supplier for the armies. The flourishing economy together with the new relationships which this cadastre created led to a new socio-cultural development.

Notes

Chapter One

1 *Centuriatio* means a form of surveying in which the *limites* divide the surveyed land into squares or, occasionally, rectangles. Centuriations are known of various sizes, but during the late republic and Empire the 20 by 20 *actus* size appears to have become the standard.

2 A 'cadastre' means a land information system and, in the case of ancient landscapes, its physical remains. The establishment of a formal Roman cadastre was preceded by surveying and the establishment of survey markers. As will be seen below, not all Roman surveys were centuriations. It is thus technically incorrect to use that word to signify all types of Roman land planning and allotment. For this reason, and because it embraces all aspects of the system, the term 'cadastre' is to be preferred.

3 This research question was instigated by a hypothesis of Tim Vanderbeken, city-archaeologist of Bilzen, Lanaken and Riemst (ZOLAD).

4 For instance, Dilke 1971; Hinrichs 1974; Behrends and Capogrossi Colognesi 1992; Chouquer and Favory 1992; 2001; Campbell 2000: xx-lxi.

5 For more information on the history of research on Roman cadastres, as well as on the historical sources, see Dilke 1971; Chouquer and Favory 1992; 2001.

6 Croatia: Bradford 1957: 178-193; Chevallier 1961. Italy: Castagnoli 1958; Dilke 1971: 142-149; Compatangelo 1989. Northern Africa, chiefly Tunisia and Algeria: Anonymous 1954; Chevallier 1958; Soyer 1976. Syria: Dodinet *et al.* 1990; Tate 1992: 235.

7 Note that Tongres was granted the status of *municipium* in the second century AD (see chapter 3).

8 Dilke (1971: 86) argued, for instance, that after Augustus the size of one cadastre became so standard that exceptions to it are virtually non-existent. Note that a book review of the Corpus Agrimensorum's English edition expresses the same issues and misconceptions in modern scholarship as described here (Cuomo 2002: 200-201).

Chapter Three

9 Needless to say, as the above expresses the concern about dating the Late Iron Age-Early Roman transitional phase, the precise dates mentioned here are not as precise as they seem.

10 As mentioned in chapter 2, loess was particularly susceptible to soil erosion.

11 The name 'Celtic fields' is founded in the 1920s by British archaeologists. Although we now know that these particular kind of field systems is not specific for the Celtic region, its name as a *terminus technicus* has remained to prevent confusion (Roymans 1990: 131, n. 12; Brongers 1976: 18ff.).

12 Some give a date around 31 BC (Duurland 2000: 10), while others date it around 57 BC (Hollstein 1976). Which date is correct – if they actually are correct at all – remains unknown. Maybe new light will be shed on this matter in 2008 since new excavations at the site are scheduled (T. Vanderbeken, pers. comm.).

13 The administrative organisation, however, did not extend further than the *civitas Tungrorum* with Atuatuca Tungrorum (Tongres) as the most northerly *civitas* capital. There is no evidence

that shows that the region north of the river Demer was divided officially into *civitates* during that time. The same applies to the region immediately bordering the Rhine (Slofstra 1991: 135-136). Note, too, that these new *civitates* probably do not represent the Late Iron Age *civitates*.

14 The Middle Roman development of the city of Tongres has been abundantly discussed by other scholars (see Vanvinckenroye 1985; 1994a; Nouwen 1997: 89-152).

15 Tongres' second century city wall was 4.544 m, while that of Cologne was 3.911 m. This does however not mean that Tongres was larger than Cologne, since large parts within the city walls often were left uninhabited. It, nonetheless, still suggests that Tongres might not have been inferior to cities as Cologne that were given the status of *colonia*. Note, in this respect, that there is often been thought to have been a difference between *municipia* and *coloniae* regarding their size. This, though, does not have to be the actual case, but was due to historical reasons (see Galsterer-Kroll 1973: 280).

16 The Roman villa, its origin and implications have been extensively discussed in modern scholarship. See, for instance, De Maeyer 1937; 1940; De Boe 1971b; 1973; Slofstra 1983: 84-89; 1995; Woolf 1998: 148-157; Heimberg 2003; Marzano 2007: 154-198; Terrenato 2007: 139-152.

17 In the Tongres-Maastricht area this thus far has been attested at several sites: Neerharen-Rekem (De Boe 1986); Valmeer-Meerberg (Pauwels *et al.* 2002); Vlijtingen-Keyberg/Op de Alderen Berg (M. Vanderhoeven 1978); Smeermaas-Dukatonweg (Pauwels and Creemers 2006).

18 Calculations are based on plans taken from (De Boe 1971a; 1976; Willems 1987). Note that in the case of Valmeer-Meerberg the calculation is based on only the main building, since this is the only building thus far excavated, while at both Voerendaal and Haccourt the entire villa with accompanying structures has been excavated. This may explain the size difference, yet note that at Valmeer-Meerberg no indications have been found which assume that the main building was linked to other buildings during the second century AD as happened at Voerendaal and Haccourt. Indeed, Heimberg (2003: 93-95) has shown that the size of Valmeer-Meerberg corresponds with most other *villae* in this region (52 of 80 calculated *villae*).

19 There are some objections to the method of land size calculation as stated here (see chapter 6).These objections, however, do not count for Gaitzsch's observation at the Hambacher Forst, since this is based on a large area that was entirely excavated due to mining.

20 For calculations of the land size for *villae* in the Tongres-Maastricht area, see chapter 5.

21 In chapter 6 the position of these burial mounds in the landscape in relationship to the villas will be examined. Burials, especially burial mounds, often take in an important position in the landscape and therefore seem often to be used as a demarcation of land plots (e.g. Hiddink 2003: 1-76).

22 In the past, archaeologists concentrating on the loess region focused their attention predominantly on the stone remains conforming to Roman cultural forms. As already mentioned above, this caused the neglecting of earlier occupation phases underneath Roman villas. However, as these new finds might illustrate, it also may have caused a false view of what thus far has been viewed as the 'villa landscape', since it shows that during the Middle Roman period not only villas occupied the landscape but also native-styled farmhouses. Maybe our view of the 'villa-landscape' must be transformed into one more corresponding to the one Louis (2004) proposed for the Scarpe Valley (France) during the Middle Roman period.

Chapter Four

23 Maps from earlier periods with less detail (like the famous Peutinger map) are still very helpful regarding the study of toponyms and ancient roads.

24 In the journal *Computers & Geosciences* many of these remote sensing techniques are published and their computer programs can be downloaded. Though not all are applicable to the study of Roman cadastres, for archaeologists it seems promising to keep an eye on this journal considering these techniques' usefulness.

25 Also in other regions in Northern Gaul such attempts have been made (see Vermeulen and Antrop 2001: 117-175, for attempts around Roman Cassel, i.e. Castellum Menapiorum). However, in this section, the focus lies on those regions that had a similar geographical setting as the Tongres-Maastricht area.

26 Except for Willems (1987) and Van Enckevort *et al.* (2005), it seems striking that recent syntheses on the Roman period in this region do not mention this proposal and neglect even the possibility of a cadastre. This is most notably in the study of Kooistra (1996) on the possibilities of farming in the Roman period in this region.

Chapter Five

27 There seems to be no difference in the meaning of both words. However, Belgian literature speaks of a talus, while the Dutch literature calls it an escarpment. Because the Tongres-Maastricht area is situated in Belgium, the word 'talus' will be used in this book.

28 All digital maps and aerial photographs of the Tongres-Maastricht area that are used were given with the kind permission of T. Vanderbeken (ZOLAD). The digital NGI, *Depôt de la Guerre* and Vandermaelen maps and the digital NGI aerial photographs are courtesy of GIS-Vlaanderen.

29 L. Bogaert, G. Schaepenbeek (both prov. of Limburg), T. Vanderbeken (ZOLAD), E. Meylemans and A. Vanderhoeven (both VIOE) kindly offered their help with the inventory of the archaeological sites.

30 The orientation of the linear features was calculated by each line object, i.e. 'arc'. This object can consist out of more than one segment (i.e. the line between two nodes), in the case the orientation of a talus is not fixed to a straight line (see Vermeulen and Antrop 2001: 64). In such cases where that happened, more than one line object was used to trace the talus in order to capture the different orientations of one talus.

31 Although it is the oldest topographical map, we did not make use of the Vandermaelen map (1851). The number of talus on this map was too small (n=153) compared to the total number of talus on all maps. The *Depôt de la Guerre* map on the other hand depicted enough talus (n=425).

32 Of course, we have to bear in mind that as factors as culture, cosmology and symbols change after, for example, the Roman period this also had its influence on the nature of the general orientation of houses, roads and agricultural fields. Compare, for example, agricultural fields of the Roman period with periods before (see chapter 3) or after (see Ferdière *et al.* 2006; Slicher van Bath 1963). In the course of the Roman period, of course, things would have changed also. Surveyors, for instance, probably did not survey a particular area only once during the Roman period, but several times. This has already been attested in several areas in Southern Gaul (Piganiol 1962; Clavel-Lévêque and Laubenheimer 1984).

33 The Spearman's rank correlation coefficient (r_s) is calculated by $r_s = 1 - 6\Sigma d^2 / (n^3-n)$ (see Fletcher and Lock 1991: 110-113). The correlation between the period of the archaeological features and their orientation gave $r_s = 1 - 6(96.246{,}25) / (113^3-113) = 0{,}60$. Since the number of observations is more than 100, what is the highest number shown in most significance tables, a student's *t*-test had to be used ($t = r_s / \sqrt{(1-r_s^2)} / (n-2)$) (Zar 1972: 578). This gave $t = 0{,}60 / \sqrt{(1-0{,}60^2)} / (113-2) = 0{,}0035$. This shows that there is 99,65 percent evidence for a correlation between the period of an archaeological feature in the Tongres-Maastricht area and its orientation.

34 Duurland (2000: 20) supposes that the Late Iron Age/Early Roman period would have had more settlements as thus far has been found in the Tongres-Maastricht area. According to him, it could well be around 70 to 100 settlements. However, since this is just an assumption based on other regions, it cannot be taken into account.

35 In chapter 3, this already has been pointed out in the case of the lack of material evidence for the Late Roman period.

Chapter Six

36 A *quintarius* is the name of the fifth axis counted from the main axis of a century. It was within a century the most important axis.

37 For methodological problems and more detailed information, see Hodder and Orton 1976: 226-229; Peterson 1993: 67-71; 1996.

38 This test was calculated by grouping the settlements and burials into groups of 'continuation with former period' and 'new'. In the case of burials this instigated a problem, since they are not occupied throughout a period but build only in a certain time of that period. Therefore, burials will not show any continuation with the former period, except that they still exist and may still act as visible marks in the landscape. The latter, the visibility, is an important factor when calculating the continuation of sites. Think, for example, of cultural heritage sites in our modern landscape which try to bridge the past with the modern-day landscape. Furthermore, sites related to earlier periods have also an effect on our perception of the landscape and shape our identity (e.g. Alcock 2002: 1-25). Therefore, burials that have been constructed in the period before are included in the case of 'sites with continuation', while those burials constructed in the period that is being calculated have not.

39 Heimberg lists also villa plots in the Northwestern provinces in which the land size would have been larger than 50 ha. Yet, she did not note for the possibility of other yet unidentified sites situated between these excavated villa sites. This remains a difficult factor to grasp. Gaitzsch's land sizes on the other hand are calculated in an area, the Hambacher forst, entirely excavated due to the brown coal quarries there. Therefore, these results tend to be more reliable.

40 The fact that no scholar has yet tried to investigate the possibility of a Roman cadastre in the German Rhineland seems with respect to the encountered land sizes remarkable.

Chapter Seven

41 The supposed relationship of colonialism and Roman cadastres will be explored in the conclusion.

42 Later on in time, during the reign of Vespasian, the hinterland of Corinth seems to have been newly surveyed leading to the establishment of new cadastres (see Romano 2006: 71-81; see also chapter 5).

43 However, at both sites and at the Tumulus of Berlingen a compass was found. In addition, at Berlingen also a bronze ruler has been found (De Boe 1974: p. 42, no. 113; H. Roosens 1976a: 155). Although these artefacts can be associated to other professions (blacksmith, carpenter, stone mason), it seems remarkable that all can also be attributed to land-surveyors as seen, for instance, in the Pompeian workshop (see Dilke 1971: 73).

44 If this ongoing tradition was a choice of the owners or that this was due to necessity is not clear (see below).

Chapter Eight

45 If the Romans had a deliberate, conscious policy of 'Romanizing' their subjects remains still an open question (see Woolf 1998: 22, n. 74). In the case of cadastres, it is argued that there would not have been such a deliberate policy, but rather a choice based on more economical grounds (e.g. Purcell 1990; Cuomo 2000; Alcock 2002). This, for example, can be seen in the choice for the fertile loess soil as a location for such a cadastre in the Tongres-Maastricht area.

Bibliography

Agache, R. (1978) *La Somme pre-Romaine et Romaine. d'après les prospections aériennes à basse altitude*. Memoires de la Société des Antiquaires de Picardie 24. Amiens.

Alcock, S.E. (1993) *Graecia Capta. The Landscapes of Roman Greece*. Cambridge.

(2002) *Archaeologies of the Greek Past. Landscape, Monuments, and Memories*. Cambridge.

Amand, M. and Nouwen, R. (1989) *Gallo-Romeinse tumuli in de Civitas Tungrorum*. PPGRM 40. Hasselt.

Ando, C. (2006) The Administration of the Provinces, in D.S. Potter, ed., *A Companion to the Roman Empire*. Blackwell Companions to the Ancient World. Oxford, 177-192.

Anonymous (1954) *Atlas des centuriations romaines de Tunisie*. Paris.

Anonymous (1962) *Bij de ontdekking van drie Romeinse villa's te Millen. Tastbare bewijzen aangaande een kadastrale landindeling ten tijde der Romeinen*, Belang van Limburg, 19-11-1962.

Anonymous (1998) *Opgravingen naar Romeinse villa's*, Belang van Limburg, 20-5-1998.

Anonymous (2000) *Ruilverkaveling. Veel meer dan kavels ruilen*. Brussel.

Antrop, M. (1997) The concept of traditional landscapes as a base for landscape evaluation and planning. The example of Flanders Region, *Landscape and Urban Planning* 38, 105-117.

Attolini, I., Cambi, F., Castagna, M., Celuzza, M., Fentress, E., Perkins, P. and Regoli, E. (1990) Political geography and productive geography between the valleys of the Albegna and the Fiora in northern Etruria, in G. Barker and J. Lloyd, eds., *Roman Landscapes: Field Survey in the Mediterranean*. Rome, 142-151.

Baeyens, L. (1968) *Bodemkaart van België. Verklarende tekst bij het kaartblad Bilzen 93W*. Gent.

Baillien, H. (1949) Het kasteel van Rooi en zijn bezitters, *OLL* 4, 33-44.

Bakels, C. and Jacomet, S. (2003) Access to luxury foods in Central Europe during the Roman period: the archaeobotanical evidence, *WA* 34, 542-557.

Bauwens-Lesenne, M. (1968) *Bibliografische repertorium van de oudheidkundige vondsten in Limburg, behoudens Tongeren-Koninksem (vanaf de vroegste tijden tot de Noormannen)*. Oudheidkundige Repertoria Reeks A: Bibliografische repertoria 8. Brussel.

Bayard, D. and Collart, J.-L., eds. (1996) *De la ferme indigène à la villa romaine. La romanisation des campagnes de la Gaule. Actes du deuxième colloque de l'association Ager, Amiens (23 au 25 septembre 1993)*. Revue Archéologique de Picardie Numéro Spécial 11. Amiens.

Behre, K.-E. (2000) Frühe Ackersysteme, Düngemethoden und die Entstehung der nordwestdeutschen Heiden, *Archäologisches Korrespondenzblatt* 30, 135-151.

Behrends, O. and Capogrossi Colognesi, L., eds. (1992) *Die Römische Feldmesskunst. Interdisziplinäre Beiträge zu ihrer Bedeutung für die Zivilationsgeschichte Roms*. Göttingen.

Bel, V. and Benoit, J. (1986) Les limites du cadastre B d'Orange, *Revue Archéologique de Narbonnaise* 19, 79-99.

Bellens, J. (2001) *Inventaris van de actuele toestand van de tumuli (Juli-Augustus)*. Intern rapport van Regionaal Landschap Haspengouw. Tongeren.

Bérard, F. (1999) Organisation municipale et hiérarchies sociales dans les provinces gauloises et alpines d'après la documentation épigraphique, in, *XI Congresso Internazionale di Epigrafia Greca et Latina, Roma, 18-24 settembre 1997*. Roma, 39-54.

Berendsen, H.J.A. (1998) *De vorming van het land. Inleiding in de geologie en geomorfologie. Fysische geografie van Nederland*. Assen.

Berger, J.-F. and Jung, C. (1999) Developing a Methodological Approach to the Evolution of Field Systems in the Middle Rhône Valley, in P. Leveau *et al.*, eds., *Environmental Reconstruction in Mediterranean Landscape Archaeology*. The Archaeology of Mediterranean Landscapes 2. Oxford, 155-167.

Bescoby, D.J. (2006) Detecting Roman land boundaries in aerial photographs using Radon transforms, *Journal of Archaeological Science* 33, 735-743.

Binsfeld, W. (1984) Die früheste römische Keramik aus Trier, in, *Trier: Augustusstadt der Treverer Stadt und Land in vor- und frührömischer Zeit*. Mainz am Rhein, 174-179.

Bloemers, J.H.F. (1983) Acculturation in the Rhine/Meuse basin in the Roman period: A preliminary survey, in R. Brandt and J. Slofstra, eds., 159-210.

(1990) Lower Germany: plura consilio quam vi: Proto-urban settlement developments and the integration of native society, in T.F.C. Blagg and M.J. Millett, eds., *The early Roman empire in the West*. Oxford, 72-86.

Blume, F., Lachmann, K.K.F.W. and Rudorf, A. (1848) *Die Schriften der römischen Feldmesser*. Berlin.

Bouten, W., van Eijsden, G., Imeson, A.C., Kwaad, F.J.P.M., Mücher, H.J. and Tiktak, A. (1985) Ontstaan en erosie van de lössleemgronden in Zuid-Limburg, *KNAG Geografisch Tijdschrift* 19, 192-208.

Bradford, J.D. (1957) *Ancient Landscapes. Studies in Field Archaeology*. London.

