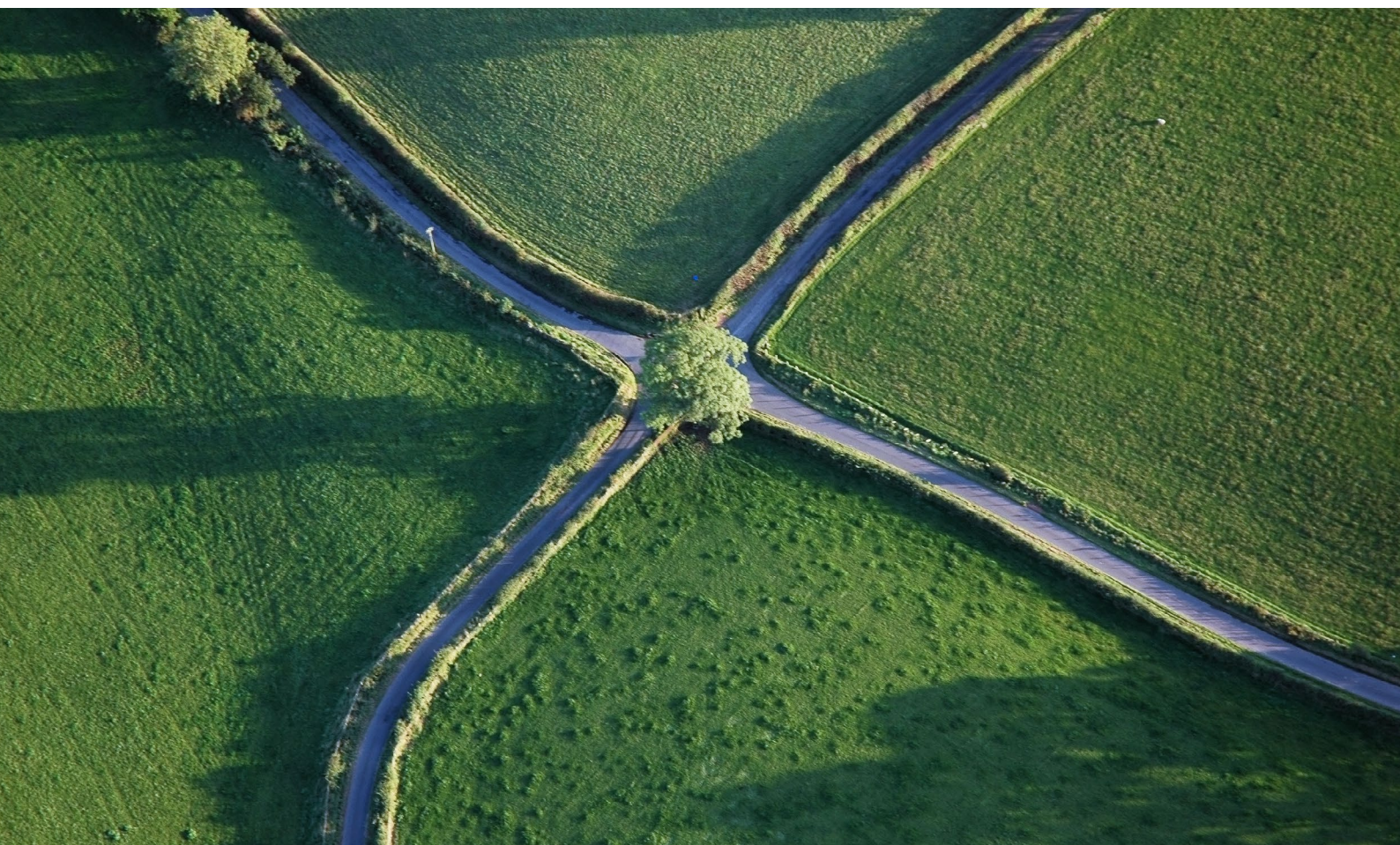




INTER-SECTION

Innovative approaches by Junior Archaeological Researchers

II



PATTERNS IN THE DISTRIBUTION OF GRAVES IN THE CENTRAL MEDIEVAL CEMETERY OF REUSEL, THE NETHERLANDS
LOCAL VARIATIONS IN BURIAL PRACTICES
Catelijne I. Nater

LIMINALITY ALONG THE LIMES
A STUDY ON THE MATILO MASK, ITS DEPOSITIONAL CONTEXT AND THE ASSOCIATED FINDS
Tom E. de Rijk

DETECTING CULTURAL FORMATION PROCESSES THROUGH ARTHROPOD ASSEMBLAGES
A CONCEPTUAL MODEL FOR URBAN ARCHAEOLOGICAL WASTE-/CESSPITS
Sander E. I. Aerts

MOLLUSC COLLECTION AND SALT-PRODUCTION RESOURCE-PROCUREMENT AND DISTRIBUTION IN THE GULF OF FONSECA
Marie M. Kolbenstetter

THE 'LIVELY' STREETS OF CLASSICAL OLYNTHOS
A SPATIAL ANALYSIS OF URBAN LIFE ON THE NORTH HILL, 432 – 348 BCE
Elena Cuijpers

INTER-SECTION
15 December 2016
Volume II

www.inter-section.nl



COLOFON

INTER-SECTION

Innovative Approaches by Junior Archaeologists

Volume 2

15 December 2016

ISSN Printed version: 2452-266X (200 copies)

ISSN Online version: 2452-2678

Cover photo: www.frogwell.com

Einsteinweg 2
2333 CC Leiden
the Netherlands
editorialboard@inter-section.nl
www.inter-section.nl
Twitter: @_INTER_SECTION_
www.facebook.com/journalintersection

Editorial Board

Mette Langbroek
Robin Nieuwenkamp
Dean Peeters
Femke Reidsma
Roosmarie Vlaskamp

Advisory Committee

Dr. M.M. Antczak
Dr. A. Brysbaert
Dr. B.S. Düring
Dr. M.H. van den Dries
Prof. Dr. H. Fokkens
Prof. Dr. D.R. Fontijn
Dr. A. Geurds
Prof. Dr. R.B. Halbertsma
Prof. Dr. C.L. Hofman
Prof. Dr. M.L.P. Hoogland
Dr. H. Kamermans
Prof. Dr. J.C.A. Kolen
Prof. Dr. J.W.M. Roebroeks
Prof. Dr. F.C.J.W. Theuus
Prof. Dr. A.L. van Gijn
Prof. Dr. Th. van Kolfschoten
Prof. Dr. M.J. Versluys
Dr. J.A.C. Vroom

Layout and Editor of Illustrations

Joanne Porck

Printer

Drukkerij de Bink



Faculty of Archaeology

CONTENTS

Editorial Preface

*Dean Peeters, Mette B. Langbroek, Robin Nieuwenkamp,
Femke H. Reidsma, Roosmarie J.C. Vlaskamp*
‘ALLER ANFANG IST SCHWER’

2

Catelijne I. Nater

**PATTERNS IN THE DISTRIBUTION OF GRAVES IN THE
CENTRAL MEDIEVAL CEMETERY OF REUSEL, THE
NETHERLANDS**
LOCAL VARIATIONS IN BURIAL PRACTICES

5

Tom E. de Rijk

LIMINALITY ALONG THE LIMES
**A STUDY ON THE MATILO MASK, ITS DEPOSITIONAL CONTEXT
AND THE ASSOCIATED FINDS**

14

Sander E. I. Aerts

**DETECTING CULTURAL FORMATION PROCESSES THROUGH
ARTHROPOD ASSEMBLAGES**
A CONCEPTUAL MODEL FOR URBAN ARCHAEOLOGICAL WASTE-/CESSPITS

22

Marie M. Kolbenstetter

**MOLLUSC COLLECTION AND SALT-PRODUCTION
RESOURCE-PROCUREMENT AND DISTRIBUTION IN THE GULF OF
FONSECA**

29

Elena Cuijpers

THE ‘LIVELY’ STREETS OF CLASSICAL OLYNTHOS
A SPATIAL ANALYSIS OF URBAN LIFE ON THE NORTH HILL, 432 – 348 BCE

36

Thesis Overview

September 2015 - August 2016

43

EDITORIAL PREFACE

‘ALLER ANFANG IST SCHWER’

*Dean Peeters¹, Mette B. Langbroek²
Robin Nieuwenkamp³, Femke H. Reidsma⁴, Roosmarie J.C. Vlaskamp⁵*

It is with great pleasure that we present to you the second volume of INTER-SECTION: Innovative Approaches by Junior Archaeological Researchers. This journal emanates from the observation that student research, which is carried out conforming to high theoretical and methodological standards, is generally only read by a handful of people. Our aim is to make student research performed at the Faculty of Archaeology, Leiden University, available to a broader public by stimulating these junior archaeologists to channelize their ‘fresh’ and innovative ideas and practice into short, focused articles. Reviews conducted by renowned external scholars further aid in the improvement of these papers and provide invaluable experience for a future academic career. The product of another cycle of writing, reviewing, rewriting and editing lies here in front of you. We wish you a happy and interesting read with our present volume!

E-mail address: editorialboard@inter-section.nl

¹*uni-koln.academia.edu/DeanPeeters*

²*leidenuniv.academia.edu/MetteLangbroek*

³*leidenuniv.academia.edu/RobinNieuwenkamp*

⁴*leidenuniv.academia.edu/FemkeReidsma*

⁵*leidenuniv.academia.edu/RoosmarieVlaskamp*

‘By three methods we may learn wisdom:

*First, by reflection, which is noblest
Second, by imitation, which is easiest
and third by experience, which is the bitterest’*

Confucius (551 BC - 479 BC)

On September 17, 2015, *INTER-SECTION*, Innovative Approaches by Junior Archaeological Researchers was successfully launched with the presentation of its first volume during the Dean’s lectures at the Faculty of Archaeology,

Leiden University. Over a year later, we are very pleased to present the second volume, again comprised of innovative studies carried out by (recently graduated) Archaeology students from Leiden University. As described in the quote above, Confucius believed reflection to be the “noblest” method for obtaining wisdom. And while this may only be our second publication, we feel it is never too early to reflect on one’s experiences.

In our editorial statement accompanying *INTER-SECTION 1*, we acknowledged and sketched the confusing and problematic reality that recently graduated students face when trying to take

the next step on the academic ladder and entering an increasingly more competitive academic arena: more and more academic development and maturity is expected from recently graduated students. The phrase ‘publish or perish’ seems very applicable to this current situation, as up and around three publications seems to have become the norm against which a CV will be evaluated, for instance, during a Ph.D.-application.

This experience and/or academic track-record is, however, often hard to obtain while studying for your degree(s). This period should instead be spent developing your interests and yourself as a person, and to a lesser degree on building an extensive list of academic publications, conference presentations and similar activities. A certain pressure thus exists to publish one’s research at an early stage. By trying to facilitate this difficult (and often first) step towards publishing in an academic language through a system of teaching referees and anonymous, international reviewers, we hope to stimulate and support innovative junior archaeologists to publish their own research and make it available for a broader scientific community.