Brandt, R. and Slofstra, J., eds. (1983) *Roman and Native in the Low Countries. Spheres of interaction*. BARIS 184. Oxford.

Breteler, H.G.M. and van den Broek, J.M.M. (1968) Graften in Zuid-Limburg, *Boor en spade* 16, 119-130.

Broadhead, W. (2007) Colonization, Land Distribution and Veteran Settlement, in P. Erdkamp, ed., *A Companion to the Roman Army*. Blackwell Companions to the Ancient World. Malden, 148-163.

Brongers, J.A. (1976) *Air photography and celtic field research in the Netherlands*. Nederlandse Oudheden 6. Amersfoort.

Brongers, J.A. and Woltering, P.J. (1978) *De prehistorie van Nederland. Economisch technologisch*. Haarlem.

Brun, P. (1995) From chiefdom to state. organization in Celtic Europe, in B. Arnold and D.B. Gibson, eds., *Celtic chiefdom, Celtic state*. New Directions in Archaeology. Cambridge, 13-25.

Brunaux, J.L. (1986) *Les Gaulois. Santuaires et rites*. Collection des Hésperides. Paris.

Brunaux, J.L., Fichtl, S. and Marchand, C. (1990) Die ausgrabungen am Haupttor des «Camp César» bei La Chaussée-Tirancourt (Dép. Somme, Frankreich), *Saalburg Jahrbuch* 45, 5-23.

Buchsenschutz, O. (1988) *Levroux: L'evolution du Canton de Levroux d'apres les prospections et les sondages archeologiques*. Levroux.

Buikstra, J.E. and Charles, D.K. (1999) Centering the Ancestors: Cemeteries, Mounds, and Sacred Landscapes of the Ancient North American Midcontinent, in W. Ashmore and A.B. Knapp, eds., *Archaeologies of Landscape. Contemporary Perspective*. Malden, 201-228.

Campbell, B. (1995) Sharing Out Land: Two Passages in the Corpus Agrimensorum Romanorum, *Classical Quarterly* 45, 540-546.

(1996) Shaping the Rural Environment: Surveyors in Ancient Rome, *JRS* 86, 74-99.

(2000) *The writings of the Roman Land Surveyors. Introduction, Text, Translation and Commentary*. Journal of Roman Studies Monograph 9. London.

Capenberghs, J. (1985) *De begraafplaatsen uit de Romeinse tijd in het Limburgse Haspengouw. Een topografische, chronologische en methodologische studie*. Unpublished M.A. thesis. Leuven.

Caravello, G.U. and Michieletto, P. (1999) Cultural Landscape: trace Yesterday, Presence Today, Perspective Tomorrow For "Roman Centuriation" in Rural Venetian Territory, *Human Ecology Review* 6, 45-50.

Carroll, M. (2001) *Romans, Celts & Germans. The German Provinces of Rome*. Stroud.

Castagnoli, F. (1958) *Le ricerche sui resti della centuriazione*. Note e discussioni erudite 7. Roma.

Chevallier, R. (1958) Essai de Chronologie des centuriations romaines de Tunisie, *MEFRA* 52, 61-128.

(1961) La centuriazione romana dell'Istria e della Dalmazia, *Atti e memorie dalla Societá istriana di archeologia e storia patria* 9, 11-23.

(2001) À la recherche des anciennes limites, L'exemple de la Gaule, in M. Lodewijckx, ed., *Belgian archaeology in a European setting II*. AAL 12. Leuven, 13-21.

Chevallier, R., Fontanel, A., Grau, G. and Guy, M. (1970) Aplication of Optical Filtering to the study of Aerial Photographs, *Photogrammetria* 26, 17-35.

Chouquer, G. (1981) Les centuriations de Romagne orientale. Etude morphologique, *MEFRA* 93, 823-868.

(1983a) Localisation et extension géographique des cadastres affichés à Orange, in M. Clavel-Lévêque, ed., 275-296.

(1983b) Photographie aérienne et épigraphie: le cadastre A affiché à Orange (France), *Photo-interpretation* 15, 1-7.

(1985) Traitements d'images et paysages médiévaux, *Archéologie Médiévale* 15, 7-30.

ed. (1987) *Structures agraires en Italie centro-méridionale cadastres et paysages ruraux*. Collection de l'Ecole française de Rome 100. Rome.

(1989) La Klee des champs: Structures mentales et histoire des paysages, in M.-M. Mactoux and E. Geny, eds., *Mélanges P Lévêque, vol 2*. Annales Litteraires de l'université de Besançon 377. Paris, 95-135.

(1996a) Introduction, in G. Chouquer, ed., *Les formes du paysage Tome 1 - Etudes sur les parcellaires*. Paris, 7-10.

ed. (1996b) *Les formes du paysage. Tome 1 - Etudes sur les parcellaires*. Paris.

Chouquer, G. and De Klijn, H. (1989) Le Finage antique et médiéval, *Gallia* 46, 261-299.

Chouquer, G. and Favory, F. (1980) *Contribution à la recherche des cadastres antiques*. Annales littéraires de l'Université de Besançon 236. Paris.

(1991) *Les paysages de l'Antiquité. Terres et cadastres de l'Occident romain (IV^e s. avant J.-C. / III^e s. après J.-C.)*. Collection des Hespérides. Paris.

(1992) *Les arpenteurs romains. Théorie et pratique*. Archéologie d'aujourd'hui. Paris.

(2001) *L'arpentage romain histoire des textes, droit, techniques*. Paris.

Claassen, A. (1964) Romeins te Hoeselt, *Limburg* 43, 249.

(1965) De vondsten van Eigenbilzen, *Limburg* 44, 98-125.

(1970) *Van mottoren tot kasteel*. PPGRM 14. Tongeren.

(1973) Romeinse vondsten in de Limburgse Maasvallei, *OLL* 28, 9-23.
Clavel-Lévêque, M., ed. (1983a) *Cadastres et Espace Rural. Approches et réalités antiques (table ronde de Besançon mai 1980)*. Paris.
(1983b) Cadastres, Centuriations et problèmes d'occupation du sol dans le Bitterrois, in M. Clavel-Lévêque, ed., 207-258.
(1988) Résistance, révoltes et cadastres: problemes du contrôle de la terre en Gaule transalpine, in T. Yuge and M. Doi, eds., *Forms of Control and Subordination in Antiquity*. Leiden/New York, 177-208.
(1989) *Puzzle gaulois: les Gaules en mémoire*. Paris.
(1993) Un plan cadastral à l'echelle. La forma de Lacimurga, *Estudios de la Antigüedad* 6/7, 175-182.
Clavel-Lévêque, M. and Laubenheimer, F. (1984) Cadastres et ateliers d'amphores en Languedoc méditerranéan, in, *Actes du LVIIe Congrès de la Fédération historique du Languedoc méditerranéen et du Rousillon*. Beziers.
Clavel-Lévêque, M. and Orejas, A., eds. (2002) *Atlas Historique des cadastres d'Europe II*. Action COST G2 «Paysages anciens et structures rurales». Bruxelles.
Clavel-Lévêque, M., Vassilopoulos, A., Evelpidou, N. and Tirologos, G. (2000) An Example from Béziers to Demonstrate a GIS-based Methodology on Selecting Possible Roman Cadastre Grids, in F. Vermeulen and M. De Dapper, eds., 15-22.
Close, F. (1997a) D'occupation romaine á Bassenge, in J.-P. Lensen, ed., *Richesses archéologiques de la Basse-Meuse Liégeoise*. Visé, 30-40.
(1997b) D'occupation romaine á Eben-Emael, in J.-P. Lensen, ed., *Richesses archéologiques de la Basse-Meuse Liégeoise*. Visé, 50-60.
(1997c) D'occupation romaine á Wonck, in J.-P. Lensen, ed., *Richesses archéologiques de la Basse-Meuse Liégeoise*. Visé, 110-120.
Close, F. and Marcolungo, D. (1985a) Le cimetière gallo-romain d'Eben, «Sur les jardins», *Vie Archéologique* 17, 101-201.
(1985b) Vestiges d'occupation romaine à Eben «Sol'Pireu», *Vie Archéologique* 17, 28-98.
(1986) Traces d'occupation romaine à Wonk Basse-Cour, *SOS Fouilles* 4, 45-52.
Coenen, A. (1989) *Het kasteel van Schalkhoven, de geschiedenis van Schalkhoven in een notedop*. Hoeselt.
Coenen, J. (1944) Het slot Pietersheim, *Limburg* 25, 14-27, 29-37.
(1946) Het kasteel en de ruïne van Hocht, *Limburg* 26, 147-158.
(1948) Het kasteel Daalbroek, *Limburg* 27, 190-195.
Compatangelo, R. (1989) *Un Cadastre de Pierre le Salento Romain. Paysage et structures agraires*. Centre de Recherches d'Histoire Ancienne 90. Paris.
Creemers, G. (1991) *Gallo-Romeinse vondsten in prive-bezit*. Tongeren.
(2006) Hoeselt: romeins bronzen laarsje, in G. Creemers and A. Vanderhoeven, eds., Archeologische kroniek Limburg 2001, *Limburg - OLL* 85, 34-39.
Creemers, G. and Vanderhoeven, A. (2005) Archeologische kroniek van Limburg 2000, *Limburg - OLL* 84, 339-356.
Cuomo, S. (2000) Divide and Rule: Frontinus and Roman Land-Surveying, *Studies in History and Philosophy of Science* 31, 189-202.
(2002) Review of Campbell, B. 2000. The Writings of the Roman Land Surveyors. Introduction, Text, Translation and Commentary, *JRS* 92, 200-201.
De Beenhouwer, J. (1991) Roman terracotta statuettes from a closed find at Tongeren and their relation to the Köln, Trier and Central-Rhine production centres, *AAL* 30, 61-93.
De Boe, G. (1971a) *De Romeinse villa op de Meerberg te Val-Meer*. AAL 4. Leuven.
(1971b) *De stand van het onderzoek der Romeinse villa's in België*. AB 132. Brussel.
(1973) De landelijke bewoning in de Romeinse tijd, *OLL* 28, 85-114.

(1974) *Haccourt I. Vestiges d'habitat pré-romain et premières périodes de la villa romaine*. AB 168. Brussel.
(1976) *Haccourt III. Les bains de la grande villa*. AB 182. Brussel.
(1981a) Noodopgravingen te Neerharen (Belgisch Limburg), *Archeologie in Limburg* 12, 5-7.
(1981b) Romeinse grafvondsten te Opgrimbie, in, *Conspectus MCMLXXX*. AB 238. Brussel, 42-46.
(1982) Meer dan 1500 jaar bewoning rond de Romeinse villa te Neerharen-Rekem, in, *Conspectus MCMLXXXI*. AB 247. Brussel, 71-74.
(1983) De Laat-Romeinse "Germaanse" nederzetting te Neerharen-Rekem, in, *Conspectus MCMLXXXII*. AB 253. Brussel, 70-73.
(1985) De opgravingscampagne 1984 te Neerharen-Rekem, *AB* 1, 53-62.
(1986) De opgravingscampagne 1985 te Neerharen-Rekem, *AB* 2, 23-26.
(1987) Bewoning rond de villa te Neerharen-Rekem (B), in P. Stuart and M.E.T. De Grooth, eds., 51-54.
(1988) De inheems-Romeinse houtbouw in de Antwerpse Kempen, in F. Brenders and G. Cuyt, eds., *Van beschaving tot opgraving 25 jaar archeologisch onderzoek rond Antwerpen*. Antwerpen, 47-62.
(1989) Onder Romeinse heerschappij, in M. Gorissen and B. Roosens, eds., *Bodemschatten Archeologisch onderzoek in Groot-Bilzen van de bandceramiek tot de Merovingers*. Bilzen, 39-49.
De Boe, G. and Van Impe, L. (1979) *Nederzetting uit de IJzertijd en de Romeinse villa te Rosmeer*. AB 216. Brussel.
De Maeyer, R. (1937) *De Romeinsche Villa's in België. Een archeologische studie*. Antwerpen.
(1940) *De overblijfselen der Romeinsche villa's in België. De archeologische inventaris, eerste deel*. Antwerpen.
De Poorter, A. and Claeys, P. (1989) *Les sigles sur matériaux de construction romains en terre cuite en Belgique*. AAL 1. Leuven.
Defize-Lejeune, A.M. (1964) *Répertoire bibliographique des trouvailles archéologiques de la province de Liège (depuis l'âge du bronze jusqu'aux Normands*. Répertoires archéologiques Série A: répertoires bibliographiques 5. Bruxelles.
Derks, T. (1998) *Gods, Temples and Ritual Practices. The transformation of religious ideas and values in Roman Gaul*. AAS 2. Amsterdam.
Dijkstra, Y. (1997) *Aanvullend Archeologisch Onderzoek (AAO), vindplaats Kerkrade-Winckelen, verkaveling Maar-West*. Rapportage Archeologische Monumentenzorg 51. Amersfoort.
Dilke, O.A.W. (1971) *The Roman Land Surveyors. An Introduction to the Agrimensores*. London.
Dodinet, M., Leblanc, J., Vallat, J.-P. and Villeneuve, F. (1990) Le paysage antique en Syrie: l'exemple de Damas, *Syria* 67, 339-367.
van Doorselaer, A. (1964) *Repertorium van de Begraafplaatsen uit de Romeinse tijd in Noord-Gallië. I. België*. Brussel.
Driesen, P. and Borgers, K. (2006) *Rapport 13. Archeologisch onderzoek aan de Onderwijsstraat te Munsterbilzen (gem. Bilzen), in opdracht van P&A Construct nv*. Sint-Truiden.
Drinkwater, J.D. (1983) *Roman Gaul. The three provinces, 58 BC–AD 260*. London.
Dudal, R. and Baeyens, L. (1957) *Bodemkaart van België. Verklarende tekst bij het kaartblad Tongeren 107W*. Gent.
(1958) *Bodemkaart van België. Verklarende tekst bij het kaartblad Herderen 107E*. Gent.
Duurland, M. (2000) *Romeinse vindplaatsen in het landelijke gebied tussen Tongeren en Maastricht. Een inventarisatie en periodisering*. Unpublished M.A. Thesis. Amsterdam.

Dyson, S.L. (1975) Native revolt patterns in the western Empire, *ANRW* II.3, 138-175.
Eckholdt, M. (1980) *Schiffahrt auf kleinen Flüssen Mitteleuropas in Römerzeit und Mittelalter*. München.
Edelman, C.H. and Eeuwens, B.E.P. (1959) Sporen van een Romeinse landindeling in Zuid-Limburg, *Berichten van de ROB* 9, 49-56.
Eerman, H. (2002) *IJzertijdceramiek van 2 Distrigas-sites in Zuid-Limburg (Lafelt en Valmeer)*. Unpublished M.A. Thesis. Leuven.
van Enckevort, H., de Groot, T., Hiddink, H.A. and Vos, W. (2005) *De Romeinse tijd in het Midden-Nederlandse rivierengebied en het Zuid-Nederlands dekzand- en lössgebied*. NOaA hoofdstuk 18 (versie 1.0), (www.noaa.nl).
Faider-Feytmans, G. (1956) Tongres, *L'Antiquité Classique* 25, 136.
Favory, F. (1980) Détection des cadastres antiques par filtrage optique: Gaule et Campanie, *MEFRA* 92, 347-386.
(1983) Propositions pour une modélisation des cadastres ruraux antiques, in M. Clavel-Lévêque, ed., 51-135.
Ferdière, A. (2004) Indigènes et «romanisation» à travers la tombe privilégiée en Gaule, *Latomus* 63, 35-57.
Ferdière, A., Malrain, F., Matterne, V., Méniel, P. and Jaubert, A.N. (2006) *Histoire de l'agriculture en Gaule. 500 av. J.-C. - 1000 apr. J.-C.* Paris.
Fletcher, M. and Lock, G.R. (1991) *Digging Numbers. Elementary Statistics for Archaeologists*. Oxford University Committee for Archaeology 33. Oxford.
Fulford, M.G. (1985) Roman material in barbarian society c.200 B.C.-c.A.D. 400, in T.C. Champion and J.V.S. Megaw, eds., *Settlement and Society: aspects of West European prehistory in the first millenium BC*. Leicester, 91-108.
Gaitzsch, W. (1986) Grundformen römischer Landsiedlungen im Westen der CCAA, *BJ* 186, 397-427.
Galsterer-Kroll, B. (1973) Zum ius Latii in den Keltischen Provinzen des Imperium Romanum, *Chiron* 3, 277-306.
Gechter, M. and Kunow, J. (1986) Zur ländlichen Besiedlung des Rheinlandes in römischer Zeit, *BJ* 186, 377-396.
Genicot, L.F., ed. (1976) *Het groot kastelenboek van België. Kastelen en buitenplaatsen*. Brusse.
Gerritsen, F.A. (2003) *Local identities: Landscape and community in the late prehistoric Meuse-Demer-Scheldt region*. AAS 9. Amsterdam.
Given, M. (2004) *The Archaeology of the Colonized*. London.
Göbel, J. (1992) Ein Blick in die Eisenzeit. Das Modell der spätlatènezeitlichen befestigten Siedlung Niederzier, in, *Spurensicherung Archäologische Denkmalpflege in der Euregio Maas-Rhein*. Mainz am Rhein, 438-446.
Gorissen, M. and Roosens, B., eds. (1989) *Bodemschatten. Archeologisch onderzoek in Groot-Bulzen van de bandceramiek tot de Merovingers*. Bilzen.
Gosden, C. (2004) *Archaeology and Colonialism. Cultural contact from 5000 BC to the present*. Topics in contemporary archaeology 2. Cambridge.
Haase, D., Fink, J., Haase, G., Ruske, R., Pecsi, M., Richter, H., Altermann, M. and Jäger, K.D. (2007) Loess in Europe - its spatial distribution based on a European Loess Map, scale 1:2,500,000, *Quaternary Science Reviews* 26, 1301-1312.
Hachmann, R., Kossack, G. and Kuhn, H. (1962) *Völker zwischen Germanen und Kelten*. Neumünster.
Hart, J.F. (1998) *The Rural Landscape*. Baltimore.
Haselgrove, C.C. (1995) Social and Symbolic order in the origins and layout of Roman villas, in J. Metzler *et al.*, eds., *Integration in the Early Roman West. The role of Culture and Ideology*. Dossiers d'Archéologie du Musée National d'Histoire et d'Art 4. Luxembourg, 65-76.