That experiencing and reflecting can both be ‘bitter’ trajectories is something potential authors—and we ourselves as junior editors in the same academic field—have encountered during the last cycles of peer-review for this postponed second volume. This illustrates the exact reason why our initiative, just like the long-running *Tijdschrift voor Mediterrane Archeologie*¹ and recently initiated *Kleos* (Amsterdam Bulletin of Ancient Studies and Archaeology)², fulfils an important role by stimulating and facilitating student publication in an accessible way. Specifically, the opportunity to receive constructive reviews by specialists in a junior archaeologist’s own field provides a certain moment of reflection that is usually restricted to a single instance of feedback and rewriting on one’s first version of a thesis. The writing of a short, focused article appears to be a different exercise entirely. ‘Aller Anfang ist schwer’, is the way in which these important, but now and then difficult, first steps on the academic ladder can be aptly phrased in German.

1 The small alleys, stenopoi, running from east to west in the middle of each house block are excluded from the analysis, as they were mainly used for drainage and not for passage (Robinson and Graham 1938, 33-39; Nevet 1999, 55-56). Another hypothesis is that the alleys serve as light sources, allowing light to enter the houses through windows placed along the walls (Graham 1958, 322).

2 The small alleys, stenopoi, running from east to west in the middle of each house block are excluded from the analysis, as they were mainly used for drainage and not for passage (Robinson and Graham 1938, 33-39; Nevet 1999, 55-56). Another hypothesis is that the alleys serve as light sources, allowing light to enter the houses through windows placed along the walls (Graham 1958, 322).

As we conclude our ‘noble’ moment of reflection, we again remember Confucius who not only tells us that life can at times be bitter, but also that beauty is everywhere around us. We believe this is reflected in the fine collection of papers bundled into this volume.

Contents

We are very happy and proud to present to you in this second volume papers that focus on various regions, timespans and themes of research, and work between and across the traditional archaeological ‘specialisations’ offered by the Leiden University Faculty of Archaeology; worthy of the name *INTER-SECTION*.

The first contribution is by Cathelijne Nater and offers a detailed spatial evaluation of burial practices at the cemetery of Reusel (Noord-Brabant, the Netherlands) from the 10th-13th centuries CE, focusing on grave orientation and morphology. By discussing her findings in the light of differentiation on the basis of social status and gender, Nater comes to the conclusion that the site-specific pattern and inter-site variation in burial customs in this period to some extent resulted from the freedom to which local communities could “give their own interpretation to Christian rituals”.

Tom de Rijk’s study is also set in the Netherlands and focuses on the Roman cavalry helmet that was excavated at Matilo (Leiden, the Netherlands). De Rijk takes the unique opportunity to thoroughly evaluate this extraordinary find in the same light as the archaeological layers in which it was retrieved, “possibly liminal and *in situ*”. In this way, de Rijk contributes to a better understanding on the questions “if this helmet should be seen as a ritual deposition” and “whether the concept of liminality can be applied to the Matilo mask”.

The next contribution stays in the field of contextual depositional analyses of archaeological evidence, specifically discussing how remains of arthropods (i.e., invertebrate insects and spiders) can provide additional depositional information in archaeological contexts. In his contribution, Sander Aerts evaluates and elaborates upon Michael Schiffer’s classic work *Formation Processes of the Archaeological Record* and proposes a conceptual model linking arthropods assemblages to cultural formation processes, potentially leading to a better understanding of stratigraphy and deposition by allowing for the identification of “ ‘invisible’ stratigraphies and functions”.

In her article, Marie Kolbenstetter explores the collection of molluscs and the production of salt in the Gulf of Fonseca, bordering El Salvador, Honduras and Nicaragua, from roughly 550 to 1200 CE. Based on several case studies from around the Gulf, various economic models of procurement and redistribution, including centralized production and seasonal mobility, are put forward and tested. By evaluating the traces of these economic activities, Kolbenstetter gains a better understanding of the regional pattern of economic activity and the economic advantages that are offered by the Gulf of Fonseca.

In the last contribution, Elena Cuijpers evaluates the Greek site of Olynthus from a spatial perspective. Using the exceptional preservation of this site to her advantage, Cuijpers applies a range of macro- and micro-scale space-syntax analyses to examine the built and non-built environment and manages to provide additional perspectives on the seemingly well-known "lively streets of Olynthus", specifically regarding matters of social activity, social control, privacy and movement through this urban environment.

Acknowledgements

First and foremost, we would like to thank the contributing authors, Sander Aerts, Elena Cuijpers, Marie Kolbenstetter, Catelijne Nater and Tom de Rijk, for their enthusiasm and for sharing their excellent research with us in this second volume of *INTER-SECTION*. We are very thankful for the many people who have contributed and supported us, and our aims, in our last cycle towards publication. A special word of gratitude is needed for the members of the Board of the Faculty of Archaeology, Leiden University, our Editorial Advisory Committee, the authors' teaching referees and the anonymous reviewers for their invaluable support in making this volume possible. Furthermore, we are very grateful for the initiative taken by Dr. Geeske Langejans to organise a skill-course on academic writing for the authors of the current volume, which provided another precious and fruitful moment of feedback for the individual authors, certainly contributing to the quality of this second volume. We also would like to thank Andrew Sorensen for his kind proof-reading of this preface and English language revisions. A further thank you and welcome is wished here to Femke Reidsma, who replied positively and full of enthusiasm to our request to join our Editorial Board after the publication of our first volume last year.

Practical Details

INTER-SECTION: Innovative Approaches by Junior Archaeological Researchers is an open-access

journal. It is our aim to publish twice a year, both online (<http://www.inter-section.nl>) and in a limited number of hardcopies, with five to seven articles per edition. To further stimulate the publicity of research conducted by archaeology students, each edition will contain an overview of all undergraduate and graduate thesis titles that have been approved since the previous edition. We gladly invite everyone to distribute *INTER-SECTION* publications amongst their personal network and welcome students to send in proposals. Details can be found on our website.

PATTERNS IN THE DISTRIBUTION OF GRAVES IN THE CENTRAL MEDIEVAL CEMETERY OF REUSEL, THE NETHERLANDS

LOCAL VARIATIONS IN BURIAL PRACTICES

Catelijne I. Nater

Leiden University

Abstract

Cemeteries from the Central and Late Middle Ages have not yet been studied extensively, even though cemeteries can provide interesting information about societies. This study assesses patterns in the ways that individuals were buried at the central medieval cemetery of Reusel (the Netherlands). It was examined whether patterns in grave morphologies and distribution were different from burial practices in other medieval cemeteries. In order to do this, the distribution of different grave morphologies and their orientation were examined. Different grave morphologies appeared all over the cemetery, apart from the ladder grave-type, which was restricted to the eastern part of the churchyard. Differentiation was also apparent in the orientation of graves. One woman was buried in a priest-like position. Such patterns suggest that social differences between individuals were expressed by burial in different parts of the cemetery, and by burial in different types of graves and orientations. Furthermore, this study confirms the existence of local variation in burial practices in this period.

Keywords

Central Middle Ages, graveyard, spatial analysis, North Brabant, burials

LinkedIn: [linkedin.com/in/cateljnenater](https://www.linkedin.com/in/cateljnenater)

Introuduction

Archaeological research on ancient burials and their context can give a great deal of information about past societies (Effros 2003, 1-3). Pre-historic cemeteries have been studied extensively, since grave fields are among the best documented and well-preserved features to learn about societies from this period (Drenth and Lohof 2005, 433; Toorians 1998, 1-9). Cemeteries from the early medieval period (the fifth to eighth centuries CE) have seen much study as well, because the abundance of grave goods in such burials (Effros 2003, 2; Theuws and Van Haperen 2012, 163; Treffort 1996, 73) makes them relatively easy to date (Arts *et al.* 2007, 41; Blair 2005, 240-1; Lefever *et al.* 1993, 179; Renfrew and Bahn 2012, 123-4). Cemeteries from the Central and Late Middle Ages (around CE 950 to 1500), however, are studied less, especially in the Netherlands (Arts *et al.* 2007, 58; Arts 2013a, 23; Theuws in press). As a result, knowledge

on funerary rituals and their social meaning in this period is limited. Furthermore, local differences in mortuary ritual are apparent (Blair 2005, 60-1; Daniell 1997, viii). This means that one cannot simply extrapolate knowledge about death rituals from one location to another. Therefore, more research on this subject is necessary to understand social cultural religious values in past societies.

In order to contribute to the research on medieval graveyards, the cemetery of Reusel, a village in the southern part of the Netherlands, is studied (fig. 1). This case study was chosen because the cemetery was well-dated and well-documented. This site has been excavated between 1995 and 1997 by the University of Amsterdam. The excavation resulted in the recovery of the foundations of three former churches: an early timber church, followed by a Romanesque church to which a tower was added later on, and eventually a gothic

church (fig. 2). Around and in these church foundations, 492 graves and a series of other features were found. The establishment date of the cemetery is estimated to be in the second half of the tenth century CE, based on radiocarbon dates. Most excavated graves are from the tenth to thirteenth century, with some additions from later periods. The chronology of the cemetery and churches was determined based on stratigraphic relations and height values (fig. 2). Burial started west of the timber church and continued on the south-eastern side of the church at the time of the Romanesque church. When this part of the cemetery became crowded, burial continued north and west of the church. In this period, a tower was added to the western side of the church. Eventually, the Romanesque church was replaced by a larger gothic church, while burial continued on the north-western side of this church. A few graves were presumably constructed within this church, although this is not entirely certain.

To find out to what extent differences between villages play a role in central medieval cemeteries, the graves and individuals at the cemetery of Reusel were analysed in terms of time of burial, location, orientation, morphology, sex and age. Patterns that appeared were then compared to other archaeological sites, and possible reasons for differences in patterns were attested. This article highlights some aspects of this research. The complete documentation of the research, including more details about the chronology of the cemetery, can be found in Nater (2016).

Burial within the Christian religion during the Central and Late Middle Ages

During the Central and Late Middle Ages, Christianity became more and more institutionalised (Arts *et al.* 2007, 27; Janssens 2011, 38). This had its impact on all aspects of life, including burial practices, for which regulations arose (Blair 2005, 463; Lauwers 1997, 318; Theuws and Van Haperen 2012, 165). Being buried in a favourable place at the cemetery was important, especially for high-status people (Effros 1997, 5). Who was to be buried where, was determined by the clergy (Treffort 1996, 188) or by the deceased's kinsmen (Boddington 1996, 69).

Several patterns of burial differentiation are visible in medieval graveyards throughout Europe. People of very low status, such as criminals, lepers, excommunicates and unbaptised neonates, were often excluded from the communal graveyard (Binski 1996, 56; Bourin and Durand 2000, 60; Gilchrist 2012, 209; Lauwers 1997, 221-2; Meier and Graham-Campbell 2013, 434). In the tenth



Figure 1. Location of Reusel in the Netherlands.

century CE, burial inside the church was exceptional (Treffort 1996, 138). Children's graves often had their own part of the cemetery (Daniell 1997, 115; Gilchrist 2012, 205; Pinhasi and Bourbou 2008, 35; Saunders 2008, 120), sometimes under the eavesdrop (Daniell 1997, 118; Treffort 1996, 147). Other favourable places were the east of the church (Blair 2005, 471; Boddington 1996, 36-7; Huijbers 2007, 409) or the southern, sunny side of the church (Blair 2005, 471; Boddington 1996, 36-7; Huijbers 2007, 409; Parker Pearson 1999, 14).

Apart from location, the morphology of medieval graves is important. At most cemeteries, multiple types of grave structures appear both above and below ground. In the later Middle Ages, burial in a shroud, without a coffin, was very common (Bourin and Durand 2000, 60; Gilchrist 2012, 200). However, in some cemeteries, e.g. Aalst (Arts *et al.* 1998, 33) and Eindhoven (Arts 2013b, 130) coffin burials were more common. Differences may be related to the period the cemetery was in use or to the wealth of different parishes (Binski 1996, 55; Gilchrist 2012, 200).

Another significant characteristic of Christian cemeteries is the orientation of the graves. Usually, people were buried with the head to the west and the feet to the east. Since it was believed that Jesus would one day arrive in the east, people buried with their heads to the west would be able to

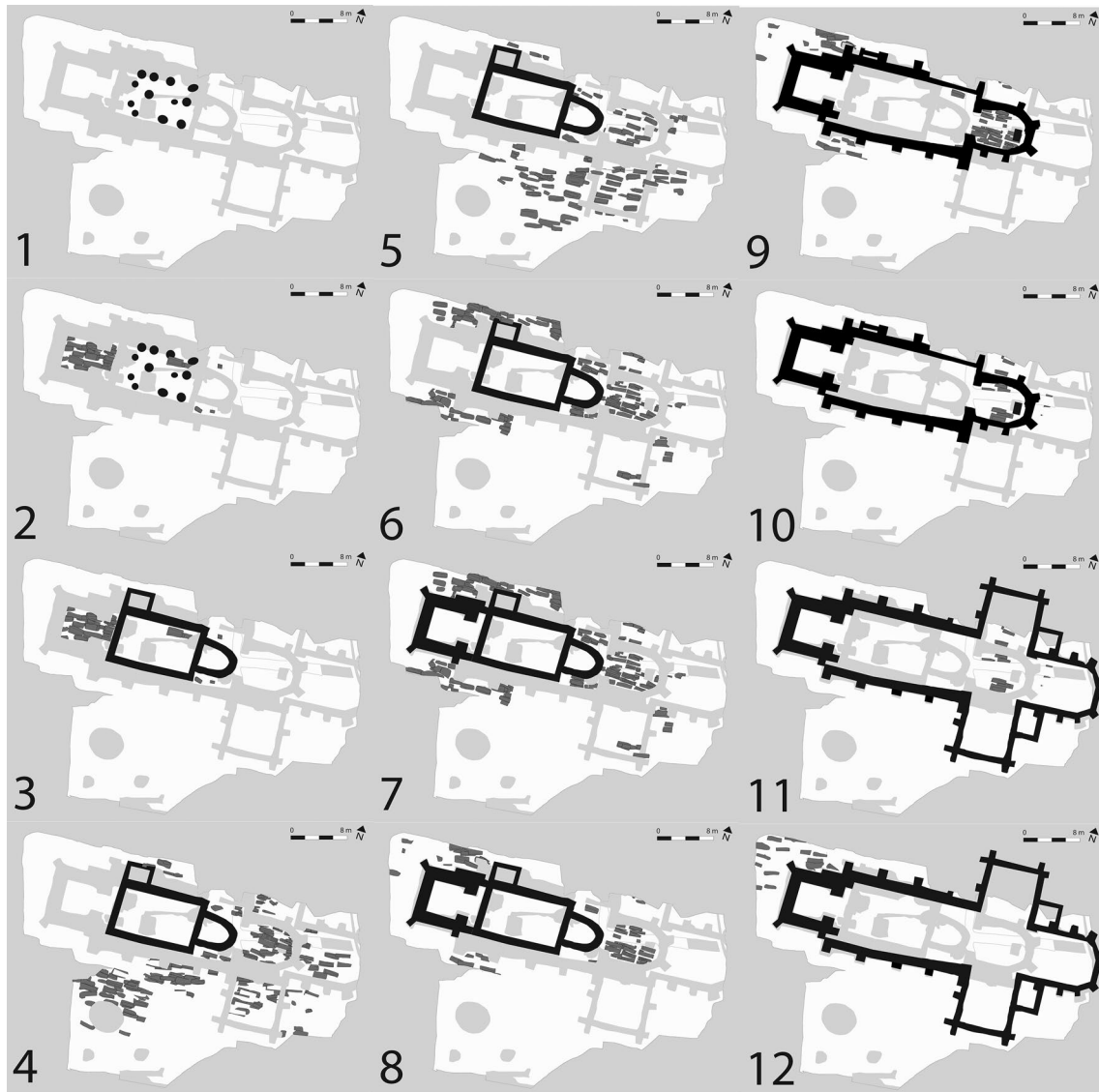


Figure 2. The phases of the churches and the graves, starting with a timber church, and followed by a Romanesque church and a gothic church. Graves that could not be dated are not displayed

watch this sight (Augenti and Gilchrist 2011, 504; Binski 1996, 56; Daniell 1997, 148; Kok 2005, 67; Parker Pearson 1999, 6). Priests had to watch their followers, and were therefore buried the other way around (Arts 2013a, 30; Arts 2013b, 123; Arts and Nollen 2006, 88).

It is obvious that the location and morphology of burials was important, not only for religious reasons but also for social ones. However, parishes and cemeteries gave their own interpretation to general practices and religious rules, which has resulted in local differences in burial practices. Such local differences complicate interpretation of the meaning of such practices.

Methods: spatial analyses

Several analyses related to location were performed. In order to be able to analyse certain parts of the ceme-

tery separately, the cemetery was divided into eleven areas. Each part was chosen according to the boundaries of the foundations of the churches, which had already divided the cemetery into separate parts (fig. 3).

To see which locations were most favourable for burial, the grave density is useful. Therefore, the amount of graves per square metre was determined for all parts of the cemetery. Secondly, the graves were filtered on grave morphology, orientation, and sex and plotted on the map.

Four types of morphologies were distinguished (fig. 4): anthropomorphic, log coffin, timber coffin, and ladder (coffin with open floor or coffin with a bier underneath it). Every grave was assigned to one of these categories, or to the category unknown. The ori-



Figure 3. The eleven areas into which the cemetery was divided.

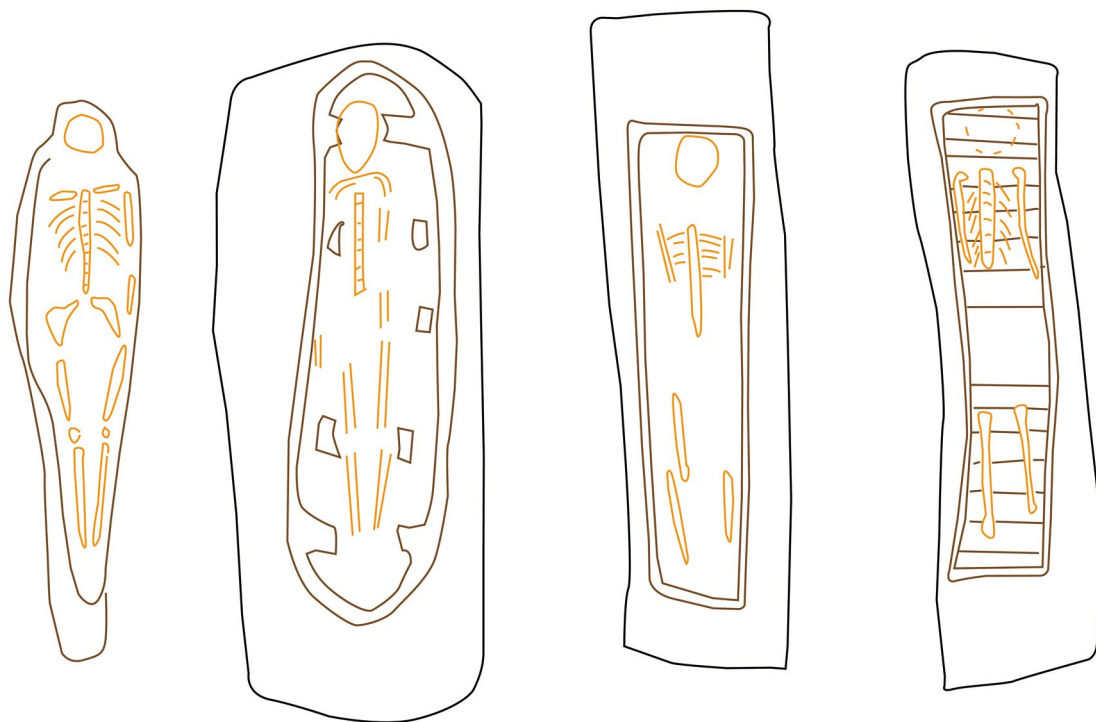


Figure 4. The four types of containers. From left to right: anthropomorphic, log coffin, timber coffin, and ladder grave.

entation of the graves was determined by measuring from the head to the feet of the skeleton. If a skeleton was preserved, it was attempted to estimate sex.

By plotting different traits on the cemetery map, patterns can be discovered that may point to special or different treatment of certain groups or the development of the cemetery through time.

Results: spatial distribution of population density, grave morphologies, orientation, and sex

People were buried everywhere around the church, but the most striking aspect of the map is the concentration of graves in the area of the second presbytery (table 1). The population density of this area (3.19 graves/m²) is almost three times as high as the average (1.23 graves/m²). Since some of these graves are intersected by the presbytery, it can be deduced that those graves predate the gothic church. They were probably interred during the period of the timber or Romanesque church. Also notable is that there are hardly any people buried intramurally. Stratification shows that most graves that lie within the walls of the gothic church were originally buried outside (Nater 2016, 63-68).

All types of graves were spread across the cemetery, apart from the ladder coffins, which were located only in the eastern part of the cemetery (fig. 5). Orientation could be determined for only

39 percent of the graves, because many graves were badly preserved. It turned out that most orientations appear across the cemetery. Only three graves were oriented from southwest to northeast, rather than northwest to southeast. These are all located more to the east and southeast of the church (fig. 6). One of these was an older woman buried in a timber coffin. The others could not be sexed or aged, and were buried in an anthropomorphic and an unknown way.

The skeletons of 146 individuals were sufficiently preserved to be studied. Estimation of sex was possible in 63 individuals. When plotting the sexes on the map, it appeared that men and women were buried unsegregated (fig. 7). In the area enclosed by the tower, females were buried right in front of the church doors and in extension of these. No males were recovered in this area, although most skeletons in the tower could not be sexed. As far as could be determined, the burials within the Romanesque church were all male. Both sexes were buried in all types of containers, apart from the ladder coffin, which was only used for males (fig. 8).