(1996) Roman impact on rural settlement in southern Picardy, in N. Roymans, ed., *From the Sword to the Plough Three studies on the earliest Romanisation of Northern Gaul*. AAS 1. Amsterdam, 127-188.

Heeren, A.M. (1976) *De topografie van de noordelijke Maasvallei in de Romeinse tijd*. Unpublished M.A. Thesis. Leuven.

Heimberg, U. (2003) Römische Villen an Rhein und Maas, *BJ* 203, 57-148.

Heymans, H. (1977) *De topografie van de Merovingische grafvelden in Belgisch-Limburg en Maastricht*. Unpublished M.A. Thesis. Leuven.

Hiddink, H.A. (2003) *Het grafritueel in de Late IJzertijd en Romeinse tijd in het Maas-Demer-Scheldegebied, in het bijzonder van twee grafvelden bij Weert*. Zuidnederlandse Archeologische Rapporten 11. Amsterdam.

Hingley, R. (1984) The Archaeology of Settlement and the Social Significance of Space, *SAR* 3, 22-27.

(1990) Boundaries surrounding Iron Age and Romano-British Settlements, *SAR* 7, 96-103.

Hinrichs, F.T. (1974) *Die Geschichte der gromatischen Institutionen*. Wiesbaden.

Hinz, H. (1972) Die Landwirtschaft im römischen Rheinland, *Rheinsches Vierteljahresblatt* 36, 1-27.

Hodder, I. and Orton, C. (1976) *Spatial analysis on archaeology*. New studies in archaeology 1. Cambridge.

Hollstein, E. (1976) Dendrochronologische datierung von Hölzern aus der wallanlage von Kanne, Caster, in, *Conspectus MCMLXXV*. AB 186. Brussel, 59-61.

Hombroux, C. (1982) De muntschat van Riemst: antoniniani van Gordianus III tot Postumus, *Limburg* 61, 112-122.

Huybrigts, F. (1904) Etude comparative des Occupations Romaines et Franques de la Hesbaye et des contrées au Sud de la Meuse et de la Sambre dans la province de Namur et dans le Hainaut, *Bulletin de la Société Scientifique et Littéraire du Limbourg* 22, 17-41, 279-316.

(1905) Trouvaille de Monnaies, *Bulletin de la Société Scientifique et Littéraire du Limbourg* 23, 307-320.

Huygen, C.A. (1960) Romeinse landindeling en Romeinse wegen in Zuid Limburg, *Der Bronk* 7, 353-355.

In 't Ven, I. and De Clercq, W., eds. (2005) *Een lijn door het landschap. Archeologie en het VTN-project 1997-1998*. Archeologie in Vlaanderen Monografie 5. Brussel.

Ingold, T. (1993) The temporality of the landscape, *WA* 25, 152-174.

Isaac, B. (1988) The meaning of the Terms Limes and Limitanei, *JRS* 78, 125-147.

Janssen, L. (1978) Sporen van Romeinse bewoning langs de oude Maasbedding te Rekem, *Limburg* 57, 62-76.

Janssen, L. and Vanderhoeven, M. (1962) De Archeologische verzameling Smeets uit Rekem, *Limburg* 41, 123-132.

Janssens, D. (1977) *Een Gallo-Romeins grafveld te Maaseik*. AB 198. Brussel.

Joachim, H.-E. (1980) Jüngerlatènezeitliche Siedlungen bei Eschweiler, Kr. Aachen, *BJ* 180, 355-441.

(1982) Ländliche Siedlungen der vorrömischen Eisenzeit im rheinischen Raum, *Offa* 39.

Jones, M. (1989) Agriculture in Roman Britain: The Dynamics of Change, in M. Todd, ed., *Research on Roman Britain: 1960-89*. Britannia monograph 11. London, 127-134.

Kealhofer, L. (1999) Creating Social Identity in the Landscape: Tidewater, Virginia, 1600-1750, in W. Ashmore and A.B. Knapp, eds., *Archaeologies of Landscape: Contemporary Perspectives*. Malden, 58-82.

King, A. (1990) *Roman Gaul and Germany*. London.

Klinkenberg, J. (1936) Die Stadtanlage der römischen Köln und die Limitation des Ubierlandes, *BJ* 140-141, 259-298.

Knaepen, E. (2001) *De landelijke bewoning in de Gallo-Romeinse periode in Zuid-Limburgs Haspengouw*. Unpublished M.A. thesis. Leuven.

Knapp, A.B. and Ashmore, W. (1999) Archaeological Landscapes: Constructed, Conceptualized, Ideational, in W. Ashmore and A.B. Knapp, eds., *Archaeologies of Landscape: Contemporary Perspectives*. Malden, 1-30.

Knörzer, K.-H. (1980) Subfossile Pflanzenreste aus der jünglatènezeitlichen Siedlung bei Laurenzberg, Gem Eschweiler, Kr. Aachen, *BJ* 180, 441-457.

Kolen, J. (1995) Recreating (in) nature, visiting history, *AD* 2, 127-159.

(2005) *De Biografie van het Landschap. Drie Essays over Landschap, Geschiedenis en Erfgoed*. Unpublished Ph.D. thesis. Amsterdam.

van de Konijnenburg, R. (1985) Het kasteel d'Aspremont-Lynden te Rekem, *AB* 1, 99-102.

(1986) Het kasteel d'Aspremont - Lynden te Rekem (gem. Lanaken), *AB* 2, 117-120.

(1987) Het kasteel d'Aspremont - Lynden te Rekem (gem. Lanaken). Interimverslag 1986, *AB* 3, 237-239.

Kooistra, L.I. (1996) *Borderland farming. Possibilities and limitations of farming in the Roman Period and Early Middle Ages between the Rhine and Meuse*. Assen.

Kopytoff, I. (1986) The cultural biography of things: commoditization as process, in A. Appadurai, ed., *The social life of things Commodities in cultural perspective*. Cambridge, 64-91.

Kreuz, A. (1999) Becoming a Roman farmer: preliminary report on the environmental evidence from the Romanization project, in J.D. Creighton and R.J.A. Wilson, eds., *Roman Germany. Studies in cultural interaction*. JRA Supplement 32. Portsmouth, 71-98.

Lambert, A.M. (1971) *The Making of the Dutch Landscape*. London.

Le Gall, J. (1975) Les Romains et l'orientation solaire, *MEFRA* 87, 287-320.

Lebret, P. and Lautridou, J.-P. (1991) The Loess of West Europe, *GeoJournal* 24, 151-156.

van der Leeuw, S., Favory, F. and Fiches, J.-L. (2003) *Archéologie et systèmes socio-environnementaux. Études multiscalaires sur la vallée du Rhône dans le programme ARCHAEOMEDES*. CRA monographies 27. Paris.

Legros, R. (1970) Structures agraires gallo-romaines près de Reims, *Photo-Interpretation* 2, 38-42.

Lemaire, T. (1997) Archaeology between the invention and the destruction of the landscape, *AD* 4, 5-21.

Lenz, K.H. (1998) Villae Rusticae: Zur Entstehung dieser Siedlungsform in den Nordwestprovinzen des römischen Reiches, *KJ* 31, 49-70.

(1999) *Siedlungen der Römischen Kaiserzeit auf der Aldenhover Platte*. Rheinsche Ausgrabungen 45. Köln.

(2006) Veteranen der römischen Armee im Siedlungsbild einer früh- und mittelkaiserzeitlichen Koloniestadt und deren Hinterland. Das Beispiel der *Colonia Claudia Ara Agrippinensium* (Köln), *Germania* 84, 61-91.

Lewit, T. (2003) 'Vanishing villas': what happened to élite rural habitation in the West in the 5th-6th c?, *JRA* 16, 260-274.

Lodewijckx, M. (1976) *De La Tène periode in het gebied tussen Dijle, Demer en Maas*. Unpublished M.A. thesis. Leuven.

Louis, E. (2004) A De-romanised Landscape in Northern Gaul: The Scarpe Valley from the 4th to the 9th century A.D, in W. Bowden *et al.*, eds., *Recent Research on the Late Antique Countryside*. Late Antique Archaeology 2. Leiden, 479-504.

Lux, G.V. (1957) De vroegste geschiedenis van Rosmeer, *OLL* 22, 19.
(1970) De Romeinse overblijfselen tussen Tongeren en Maastricht, in H. Roosens and G.V. Lux, eds., *Een Gallo-Romeinse tumulus te Eben-Emael-Kanne*. AB 121. Brussel, 21-28.
Lux, G.V. and Roosens, H. (1972) *Een ronde hut uit de IJzertijd en andere vondsten te Grote Spouwen (Gem. Spouwen)*. AB 141. Brussel.
Lux, G.V. and Thyssen, W. (1977) Oudheidkundig bodemonderzoek te Alden Biesen, in, *Conspectus MCMLXXVI*. AB 196. Brussel, 107-110.
(1978) De voormalige kerk van Alden-Biesen, in, *Conspectus MCMLXXVII*. AB 206. Brussel, 119-121.
(1979) De voormalige kerk van Alden-Biesen, in, *Conspectus MCMLXXVIII*. AB 213. Brussel, 164-167.
(1980a) De grondvesten van de burcht te Borgloon, in, *Conspectus MCMLXXIX*. AB 223. Brussel, 98-101.
(1980b) De voormailge kerk van Alden-Biesen, in, *Conspectus MCMLXXIX*. AB 223. Brussel, 123-127.
Marzano, A. (2007) *Roman Villas in Central Italy. A Social and Economic History*. Columbia Studies in the Classical Tradition. Leiden.
Massart, C. (1994) *De bewaarde Gallo-Romeinse tumuli van Haspengouw*. Musées royaux d'art et d'histoire 9. Brussel.
(2007) Caractérisation des tumulus gallo-romains de Hesbaye (cité des Tongres); structures architecturales, funéraires et rituelles, *Latomus* 66, 41-66.
Mattingly, D.J. (2006a) The Imperial Economy, in D.S. Potter, ed., *A Companion to the Roman World*. Blackwell Companions to the Ancient World. Oxford, 283-297.
(2006b) *An Imperial Possession: Britain in the Roman Empire, 54 BC - AD 409*. The Penguin history of Britain 1. London.
Melard, L. (1986) Millen. Van natuurlandschap tot cultuurlandschap, *Volkskunde* 87, 262-345.
Mertens, J.R. (1954) Membruggen (Germania Inferior, Belgium: Limbourg), *Fasti Archaeologici* 7, 352.
(1958) Sporen van een Romeins kadaster in Limburg?, *Limburg* 37, 253-260.
(1964) *Enkele beschouwingen over Limburg in de Romeinse tijd*. AB 75. Brussel.
(1983) Quelques aspects chronologiques du reseauroutier Romain en Belgique, *Caesarodunum* 18, 329-337.
(1987) De weg Boulogne-Keulen op Belgisch grondgebied, in P. Stuart and M.E.T. De Grooth, eds., 16-21.
Mertens, J.R. and Vanvinckenroye, W. (1975) *Een Romeins gebouwencomplex extra-muros te Tongeren*. AB 180. Brussel.
Metzler, J. (1984) Das treverische Oppidum auf dem Titelberg (Luxemburg), in, *Trier: Augustusstadt der Treverer Stadt und Land in vor- und frührömischer Zeit*. Mainz am Rhein, 68-78.
Milikowski, E. (1985) Archeologische luchtkartering van het gebied Eersel-Riethoven-Bergeijk, in J. Slofstra *et al.*, eds., *Het Kempenproject 2. Een regionaal-archeologisch onderzoek in uitvoering*. Bijdragen tot de studie van het Brabantse Heem 27. Waalre, 79-85.
Millett, M.J. (1990) *The Romanization of Britain. An essay in archaeological interpretation*. Cambridge.
Mücher, H.J. (1973) Enkele aspekten van de loess en zijn noordelijke begrenzing, in het bijzonder in Belgisch en Nederlands Limburg en in het daaraangrenzende gebied in Duitsland, *KNAG Geografisch Tijdschrift* 7, 259-276.
Müller-Wille, M. (1970) Die landwirtschaftliche Grundlage der Villae Rusticae, *Gymnasium Beihefte* 7, 26-42.

(1979) Flursysteme der Bronze- und Eisenzeit in den Nordseegebieten, in H. Beck *et al.*, eds., *Untersuchungen zur eisenzeitlichen und frühmittelalterlichen Flur in Mitteleuropa und ihrer Nutzung*. Abhandlungen der Akademie der Wissenschaften in Göttingen, Phil.-Hist. Klasse, Folge 3, nr. 115. Göttingen, 196-239.

Nales, T. and Bink, M. (2005) *Tongeren Plangebied De Locht-Hasseltsesteenweg-Mulkerweg, fase 1*. 's-Hertogenbosch.

Nash, D. (1976) The growth of urban society in France, in B. Cunliffe and T. Rowley, eds., *Oppida in Barbarian Europe. Papers presented to a Conference at Oxford, October 1975*. BAR Supplementary Series II. Oxford, 95-134.

Nouwen, R. (1991) Oude collectiestukken van het Provinciaal Gallo-Romeins Museum in een nieuw licht. Het zogenaamde Junobeeld van Tongeren, *Limburg* 70, 13-18.

(1997) *Tongeren en het land van de Tungri (31 v.Chr. – 284 n.Chr.)*. Maaslandse Monografiën 59. Leeuwarden.

Opsteyn, L. and Lodewijckx, M. (2001) Wange-Damekot revisited. New perspectives in Roman habitation history, in M. Lodewijckx, ed., *Belgian archaeology in a European setting II*. AAL 13. Leuven, 217-230.

Palet Martínez, J.M. (2005) Apports de l'archéologie du paysage à l'étude des systèmes agropécuaires anciens, *Cahier de recherches de l'Institut de la papyrologie et égyptologie de Lille* 25, 329-348.

Pals, J.P. and Hakbijl, T. (1992) Weed and insect infestication of a grain cargo in a ship at the Roman fort of Laurium in Woerden (Province of Zuid-Holland), *Review of Palaeobotany and Palynology* 73, 287-300.

Panhuysen, T.A.S.M. (1996) *Romeins Maastricht en zijn beelden*. Assen.

Parker Pearson, M. (1999) *The Archaeology of Death and Burial*. Stroud.

Parker Pearson, M. and Richards, C. (1993) Architecture and order: spatial representation and archaeology, in M. Parker Pearson and C. Richards, eds., *Architecture and order: approaches to social space*. London, 38-72.

Paulissen, E. (1973) Het landschap van de Romeinse Maasvallei in Belgisch Limburg, *OLL* 28, 25-55.

Pauwels, D. and Creemers, G. (2006) Een Romeinse landelijke nederzetting te Smeermaas (Lanaken, prov. Limburg), *Relicta* 2, 49-118.

Pauwels, D., Vanderhoeven, A. and Vynckier, G. (2000) Een streep Ijzertijd tussen Tongeren en Maastricht: Distrigas in zuid-Limburg, *Lunula Archaeologia Protohistorica* VIII, 48.

(2002) Val-Meer (Riemst): sporen uit de IJzertijd, Romeinse nederzetting en laatromeinse graven op het Distrigas-traject, in G. Creemers and A. Vanderhoeven, eds., Archeologische kroniek van Limburg 1999, *Limburg - OLL* 81, 310-313.

Pauwels, D., Vanderhoeven, A., Vynckier, G. and Wesemael, E. (2003) Een inheems-Romeinse nederzetting te Veldwezelt (L.), in M. Lodewijckx, ed., *Romeinendag - Journée d'archéologie romaine Leuven - 8-2-2003*. Leuven, 59-60.

Peterson, J.W.M. (1992a) Computer-aided projection of part of the Orange B cadastre to the Cèze valley, *Dialogues d'Histoire Ancienne* 18, 169-176.

(1992b) Fourier analysis of field boundaries, in G. Lock and J. Moffett, eds., *CAA91: Computer Applications and Quantative Methods in Archaeology 1991*. BAR International Series S577. Oxford, 149-156.

(1993) *Computer-aided investigation of ancient cadastres*. Unpublished Ph.D. thesis. Norwich.

(1996) A computer model of Roman landscape in South Limburg, in H. Kamermans and K. Fennema, eds., *Interfacing the Past Computer Applications and Quantitative Methods in Archaeology CAA 1995*. Analecta Praehistorica Leidensia 28. Leiden, 185-194.

Peuskens, N. (1974) Bilan de 15 ans de recherches et fouilles dans la région Basse-Meuse

Bas-Geer, in, *Handelingen van het archeologisch congres, gehouden te Tongeren van 11 tot 14 november 1971*. PPGRM 19. Hasselt.

Piganiol, A. (1962) *Les documents cadastraux de la colonie romaine d'Orange*. 16e supplément à Gallia. Paris.

Popper, K.R. (1972) *Conjectures and Refutations*. London: Routledge/Kegan Paul.

Potter, T.W. (1987) *Roman Italy*. London.

Purcell, N. (1990) The Creation of Provincial Landscape: the Roman Impact on Cisalpine Gaul, in T.F.C. Blagg and M.J. Millett, eds., *The early Roman empire in the West*. Oxford, 6-29.

Quilici, L. (1974) *Collatia*. Forma Italiae, Regio I, volumen 10. Roma.

Rackham, O. (1986) *The history of the countryside*. London.

Raepsaet-Charlier, M.-T. (1995) Municipium Tungrorum, *Latomus* 54, 361-369.

(1999) Les institutions municipales dans les Germanies sous le Haut Empire: bilan et questions, in M. Dondin-Payre and M.-T. Raepsaet-Charlier, eds., *Cités, municipes, colonies Les processus de municipalisation en Gaule et en Germanie sous le Haut Empire romain*. Paris, 271-352.

(2003) Vielfalt und kultureller Reichtum in den civitates Niedergermaniens, *BJ* 203, 35-56.

Raepsaet, G. (1977) Quelques aspects de la division du sol en Pays Tongres, in D. Haupt and H.G. Horn, eds., *Studien zu den Militärgrenzen Roms II*. Beiheft der BJ 38. Köln, 147-157.

Remouchamps, A.E. (1925) Opgraving van een Romeinsche villa in het Ravensbosch (L.), *Oudheidkundige Mededelingen van het Rijksmuseum van Oudheden te Leiden* 6, 40-77.

Renes, J. (1988) *De Geschiedenis van het Zuidlimburgse Cultuurlandschap*. Maaslandse Monografieën 6. Assen.

Rizakis, A. (1996) Les colonies Romaines des côtes occidentales Grecques. Populations et territoires, *Dialogues d'Histoire Ancienne* 22, 255-324.