Discussion

There are several patterns visible within the cemetery of Reusel. The grave density in the area east of the Romanesque church presbytery suggests that this location was the most favourable place at the cemetery (Blair 2005, 471; Boddington 1996, 36-

Area	Amount of graves	Area (m ²)	Graves/m ²
Romanesque church	7	49.1	0.14
second pres.	114	35.7	3.19
third pres.	27	53.1	0.51
tower	27	27.2	0.99
northern transept	25	15.5	1.61
southern transept	39	39.9	0.98
southeast	23	76.4	0.30
south	124	343.9	0.36
northwest	71	105.9	0.67
north of first pres.	20	11.8	1.69
south of first pres.	15	6.2	2.42
total	492	764.7	1.23

Table 1. The amount of graves per area and the population density of every area.

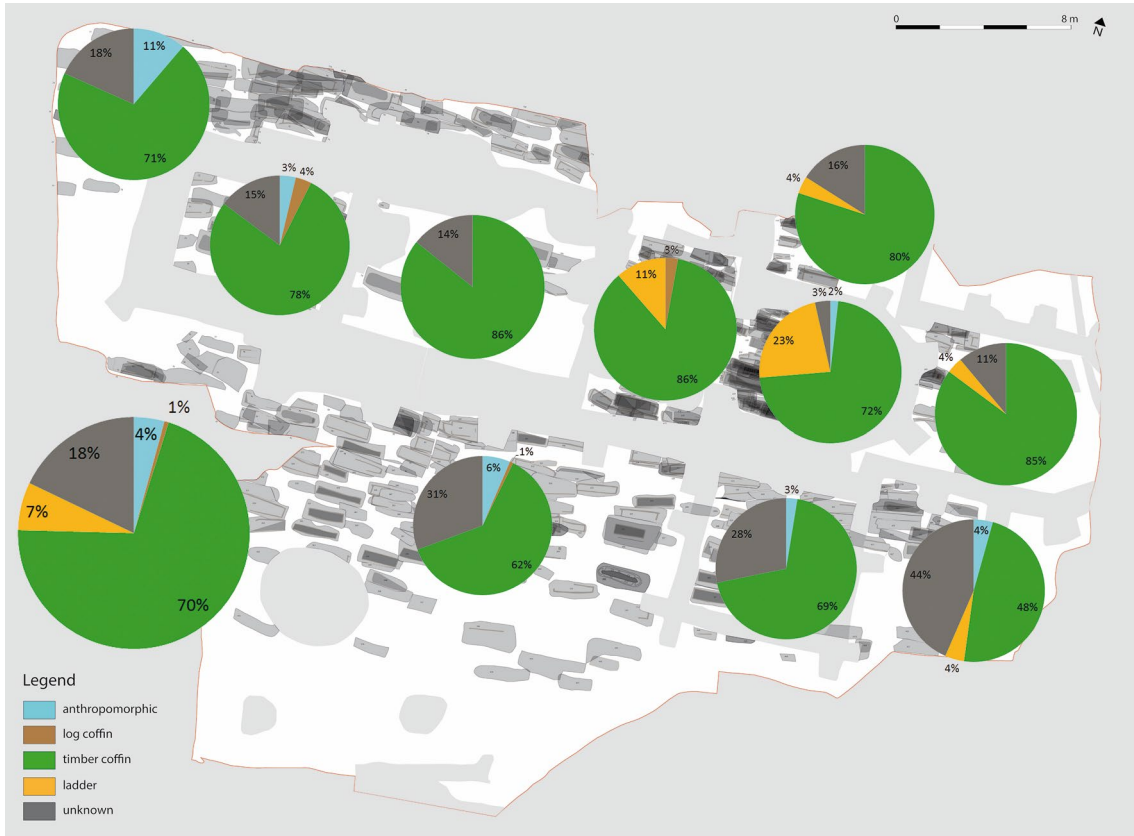


Figure 5. Map with pie charts displaying the relative amounts of grave types per area, and for the total.

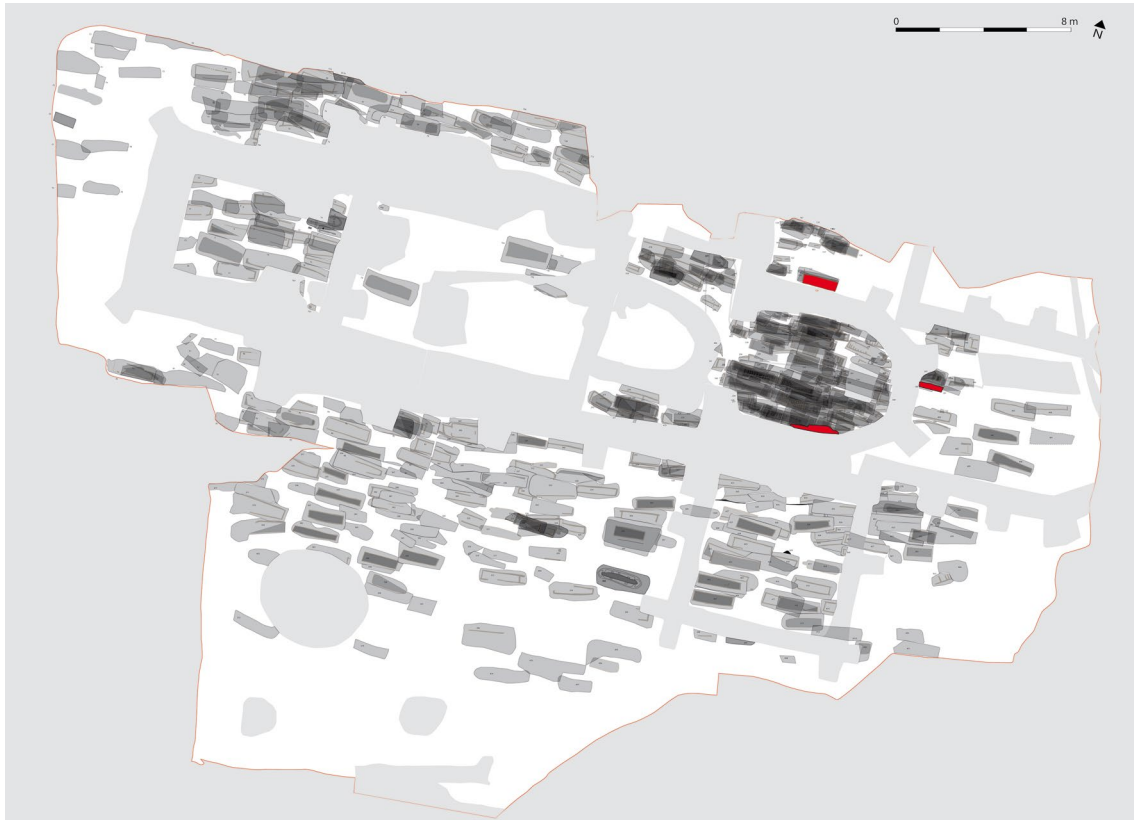


Figure 6. The graves that were located with the head to the west (indicated in red). All other graves of which orientation could be determined, are oriented from east to west.

7; Huijbers 2007, 409). It is possible that this part was reserved for people that were considered pious.

In general, males and females were buried unsegregated. However, only males were buried inside the Romanesque church. Perhaps females could not be buried intramurally. In front of the entrance of the Romanesque church, which is expected to be a humble, yet at the same time worthy, place (Effros 1997, 22; Meier and Graham-Campbell 2013, 436-7), only women were recovered. It appears that this location was, for unknown reasons, considered to be suitable for women, but the result could also be due to the small sample size.

When it comes to the spatial distribution of grave morphologies, the clustering of ladder graves east of the Romanesque church presbytery is the most remarkable. The ladder graves cluster in this favourable area, which suggests that this type of container was reserved for specific people, possibly either the clergy or wealthy laymen. It is noteworthy that this is the only type of container in which only men appear to be buried. Perhaps only certain males were considered suitable for such burials. Chronological analysis shows that these graves were constructed throughout most phases during the use of the cemetery. Ladder

graves were only absent in the first and last phases (Nater 2016, 93). The same variation in grave morphologies is visible from other archaeological cemetery sites (Arts *et al.* 1998, 33; Lefever *et al.* 1993, 194), although this clustering of ladder graves is unique.

The orientation of a grave can provide information on burial ritual and the buried individual. At this cemetery the majority of the graves is orientated roughly from west to east, save three exceptions, which were buried from east to west. This suggests that these exceptions were priests, for the reason mentioned in paragraph 'Burial within the Christian religion during the Central and Late Middle Ages'. This is also in accordance with results from other archaeological sites (see for examples: Rohtus 2015, 41-46). Because one of these was a woman, it is possible that in Reusel, east to west burial was not meant for priests only, contrary to the common practice (e.g. Arts 2013a, 30; Arts 2013b, 123; Arts and Nollen 2006, 88). It could also mean that this society had progressive ideas about the roles of females, or potentially that we are dealing with a nun. All of the east-west burials were rather far from the church.

The surrounding graves are all orientated from west to east. This suggests that there was no specific location to bury these people. However, there may

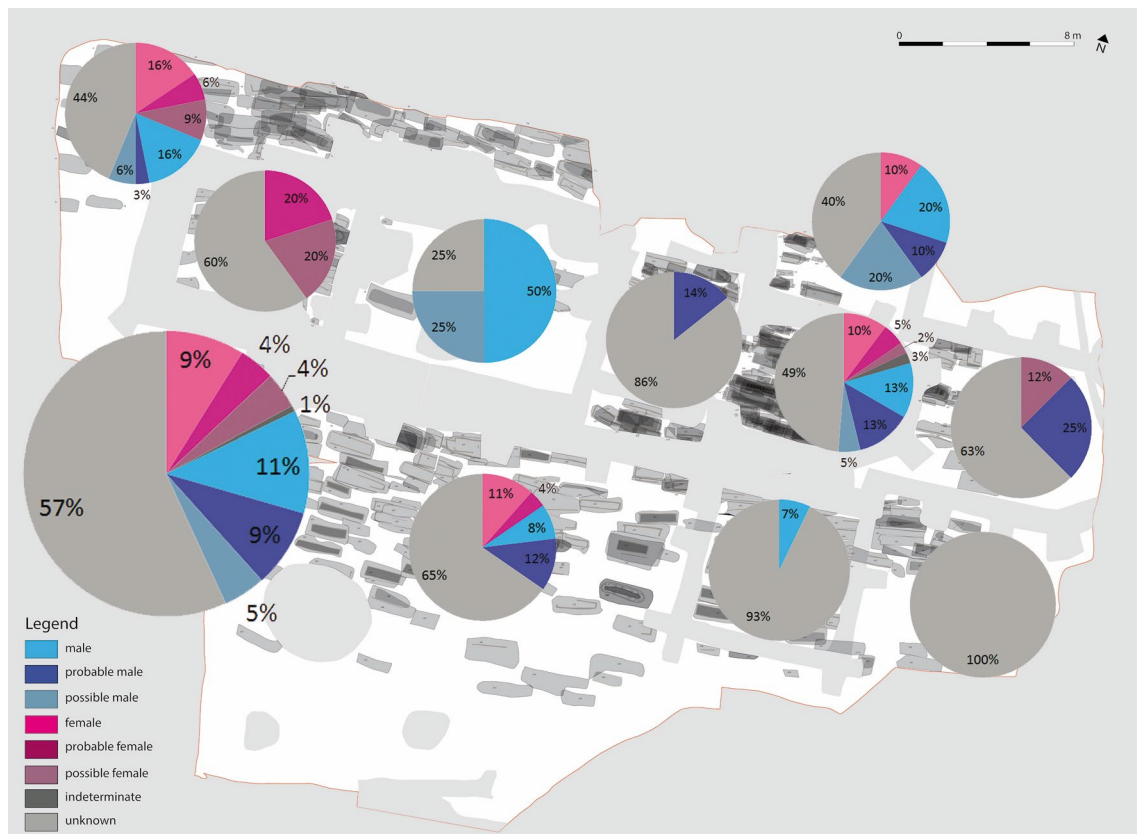


Figure 7. Map with pie charts displaying the relative amounts of males and females per area, and for the total.