Romano, D.G. (2006) Roman Surveyors in Corinth, *Proceedings of the American Philosophical Society* 150, 62-85.

Romano, D.G. and Tolba, O. (1995) Remote Sensing, GIS and Electronic Surveying: Reconstructing the City Plan and Landscape of Roman Corinth, in J. Huggett and N. Ryan, eds., *CAA94: Computer Applications and Quantitative Methods in Archaeology 1994*. BARIS 600. Oxford, 163-174.

Rommens, T., Verstraeten, G., Poesen, J., Govers, G., Van Rompaey, A., Peeters, I. and Lang, A. (2005) Soil erosion and sediment deposition in the Belgian loess belt during the Holocene: establishing a sediment budget for a small agricultural catchment, *The Holocene* 15, 1032-1043.

Roosens, B. (1987) Het kasteel "Jonkholt" te Hoelbeek (gem. Bilzen). Interimverslag 1986, *AB* 3, 241-246.

Roosens, B. and Wouters, W. (1986) Eerste opgravingscampagne van het kasteel "Jonkholt" te Hoelbeek (gem. Bilzen), *AB* 2, 113-116.

Roosens, H. (1960) Vlijtingen (Limburg), *L'Antiquité Classique* 29, 420.

(1975) Oude versterking te Kanne-Caster, in, *Conspectus MCMLXXIV*. AB 177. Brussel, 32-36.

(1976a) Bestattungsritual und Grabinhalt einiger Tumuli im Limburger Haspengouw, *Helinium* 16, 139-155.

(1976b) De oude versterking te Caster, in, *Conspectus MCMLXXV*. AB 186. Brussel, 54-58.

Roosens, H. and Janssens, P. (1978) *Het Merovingisch grafveld van Rosmeer. II De merovinger van Rosmeer: zijn fysiek en zijn pathologie*. AB 204. Brussel.

Roosens, H. and Lux, G.V. (1969) *Een nederzetting uit de IJzertijd op de Staberg te Rosmeer*.

AB 109. Brussel.
(1970) *Een Gallo-Romeinse tumulus te Eben-Emael-Kanne*. AB 121. Brussel.
(1973) *Grafveld met Gallo-Romeinse tumulus te Berlingen*. AB 147. Brussel.
(1974) *Gallo-Romeinse tumulus te Helshoven onder Hoepertingen*. AB 164. Brussel.

Roosens, H. and Vanderhoeven, M. (1952) Een Merovingisch grafveld in Romeins puin te Rosmeer, *OLL* 7, 110-119.
(1955) *Een verdwenen tumulus te Rosmeer*. AB 24. Brussel.

Rowlands, M. (1993) The role of memory in the transmission of culture, *WA* 25, 141-151.

Roymans, N. (1983) The North Belgic tribes in the 1st century B.C.: a historical-anthropological perspective, in R. Brandt and J. Slofstra, eds., 43-70.
(1990) *Tribal societies in Northern Gaul. An anthropological perspective*. Cingula 12. Amsterdam.
(1995) The cultural biography of urnfields and the long-term history of a mythical landscape, *AD* 2, 2-24.
(1996) The sword or the plough. Regional dynamics in the romanisation of Belgic Gaul and the Rhineland area, in N. Roymans, ed., *From the Sword to the Plough Three studies on the earliest Romanisation of Northern Gaul*. AAS 1. Amsterdam, 9-126.

Roymans, N. and Theuws, F. (1999) Long-term perspectives on land and people in the Meuse-Demer-Scheldt region (1100 BC-1500 AD). An introduction, in F. Theuws and N. Roymans, eds., *Land and Ancestors. Cultural dynamics in the Urnfield period and the Middle Ages in the Southern Netherlands*. AAS 4. Amsterdam, 1-32.

Rubini, J. (2007) La borne de Cantabrie, *Histoire et mesure* 19, 41-93.

van der Sanden, W.A.B. (1987) Oss-Ussen: de nederzettingen, in W.A.B. van der Sanden and P.W. van den Broeke, eds., *Getekend Zand. Tien jaar archeologisch onderzoek in Oss-Ussen*. Bijdragen tot de studie van het Brabantse Heem 31. Waalre, 53-69.

Saris, F.J.A. (1984) Lijnvormige landschapselementen, belangrijke onderdelen van een ecologische infrastructuur, *Landschap* 1, 91-108.

Savenay, J. (1969) Afvalkuilen van een Romeins Landhuis ontdekt te Zichen-Zussen-Bolder, *Limburg* 48, 205-206.

de Schaetzen, P. (1950) La Tombe Belgo-Romaine de Riempst, *Bulletin de L'Institut Archéologique Liégeois* 47, 37-60.

de Schaetzen, P. and Vanderhoeven, M. (1955) Twee Romeinse graven uit Tongeren, *OLL* 10, 101-113.

Schama, S. (1995) *Landscape and memory*. London.

Schulzki, H.-J. (2001) Der Katastrophenhorizont der zweiten Hälfte des 3. Jahrhunderts auf dem Territorium der CCAA. Historisches Phänomen und numismatischer Befund, *KJ* 34, 7-88.

Schwan, J. (1986) The origin of horizontal alternating bedding in Weichselian aeolian sands in northwestern Europe, *Sedimentary Geology* 49, 73-108.

Slicher van Bath, B.H. (1963) *The agrarian history of Western Europe. A.D. 500-1850*. London.

Slofstra, J. (1983) An anthropological approach to the study of romanization processes, in R. Brandt and J. Slofstra, eds., 71-104.
(1987) Een nederzetting uit de Romeinse tijd bij Hoogeloon, in W.C.M. van Nuenen, ed., *Drie dorpen een gemeente. Een bijdrage tot de geschiedenis van Hoogeloon, Hapert en Casteren*. Hapert, 51-86.
(1991) Changing settlement systems in the Meuse-Demer-Scheldt area during the Early Roman period, in N. Roymans and F. Theuws, eds., *Images of the past Studies on ancient societies in Northwestern Europe*. Studies in Pre- en Protohistorie 7. Amsterdam, 131-200.

(1995) The villa in the Roman West: space, decoration and ideology, in J. Metzler *et al.*, eds., *Integration in the Early Roman West. The role of culture and ideology*. Dossiers d'Archéologie du Musée National d'Histoire et d'Art 4. Luxembourg.

Smeesters, J. (1974) Schat te Riemst, *Limburg* 53, 134-136.

Soyer, J. (1976) Les centuriations romaines en Algérie orientale, *Antiquités Africaines* 10, 107-180.

Spits, J. (1963) Bodemkartering en Archeologie, *Limburg* 42, 14-16.

Stuart, P. and De Grooth, M.E.T., eds. (1987) *Langs de Weg. De Romeinse weg van Boulogne-sur-Mer naar Keulen*. Maastricht.

Sweely, T.L. (1999) Introduction, in T.L. Sweely, ed., *Manifesting Power. Gender and the Interpretation of power in archaeology*. London, 1-14.

Tate, G. (1992) *Les campagnes de la Syrie du Nord du II^e au VII^e siècle: Un exemple d'expansion démographique et économique à la fin de l'Antiquité*. Paris.

Terrenato, N. (2007) The Essential Countryside: The Roman World, in S.E. Alcock and R. Osborne, eds., *Classical Archaeology*. Blackwell Studies in Global Archaeology 10. Oxford, 139-161.

Tichelman, G. (2005) *Het villacomplex Kerkrade-Holzkuil*. ADC Rapport 155. Amersfoort.

Timpe, D. (1993) Der Namensatz der taciteischen Germania, *Chiron* 23, 323-352.

Trips, E. (1954) De villa van Membrugge, *L'Antiquité Classique* 23, 181.

Trousset, P. (1977) Nouvelles observations sur la centuriation romaine à l'Est d'El Jem, *Antiquités Africaines* 11, 175-207.

Ucko, P.J. and Layton, R., eds. (1999) *The Archaeology and Anthropology of Landscape. Shaping your landscape*. One World Archaeology 30. London.

Ulrix, F. (1959) Centuriatio in de omstreken van Tongeren, *Limburg* 38, 34-44.

Van Crombruggen, H. (1962) Les nécropoles Gallo-Romaines de Tongres, *Helinium* 2, 36-50.

Van Impe, L. (1977) Sporen van oude akkersystemen in de Limburgse Kempen, in N. Roymans *et al.*, eds., *Brabantse Oudheden*. Bijdragen tot de studie van het Brabantse Heem 16. Eindhoven, 101-109.

Van Londen, H. (2006) *Midden-Delfland. The Roman Native Landscape. Past and Present*. Unpublished Ph.D. thesis. Amsterdam.

Van Ossel, P. (1979) Les établissements ruraux au Bas-Empire dans la partie méridionale de la Civitas Tungrorum, *Revue des Archéologues et Historiens d'Art de Louvain* 12, 9-27.

(1983) Létablissement Romain de Loën a Lixhe et l'occupation rurale au Bas-Empire dans la Hesbaye Liégoise, *Helinium* 23, 143-169.

(1992) *Etablissements ruraux de l'Antiquité tardive dans le nord de la Gaule*. Supplément à Gallia 51. Paris.

Van Ossel, P. and Ouzoulias, P. (2000) Rural settlement economy in Northern Gaul in the Late Empire: an overview, *JRA* 13, 133-160.

Vandekerckhove, V. (1996) Celtic field research in the Belgian Campine, in M. Lodewijckx, ed., *Archaeological and hostirical apsects of West-European societies. Album amicorum André van Doorselaer*. AAL 8. Leuven, 67-76.

Vanderhoeven, A. (1996) The earliest urbanisation in Northern Gaul. Some implications of recent research in Tongres, in N. Roymans, ed., *From the Sword to the Plough Three studies on the earliest romanisation of Northern Gaul*. AAS 1. Amsterdam, 189-260.

(2001) Das vorflavische Tongeren: Die früheste Entwicklung der Stadt anhand von funden und befunden, in G. Precht, ed., *Genese, Struktur und Entwicklung römischer Städte im 1 jahrhundert n Chr in Nieder- und Obergermanien*. Xantener Berichte 9. Mainz am Rhein, 157-176.

(2002) Aspekte der frühesten Romanisierung Tongerens und des zentralen Teiles der *civitas Tungrorum*, in T. Grünewald and S. Seibel, eds., *Kontinuität und Diskontinuität. Germania inferior am Beginn und am Ende der römischen Herrschaft* Reallexikon der Germanischen Altertumskunde 35. Berlin, 119-144.

Vanderhoeven, A. and Vynckier, G. (2002) Tongeren: Romeinse Kassei, *Limburg - OLL* 81, 245-250.

(2003) Een rijk laat-Romeins graf aan de Darenbergstraat te Tongeren, in M. Lodewijckx, ed., *Romeinendag - Journée d'archéologie romaine Leuven - 8-2-2003*. Leuven, 77.

(2006) Opgraving Darenbergstraat, Tongeren, in G. Creemers and A. Vanderhoeven, eds., Archeologische kroniek Limburg 2002, *Limburg - OLL* 85, 170-173.

Vanderhoeven, A., Vynckier, G. and Vynckier, P. (1991) Het oudheidkundig bodemonderzoek aan de Kielenstraat te Tongeren. Interimverslag 1987, *Archeologie in Vlaanderen* 1, 107-124.

Vanderhoeven, M. (1976) De Gallo-Romeinse tumulus van Riemst, *Limburg* 55, 3-29.

(1978) *Sporen van een nederzetting uit de IJzertijd op de Kayberg te Vlijtingen*. PPGRM 24. Tongeren.

Vanderhoeven, M. and Janssen, L. (1974) De archeologische verzameling Coenegracht uit Rekem, *OLL* 29, 141-163.

Vanvinckenroye, W. (1981) Bronzen bustebalsamarium gevonden te Vlijtingen, *Limburg* 60, 264-265.

(1984) *De Romeinse zuidwest-begraafplaats van Tongeren (Opgraving 1972-1981)*. PPGRM 29. Tongeren.

(1985) *Tongeren. Romeinse stad*. Tielt.

(1988a) *De Romeinse villa op de Sassenbroekberg te Broekom*. PPGRM 38. Tongeren.

(1988b) Middeleeuwse kerk onder de St.-Evermaruskapel te Rutten, *Limburg* 66, 5-9.

(1990) *De Romeinse villa's van Piringen ("Mulkenveld") en Vechmaal ("Walenveld")*. PPGRM 42. Hasselt.

(1994a) *Een bijdrage tot het stadskernonderzoek van Romeins Tongeren*. PPGRM 46. Hasselt.

(1994b) Een Romeins votiefaltaar te Tongeren, *Limburg* 73, 225-228.

(1996) Some reflections on Tongeren (prov. Limburg) in the augustan era, in M. Lodewijckx, ed., *Archaeological and historical aspects of West-European societies. Album amicorum André Van Doorselaer*. AAL 8. Leuven, 109-121.

(2001) Über Atuatuca, Cäsar und Ambiorix, in M. Lodewijckx, ed., *Belgian archaeology in a European setting II*. AAL 12. Leuven, 63-67.

Vermeulen, F. and Antrop, M., eds. (2001) *Ancient Lines in the Landscape. A Geo-Archaeological Study of Protohistoric and Roman Roads and Field Systems in Northwestern Gaul*. BABesch Supplements 7. Leuven.

Vermeulen, F. and De Dapper, M., eds. (2000) *Geoarchaeology of the Landscapes of Classical Antiquity. International Colloquium Ghent 23-24 October 1998*. BABesch Annual Papers on Classical Archaeology 5. Leiden.

Vleeshouwer, J.J. and Damoiseaux, J.H. (1990) *Bodemkaart van Nederland. 1:50.000. Blad 61-62 West en Oost. Maastricht - Heerlen*. Wageningen.

Walthew, C.V. (1982) Early Roman town development in Gallia Belgica: a review of some problems, *OJA* 1, 225-236.

Ward-Perkins, B. (2000) Land, labour and settlement, in A. Cameron *et al.*, eds., *the Cambridge Ancient History vol XIII, Late Antiquity: empire and successors, AD 425-600*. Cambridge, 315-345.

Weber, M. (1978 [1919]) *Economy and Society: An Outline of Interpretive Sociology*. Berkeley.

Wesch-Klein, G. (2007) Recruits and Veterans, in P. Erdkamp, ed., *A Companion to the Roman Army*. Blackwell Companions to the Ancient World. Malden, 435-450.

Wesemael, E. (2006) Veldwezelt (Lanaken): vondsten uit het midden paleolithicum, de ijzertijd en de Romeinse periode, in G. Creemers and A. Vanderhoeven, eds., Archeologische kroniek van Limburg 2001, *Limburg - OLL* 85, 60-63.

Wightman, E.M. (1975) Rural settlement in Roman Gaul, *ANRW* II.4, 568-657.

Will, W. (1987) Römische 'Klientel-Randstaaten' am Rhein? Eine Bestandsaufnahme, *BJ* 187, 1-61.

Willems, W.J.H. (1987) De grote villa van Voerendaal, in P. Stuart and M.E.T. De Grooth, eds., 46-51.

Willems, W.J.H. and Kooistra, L.I. (1987) De Romeinse villa te Voerendaal. Opgraving 1986, *Archeologie in Limburg* 32, 29-38.

Witcher, R. (1998) Roman Roads: phenomenological perspectives on roads in the landscape, in C. Forcey *et al.*, eds., *TRAC 97. Proceedings of the Seventh Annual Theoretical Roman Archaeology Conference, Nottingham 1997*. Oxford, 60-70.

Witherick, M., Small, J. and Ross, S. (2001) *A Modern Dictionary of Geography*. Oxford.

Woolf, G.D. (1993) Rethinking the Oppida, *OJA* 12, 223-234.

(1995) Beyong Romans and Natives, *WA* 28, 339-350.

(1998) *Becoming Roman. The origins of provincial civilization in Gaul*. Cambridge.

(2003) Local Cult in Imperial Context: the Matronae revisited, in P. Noelke, ed., *Romanisation und Resistenz in Plastik, Architektur und Inschriften der Provinzen des Imperium Romanum Neue Funde und Forschungen*. Mainz am Rhein, 131-138.

Wouters, W. and Roosens, B. (1986) Oude vondsten van het kasteel Jonkholt te Hoelbeek (gem. Bilzen), *AB* 2, 227-240.

Zandboer, S. (2006) *De locatiekeuze van Romeinse villa's in Zuid-Limburg*. Unpublished M.A. thesis. Amsterdam.

Zar, J.H. (1972) Significance Testing of the Spearman's Rank Correlation Coefficient, *Journal of American Statistical Association* 67, 578-580.

Catalogue

This catalogue lists 181 sites that are examined within the Tongres-Maastricht area. The catalogue numbers used here correspond to the numbers on maps 1-5 and on some other figures. With regard to the coordinates given here, when the location of a site is not precisely known the coordinates will be given in italics. The dating of the sites and occupation phases is based on the stratigraphy (only in the case of excavations) and pottery and metal finds as found in the publications or as given by the experts of the VIOE. The publication of Duurland (2000) has been a major contribution in the dating of most of the surveyed sites. For details and problems with the dating of survey finds in this region, I therefore refer to his publication.

The archaeological material is abbreviated in the following way: F = Foundation; W = Wall remain; Wo = Wood; Ph = Posthole(s); Br = Brick; T = Tile; Si = Silex; Ht = Hypocaust tile; Tu = Tubulus; Os = Opus Signinum; Gl = Window glass; St = Stone; Pt = Pottery; C = Coin(s); Fi = Fibula(e); Gl = Glass; Mt = Metal (unspecified); Ab = Animal bone; Hb = Human bone; Tf = Tefryt (volcanic stone used as grinder); Phl = Phyllite (wetstone); Tp = Trash pit(s); O = Other finds.