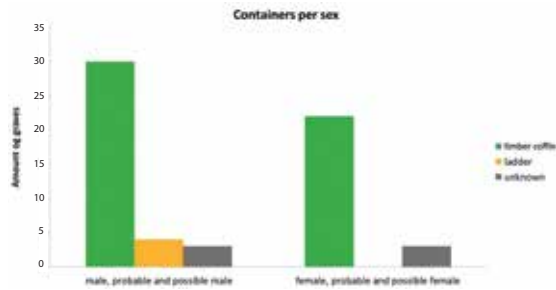


Figure 8. The amount of individuals buried in each container, sorted per sex.

have been more burials from east to west than those that were found, because determination of orientation was not possible for all graves. Alternatively, it is possible that not much notice was given to the location or orientation of burial. Yet, this would be surprising, since several sources mention the importance of burial locations in the Middle Ages (Binski 1996, 34; Daniell 1997, 79; Effros 1997, 4-5; Parker Pearson 1999, 14; Treffort 1996, 153; 174). It seems more likely that people were buried at certain locations and in certain ways for a reason. This study suggests that there were small differences in the treatments of males and females, and clear differences in the popularity of different locations around the church. Some practices in Reusel were in accordance with those in other medieval societies, although others were clearly different. It confirms the existence of local variation in burial practices in this period. Apparently, people from local communities could, to a certain extent, give their own interpretation to Christian rituals.

Conclusion

The study shows that several patterns appear in the distribution of graves and individuals across the cemetery. Some of these are similar to burial practices at other medieval sites, but some are different. The most remarkable patterns are the following:

- The eastern side of the cemetery was the most densely populated area. This is also the location where almost all ladder coffins were found.
- Males and females were buried unsegregated. Females were also buried in places that were considered important.
- All burials are approximately orientated from west to east, except for three graves on the eastern side of the church, which are orientated from east to west. At least one of these was a woman.

The aforementioned patterns suggest that social differences between individuals were expressed by burial at different parts of the cemetery, and by burial in different types of graves and orientations. Only ladder coffins seem to have been

reserved for particular people, and males and females were treated in a similar way. The clustering of ladder graves and the priest-like burial of females is unlike practices from other medieval cemeteries. The exact reasons for this variation are difficult to grasp. They could be related to a variety of reasons, including the period that the cemetery was in use or the wealth of the village. Although this study has answered some questions regarding medieval burials in the south of the Netherlands, it also raises new ones. Future research will help to acquire a better picture of medieval burial ritual, its social meaning, and local variations.

Acknowledgements

The author would like to thank Frans Theuws and Andrea Waters-Rist for their support, as well as colleagues at the laboratory, friends and family for their feedback and help. Furthermore, the author would like to thank the Editorial Board and the peer reviewer for their useful feedback.

Bibliography

- Arts, N.M.A., A. Huijbers, K. Leenders, J. Schotten, H. Stoepker, F.C. Theuws and A. Verhoeven, 2007. De Middeleeuwen en vroegmoderne tijd in Zuid-Nederland. *Nationale Onderzoeksagenda Archeologie (NOaA)*, <http://archeologiein nederland.nl/sites/default/files/22%20Middeleeuwen%20en%20vroegmoderne%20tijd%20in%20Zuid-Nederland%20%2B%20links.pdf>
- Arts, N.M.A., 2013a. Begraven op de Brabantse zandgronden. De archeologie van veranderende grafrituelen, circa 1000-1900, in P. Bitter, V. Bonenkampová and K. Goudriaan, *Graven spreken. Perspectieven op grafcultuur in de middeleeuwse en vroegmoderne Nederlanden*. Hilversum: Verloren, 23-35.
- Arts, N.M.A. (ed), 2013b. *Een knekelveld maakt geschiedenis*. Utrecht: Uitgeverij Matrijs.
- Arts, N.M.A., A.A. Bijsterveld, T.F. van Dijk, J.W. Hagen and J. Walinga, 1998. *De schaduw van een heiligdom*. De geschiedenis van Aalst en zijn middeleeuwse kerk. Waalre: Stichting Waalres Erfgoed.
- Arts, N.M.A. and J. Nollen, 2006. Een bed van botten. Het archeologisch onderzoek van de middeleeuwse Catharinakerk in Eindhoven in beeld. 's-Hertogenbosch: Heinen.
- Augenti, A. and R. Gilchrist, 2011. Life, Death and Memory, in M. Carver and J. Klápště (eds), *The Archaeology of Medieval Europe. Vol. 2. Twelfth to Sixteenth Centuries*. Aarhus: University Press, 494-515.
- Binski, P., 1996. *Medieval Death. Ritual and Representation*. London: British Museum Press.

- Blair, J., 2005. *The Church in Anglo-Saxon Society*. Oxford: University Press.
- Boddington, A., 1996. *Raunds Furnells. The Anglo-Saxon church and churchyard*. London: English Heritage.
- Bourin, M. and R. Durand, 2000. *Vivre au village au Moyen Âge. Les solidarités paysannes du XI^e au XIII^e siècle*. Rennes: Presses Universitaires.
- Daniell, C., 1997. *Death and Burial in Medieval England 1066-1550*. London: Routledge.
- Drenth, E. and E. Lohof, 2005. Heuvels van de doden. Begraving en grafritueel in bekertijd, vroege en midden-bronstijd, in L.P. Louwe Kooijmans, P.W. van den Broeke, H. Fokkens and A. van Gijn (eds). *Nederland in de prehistorie*. Bert Bakker: Amsterdam.
- Effros, B., 1997. Beyond cemetery walls: early medieval funerary topography and Christian salvation. *Early Medieval Europe* 6(1), 1–23.
- Effros, B., 2003. *Merovingian Mortuary Archaeology and the Making of the Early Middle Ages*. Berkeley: University of California Press.
- Gilchrist, R., 2012. *Medieval Life. Archaeology and the Life Course*. Woodbridge: The Boydell Press.
- Huijbers, A.M.J.H., 2007. *Metaforisering in beweging. Boeren en hun gebouwde omgeving in de Volle Middeleeuwen in het Maas-Demer-Scheldegebied*. Amsterdam (unpublished Ph.D. thesis University of Amsterdam).
- Janssens, J., 2011. *Spiegel van de Middeleeuwen. In woord en beeld*. Leuven: Davidsfonds Uitgeverij.
- Kok, H.L., 2005. *Thanatos. De geschiedenis van de laatste eer*. Heeswijk: Berne.
- Lauwers, M., 1997. *La mémoire des ancêtres, le souci des morts*. Paris: Beauchesne (Théologie historique 103).
- Lefever, L., P. van der Plaetsen and H. Verbeek, 1993. Het middeleeuwse grafveld, in F. Vermeulen, M. Rogge and L. van Durme (eds), *Terug naar de bron. Kruishoutem archeologisch doorgelicht*. Gent: Archeologische Inventaris Vlaanderen, 175-96.
- Meier, T. and J. Graham-Campbell, 2013. Life, Death and Memory, in J. Graham-Campbell and M. Valor (eds), *The Archaeology of Medieval Europe. Vol. 1: Eighth to Twelfth Centuries AD*. Aarhus: University Press, 420-49.
- Nater, C., 2016. *Social differences in burial practices in the medieval cemetery of Reusel. An osteoarchaeology and mortuary archaeology study of burial practices in the southern Netherlands during the Central Middle Ages*. Leiden (unpublished MSc thesis Leiden University).
- Parker Pearson, M., 1999. *The Archaeology of Death and Burial*. Stroud: Texas A&M University Press.
- Pinhasi, R. and C. Bourbou, 2008. How Representative Are Human Skeletal Assemblages for Population Analysis?, in R. Pinhasi and S. Mays (eds), *Advances in Human Palaeopathology*. Chichester: John Wiley & Sons, 31-44.
- Renfrew, C. and P. Bahn, 2012. *Archaeology. Theories, Methods and Practice*. London: Thames & Hudson.
- Rochtus, G., 2015. *Sociale differentiatie in middeleeuwse en post-middeleeuwse graven. Met behulp van fysisch-anthropologisch onderzoek*. Gent: Universiteit Gent.
- Saunders, S.R., 2008. Juvenile Skeletons and Growth-related Studies, in M.A. Katzenberg and S.R. Saunders (eds), *Biological Anthropology of the Human Skeleton*. Hoboken: John Wiley & Sons, 117-47.
- Theuws, F.C.W.J., in press. *Rural cemeteries, cult places and local identities in the Central Middle Ages in the Kempen region*. Leiden (unpublished article).
- Theuws, F.C.W.J. and M. van Haperen (eds), 2012. *The Merovingian cemetery of Bergeijk-Fazantlaan*. Bonn: Habelt-Verlag.
- Toorians, L., 1998. *Kelten en de Nederlanden van prehistorie tot heden*. Leuven: Peeters.
- Treffort, C., 1996. *L'Église Carolingienne et la mort*. Lyon: Presses Universitaires de Lyon (Collection d'histoire et d'archéologie médiévales 3).

LIMINALITY ALONG THE LIMES

A STUDY ON THE MATILO MASK, ITS DEPOSITIONAL CONTEXT AND THE ASSOCIATED FINDS

Tom E. de Rijk

Leiden University

Abstract

In Western Europe many Roman finds have been retrieved from wet locations. A possible explanation for why these finds, often still useable, ended up there is the association of wet places with liminality. In this article, the concept of liminality will first be elaborated with a focus on places that are in-between (cosmological) worlds, and that are both natural and artificial. In this regard, an example of the former is the river Rhine, which formed a part of the Limes frontier (between the Roman world and everything else), while the Corbulo channel may be seen as an example of the latter. In contrast to the majority of Roman helmets found along the Lower Rhine Limes the Matilo mask was discovered during an excavation, which allows a thorough analysis of its depositional context. Such finds, and the Matilo mask itself, have frequently been interpreted as depositions by soldiers after their military service to thank the Gods for their protection. This paper however, attempts to show that the interpretation of these ritual practices in terms of liminality is also possible. As a consequence, interpretations of mask finds and contexts that are similar to that of the Matilo mask might need to take liminality into consideration as well.

Keywords

Ritual deposition, Corbulo channel, Roman helmets, bronze mask, river finds.

E-mail address: Tomderijk1@gmail.com

Introuction

Wet places have long been associated with rituals: during the Bronze Age in the Low Countries weapons were deposited in rivers and bogs while in the Roman period temple at Bath watery contexts were used to ritually dispose of objects (Fokkens and Fontijn 2013, 564; Kamash 2009, 230-232; Nicolay 2007, 124). Nevertheless, a constructed sanctuary does not seem to have been needed to perform rituals, so long as the location was considered to be extraordinary (Derks 1998, 132). Another respect in which depositions in wet places differ from rituals in built sanctuaries is that the objects could not be retrieved anymore, they seem to disappear, and become invisible as they submerge (Cousins 2014, 61; Kamash 2009, 232). Water can be in both a natural or man-made (i.e. artificial) situation despite being intrinsically natural and it is this fuzziness of natures which is of importance for

liminality, with which wet places are often associated (Cousins 2014, 60-61; Kamash 2009, 230). This concept was described by Thomassen (2015, 40) as follows:

“Liminality involves the experience of inbetweenness itself, as well as how exactly that experience is shaped and structured anew as subjects and collectivities move through the in-between, try to overcome it, and leave it behind-with a difference”

A place can therefore be considered liminal when it is in-between two spaces or worlds (Kamash 2009, 230; Thomassen 2015, 40; 48). These spaces and worlds can be both cosmological and worldly. And, because of the ever changing nature of water it has been argued that it was seen as a cosmological border between worlds (Fontijn 2002, 64; Kamash 2009, 226-230).

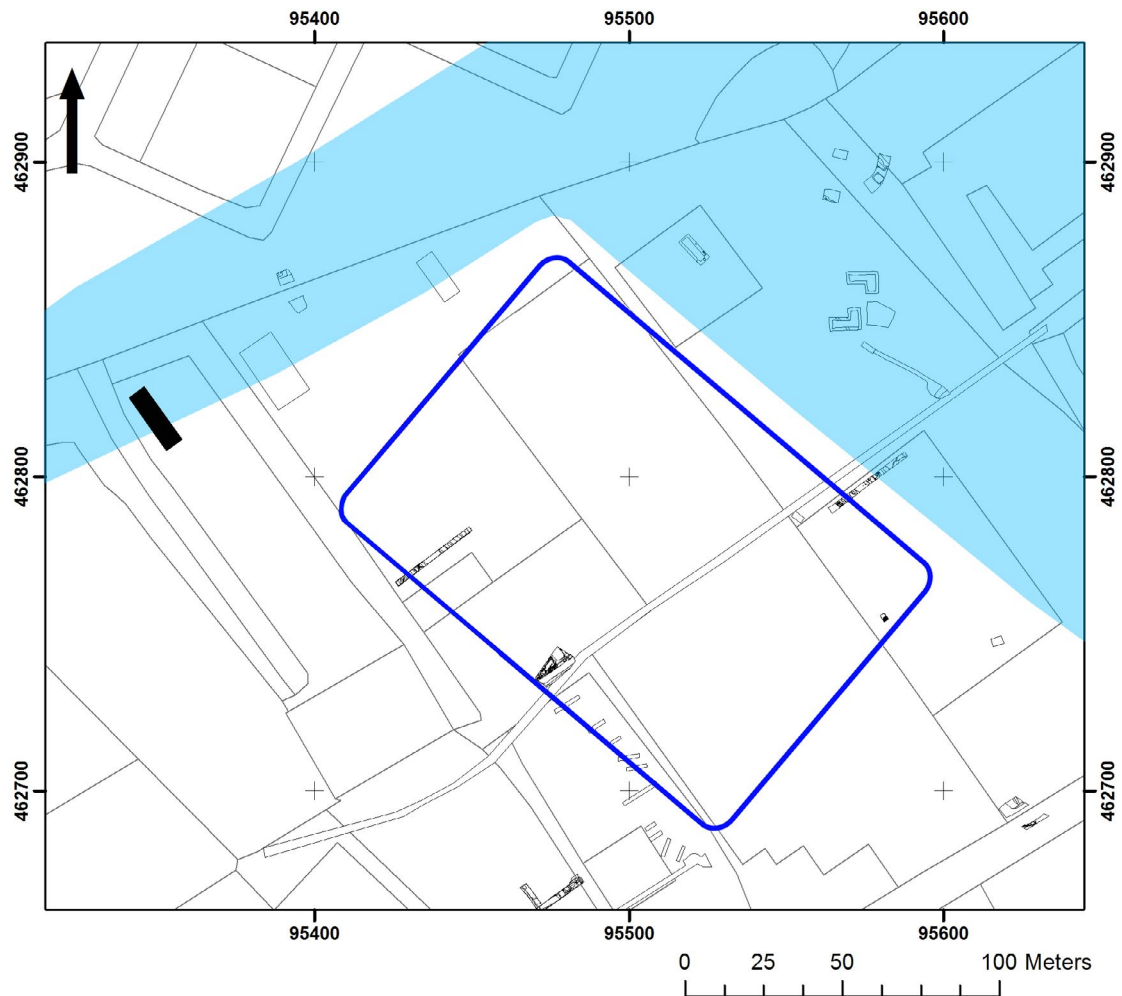


Figure 1. A plan of the castellum Matilo with trench number three marked by the black rectangle, dark blue marks the contour of the fort, and the Corbulo channel is marked by the light blue area (Courtesy of J. de Bruin).

Along the Lower Rhine Limes many Roman military objects have been found in rivers (Nicolay 2007, 124). It has been suggested that these objects were offered by Roman soldiers in rites of passage to Gods in return for their safety (Nicolay 2007, 181; Roymans 1996, 32). However, no direct evidence for this explanation has been found, indicating that other interpretations of these finds can be just as valid.

Around the first century AD the river Rhine in the Low Countries formed the Limes, the border between the Roman world and everything else. In the Roman period this was known as *orbis terrarum* and *terra incognita* (Hazenberg 2000, 7; Nicolet 1991 in Driessen 2007, 41). Considering the nature of the Dutch Rhine it is possible that liminality was of importance for the potentially ritual depositions along these frontiers.

Three near complete Roman cavalry helmets were found in the Lower Rhine Limes region. One of these finds, the mask from Matilo near Leiden, was found during the excavation of the Corbulo channel (which from 50 CE onwards connected the Meuse and Rhine) (fig. 1) while the other two Roman helmets from Bodegraven and Woerden were dredged up from the Rhine (Hazenberg 2000, 36; Klumbach 1974, 54; Van Enckevort and Hazenberg 1997, 38; Vos *et al.* 2010, 113). Because the Matilo mask is thus far the only helmet with a clear archaeological context it provides the unique opportunity to study a possible deposition of a Roman military object found in a wet, possibly liminal and *in situ*, context.

This article will answer the research question whether the concept of liminality can be applied to the Matilo mask. However, to answer the research question first the sub question whether the Matilo mask was a ritual deposition will need to be answered.



Figure 2. The Matilo mask (Photo courtesy of © National Museum of Antiquities, Leiden).

Research methodology

To answer the research question, the character of this possible deposition will be examined. This is done by describing the mask, the stratigraphy of its find location, and by discussing the items that are associated with the mask. If the results are indicative of a deposition of the Matilo mask, then this might be explicable by the concept of liminality.

From the comprehensive description of all finds, associated with the Matilo mask, by de Rijk (2015) a selection will be made for material culture categories that are indicative of potentially ritualistic finds (cf. Martens 2004, 132-148). Yet, as is stated by Hill (1995, 125) all archaeological material is special, because it has escaped the normal processes of destruction. That is why all the finds associated with the mask are presented in a table as well. The find categories comprise ceramics, animal bones, and metal finds, materials which have also

frequently been found in ritual deposits in the Middle-Dutch river area (cf. Nicolay 2007, 85; cf. Roymans 1990, 77-80). Ceramics with *graffiti* are discussed to discover whether they convey information about the nature of the cavalry mask. In this article the specific pottery types will not be related to ritual activity, as was done by Martens (2004, 133), but the specifically dateable ceramics will be used to see if the material from the mask layer is contemporary with the mask. Horse bones are discussed because these were interpreted as a part of a ritual, and because horse bones have often been found in Roman ritual deposits (Lauwerier and Robeerst 1998, 23; Martens 2004, 139). Lastly, metal finds are also presented, since in the Roman period metal was often reused (Roest 1994, 154-158). Bronze objects (e.g. helmets), coins, and iron objects (e.g. weapons) are also frequently part of Roman ritual deposits (Martens 2004, 142-144; Nicolay 2007, 85; Roymans 1990, 77-80). Therefore, it would be remarkable if