1.
Site: Sint-Huibrechts-Hern - Vrijhern
Examination: Field survey
References: Duurland 2000: 38
Coordinates: *227647 / 168332*
Occupation phases: MR; LR (?)
Interpretation: Villa / farmstead
Material: T; Br; Pt
Notes: Nearby Roman burial (CAI 700566)

2.
Site: Hoeselt - Goos
Examination: Field survey
Coordinates: *227492 / 172094*
CAI: 700820; 700868
Occupation phase: (?)
Interpretation: Farmstead (?)
Material: T (?); C
Notes: Location of coin (CAI 700868) is some 250 m. S of CAI 700820

3.
Site: Schalkhoven - Teugelveld
Examination: Field survey
References: *Archéologie* 1970: 21
Coordinates: 226516 / 171394
CAI: 700817
Occupation phase: (?)
Interpretation: Villa (?)
Material: T; Si; Br

4.
Site: Hoeselt - Den Vlikker Berg
Examination: Unknown
Coordinates: 227572 / 174609
CAI: 700548
Occupation phase: (?)
Interpretation: Unknown

5.
Site: Hoeselt - Het Achterste Teugelenveld
Examination: Field survey
Coordinates: 227322 / 170629
CAI: 700554
Occupation phase: (?)
Interpretation: Villa (?)
Notes: Probably a villa, yet no finds listed

6.
Site: Hoeselt - Paneel
Examination: Field survey
Coordinates: 226617 / 175069
CAI: 700555
Occupation phase: MR
Interpretation: Villa (?)
Material: Si; Gl; C

7.
Site: Hoeselt - Nederstraat
Examination: Unknown
Coordinates: 228106 / 174349
CAI: 700549
Occupation phase: (?)
Interpretation: Unknown

8.
Site: Schalkhoven - Steenbergveld
Examination: Chance find
References: A. Coenen 1989: 3
Coordinates: 226513 / 170230
CAI: 700563
Occupation phase: MR (?)
Interpretation: Villa (?)
Notes: examination of site in 1866

9.
Site: Sint-Huibrechts-Hern - Hardelingen
Examination: Field survey
References: Duurland 2000: 38
Coordinates: 227194 / 169481
CAI: 700558
Occupation phases: MR; LR (?)
Interpretation: Villa (?)
Material: T; Pt

10.
Site: Hoeselt - Hombroek
Examination: Excavation
References: A. Claassen 1964; *Archéologie* 1964: 23-24
Coordinates: 228125 / 172349
CAI: 700547
Occupation phase: MR
Interpretation: Villa
Material: T; Br; Si; W; Pt; Tf
Notes: Also a burned layer found

11.
Site: Hoeselt - Op het groot Wilder
Examination: Field survey
References: Duurland 2000: 38; Creemers 2006: 34-39
Coordinates: *228651 / 170569*
CAI: 700537; 700550
Occupation phase: MR (?)
Interpretation: Villa (?)
Material: T; Pt; Mt; Gl
Notes: Wilder is an indicative Roman toponym

12.
Site: Hoeselt - Twee kruisen
Examination: Field survey
Coordinates: 227834 / 170524
CAI: 700818
Occupation phase: (?)
Interpretation: Villa / farmstead (?)
Material: Pt; C
Notes: Among the pottery also Samian ware

13.
Site: Sint-Huibrechts-Hern - Papenberg / Steenbroeck
Examination: Field survey
References: De Maeyer 1940: 118; Bauwens-Lesenne 1968: 337; Duurland 2000: 38
Coordinates: 226388 / 166284
CAI: 51562; 700538
Occupation phase: MR (?)
Interpretation: Villa
Material: Br; T; F; Pt
Notes: Tiles show burning marks, suggesting a fire

14.
Site: Hees - Grote Steen
Examination: Field survey
References: Lux 1970: no. 20; A. Claassen 1973: 12; Duurland 2000: 40; Creemers and Vanderhoeven 2005
Coordinates: *237478 / 171828*
CAI: 55083; 52357
Occupation phase: MR
Exact date: 2nd h. 1st - 3rd (?) c. AD

Interpretation: Villa (?)
Material: T; Br; Pt
Notes: CAI 52357 mentions a church where Roman material (maybe *spolia* from another location) has been found

15.
Site: Rosmeer - Staberg
Examination: Excavation and Field survey
References: Lux 1957; De Boe 1989; Duurland 2000: 39
Coordinates: *235743 / 171918*
CAI: 50117
Occupation phase: MR
Interpretation: Villa (villa (?); well)
Material: F; Br; Pt; T; Si

16.
Site: Rosmeer - Diepestraat
Examination: Excavation
References: H. Roosens and Vanderhoeven 1952: 111; H. Roosens and Lux 1969: 7-8; Heymans 1977: 112-115; De Boe and Van Impe 1979; De Boe 1989; Duurland 2000: 39
Coordinates: 235280 / 171438
CAI: 50116
Occupation phases: LIA; ER
Interpretation: Traditional farmstead (2)
Material: Ph; Pt; Gl (La Tène bracelet)
Notes: Exact plans of structures could not be deduced from postholes
Occupation phases: MR; LR
Exact date: 2nd h. 1st - late-4th c. AD
Interpretation: Villa (villa; well; ditch)
Material: Br; T; Si; F; Fi; C; Pt; Tp; Ab; Gl; Mt; Tf
Notes: Also rectangular pit (1.7 x 2.4 m) found

17.
Site: Bilzen - Schureveld / Klooster
Examination: Excavation
References: *De Standaard* 1981
Coordinates: 230949 / 174502
CAI: 55080
Occupation phase: MR (?)
Interpretation: Villa
Material: T; W; Br; Pt; Tf; C; Mt

18.
Site: Munsterbilzen - Broekem
Examination: Field survey
Coordinates: 231070 / 175545
CAI: 915041
Occupation phase: (?)
Interpretation: Unknown
Material: Pt

19.
Site: Beverst - Heesveld-Eik
Examination: Chance find
Coordinates: 230143 / 177638
CAI: 915042
Occupation phase: (?)
Interpretation: Unknown
Material: Pt
Notes: Marked by T. Vanderbeken

20.
Site: Munsterbilzen - Centrum
Examination: Excavation
References: Driesen and Borgers 2006
Coordinates: 231455 / 176088
CAI: 915031; 915034
Occupation phase: ER (?)
Interpretation: Traditional farmstead
Material: Ph; Pt
Occupation phase: MR (?)
Interpretation: Villa (?)
Material: T; Pt
Notes: No structures found, only epiphenomenon

21.
Site: Grote-Spouwen - Dorp
Examination: Excavation and Field survey
References: Lux and Roosens 1972
Coordinates: *233343 / 169879*
CAI: 50109
Occupation phase: (?)
Interpretation: Ditch
Material: Pt
Notes: Roman pottery found in ditch

22.
Site: Rosmeer - Achter de Staberg
Examination: Field survey
References: H. Roosens and Janssens 1978; Duurland 2000
Coordinates: *236461 / 172244*
CAI: 700515
Occupation phases: LIA; ER
Interpretation: Unknown
Material: Pt
Occupation phase: MR
Interpretation: Villa (?)
Material: T; Pt

23.
Site: Kleine-Spouwen - Berg
Examination: Field survey
References: H. Roosens and Vanderhoeven 1955: fig. 3; Bauwens-Lesenne 1968: 158-159; Lux 1970: no. 12; Duurland 2000: 39
Coordinates: *233049 / 171442*
CAI: 55249
Occupation phase: MR
Exact date: 161-180 AD (?)
Interpretation: Villa / farmstead
Material: T; Pt; C
Notes: Coins of Marcus Aurelius

24.
Site: Waltwilder - Sulken Dael
Examination: Field survey
References: Lux 1970: no. 10; Duurland 2000: 39
Coordinates: 233022 / 172575
CAI: 700489
Occupation phases: LIA; ER
Interpretation: Unknown
Material: Pt
Occupation phase: MR (?)
Interpretation: Villa (?)
Material: T; Br; Pt

25.
Site: Hees - Lippenberg
Examination: Field survey
References: H. Roosens and Vanderhoeven 1955: fig. 3; *Archéologie* 1964: 8-10; Duurland 2000: 39
Coordinates: 236692 / 170948
CAI: 50382
Occupation phase: MR (?)
Interpretation: Villa (?)
Material: T; Si; Pt

26.
Site: Rijkhoven - Ouden Biezen veld
Examination: Field survey
References: Duurland 2000: 38
Coordinates: 231936 / 170936
CAI: 700509; 700511; 700516
Occupation phase: ER
Interpretation: Unknown
Material: Pt; Fi
Notes: Two fibulae from 1st c. BC
Occupation phase: MR
Exact date: 81 - 238 AD (?)
Interpretation: Villa
Material: T; Br; Pt; C; Gl (bracelet); Mt
Notes: Two coins of Commodus/Gordian and one of Domitian (some 800 m NW)

27.
Site: Eigenbilzen - Groot Steenbergerveld
Examination: Field survey
References: De Maeyer 1940: 106; A. Claassen 1965: 99; 1973: 12; Lux 1970: no. 2; Gorissen and Roosens 1989: 73; Duurland 2000: 40
Coordinates: *235953 / 174041*
CAI: 50837; 700497
Occupation phase: MR
Interpretation: Villa
Material: T; Os; Br; Pt

28.
Site: Mopertingen - Dorp
Examination: Unknown
References: Bauwens-Lesenne 1968: 237; A. Claassen 1973: 14
Coordinates: *234872 / 173158*
CAI: 50856
Occupation phase: (?)
Interpretation: Unknown

29.
Site: Kleine-Spouwen - Dries
Examination: Field survey
References: Lux 1970: no. 13; H. Roosens and Janssens 1978: fig. 9; Duurland 2000: 39
Coordinates: *233547 / 171146*
CAI: 700491
Occupation phase: MR
Exact date: late-1st - late-3rd c. AD
Interpretation: Villa (villa; outbuilding)
Material: T; Si; Br; Pt; Phl; Gl
Notes: Finds relate to this site; CAI 700518 is located 100 m W from CAI 700491

30.
Site: Grote-Spouwen - Op grens met Vlijtingen
Examination: Field survey
References: *Archéologie* 1964, 8-10; Lux 1970: no. 22; 1972: 5-19; Duurland 2000: 38
Coordinates: 234309 / 170141
CAI: 50383; 700495
Occupation phases: MR; LR (?)

Interpretation: Stone building (?)
Material: T

31.
Site: Gellik - Komveld
Examination: Field survey
References: Lux 1970: no. 4; A. Claassen 1973: 12; Heeren 1976; Duurland 2000: 40
Coordinates: *238075 / 174601*
CAI: 50838
Occupation phase: MR (?)
Interpretation: Villa / farmstead
Material: T; Br; Si

32.
Site: Neerharen - Kerk
Examination: Chance find
References: Bauwens-Lesenne 1968: 247; A. Claassen 1973: 14
Coordinates: 242755 / 178270
CAI: 51267
Occupation phase: MR (?)
Interpretation: Unknown
Material: Pt
Notes: Large amount of different types of pottery

33.
Site: Rekem - Dorp
Examination: Field survey
References: Janssen 1978
Coordinates: *243782 / 179957*
CAI: 51290
Occupation phase: MR (?)
Interpretation: Villa
Material: T; Mt; Ab; Pt
Notes: Large amount of tiles

34.
Site: Veldwezelt - Heerbaan
Examination: Excavation
References: Lux 1970: no. 5; Duurland 2000: 40
Coordinates: 237271 / 173272
CAI: 51579; 52422; 915052
Occupation phase: MR
Interpretation: Villa
Material: T; Pt; Mt (gold)
Notes: Duurland views 'Heerbaan' as indication for Roman road

35.
Site: Neerharen / Rekem - Het kamp
Examination: Excavation
References: De Maeyer 1940: 111-116; A. Claassen 1973: 14; Heymans 1977: 66; De Boe 1981a; 1982; 1983; 1985; 1986
Coordinates: 242822 / 178972
CAI: 51812; 51929; 50859
Occupation phases: LIA; ER
Interpretation: Traditional farmsteads (two-aisled houses (9); double ditches (2); ditches (2))
Material: Ph; Pt; C
Notes: One of the double ditches is maybe a road
Occupation phase: MR
Interpretation: Villa (villa (2); outbuilding (4); ditch)
Material: F; T; Br; W; Si; Os; Tu; Ht; Pt; C; Fi; Mt; Gl; Ab
Occupation phase: LR
Interpretation: 'Germanic' settlement ('Germanic' longhouse (2); sunken hut (23))
Material: Ph; Pt

36.
Site: Veldwezelt - Op de Schans
Examination: Excavation
References: Bauwens-Lesenne 1968: 358; Pauwels *et al.* 2003; Wesemael 2006: 60-63
Coordinates: 239535 / 171170
CAI: 51381; 50708
Occupation phase: ER
Exact date: 1st c. AD
Interpretation: Traditional farmsteads (two-aisled houses (5); road; ditches (2))
Material: Ph; Pt
Notes: Burned down in the mid-1st century AD; road located on the south of excavation
Occupation phase: MR
Exact date: 2nd - 3rd c. AD
Interpretation: Villa / farmstead (two-aisled houses (3); kilns (2); cellar; road; ditches (2))
Material: Ph; W; F; Br; Mt (e.g. metal slags); Pt; Wo
Notes: Also two drinking pools for cattle and a small fenced enclosure found;

kilns probably used for metallurgy; cellar burned down in 3rd century AD

37.
Site: Rekem - Tombos
Examination: Field survey
Coordinates: 242428 / 181340
CAI: 700192
Occupation phase: MR (?)
Interpretation: Villa
Material: T; Br; Si; Gl; Pt; C

38.
Site: Lanaken - Smeermaas / Dukatonweg
Examination: Excavation
References: Lux 1970: no. 6; A. Claassen 1973: 13; Duurland 2000: 40; Pauwels and Creemers 2006
Coordinates: 241262 / 175584
CAI: 55505; 55219
Occupation phase: ER
Interpretation: Traditional farmsteads (two-aisled houses (4); fences (3); road)
Material: Ph; Pt
Occupation phase: MR
Interpretation: Villa (cellar; hypocaust room; road)
Material: T; W; Br; Si; Tu; Ht; Pt; C; Fi; Gl; Mt
Notes: Rest of villa probably outside excavation; already excavated in 19th century

39.
Site: Berg - Tomveld
Examination: Field survey
References: Bauwens-Lesenne 1968; Duurland 2000: 47
Coordinates: 229900 / 164341
CAI: 700850; 700473; 51819; 51890; 51889
Occupation phase: ER
Exact date: Augustan
Interpretation: Military camp (?) (military camp; ditches)
Material: Pt; C
Notes: Rich of ER import material from other regions
Occupation phase: MR
Exact date: 2nd - late-3rd c. AD
Interpretation: Villa
Material: T; Si; Br; Pt; C; Mt
Notes: Most coins and metal finds related to military usage

40.
Site: Lauw - Aen het Kruis
Examination: Unknown
Coordinates: *222857 / 160662*
CAI: 700475
Occupation phase: MR
Interpretation: Villa
Material: Br; T; Fi; C
Notes: One coin of Hadrian

41.
Site: Vreren - Aan de drie Hagen
Examination: Excavation
References: In 't Ven and De Clercq 2005
Coordinates: *228433 / 158375*
CAI: 700047; 700877
Occupation phase: MR (?)
Interpretation: Ditch
Material: T; C
Notes: Ditch was filled with tiles; coin of Faustina found in vicinity

42.
Site: Henis - Bouberg
Examination: Field survey
References: Lux and Thyssen 1979
Coordinates: *228033 / 165531*
CAI: 700026
Occupation phase: (?)
Interpretation: Unknown
Material: Pt; Mt; C

43.
Site: Henis - Verhenis
Examination: Field survey
References: Duurland 2000: 37
Coordinates: 228281 / 167204
CAI: 700362
Occupation phases: MR (?); LR (?)
Interpretation: Villa / farmstead
Material: T; Br; Si; Pt
Notes: Located near burial mound; asked for archaeological protection by Roosens

44.
Site: Widooie - Hoogveld
Examination: Field survey
Coordinates: *222903 / 161506*
CAI: 700852; 700853
Occupation phase: (?)
Interpretation: Villa

Material: Br; Si; T; Pt; C; Fi
Notes: One sestertius and a silver ornamental disc found

45.
Site: Riksingen - Keiberg
Examination: Field survey
References: De Maeyer 1940: 117; Duurland 2000: 37
Coordinates: 226709 / 166202
CAI: 700438; 700856; 50542; 700441
Occupation phase: ER (?)
Interpretation: Traditional farmstead (?)
Material: Pt; Fi
Occupation phase: MR (?)
Interpretation: Villa / farmstead
Material: T; Si; F; Pt; Fi
Notes: CAI 700441 locates Roman coins and metal finds in vicinity

46.
Site: Berg - Den Eggerman
Examination: Unknown
Coordinates: 229600 / 164521
CAI: 700474
Occupation phase: (?)
Interpretation: Unknown
Notes: Mentioned by A. Vanderhoeven

47.
Site: Mal - Klein-Mal
Examination: Field survey
References: Duurland 2000: 37
Coordinates: 231791 / 163953
Occupation phases: MR; LR
Exact date: late-1st - early-5th c. AD
Interpretation: Villa
Material: T; Si; Os; Br; Pt; Tf

48.
Site: Berg - Molenweg
Examination: Field survey
Coordinates: 228810 / 165155
CAI: 700827
Occupation phase: (?)
Interpretation: Unknown
Material: C
Notes: One coin of Gallia Audacia (12 BC); probably related to site no. 54

49.
Site: Berg - Trappenberg
Examination: Field survey
References: Duurland 2000: 37
Coordinates: 228689 / 164716
CAI: 700822; 51895
Occupation phase: ER
Interpretation: Military camp (?)
Material: C; Pt
Notes: some Celtic coins; large amount of Roman republican coins; good outlook over Tongres
Occupation phase: MR (?)
Interpretation: Villa / farmstead
Material: F; T; Si

50.
Site: 's Herenelderen - Bosch Veld
Examination: Field survey
References: Duurland 2000: 38
Coordinates: 230851 / 167607
CAI: 700444
Occupation phase: (?)
Interpretation: Villa / farmstead (?)
Material: T
Notes: Asked for archaeological protection by Roosens; site presumably lost due to construction of an highway

51.
Site: Tongres - Paspoel
Examination: Excavation
References: *Archéologie* 1963: 68; 1964: 76; 1976: 20; Vanvinckenroye 1985: 27-31
Coordinates: 226345 / 163258
CAI: 50545
Occupation phase: ER
Interpretation: Military camp (?) (ditches)

52.
Site: Berg - Kerk
Examination: Field survey
References: De Maeyer 1940: 105; *Archéologie* 1959: 136; Bauwens-Lesenne 1968: 20; Duurland 2000: 37
Coordinates: 229282 / 165032
CAI: 50351
Occupation phase: MR (?)
Interpretation: Villa (?)
Material: T; St
Notes: Four-deity stone found (of a Jupiter column?) in 1869

53.
Site: Lauw - SP173 / D48
Examination: Excavation
References: In 't Ven and De Clercq 2005
Coordinates: *222738 / 160321*