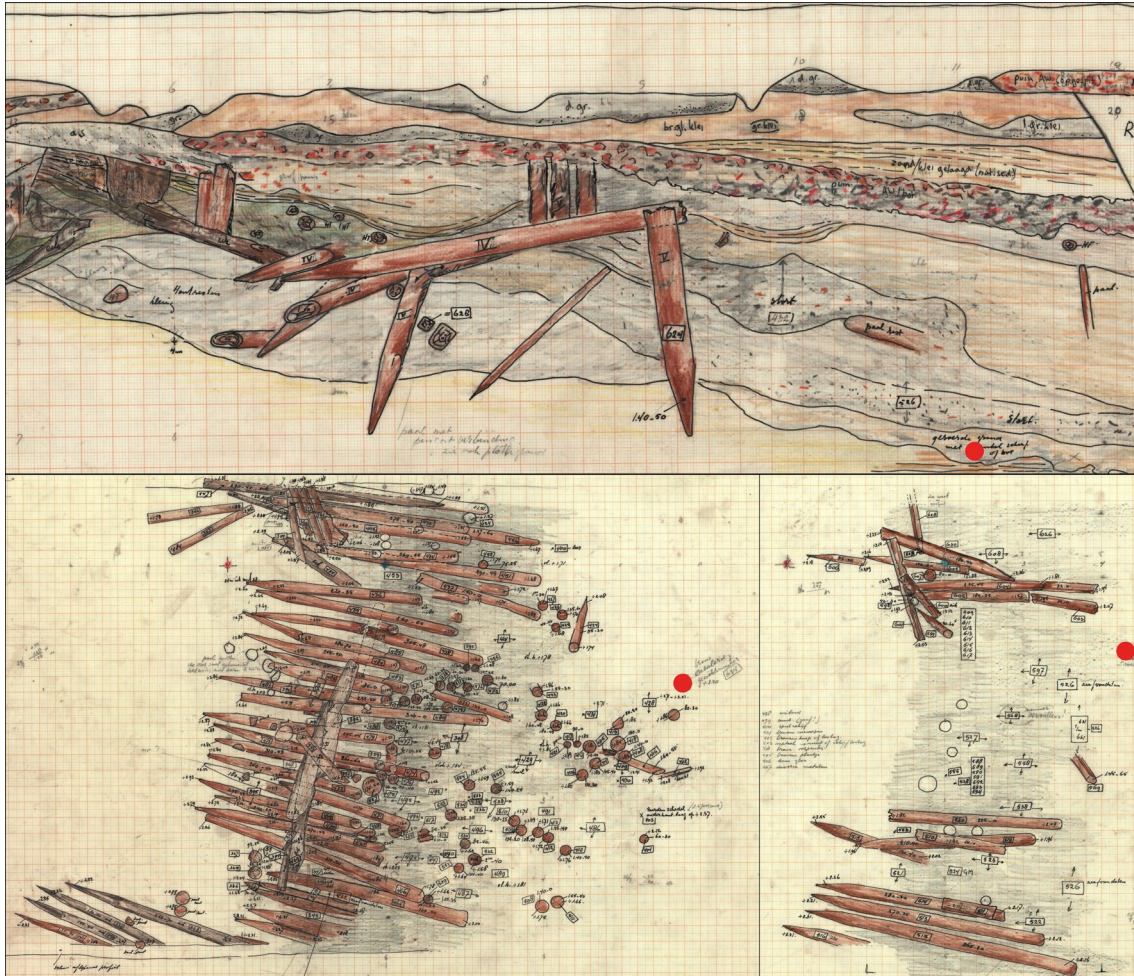


Figure 3. The excavation drawings of the west profile, and level six and seven. The red dots mark the find spot of the mask (upper left: west profile; upper right: level seven; below: level six). One square is equal to 20 centimetres (After Erfgoed Leiden en Omstreken).

all these potentially reusable metal finds would have been discarded or lost.

Description of the Matilo mask

The Matilo mask is made of bronze that was hammered and chased into a face with a Hellenistic masculine expression and hairdo (Hazenberg 1997, 38-39). There are holes on the sides of the face beneath the slightly protruding ears, in the eyes, mouth and nose (fig. 2). A hinge is located in the middle of the helmet.

The morphological features of the face and hairdo of the mask point towards the Alexander type and only a few of these masks have been found (Hazenberg 1997, 38-39). Using Robinson's typology the mask can be characterized as a type D parade helmet, which dates to the first and second century CE (Robinson 1975, 118).

Lastly, the hinge of the mask was broken (fig. 2), indicating that the mask was broken from its helmet, but it is unclear if this happened before or after deposition.

Build-up of the Corbulo channel at the find-location

The find spot of the mask in the Corbulo channel is situated between the *vicus* and *castellum*, near a revetment and a bridge (fig. 1). The mask was found in the lowest and oldest fill of the channel (in trench three of the 1996 excavation), which was interpreted as 'stirred' soil (fig. 3; Van Enckevort and Hazenberg 1997, 38). Based on the ceramic and metal finds the mask layer can be dated between 75 and 150 CE, coinciding with the previously mentioned date of the mask (De Rijk 2015, 41). This mask layer constituted level six and seven in the excavation (fig. 3). It is possible that the mask ended up there as a result of erosion, before the dump layer that

covered the mask layer had formed. However, the currents in this part of the channel were probably not very strong (cf. Hazenberg 2000, 36). And, also on top of the dump layer there are other alternating clay/sand and dump layers (fig. 3).

Another argument for the interpretation that the mask purposely ended up in the mask lay-

er, in the same period as the other objects, is that articulated horse bones were found in the same layer (Lauwerier and Robeerst 1998, 21). If taphonomical processes were the reason for the accumulation of these finds, it would be improbable to find articulated horse bones.

Vlak 6	Velddeterminatie	Vlak 6	Velddeterminatie	Vlak 7	Velddeterminatie
Rand zone		Masker laag		Rand zone	
406	htm	402	bew hout	526	zeefmonster
415	htm	403	paardenhoofd	569	htm
420	htm Eik	404	htm	603	htm
421	htm Eik	405	bew ht	631	Bronzen knopspijkers en hol/bolvormige knoppen
422	htm Eik	408	htm	632	chv bronzenplaatjes
423	htm Eik	410	htm	633	3 benen speelschijven met tekst!
424	htm Eik	411	htm	634	6 half bolvormige glas pasta speelschijven
425	htm Eik	412	htm	635	4 fibulea/ 3 draad / 1 kap fib
426	htm Eik	413	htm	636	8 () ringen (1 met hanger)
427	htm Eik	414	htm	637	3 () ringen (1 met gem, 1 met zand? Gem 1 versierd
429	aw bot	416	htm	638	7 speelschijfjes (versierd) met aanhechtingpen(?)
487	aw bot (uitspit stortlaag besch 6)	417	htm	639	2 fragm olielampjes
489	aw/bot uitspit	418	htm	640	1 meloen(?) Kraal
490	stylus	419	htm	641	2 ijz en 1 bronzen stylus
512	htm	428	aw bot	642	2 bronzen bolknoppen met ringaanhechting
517	htm	430	schoenleer(?)	643	1 onbeschreven? Naamplaatje (brons)
530	htm	431	boothaak(?)/ijspik	644	diverse bronzen voorwerpen
531	httm	486	aw/bot uitspit uit zeef/zamel laag	645	afgebroken breinaald(?) (been)
532	htm	491	handdissel	646	bronzen naainaald (gebroken oog)
533	ijzeren mes uitspit	496	aw/bot enz uitspit	647	zilveren munt
		508	htm	648	1 la luna(?) Hanger en 1 deksel of doosje hanger
		509	htm	649	brons diversen naald/ hanger/knopspeld
		510	htm	650	2 bronzen scharnierplaatjes?
		532	htm	651	1 muntje (republiek)
		534	fib	652	munt
		535	ijz mesje (chirurgen mesje)	653	munt
		536	ijz roset	654	munt
		538	aw bot met leer glas uitspit/kraal	655	munt
		625	brons gezichtsmasker 2/10 uitspit	656	munt
				657	munt
				658	munt
				659	munt
				660	diverse pennen. W.O. 1 been
				661	lood 3 vislood/gewicht/smelt fragm

Table 1. An overview of the finds that are associated with the Matilo mask (After De Rijk 2015, 59-66).

Vlak 6	Velddeterminatie	Vlak 6	Velddeterminatie	Velddeterminatie
Rand zone		Masker laag		
429	aw bot	402	bew hout	zeefmonster
487	aw bot (uitspit stortlaag besch 6)	403	paardenhoofd	Bronzen knopspijkers en hol/bol vormige knoppen
489	aw/bot uitspit	405	bew ht	chv bronzenplaatjes
490	stylus	428	aw bot	3 benen speelschijven met tekst!
533	ijzeren mes uitspit	430	schoenleer(?)	6 half bolvormige glaspasta speelschijven
		431	boothaak(?)/ijspik	4 fibulea/ 3 draad / 1 kap fib
		486	aw/bot uitspit uit zeef/zamel laag	8 () ringen (1 met hanger)
		491	handdissel	3 () ringen (1 met gem, 1 met zand? Gem 1 versierd
		496	aw/bot enz uitspit	7 speelschijfjes (versierd) met aanhechtingspen(?)
		534	fib	2 fragm olielampjes
		535	ijz mesje (chirurgen mesje)	1 meloen(?) Kraal
		536	ijz roset	2 ijz en 1 bronzen stylus
		538	aw bot met leer glas uitspit/kraal	2 bronzen bolknoppen met ringaanhechting
		625	brons gezichtsmasker 2/10 uitspit	1 onbeschreven? Naamplaatje (brons)
				diverse bronzen voorwerpen
				afgebroken breinaald(?) (been)
				bronzen naainaald (gebroken oog)
				zilveren munt
				1 la luna(?) Hanger en 1 deksel of doosje hanger
				brons diversen naald/hanger/knopspeld
				2 bronzen scharnierplaatjes?
				1 muntje (republiek)
				munt
				munt
				munt
				munt
				munt
				munt
				munt
				munt
				munt
				munt
				diverse pennen. W.O. 1 been
				lood 3 vislood/gewicht/smelt fragm

Additional finds from the mask layer

All finds from the mask layer are presented in table 1.

Among the ceramics is a sherd with a *graffito* on it that says 'VBERNI X' which was interpreted as *contubernium X*, number ten of the smallest military unit (De Bruin 2000, 67). The metal assemblage also contained jewellery (among which a ring inscribed with 'AVE AMMA' which was possibly dedicated to a local goddess), parts of weapons, horse gear, and coins (De Rijk 2015, 66; Hazenberg 2000, 53). The majority of the

horse gear, nine complete *fibulae*, and a votive plaque (with an inscription) were found in trench three (De Bruin 2000, 67). Furthermore, of the 118 coins that were found in the entire excavation 69 coins (some unworn) were found in this trench (Brandenburgh and Hensing 2005, 25; De Bruin 2000, 67; 71). It is also worth mentioning that 8 out of the 13 coins of Trajan (dating between 97 and 111 CE within the range of the mask date) were found in the same trench (De Bruin 2000, 71; Prins and Polak 2009, 3).

Discussion

The Channel of Corbulo itself, while directly flowing into the Rhine next to Matilo, may not have been a Roman world border, but it can be argued that it was a liminal border in-between cosmological worlds. The mask was taken out of use by depositing it in a place where it could not be retrieved or seen anymore (cf. Cousins 2014, 61; cf. Kamash 2009, 232). On top of that the Corbulo channel was a converted natural waterway, meaning that the fuzziness whether it was seen as natural or artificial was connected to the deposition as well (cf. Cousins 2014; 6061). Therefore, an explanation for a ritual deposition of the Matilo mask and the associated finds in terms of liminality seems plausible. The channel, being a liminal space, would have functioned as an extraordinary place between (cosmological) worlds, where objects could be offered or 'move through the in-between and leave it behind with a difference' (cf. Derks 1998, 132; cf. Fokkens and Fontijn 2013, 564; cf. Kamash 2009, 230-232; cf. Nicolay 2007, 124; cf. Thomassen 2015, 40).

The mask was found at the bottom of the channel (fig. 2). A couple of meters away from the mask, heavily chopped articulated horse bones were found that belonged to two horses (Lauwerier and Robeerst 1998, 22). In addition, the skull of a horse was found. Research on this skull revealed that the horse was decapitated and that the chopping of the other bones was not done for functional butchering reasons (Lauwerier and Robeerst 1998, 13; 22). The bones of a leg were found together, while normally these bones would disperse after butchery (Lauwerier and Robeerst 1998, 21). Thus, Lauwerier and Robeerst (1998, 23) propose that a ritual following the *pars pro toto* principle had taken place: the parts of the horses representing entire animals. Especially when it comes to the horse skull, the ritual resembles the find of the mask: both horseman and horse are represented by the facial area. The mask was broken off its helmet and the horseman had armour which was not found either: both are arguments for a *pars pro toto* explanation of the ritual. However, the incomplete state of the mask might as well have been a reason for its discard. Still, the mask and horse bones differ in another respect: the individual parts of the horse skeleton were destroyed on purpose, whereas the mask was not (cf. Lauwerier and Robeerst 1998, 23; fig. 2). The act of damaging an object has long been perceived to signal the end of its use or meaning (i.e. ritual killing). Nevertheless, recent work on broken objects shows that is possible that fragmented finds served new purposes and embodied the whole (Croxford 2003, 82-83; 93). The same might apply to these fragmented finds which had now become part of a ritual, possibly serving a new purpose.