CAI: 701520
Occupation phase: (?)
Interpretation: Villa
Material: W; Br; Si; T

54.
Site: Berg - Sint Antoniusveld
Examination: Field survey
Coordinates: *228491 / 165334*
CAI: 700600; 700068; 700072
Occupation phase: (?)
Interpretation: Stone building (?)
Material: T; Pt; Mt; C
Notes: One Roman denarius (130 BC) and a gilded rainbow cup

55.
Site: Rutten - Wilkuilen
Examination: Unknown
Coordinates: *225157 / 160339*
CAI: 700458
Occupation phases: (?)
Interpretation: Unknown

56.
Site: 's Herenelderen - Rijcker Veld
Examination: Field survey
References: Duurland 2000: 37
Coordinates: 230370 / 168237
CAI: 700445; 700858; 52414
Occupation phase: LIA
Interpretation: Unknown
Material: C; Mt
Notes: One Celtic wheel; couple of coins in the vicinity
Occupation phase: ER
Interpretation: Unknown
Material: Fi; C; Pt
Notes: Two characteristic ER fibulae
Occupation phases: MR; LR (?)
Exact date: late-1st - late-4th c. AD
Interpretation: Villa
Material: Br; T; Si; Tu; Gl; Os ; C; Ir; Pt; Phl; Fi
Notes: Remains of a Roman key

57.
Site: Vreren - Lange Akker
Examination: Field survey
References: Van Ossel 1979: 23
Coordinates: *227966 / 159472*
CAI: 700876; 700877
Occupation phase: ER (?)
Interpretation: Unknown
Material: Fi
Notes: Two characteristic ER fibulae
Occupation phase: MR (?)
Interpretation: Villa
Material: T; Br; Si ; Fi; C
Notes: Two characteristic MR fibulae
Occupation phase: LR
Exact date: Constantine (?)
Interpretation: Unknown
Material: Pt; O
Notes: Late Roman Samian ware and other material from the period of Constantine

58.
Site: Tongres - Hondsstraat
Examination: Excavation
References: A. Vanderhoeven 1996: 212-215
Coordinates: 227076 / 163808
CAI: 700396
Occupation phase: ER1
Exact date: Augustan (10 BC)
Interpretation: Military camp
Material: Ph; Pt
Notes: Vanderhoeven interprets the site as a military camp
Occupation phase: ER2
Exact date: Tiberian (first decades AD)
Interpretation: Traditional farmstead (two-aisled houses (2))
Material: Ph; Pt, C
Occupation phase: ER3
Exact date: Claudian and Neronian
Interpretation: Roman courtyard house
Material: W; Ph; Pt; C; Mt
Notes: Destroyed by Batavian revolt

59.
Site: Tongres - Sacramentstraat
Examination: Excavation
References: A. Vanderhoeven 1996: 215-218
Coordinates: 227434 / 164456
CAI: 51935
Occupation phase: ER1
Exact date: pre-Claudian
Interpretation: Military camp (?) (ditches)
Notes: In 1963 already some pre-70 AD ditches have been found 50 m N
Occupation phase: ER2
Exact date: Claudian
Interpretation: Traditional farmstead

Material: Ph; Pt; C
Notes: Ditches surrounded the house
Occupation phase: ER3
Exact date: Neronian
Interpretation: Traditional farmstead
Material: Ph; Pt; C
Notes: On top of the older traditional farmstead

60.
Site: 's Herenelderen - Hommelenberg
Examination: Field survey
References: Duurland 2000: 37
Coordinates: 230595 / 166827
CAI: 700446
Occupation phases: MR; LR
Exact date: late-1st - early-5th c. AD
Interpretation: Villa
Material: T; Si; Br; Os; Pt; Tf
Notes: Asked for archaeological protection by Roosens

61.
Site: Piringen - Mulkenveld
Examination: Excavation
References: Vanvinckenroye 1990: 11-20
Coordinates: 225060 / 165150
CAI: 52390; 52391
Occupation phase: ER (?)
Interpretation: Traditional farmsteads (two-aisled houses (2))
Material: Ph
Occupation phase: MR
Exact date: Flavian period - 3rd c. AD (?)
Interpretation: Villa (villa; outbuilding (2); well)
Material: Br; T; F; Pt
Notes: ca. 100 m from rest of the buildings

62.
Site: Lauw - Sleiberg / Oude molen
Examination: Excavation
References: De Maeyer 1940: 117; In 't Ven and De Clercq 2005
Coordinates: 224800 / 160620
CAI: 51952
Occupation phase: ER (?)
Interpretation: Unknown
Material: C
Notes: one Celtic coin
Occupation phase: MR (?)
Interpretation: Villa (?)
Material: W; F; Br; T; Pt; Fi; Mt; C
Notes: A wall fragment of the NE-SW side found and a little bronze deity statue

63.
Site: Tongres - Linder Veld
Examination: Excavation
References: Mertens and Vanvinckenroye 1975
Coordinates: 226596 / 163081
CAI: 700413; see also 50544
Occupation phase: MR
Exact date: early-2nd - mid-3rd c. AD
Interpretation: Horreum (horreum; public buildings (?) (3))
Material: F; Br; T; Pt; Mt; C

64.
Site: Lauw - Tillerweg
Examination: Unknown
Coordinates: *223416 / 158626*
CAI: 700466
Occupation phase: (?)
Interpretation: Villa / farmstead
Notes: Illegal excavation; some unspecified building remains have been recorded

65.
Site: Lauw - Onder de Roomsche Katzij
Examination: Unknown
Coordinates: *223460 / 161000*
CAI: 700476
Occupation phase: MR (?)
Interpretation: Unknown
Notes: marked by Vanvinckenroye

66.
Site: Tongres - Plinius
Examination: Excavation and Field survey
References: Nales and Bink 2005
Coordinates: 226290 / 164469
CAI: 700595; 52370
Occupation phase: (?)
Interpretation: Unknown
Material: Pt; C; Mt; Fi
Notes: ca. 30 finds

67.
Site: Lauw - In de Louwer Zouw
Examination: Excavation and Field survey
Coordinates: *224667 / 159543*
CAI: 700455; 700000
Occupation phase: (?)
Interpretation: Villa / farmstead
Material: F; Br; T; Mt

Notes: Illegal excavation; some unspecified building remains have been recorded

68.
Site: Rutten - De Nieuwe Weide
Examination: Excavation
References: Vanvinckenroye 1988b; Knaepen 2001: 166
Coordinates: 225974 / 159925
CAI: 51810; 700457
Occupation phase: MR
Exact date: mid-2nd c. AD (?)
Interpretation: Villa (?)
Material: W; Si; Br; T

69.
Site: Koninksem - Tongers Veld
Examination: Excavation and Field survey
References: Van Ossel 1979: 25
Coordinates: *225590 / 163140*
CAI: 700429
Occupation phases: MR (?); LR
Interpretation: Villa / farmstead (?)
Material: Si; Pt; O
Notes: Material dates to period of Crispus

70.
Site: Tongres - Kielenstraat
Examination: Excavation
References: A. Vanderhoeven 1996: 193-212
Coordinates: 227481 / 164008
CAI: 50009
Occupation phase: ER1
Exact date: Augustan (10 BC)
Interpretation: Military camp (ditches)
Notes: V-shaped
Occupation phase: ER2
Exact date: Tiberian (first decades AD)
Interpretation: Traditional farmsteads (two-aisled houses (4))
Material: Ph; Pt; C
Notes: Also two small cellars (2 x 2 x 2 m); offering in central posthole in one of the houses; small coin hoard (nine denarii)
Occupation phase: ER3
Exact date: Claudian and Neronian
Interpretation: Roman courtyard house (Roman courtyard house; road)
Material: W; F; Ph; Pt; C
Notes: painted plasterwork; destroyed by Batavian revolt; road was made of gravel

71.
Site: Nerem - Kevie Landschapspark
Examination: Field survey
Coordinates: *229123 / 162905*
CAI: 700414
Occupation phase: (?)
Interpretation: Villa / farmstead (?)
Material: T; Pt; Mt; Fi; C

72.
Site: Lauw - Bosch veld
Examination: Excavation and Field survey
References: De Maeyer 1940: 109; Knaepen 2001: 149
Coordinates: *224240 / 158236*
CAI: 700467; 700854
Occupation phase: MR (?)
Interpretation: Villa / farmstead
Material: W; F; Br; T; Mt; Pt
Notes: illegal excavation; some unspecified building remains have been recorded

73.
Site: Overrepen - Kolmont
Examination: Excavation and Field survey
References: *Archeologie* 1970: 21
Coordinates: 223737 / 166282
CAI: 700598; 50541; 700596
Occupation phase: (?)
Interpretation: Villa
Material: T; Br; Si; C; Mt

74.
Site: Henis - Aen de Vier Linden
Examination: Chance find
References: Capenberghs 1985: 258-259; Knaepen 2001: 138
Coordinates: 227438 / 167764
CAI: 700360
Occupation phase: (?)
Interpretation: Villa / farmstead (?)
Material: T; Pt
Notes: Capenberghs identifies it as grave field, but Knaepen suggests a villa

75.
Site: Kanne - Stichelveld
Examination: Field survey
References: Lux 1970: no. 41; Duurland 2000: 44
Coordinates: 240830 / 167277
CAI: 700004
Occupation phases: LIA; ER
Interpretation: Unknown

Material: Pt
Notes: one LIA / ER pottery sherd found
Occupation phase: MR
Interpretation: Villa / farmstead (?)
Material: T; Pt; Tf

76.
Site: Millen - Dorp
Examination: Unknown
References: De Boe 1976: pl. 1
Coordinates: *234077 / 163996*
CAI: 700069
Occupation phase: (?)
Interpretation: Unknown

77.
Site: Vlijtingen - Klein Lafelt
Examination: Field survey
References: Lux 1970: no. 27; Duurland 2000: 44
Coordinates: *238300 / 170103*
CAI: 700104
Occupation phase: MR (?)
Interpretation: Stone building (?)
Material: T

78.
Site: Vlijtingen - Keyberg / Op de Alderen Berg
Examination: Excavation
References: Lux 1970: no. 28; M. Vanderhoeven 1978: fig. 3; Duurland 2000: 44; Eerman 2002: 139
Coordinates: 236832 / 169516
CAI: 50173; 51744; 700105; 700107; 915056
Occupation phase: ER
Exact date: 1st c. AD
Interpretation: Traditional farmsteads (two-aisled houses (4))
Material: Ph; Pt; Gl
Occupation phase: MR
Exact date: late-1st - 3rd c. AD
Interpretation: Villa (villa; outbuildings (3); ritual pit)
Material: Br; F; T; Si ; Pt; Mt; Ab; Gl
Notes: ritual pit is rectangular shaped (1.6 x 2.5 m) with on the bottom several jars, an oil lamp, light-blue glass paste and many animal bones
Occupation phase: LR
Exact date: 4th c. AD
Interpretation: Villa (ditches (2))
Notes: V-shaped

79.
Site: Vlijtingen - Het kapelletje
Examination: Field survey
References: Duurland 2000: 43
Coordinates: 236058 / 169232
Occupation phase: MR
Exact date: 1st h. 2nd - 3rd c. AD
Interpretation: Villa
Material: Br; Si; T; Pt; Mt

80.
Site: Zichen-Zussen-Bolder - Mons Trudo Janstraat
Examination: Field survey
References: *Archéologie* 1969: 97; Savenay 1969: 205-206; De Boe 1976: pl. 1; Heeren 1976: 52
Coordinates: 239200 / 165780
CAI: 50535; 700015
Occupation phase: MR
Exact date: Trajan/Hadrian
Interpretation: Villa
Material: T; Si; Br; Wo; Tp; Ab; Pt; Fi; C; Mt; Gl
Notes: Knife; ca. 20 animal bones; bronze pins; three iron keys; Trajan coin; Samian ware

81.
Site: Vroenhoven - Op het Roof
Examination: Unknown
References: De Boe 1976: pl. 1
Coordinates: *238450 / 168960*
CAI: 700054
Occupation phase: (?)
Interpretation: Unknown

82.
Site: Zichen-Zussen-Bolder - Pitsjesberg
Examination: Chance find
References: Duurland 2000: 43
Coordinates: 238241 / 165204
CAI: 700005
Occupation phase: LR
Interpretation: Villa / farmstead (?)
Material: T; Pt; C
Notes: Only a few finds

83.
Site: Millen - Honsberg
Examination: Excavation and Field survey

References: Anonymous 1962; Bauwens-Lesenne 1968: 364; Duurland 2000: 40
Coordinates: 232686 / 163456
CAI: 700075; 915035
Occupation phases: MR; LR
Exact date: early-2nd - late-5th c. AD
Interpretation: Villa (cellar; other wall fragments)
Material: T; Si; Br; W; F; Pt
Notes: 500 m NE another concentration of tiles and pottery has been found in 2006

84.
Site: Zichen-Zussen-Bolder - Coutenberg
Examination: Field survey
References: Lux 1970: no. 50; Duurland 2000: 43
Coordinates: 238740 / 166510
CAI: 700014
Occupation phase: MR (?)
Interpretation: Farmstead (?)
Material: T; Pt

85.
Site: Herderen - Dorp
Examination: Field survey
References: Mertens 1964: fig. 13; Lux 1970: no. 38; Duurland 2000: 42
Coordinates: 234341 / 166752
CAI: 700085
Occupation phase: (?)
Interpretation: Unknown

86.
Site: Riemst - Maastrichtersteenweg
Examination: Chance find
References: Huybrigts 1905; Smeesters 1974; Hombroux 1982; Duurland 2000: 42
Coordinates: *236422 / 167460*
CAI: 700119
Occupation phase: MR
Exact date: End date is 268 AD
Interpretation: Villa (?)
Material: C
Notes: A coin hoard; according to some sources, also remains of a Roman building must have been found here of which nothing is left anymore today

87.
Site: Millen - Achter Meerhoven
Examination: Unknown
References: De Boe 1976: pl. 1
Coordinates: *235445 / 165111*
CAI: 700067
Occupation phase: (?)
Interpretation: Unknown

88.
Site: Millen - Elst
Examination: Unknown
References: Lux 1970: no. 43 (wrongly located); De Boe 1976: pl. 1; Duurland 2000: 41
Coordinates: *233668 / 162832*
CAI: 700076
Occupation phase: (?)
Interpretation: Unknown

89.
Site: Millen - Dries
Examination: Field survey
References: De Boe 1976: pl. 1
Coordinates: *233750 / 165290*
CAI: 700077; 9150366
Occupation phase: (?)
Interpretation: Stone building (?)
Material: T; Pt
Notes: Only one piece of tile and two pottery finds by Vanderbeken some 150 m SEE from spot De Boe marked

90.
Site: Riemst - Tongersesteenweg
Examination: Unknown
References: De Boe 1976: pl. 1
Coordinates: *236186 / 167317*
CAI: 700115
Occupation phase: (?)
Interpretation: Unknown

91.
Site: Riemst - Dorp
Examination: Field survey
Coordinates: 236780 / 167337
Occupation phase: (?)
Interpretation: Villa / farmstead
Material: T; Si; Pt

92.
Site: Valmeer - Meerberg
Examination: Excavation
References: *Archéologie* 1966: 69; 1972: 96; Bauwens-Lesenne 1968: 355; Lux 1970: no. 46; De Boe 1971a; Duurland 2000: 41
Coordinates: 235237 / 165820
CAI: 50124

Occupation phases: LIA; ER
Interpretation: Traditional farmstead (?)
Material: Ph; Tp
Notes: no structure could be deduced from postholes
Occupation phase: MR
Exact date: 2nd - 3rd century AD
Interpretation: Villa (villa; ditches (2))
Material: F; Br; Si; T; Tu; Ht; Pt; Mt; Gl; Tf; Ab
Notes: One ditch makes a 40°-corner and goes along in a 70°-direction

93.
Site: Vlijtingen - Op de Merkskens
Examination: Field survey
References: Lux 1970: no. 29; Duurland 2000: 42
Coordinates: 235027 / 169308
CAI: 700112
Occupation phase: ER (?)
Interpretation: Unknown
Material: Pt
Occupation phase: MR (?)
Exact date: 1st - 2nd century AD
Interpretation: Villa
Material: T; Si; Pt; Tf
Notes: Samian ware with stamp

94.
Site: Vroenhoven - Aan den Muizen gracht
Examination: Field survey
References: Lux 1970: no. 33; Duurland 2000: 44
Coordinates: 239890 / 168111
CAI: 700055
Occupation phases: LIA (?); ER (?)
Interpretation: Unknown
Material: Gl (La Tène bracelet)
Occupation phases: MR; LR
Exact date: late-1st - early-5th c. AD
Interpretation: Villa / farmstead
Material: T; Si; Pt; Tf

95.
Site: Vlijtingen - Zuidelijk van Vrouwenkapel
Examination: Field survey
References: Lux 1957: 19; 1970: no. 30; Duurland 2000: 42
Coordinates: 235831 / 168340
CAI: 50972; 700110
Occupation phase: MR
Exact date: 2nd h. 1st - 3rd c. AD
Interpretation: Villa
Material: T; Br; Si; Os; Gl; Pt; Tf

96.
Site: Millen - Mierenweg
Examination: Excavation
References: Anonymous 1962; Bauwens-Lesenne 1968: 364; Lux 1970: no. 44; De Boe 1976: pl. 1; Duurland 2000: 41
Coordinates: 234514 / 163434
CAI: 700071
Occupation phase: MR
Exact date: 2nd c. AD
Interpretation: Villa
Material: F; Br; W; T; Pt

97.
Site: Kanne - Caster
Examination: Excavation
References: H. Roosens 1975; 1976b; Hollstein 1976; Duurland 2000: 10-11
Coordinates: 242850 / 167000
CAI: 50122
Occupation phase: LIA
Interpretation: Enclosed fortification (fortification wall)
Material: Wo; Pt; Mt; C
Occupation phase: ER
Exact date: 1st c. BC
Interpretation: Enclosed fortification (fortification wall; ditches)
Material: Wo
Notes: Dating uncertain (see chapter 2); ditches are V-shaped (14 m wide and 4 m deep)

98.
Site: Zichen-Zussen-Bolder - Bolderstraat
Examination: Field survey
References: Lux 1970: no. 49; Creemers 1991: 32-33; Duurland 2000: 41
Coordinates: 236800 / 165230
CAI: 700007
Occupation phases: MR; LR
Exact date: 2nd h. 1st - 1st h. 4th c. AD
Interpretation: Villa
Material: T; Si; Os; Br; Pt; Fi; O; Ab (hairpins); Gl; Mt
Notes: Samian ware; amphora; mortarium; glass ribbowl; iron arrow

99.
Site: Vroenhoven - Tommendal
Examination: Field survey
References: Huybrigts 1904: 26; H. Roosens and Vanderhoeven 1955: no. 14; Bauwens-Lesenne 1968: 372; Heeren 1976: 51; Duurland 2000: 44
Coordinates: 239279 / 169736
CAI: 50977; 700056; 700676; 700677; 700681; 700686
Occupation phase: MR
Exact date: late-1st - 3rd c. AD
Interpretation: Villa
Material: T; Br; Si; Os; Ht; C; Pt; Mt; Gl
Notes: Large amount of coins (e.g. Domitian, Commodus, republican [90 BC]), Dolia, Samian ware, iron ring

100.
Site: Membruggen - Steenakker
Examination: Excavation and Field survey
References: Trips 1954: 181; Mertens 1954; H. Roosens and Vanderhoeven 1955: fig. 3; Bauwens-Lesenne 1968: 223-225; Duurland 2000: 42
Coordinates: 231411 / 168269
CAI: 700094
Occupation phase: MR
Exact date: 2nd - early-3rd c. AD
Interpretation: Villa (cellar; outbuilding (?))
Material: Br; T; W; F; Si; Pt
Notes: Outbuilding found in 1995, less than 100 m from the examined cellar from 1952; tiles with stamps AAF

101.
Site: Vlijtingen - Centrum
Examination: Excavation
References: H. Roosens 1960; Bauwens-Lesenne 1968: 364; Lux 1970: no. 26; Duurland 2000: 43
Coordinates: 236048 / 170147
CAI: 50372; 700098
Occupation phase: MR (?)
Interpretation: Villa
Material: T; Br; Pt
Notes: Large amount of jars

102.
Site: Millen - Klein Veldje
Examination: Excavation
References: *Archéologie* 1963: 65; Anonymous 1962; Lux 1970: no. 43; De Boe 1976: pl. 1; Duurland 2000: 41
Coordinates: 234540 / 162453
CAI: 700070
Occupation phase: MR (?)
Interpretation: Stone building (?)
Material: T

103.
Site: Herderen - Watertoren
Examination: Field survey
References: Lux 1970: no. 36; Anonymous 1998; Duurland 2000: 42
Coordinates: 233668 / 167061
CAI: 52346; 52395; 52421; 700088; 700090; 700732
Occupation phases: LIA; ER
Interpretation: Unknown
Material: Pt
Occupation phases: MR; LR (?)
Exact date: late-1st - early-4th c. AD
Interpretation: Villa
Material: T; Si; Tu; Br; Pt; Ab; C; Mt
Notes: Piece of quartz-breccia; piece of hairpin; bronze grapes

104.
Site: Herderen - Sieberg
Examination: Field survey
References: Lux 1970: no. 34; Duurland 2000: 42
Coordinates: 235089 / 167798
CAI: 700084; 52426; 915037
Occupation phases: LIA; ER
Interpretation: Unknown
Material: Gl (bracelet)
Occupation phase: (?)
Interpretation: Stone building (?)
Material: T
Notes: Only one tile found; Lux marks here a villa, while Duurland said to have found no material

105.
Site: Millen - Percelen
Examination: Field survey
Coordinates: 234806 / 163963
CAI: 915050; 915051; 700859
Occupation phase: MR (?)
Interpretation: Villa / farmstead
Material: T; Br; Si; Mt
Notes: Vanderbeken found several spots

with building material, while Schuermans found a celtic wheel 100 m from site

106.
Site: Valmeer - Boven het Kruis
Examination: Excavation and Field survey
References: Lux 1970: no. 47; Duurland 2000: 41; Pauwels *et al.* 2000: 48; 2002; Eerman 2002: 139
Coordinates: 235890 / 166070
CAI: 51743; 700081
Occupation phases: LIA; ER
Interpretation: Traditional farmstead (?)
Material: Ph; Tp; Gl (two La Tène bracelets)
Notes: No structures could be deduced from postholes
Occupation phase: MR
Interpretation: Villa
Material: T; Si; Br; Pt; Mt

107.
Site: Riemst - Visésteenweg
Examination: Field survey
References: Duurland 2000: 43
Coordinates: 237456 / 166631
CAI: 51241
Occupation phases: MR (?); LR
Exact date: 4th c. AD
Interpretation: Farmstead (?)
Material: T; Pt
Notes: One LR tile (with stamp); large amount of pottery

108.
Site: Roclenge-sur-Geer - Eglise
Examination: Unknown
References: Peuskens 1974: 157, no. 45; De Boe 1976: pl. 1
Coordinates: *236585 / 161577*
Occupation phase: (?)
Interpretation: Villa (?)
Material: Pt (Samian ware)

109.
Site: Eben-Emael - Guizette
Examination: Excavation
References: Lux 1970: no. 53; Close and Marcolungo 1985b; Van Ossel 1992: 289-290
Coordinates: 241554 / 165611
Occupation phases: MR; LR
Interpretation: Villa
Material: Br; Si; T; F; W; Os; Pt; C; Ab
Notes: Tiles stamped with "CTEC"

110.
Site: Eben-Emael - Sol' Pireû / Int'les deux voyes
Examination: Excavation
References: Close and Marcolungo 1985b; Close 1997b: 54-56
Coordinates: 240576 / 164499
Occupation phase: ER
Interpretation: Unknown
Material: Pt (one amphora)
Occupation phase: MR
Interpretation: Villa
Material: T; Si; Br; F; W; Ht; Tu; Si; Pt; Mt; Gl; Tf

111.
Site: Bassenge - Vieille eglise
Examination: Excavation
References: *Archéologie* 1946: 372; Bauwens-Lesenne 1968: 411-416**:** Close and Marcolungo 1985: no. 11; Close 1997a: 38; Duurland 2000: 45
Coordinates: 237930 / 162234
Occupation phases: LIA (?); ER (?)
Interpretation: Unknown
Material: Pt; Gl
Notes: La Tène bracelets; LIA pottery
Occupation phase: MR
Interpretation: Villa
Material: T; Br; F; W; Ht; Pt
Notes: In 1994-1995 latrines and bath building excavated

112.
Site: Wonck - Basse Cour
Examination: Excavation
References: Mertens 1958: 258; Lux 1970: no. 52; Close and Marcolungo 1986; Close 1997c: 117; Duurland 2000: 45
Coordinates: 238887 / 162865
Occupation phases: MR; LR
Exact date: late-1st - early-4th c. AD
Interpretation: Villa (?)
Notes: No finds are mentioned, but still scholars date the site to the MR period

113.
Site: Bassenge - Haut-du-Thier
Examination: Chance find
References: De Maeyer 1940: 105; Bauwens-Lesenne 1968: 411-416; De Boe

1976: pl. 1; Close and Marcolungo 1985b: no. 12; Duurland 2000: 45
Coordinates: *237995 / 162397*
Occupation phase: (?)
Interpretation: Villa / farmstead (?)
Material: Gl; Pt; Tf; Mt
Notes: A sundial found

114.
Site: Eben-Emael - Robinthier
Examination: Field survey
References: Lux 1970: no. 55; Duurland 2000: 45
Coordinates: 241384 / 163758
Occupation phase: (?)
Interpretation: Stone building (?)
Material: T

115.
Site: Boirs - Arbre du Gibet
Examination: Chance find
References: Defize-Lejeune 1964; Peuskens 1974: no. 47; De Boe 1976: pl. 1; Duurland 2000: 44
Coordinates: 234635 / 161890
Occupation phase: MR
Exact date: 2nd c. AD
Interpretation: Villa
Material: T; Br; W; Pt
Notes: One tile stamped with 'MHF'; apsidal brickwork found

116.
Site: Roclenge-sur-Geer - Sur les Coteaux
Examination: Unknown
References: Lux 1970: no. 48; De Boe 1976: pl. 1; Duurland 2000: 44
Coordinates: 235170 / 162376
Occupation phase: (?)
Interpretation: Unknown

117.
Site: Roclenge-sur-Geer - Roclenge-sur-Geer
Examination: Field survey
References: Lux 1970: no 48; De Boe 1976: pl. 1; Duurland 2000: 44-45
Coordinates: 235440 / 162962
Occupation phase: (?)
Interpretation: Villa / farmstead (?)
Material: T; Pt; Mt

118.
Site: Boirs - Brouck à l'Abê
Examination: Unknown
References: De Boe 1976: pl. 1; Duurland 2000: 44
Coordinates: 234815 / 161325
Occupation phase: (?)
Interpretation: Unknown

119.
Site: Eben-Emael - Steny
Examination: Excavation
References: Close and Marcolungo 1985b; Duurland 2000: 45
Coordinates: 240218 / 163731
Occupation phases: LIA; ER; MR (?)
Interpretation: Workshop (?) (Kiln)
Material: Br; Pt; Mt (metal slags); Gl
Notes: Probably used for metallurgy

120.
Site: Roclenge-sur-Geer - La Ville
Examination: Field survey
References: Peuskens 1974: 157, no. 44; De Boe 1976: pl. 1
Coordinates: *236953 / 161495*
Occupation phase: MR (?)
Interpretation: Villa
Material: Br; Pt
Notes: Painted plaster fragments

121.
Site: Romershoven - Kamp Veld
Examination: Literary evidence and Aerial photography
References: Capenberghs 1985: 153-154
Coordinates: *226450 / 172634*
CAI: 700562
Occupation phase: (?)
Type: Tumulus (?)
Way of Burying: Unknown

122.
Site: Sint-Huibrechts-Hern - Tombosch
Examination: Excavation
References: Van Doorselaer 1964: 144; Bauwens-Lesenne 1968: 331-337; Capenberghs 1985: 157-161; Amand and Nouwen 1989: 33-34; Duurland 2000: 38
Coordinates: 226131 / 168762
CAI: 700557
Occupation phases: MR
Exact date: late-2nd - early-3rd c. AD

Type: Tumuli (tumulus (1); tumulus (1); tumulus (4))
Way of Burying: Inhu- and cremation
Finds: Fi; Mt; Gl; Pt
Notes: First two are 16 x 30 m and sparsely studied; one of 19 x 40 m with large amount of pottery

123.
Site: Sint-Huibrechts-Hern - Het Bosch Veldje
Examination: Excavation and Field survey
References: Bauwens-Lesenne 1968: 314-315; Capenberghs 1985: 151-152
Coordinates: *227504 / 168220*
CAI: 700566
Occupation phase: (?)
Type: Grave field (?) (burial pits)
Way of Burying: Unknown
Finds: Pt
Notes: Little information

124.
Site: Schalkhoven - Steenberg Veld
Examination: Excavation
References: Van Doorselaer 1964: 143; Capenberghs 1985: 155-156
Coordinates: *226574 / 170055*
CAI: 700564
Occupation phase: (?)
Type: Grave field (?) (burial pits)
Way of Burying: Unknown
Notes: In 1866 excavated but never published

125.
Site: Hoeselt - De Houtem
Examination: Excavation and Field survey
References: Van Doorselaer 1964: 142-143; Bauwens-Lesenne 1968: 314-315; Capenberghs 1985: 162-164
Coordinates: 227318 / 167727
CAI: 700559
Occupation phase: MR
Exact date: mid- to late-2nd c. AD
Type: Tumuli (?) (tumulus (?); tumulus (?); tumulus (?))
Way of Burying: Inhumation (1); unknown (2)
Finds: C; Pt; Os; Gl
Notes: First is a rich burial, other two are only known from literary evidence

126.
Site: Kleine-Spouwen - Berg
Examination: Excavation (?)
References: Van Doorselaer 1964: 134; Heymans 1977: 32-34; Capenberghs 1985: 56-58; Duurland 2000: 39
Coordinates: *233126 / 171386*
CAI: 55249
Occupation phase: MR
Exact date: 2nd h. 2nd - 1st q. 3rd c. AD
Type: Burial pit (1)
Way of Burying: Cremation
Finds: Pt; C (?)
Notes: Huybrigts identifies the site as grave field, but mentions only one grave

127.
Site: Eigenbilzen - Hommelenberg
Examination: Excavation and Field survey
References: A. Claassen 1965: 100; Heymans 1977: 17-19; Capenberghs 1985: 45-47; Gorissen and Roosens 1989: 73
Coordinates: 234150 / 175355
CAI: 51921
Occupation phase: ER
Exact date: early-1st century AD
Type: Grave field (urns; burial pits)
Way of Burying: Inhu- and cremation
Finds: Pt; Mt; Wo
Occupation phase: MR
Exact date: till 3rd c. AD
Type: Grave field (urns; burial pits)
Way of Burying: Inhu- and cremation
Finds: Pt; Wo; Mt; Fi (?)
Notes: Many inhu- and cremation burials; one 2nd century AD grave

128.
Site: Hoelbeek - Ketelveld
Examination: Chance find
References: Capenberghs 1985: 54-55
Coordinates: 233586 / 173177
CAI: 50111
Occupation phase: MR
Exact date: 2nd c. AD
Type: Tumulus (?) (1)
Way of Burying: Cremation
Finds: Pt
Notes: Capenberghs doubts the amateur-archaeologist G.V. Lux' interpretation of the site as being a tumulus

129.
Site: Hees - Aen de Tombe
Examination: Excavation
References: H. Roosens and Vanderhoeven 1955: no. 1; Van Doorselaer 1964: 139; Capenberghs 1985: 50-53; Gorissen and Roosens 1989: 74; Duurland 2000: 40
Coordinates: 236526 / 173000
CAI: 55084; 55077
Occupation phase: MR
Exact date: late-2nd - early-3rd c. AD
Type: Tumulus (1)
Way of Burying: Cremation
Finds: C; Pt; Mt
Notes: Near border with Mopertingen; 12 x 25 m

130.
Site: Rosmeer - Op den Boelhof / Hinnedoak
Examination: Chance find
References: H. Roosens and Vanderhoeven 1955; Van Doorselaer 1964: 143; Capenberghs 1985: 62-65; Duurland 2000: 39
Coordinates: 234339 / 171542
CAI: 700514; 51571
Occupation phase: MR
Exact date: 2nd q. 2nd c. AD
Type: Tumulus (?) (1)
Way of Burying: Cremation
Finds: Pt; C; Mt; Wo
Notes: Wooden burial chamber; Capenberghs doubts if it is a leveled tumulus

131.
Site: Grote-Spouwen - Aen Paemen
Examination: Unknown
References: Van Doorselaer 1964: 131; Lux and Roosens 1972; Capenberghs 1985: 48-49
Coordinates: *233326 / 169520*
CAI: 700494
Occupation phase: (?)
Type: Tumulus
Way of Burying: Unknown
Notes: Leveled

132.
Site: Waltwilder - De Bek
Examination: Excavation
References: *Archéologie* 1965: 115; Lux 1970: no. 9; Capenberghs 1985: 66-69; Duurland 2000: 39
Coordinates: 232950 / 172980
CAI: 50168
Occupation phase: MR
Exact date: 3rd q. 2nd c. AD
Type: Tumuli (tumulus (1); tumulus (1); tumulus (1))
Way of Burying: Cremation
Finds: Pt; Wo; Mt; C

133.
Site: Lanaken - Smeermaas
Examination: Excavation
References: *Archéologie* 1965: 15; Bauwens-Lesenne 1968: 172; Lux 1970: no. 7; Heeren 1976: 20; Capenberghs 1985; Duurland 2000: 40
Coordinates: 241872 / 175386
CAI: 50174; 50011
Occupation phase: MR
Exact date: late-2nd - early-3rd c. AD
Type: Burial pit (1)
Way of Burying: Cremation
Finds: Pt; Gl; C

134.
Site: Rekem - Tombos
Examination: Excavation
References: Janssen and Vanderhoeven 1962: 123-129; Bauwens-Lesenne 1968: 308; M. Vanderhoeven and Janssen 1974
Coordinates: *242412 / 181009*
CAI: 60417
Occupation phase: ER
Exact date: mid-1st c. AD
Type: Grave field (urns (4))
Way of Burying: Cremation
Finds: Pt; Mt; Fi
Occupation phase: MR
Exact date: late-1st - 2nd century AD
Type: Grave field (urns (2))
Way of Burying: Cremation
Finds: Mt; Pt
Occupation phase: LR
Exact date: 4th century AD
Type: Grave field (urns (1))
Way of Burying: Cremation
Finds: Pt
Notes: Continuity from LIA to the Merovingian period

135.
Site: Neerharen - Ladderstraat
Examination: Chance find
References: A. Claassen 1973: 167-172
Coordinates: 242609 / 178867
CAI: 51268; 50862
Occupation phase: MR
Type: Burial pit (1)
Way of Burying: Inhumation
Finds: Gl; Pt; Mt

136.
Site: Rekem - Grens Neerharen
Examination: Chance find
References: Bauwens-Lesenne 1968: 309
Coordinates: 242624 / 178963
CAI: 50579
Occupation phase: (?)
Type: Burial pit (1)
Way of Burying: Unknown
Finds: Pt; Gl

137.
Site: Veldwezelt - Kesselt
Examination: Literary evidence
References: Heeren 1976: 49; *Archéologie* 1983: 125; Capenberghs 1985
Coordinates: *239198 / 171356*
CAI: 55367; 51353
Occupation phase: (?)
Type: Tumulus (?)
Way of Burying: Unknown
Notes: Leveled

138.
Site: Lanaken - Brugstraat
Examination: Excavation
References: Bauwens-Lesenne 1968: 174; Lux 1970: no. 8; A. Claassen 1973: 13; Heeren 1976: 20; Capenberghs 1985
Coordinates: 241832 / 175447
CAI: 51328; 50012; 50846
Occupation phase: (?)
Type: Burial pits (4)
Way of Burying: Cremation
Finds: Gl; Pt; C

139.
Site: Neerharen - Kasteelderweide
Examination: Excavation
References: Capenberghs 1985: 174-177
Coordinates: *243007 / 178495*
CAI: 700204
Occupation phase: ER
Type: Burial pit (1)
Way of Burying: Unknown

140.
Site: Rekem - Aan Sint-Petronellakapel
Examination: Chance find
References: Janssen and Vanderhoeven 1962: 129-131; Heeren 1976: 41; De Boe 1981a: 37-41; Capenberghs 1985: 185-187
Coordinates: *242531 / 179092*
CAI: 51642
Occupation phase: MR
Exact date: 2nd - 3rd century AD
Type: Grave field (burial pits (ca. 20))
Way of Burying: Cremation
Finds: Pt; Gl
Occupation phase: LR
Exact date: 4th c. AD
Type: Grave field (burial pits (ca. 2))
Way of Burying: Inhumation
Finds: Pt

141.
Site: Veldwezelt - Op den Meulen Weg
Examination: Excavation
References: *Archéologie* 1974: 85; Capenberghs 1985: 188-189
Coordinates: 238661 / 172812
CAI: 50120
Occupation phases: MR
Type: Burial pit (1)
Way of Burying: Cremation

142.
Site: Neerharen - Aan de Heerebaan
Examination: Chance find
References: Bauwens-Lesenne 1968: 245; A. Claassen 1973: 14; Heeren 1976: 33; Capenberghs 1985: 171-173
Coordinates: 242497 / 178372
CAI: 700202; 50216; 51641; 50860; 50356
Occupation phase: (?)
Type: Grave field (urns (ca. 3))
Way of Burying: Cremation
Finds: Pt; C; Mt; Gl

143.
Site: Lauw - Het Tom Veld
Examination: Excavation
References: Van Doorselaer 1964: 137; Capenberghs 1985: 266-268; Massart 1994: 99-100; Knaepen 2001: 146-147

Coordinates: 223955 / 157542
CAI: 700469
Occupation phase: (?)
Type: Tumulus
Way of Burying: Unknown

144.
Site: Nerem - Aen het Tomken
Examination: Chance find
References: Capenberghs 1985: 273-274
Coordinates: *230106 / 161556*
Occupation phase: (?)
Type: Tumulus (20)
Way of Burying: Inhumation
Notes: Capenberghs suggests also secondary burials

145.
Site: Piringen - Tom Veld
Examination: Literary evidence
References: Capenberghs 1985: 276-278
Coordinates: *223309 / 164750*
CAI: 50104
Occupation phase: (?)
Type: Tumulus (?)
Way of Burying: Unknown
Notes: Leveled

146.
Site: 's Herenelderen - Op den Flikken Berg
Examination: Literary evidence
References: *Archéologie* 1970: 21; Capenberghs 1985: 288-289; Knaepen 2001: 124-125
Coordinates: *230646 / 167573*
CAI: 700444; 50543
Occupation phase: (?)
Type: Tumulus (?)
Way of Burying: Unknown
Notes: Leveled (?)

147.
Site: Henis - Het Tom Veld
Examination: Literary evidence
References: Van Doorselaer 1964: 132; Capenberghs 1985: 260-261; Knaepen 2001: 137
Coordinates: *228037 / 167222*
CAI: 700359
Occupation phase: (?)
Type: Tumulus
Way of Burying: Unknown
Notes: Leveled

148.
Site: Tongres - Beukenberg
Examination: Visible
References: Van Doorselaer 1964: 135; Massart 1994: 101-102
Coordinates: 225566 / 163567
CAI: 700408
Occupation phase: MR (?)
Type: Tumulus
Way of Burying: Cremation
Finds: Pt; Gl

149.
Site: Koninksem - Romeinse Kalsijde
Examination: Visible
References: Van Doorselaer 1964: 135; Massart 1994: 103-105; Knaepen 2001: 141
Coordinates: 225500 / 162668
CAI: 700426
Occupation phase: MR (?)
Type: Tumulus
Way of Burying: Cremation

150.
Site: Koninksem - Binnenveldje
Examination: Visible
References: Van Doorselaer 1964: 135; Massart 1994: 103-105
Coordinates: 225878 / 162593
CAI: 700427
Occupation phase: MR (?)
Type: Tumulus (1)
Way of Burying: Cremation
Finds: Pt; Gl; C; Mt

151.
Site: Tongres - Jaminéstraat
Examination: Excavation
References: Vanvinckenroye 1990
Coordinates: 227859 / 164172
CAI: 700417; 50468
Occupation phase: LR
Exact date: mid-4th - mid-5th c. AD
Type: Grave field (burial pits (184))
Way of Burying: Inhumation
Finds: Pt; Mt
Notes: part of Tongres' grave field; early-Christian grave field
Type: Grave field (burial pits (16))
Way of Burying: Inhumation
Finds: Pt; Mt
Notes: part of Tongres' grave field;

northern zone of grave field and most finds found here

152.
Site: Tongres - Aan de Zeedijken
Examination: Excavation
References: *Archéologie* 1947: 130
Coordinates: *226225 / 163645*
CAI: 50546
Occupation phase: LR
Exact date: 4th c. AD
Type: Burial pit (1)
Way of Burying: Inhumation
Finds: Pt; Mt
Notes: part of Tongres' grave field; bones in situ

153.
Site: Tongres - Paspoel
Examination: Excavation
References: *Archéologie* 1976: 19-20
Coordinates: *226337 / 163413*
CAI: 50415
Occupation phase: MR
Exact date: ca. 80-110 AD
Type: Burial pit (1)
Way of Burying: Inhumation
Finds: Pt
Notes: part of Tongres' grave field; many trash pits in the vicinity

154.
Site: Tongres - Darenbergstraat
Examination: Excavation
References: A. Vanderhoeven and Vynckier 2003; 2006
Coordinates: 227799 / 164543
CAI: 51943
Occupation phase: LR
Exact date: mid-4th c. AD
Type: Burial pit (1)
Way of Burying: Inhumation
Finds: Gl; Pt; Mt; Wo
Notes: part of Tongres' grave field

155.
Site: Tongres - St. Antonius Veld
Examination: Excavation
References: De Schaetzen and Vanderhoeven 1955: 101-106; Faider-Feytmans 1956
Coordinates: 228363 / 164564
CAI: 51977
Occupation phase: ER
Exact date: Claudian/Neronian
Type: Burial pit (1)
Way of Burying: Unknown
Finds: Pt; Gl
Notes: part of Tongres' grave field

156.
Site: Tongres - Elderseweg
Examination: Excavation
References: De Schaetzen and Vanderhoeven 1955: 107-113; Faider-Feytmans 1956
Coordinates: 228153 / 164449
CAI: 51978; 51647
Occupation phase: MR
Exact date: late-2nd - early-3rd c. AD
Type: Burial pit (1)
Way of Burying: Cremation
Finds: Pt; Gl
Notes: part of Tongres' grave field

157.
Site: Rutten - Op de Tomkens
Examination: Literary evidence
References: Capenberghs 1985: 282-283; Knaepen 2001: 165
Coordinates: *226205 / 158519*
CAI: 700452
Occupation phase: (?)
Type: Tumulus (?)
Way of Burying: Unknown
Notes: Leveled

158.
Site: Henis - Het dorp
Examination: Excavation
References: Capenberghs 1985: 256-257; Knaepen 2001: 135
Coordinates: *227862 / 165766*
CAI: 700361
Occupation phase: MR (?)
Type: Burial pits (2)
Way of Burying: Unknown
Finds: Pt; Gl
Notes: Little information

159.
Site: Rutten - Plat Tom
Examination: Literary evidence
References: Capenberghs 1985: 284-285; Knaepen 2001: 164
Coordinates: *226784 / 158664*
CAI: 700453
Occupation phase: (?)

Type: Tumulus (?)
Way of Burying: Unknown
Notes: Leveled (?)

160.
Site: Tongres - Ijzerenborn
Examination: Excavation
References: Van Crombruggen 1962: 36-50; *Archéologie* 1973: 76-77
Coordinates: 227213 / 164635
CAI: 50397; 700424
Occupation phase: MR
Exact date: < 250 AD
Type: Grave field (burial pits (67))
Way of Burying: Cremation
Occupation phase: LR
Exact date: > 3rd c. AD
Type: Grave field (burial pits (33))
Way of Burying: Inhumation
Notes: Part of Tongres' grave field

161.
Site: Tongres - SE Grave Field
Examination: Excavation
References: *Archéologie* 1942: 302; 1967: 31; Van Crombruggen 1962: 38-39; H. Roosens and Lux 1970; Mertens and Vanvinckenroye 1975: 7-9; Vanvinckenroye 1984; A. Vanderhoeven and Vynckier 2002: 245-250
Coordinates: 226241 / 163188
CAI: 51419; 52246; 51643; 51674; 52245; 52244; 700430; 50544; 700416
Occupation phase: ER
Exact date: mid-1st c. AD
Type: Grave field (burial pits (100))
Way of Burying: Cremation
Finds: Pt; C; Gl
Occupation phase: MR
Exact date: late-1st - early-3rd c. AD
Type: Grave field (burial pits (202))
Way of Burying: Inhu- and cremation
Finds: Pt; C; Gl; Mt
Occupation phase: LR
Exact date: late-3rd - 5th c. AD
Type: Grave field (burial pits (101))
Way of Burying: Inhu- and cremation
Finds: Pt; C; Gl
Notes: Part of Tongres' grave field

162.
Site: Riksingen - Het Krikelere Veld
Examination: Literary evidence
References: *Archéologie* 1970: 21; Capenberghs 1985: 278-279
Coordinates: *227041 / 165827*
CAI: 50547
Occupation phase: (?)
Type: Tumulus (?)
Way of Burying: Unknown
Notes: Leveled

163.
Site: Lauw - Onder de Gerens Gracht
Examination: Literary evidence
References: Capenberghs 1985: 269-270; Knaepen 2001: 147-148
Coordinates: 223572 / 160600
CAI: 700471; 700470
Occupation phase: (?)
Type: Tumulus (?)
Way of Burying: Unknown
Notes: Leveled

164.
Site: Lauw - Het dorp
Examination: Literary evidence
References: Capenberghs 1985: 264-265; Knaepen 2001: 148
Coordinates: *223819 / 159501*
CAI: 700472
Occupation phase: (?)
Type: Tumulus (?)
Way of Burying: Unknown

165.
Site: Tongres - Cercle Veld
Examination: Excavation
References: *Archéologie* 1963: 12, pl. 2a
Coordinates: 227888 / 164028
CAI: 50467
Occupation phase: LR
Type: Burial pit (1)
Way of Burying: Inhumation

166.
Site: Berg - In het Tomveld
Examination: Excavation
References: Van Doorselaer 1964: 127; Bauwens-Lesenne 1968: 14; Capenberghs 1985: 252-255; Knaepen 2001: 125-126
Coordinates: 229849 / 164446
CAI: 700448; 51893; 51892; 51631
Occupation phase: ER
Exact date: 1st/2nd c. AD
Type: Grave field (burial pits (10))

Way of Burying: Unknown
Finds: C; Pt
Notes: Gallic-Nervian coin
Occupation phase: MR
Exact date: 2nd c. AD
Type: Tumulus (1)
Way of Burying: Cremation
Finds: Pt; Gl; C; Mt
Notes: Uncertainty about information of old excavation

167.
Site: Millen - Aen het Tomken
Examination: Visible
References: Van Doorselaer 1964: 147-148; Bauwens-Lesenne 1968: 355-356; Capenberghs 1985: 232-234; Duurland 2000: 41
Coordinates: 235277 / 163327
CAI: 700425; 50967
Occupation phase: MR
Exact date: 3rd c. AD
Type: Tumulus (1)
Way of Burying: Inhumation
Finds: Pt; Mt; Gl
Notes: Capenbergh's claim that the burial is a later addition to a burial mound is unwarranted

168.
Site: Herderen - Gentombe
Examination: Visible
References: Van Doorselaer 1964: 132; Lux 1970: no. 37; Capenberghs 1985: 221-222; Massart 1994: 96-97; Duurland 2000: 42
Coordinates: 234599 / 166802
CAI: 700086; 915009
Occupation phase: MR (?)
Type: Tumulus
Notes: Maybe one or two other burial mounds in the vicinity

169.
Site: Vroenhoven - Tommendael
Examination: Literary evidence
References: H. Roosens and Vanderhoeven 1955: 59; Van Doorselaer 1964: 149; Capenberghs 1985: 237-238; Duurland 2000: 44
Coordinates: *239100 / 169318*
CAI: 700058; 50975
Occupation phase: (?)
Type: Tumulus
Way of Burying: Unknown
Notes: Leveled in 1804

170.
Site: Zichen-Zussen-Bolder - Op Sicher Weegsken
Examination: Visible
References: Van Doorselaer 1964: 150; Bauwens-Lesenne 1968: 388; Heeren 1976: 53; Capenberghs 1985: 239-240; Duurland 2000: 43
Coordinates: 239358 / 166588
CAI: 700012; 50980; 50973
Occupation phase: (?)
Type: Tumulus
Way of Burying: Unknown

171.
Site: Membruggen - Op de Tombe
Examination: Field survey
References: Van Doorselaer 1964: 131; Capenberghs 1985: 229-230; Duurland 2000: 38
Coordinates: *232574 / 168328*
CAI: 700093
Occupation phase: (?)
Type: Tumulus (?)
Way of Burying: Unknown

172.
Site: Vlijtingen - Dorp
Examination: Chance find
References: Heymans 1977: 112-115; Vanvinckenroye 1981; Capenberghs 1985: 235-236; Duurland 2000: 43
Coordinates: 235893 / 169198
CAI: 50115
Occupation phase: MR
Exact date: 2nd-3rd century AD
Type: Tumulus (tumulus (1); burial pits)
Way of Burying: Unknown; cremation (?)
Finds: Mt
Notes: Burial pits interpreted as secondary burial (?)

173.
Site: Riemst - Maastrichtersteenweg
Examination: Chance find
References: De Schaetzen 1950; Van Doorselaer 1964: 142; M. Vanderhoeven 1976: 3-19; Capenberghs 1985: 215-218; Duurland 2000: 42-43
Coordinates: *236853 / 167869*

CAI: 50121
Occupation phase: MR
Exact date: mid-2nd c. AD
Type: Tumulus (1)
Way of Burying: Cremation
Finds: Wo; Mt; Pt; Gl
Notes: Some scholars interpret it as woman's burial due to the necklace

174.
Site: Kanne - De Heijse
Examination: Excavation
References: H. Roosens and Lux 1970; Capenberghs 1985: 225-228; Duurland 2000: 46
Coordinates: 241666 / 166910
CAI: 50123
Occupation phase: MR
Exact date: ca. 90 - 100 AD
Type: Tumulus (1)
Way of Burying: Cremation
Finds: Pt; C; Mt; Gl
Notes: 30 m (diameter)

175.
Site: Valmeer - Bolderstraat
Examination: Excavation
References: Pauwels *et al.* 2002
Coordinates: 236979 / 165410
CAI: 51965
Occupation phase: LR
Exact date: 4th - 5th c. AD
Type: Burial pits (burial pit (1); burial pit (1); burial pit (1))
Way of Burying: Inhu- and cremation
Finds: Gl; Pt; C; Mt

176.
Site: Herderen - Over den Bilzerweg
Examination: Literary evidence
References: Van Doorselaer 1964: 132; Lux 1970: no. 35; Capenberghs 1985: 223-224; Duurland 2000: 42
Coordinates: 233581 / 166913
CAI: 700091
Occupation phase: (?)
Type: Tumulus (?)
Way of Burying: Unknown
Notes: Possibly not Roman according to Capenberghs; next to it many pottery finds

177.
Site: Eben-Emael - Sur-les-Jardins
Examination: Excavation
References: Close and Marcolungo 1985a; Duurland 2000: 45
Coordinates: *240817 / 164308*
Occupation phase: ER (?)
Exact date: 1st h. 1st c. AD
Type: Grave field (urn (1))
Way of Burying: Cremation
Finds: Fi; Pt
Occupation phase: MR
Exact date: late-1st - early-3rd c. AD
Type: Grave field (urns (ca. 20))
Way of Burying: Cremation
Finds: Pt; Fi; Gl; C; Mt

178.
Site: Glons - Limite de Boirs
Examination: Literary evidence
References: Van Doorselaer 1964: 106
Coordinates: 234497 / 160642
Occupation phase: (?)
Type: Burial pit
Way of Burying: Unknown

179.
Site: Eben-Emael - Thier-de-la-Tombe
Examination: Visible
References: Van Doorselaer 1964: 105; Lux 1970: no. 54; Close and Marcolungo1985a: no. 4
Coordinates: *242154 / 165168*
Occupation phase: MR (?)
Type: Tumulus
Way of Burying: Unknown

180.
Site: Roclenge-sur-Geer - Carrière Communale
Examination: Chance find
References: Van Doorselaer 1964: 117; Bauwens-Lesenne 1968: 424-426
Coordinates: *236572 / 161959*
Occupation phase: (?)
Type: Burial pit
Way of Burying: Cremation
Finds: Pt

181.
Site: Bassenge - Colline
Examination: Excavation
References: Van Doorselaer 1964: 99; Bauwens-Lesenne 1968: 412-416

Coordinates: *237959 / 161372*
Occupation phase: MR
Exact date: 1st h. 2nd c. AD
Type: Grave field (burial pits (ca. 10))
Way of Burying: Cremation
Finds: Gl; Mt; Pt; C

A Roman cadastre is a particular form of land allotment which looks like a chequerboard. It was implemented by the Romans in regions throughout the Empire, from Syria to Gaul. Yet, how did a Roman cadastre exactly look like? What has Roman cadastration in common with centuriatio and parcellation, and what not? Are aerial photographs and maps a reliable source to reveal traces of a Roman cadastre? Did Roman cadastres exist outside the Mediterranean region, and if so, what are the consequences of its existence on a socio-cultural level? Behind these apparently straightforward questions are for most scholars simple definitive answers. On the basis of these answers scholars have regarded the archaeological study of Roman cadastres often as optimistic, biased and even unscientific.

In *Cadastres, Misconceptions & Northern Gaul* Rick Bonnie argues that during the Middle-Roman period a cadastre was implemented by the Romans around the provincial Roman city of Tongres. In contrast to general beliefs, Bonnie demonstrates that it is possible, using aerial photographs and maps, to reconstruct a landscape outside the Mediterranean region that was overlain by a Roman cadastre. It furthermore discusses and examines the history of research, historical and archaeological sources on Roman cadastres, as well as the Roman period of the Belgian Hesbaye region.

Rick Bonnie studied Classical Archaeology at Leiden University (MA cum laude 2008). His thesis was awarded the W.A. van Es-prize by the Dutch Institute for Cultural Heritage and was nominated for the Leiden University thesis prize 2007-2008.

Sidestone Press

ISBN: 978-90-8890-024-2

69373302

Bestelnummer: SSP41920001