Considering the horse bones were classified as ritual and that many finds from the mask layer like the

weapons, horse gear, and coins have often been found in ritual deposits it can be argued that it is possible that (at least a part) of the find assemblage was deposited in the channel in a ritual (cf. Martens 2004, 142-144; cf. Nicolay 2007, 85; cf. Roymans 1990, 77-80).

Furthermore, the rarity of mask finds and the mask's value also point to a ritual deposition (cf. Hazenberg 1997, 38-39). Since, the context date matches the mask date the Matilo mask was removed from the world in a period in which it was still in common use, indicating the mask (with a repaired hinge) could have still served its original purpose. And, because the find context of the mask is likely to be unimpaired based on the articulated horse bones, suggesting the finds did not end up in the channel by chance, it is possible to interpret these finds as having been ritually deposited in a liminal place (cf. Lauwerier and Robeerst 1998, 21).

Conclusion

The coincidence of the dating range of the Matilo mask and associated finds, the rarity of the mask, the ritual deposition of the horse bones, the other potentially ritual finds, and the undisturbed context of the Matilo mask all make it plausible that the mask was deposited in the Corbulo channel as a ritual action.

The finds from the mask layer and the mask itself appear to have been deliberately deposited. As liminality can be attributed to the Corbulo channel this may have been sufficient reason to render the channel suitable as an extraordinary place for depositions. Although this explanation in terms of liminality and the current model, in which soldiers offered equipment in rites of passage to Gods in return for their safety, are not mutually exclusive, it can be seen as an alternative or complementary interpretation.

In future archaeological research on Roman wet contexts it is important to be more cautious when interpreting the find categories, which were discussed in this article, as normal waste. And, it seems liminality might be needed as an additional dimension to explain why depositions of Roman helmets took place in wet contexts along the Limes.

Acknowledgement and copyright

First of all I would like to thank Drs. J. de Bruin for all his tips and suggestions for writing and structuring this article. Additionally, the *INTER-SECTION* board deserves recognition for both the effort they put in getting articles up to standard and for their personal help. I also want to thank Dr. Carol van Driel-Murray for checking the English. Lastly, The National Museum of Antiquities in Leiden who provided detailed images of the mask, 'Erfgoed Leiden en Omstreken' who let me use the excava-

tion data from Matilo, and the people nearest to me must undoubtedly be acknowledged as they have supported me from the outset and throughout.

Bibliography

- Brandenburgh, C. R. and W. A. M. Hessing, 2005. *Matilo-Rodenburg-Roomburg. De Roomburgerpolder: van Romeinse castellum tot moderne woonwijk*. Leiden: Primavera Pers.
- Bruin, J. de, 2000. *Fibulae en Militaria uit Leiden-Roomburg*. Amsterdam (unpublished material practical report).
- Cousins, E. H., 2014. Votive Objects and Ritual Practice at the King's Spring at Bath, in Platts, H., J. Pearce, C. Barron, J. Lundock and J. Yoo (eds), *TRAC 2013. Proceedings of the Twenty-Third Theoretical Roman Archaeology Conference King's College, London 2013*. Oxford and Philadelphia: Oxbow Books, 52-64.
- Croxford, B., 2003. Iconoclasm in Roman Britain? *Society for the Promotion of Roman Studies* 34, 81-95.
- Derks, T., 1998. *Gods, Temples and Ritual Practices. The transformation of religious ideas and values in Roman Gaul*. Amsterdam: Amsterdam University Press.
- Driessen, M., 2007. Bouwen om te Blijven. De topografie, bewoningscontinuïteit en monumentaliteit van Romeins-Nijmegen. *Rapportage Archeologische Monumentenzorg* 151. RACM Rijksdienst voor Archeologie, Cultuurlandschap en Monumenten, Amersfoort.
- Enkevort, H. van, and T. Hazenberg, 1997. Romeins masker uit de klei getrokken. *Spiegel Historiae* 32 (1), 77-88.
- Fokkens, H. and D. Fontijn, 2013. The Bronze Age in the Low Countries, in Fokkens, H. and A. Harding (eds), *The Oxford handbook of the European Bronze Age*. Oxford: Oxford University Press, 550-565.
- Fontijn, D., 2002. *Sacrificial Landscapes. Cultural Biographies of Persons, Objects and 'Natural' Places in the Bronze Age of the Southern Netherlands, C. 2300-600BC*. *Analecta Praehistorica Leidensia* 33/34, 1-391.
- Hagedoom, S., 2013. Uitrusting, in P. Bakker en J. W. Bron (eds), *Gered uit de Grond*, 49-62.
- Hazenberg, T., 2000. Leiden-Roomburg 1995-1997: archeologisch onderzoek naar het kanaal van Corbulo en de vicus van het castellum Matilo. *Rapportage Archeologische Monumentenzorg* 77. ROB Rijksdienst voor het Oudheidkundig Bodemonderzoek, Amersfoort.
- Hiddink, H. and M. Groot (eds), 2010. *Materiaal en Methoden 2: Romeins Aardewerk van de Zuid-Nederlandse zandgronden*. Amsterdam: Vrije Universiteit.
- Hill, J.D., 1995. *Ritual and Rubbish in the Iron Age of Wessex: A study in the formation of a specific archaeological record*. Oxford: Tempvs Reparatum (British Archaeological Reports 242).
- Kamash, Z., 2009. What lies beneath? Perceptions of the ontological paradox of water. *World Archaeology* 40(2), 224-237.
- Klumbach, H., 1974. *Römische Helme aus Niedergermanien*. Bonn: Rheinland-Verlag Im Kommission Bei Rudolf Habelt Verlag.
- Lauwerier, R.C.G.M. and A.J.M.M. Robeerst, 1998. Paarden in de Romeinse tijd in Nederland. *Westerheem* 47(1), 9-27.
- Martens, M.S.M.C., 2004. Re-thinking sacred "rubbish": the ritual deposits of the temple of Mithras at Tienen (Belgium). *Journal of Roman Archaeology* 17, 333-353.
- Nicolay, J., 2007. *Armed Batavians. Use and significance of weaponry and horse gear from non-military contexts in the Rhine Delta (50 BC to AD 450)*. Amsterdam: Amsterdam University Press.
- Prins, J.W. and M. Polak, 2009. Munten, in Polak, M. and T. de Groot (eds), *Vondsten langs de Limes. Rapportage Archeologische Monumentenzorg 167*. RACM Rijksdienst voor Archeologie, Cultuurlandschap en Monumenten, Amersfoort, 28-31.
- Rijk, T. de, 2015. *Godgeschenk en gedaanteverwisseling of gezichtsverlies? Een onderzoek naar de depositie van Romeinse ruitershelmen tussen de eerste en derde eeuw na Christus langs de West-Nederlandse limes*. Leiden (unpublished BA-thesis University of Leiden).
- Robinson, H., 1975. *The Armour of Imperial Rome*. London: Arms and Armour Press.
- Roest J. van der, 1994. Koper in militaire werkplaatsen, in Es, W.A. Van & W.A.M. Hessing (eds), *Romeinen, Friezen en Franken in het hart van Nederland. Van Tracietum tot Dorstad 50 v. Chr. -900 n. Chr.* Utrecht: Matrij, 153-160.
- Roymans, N., 1990. *Tribal Societies in Northern Gaul. An anthropological perspective*. Amsterdam: Amsterdam University Press.
- Roymans, N., 1996. *From the Sword to the Plough. Three studies on the Earliest Romanisation of Northern Gaul*. Amsterdam: Amsterdam University Press.
- Thomassen, B., 2015. Thinking with Liminality. To the Boundaries of an Anthropological Concept, in Horvath, A., B. Thomassen and H. Wydra (eds), *Breaking Boundaries. Varieties of Liminality*. Oxford/New York: Berghahn Books, 39-58.
- Vos, W., E. Blom and T. Hazenberg, 2010. *Romeinen in Woerden. Het archeologische onderzoek naar de militaire bezetting en de scheepvaart van Laurium*. Leiden: Hazenberg Archeologie.

DETECTING CULTURAL FORMATION PROCESSES THROUGH ARTHROPOD ASSEMBLAGES

A CONCEPTUAL MODEL FOR URBAN ARCHAEOLOGICAL WASTE-/CESSPITS

Sander E. I. Aerts

MSc student at the Faculty of Archaeology of the University of Leiden, Intern archaeoentomology at Naturalis Biodiversity Center, Leiden

Abstract

Archaeologists encounter cultural deposits on a daily basis. One possible method for demonstrating formation processes, and potential contextual re-positioning of particular deposits is by looking at arthropod remains. Many members of this phylum are likely to be preserved in the archaeological record due to their sturdy chitinous exoskeletons. They are highly abundant in practically any habitat, which makes them very suitable for formational reconstructions. This article proposes a conceptual model to link arthropod assemblages to cultural formation processes. By defining the systemic contexts as domestic, peridomestic and natural, and the archaeological context as an urban archaeological pit containing waste, the movement of deposits can be traced through the ecological implications of the present arthropod remains. The distance between the original systemic context and the archaeological context defines four different sub-assemblages. These are then further divided into groups that show the relationship with human activities to separate the natural from the cultural formation process and indicate the type of deposit based on synanthropicity. Furthermore, a number of niche groups are distinguished to indicate the material contents and characteristics of a deposit. Reconstructing the origins and characteristics of these deposits allow for a better understanding of site formations and the functions of pits. Especially when there is no visible stratigraphic succession at the time of excavation, high resolution ecological information can shed light on the stratigraphy of a pit.

Keywords

archaeoentomology, insects, synanthropic species, cultural formation processes, systemic contexts

E-mail address: sander.e.i.aerts@gmail.com

Academia: <https://leidenuniv.academia.edu/SanderAerts>

LinkedIn: <https://www.linkedin.com/in/sander-aerts-64148b91>

Introuction

At the base of the interpretation of archaeological features lies the understanding of their formation and taphonomy. These processes are either of cultural or natural cause, and can be referred to as C-Transforms and N-Transforms (Schiffer 1987), which can be very difficult to pinpoint. In many features there is an accumulation of deposits from different origins, which may result in a stratigraphy that is not clearly visible. This makes an interpretation of

these features in the field difficult, if not impossible at times. The less 'attractive' a feature is, the less attention it would get due to limitations in budget and time. Especially pits that contain rubbish or sewage are likely to be overlooked (Smith 2013, 526). This is unfortunate, as the identification of these cultural deposits can provide many insights into activities such as waste-management, consumption patterns, house maintenance, (personal) hygiene, but furthermore on the successive uses of a feature.

Whether cultural or natural, it is likely that arthropods are silent witnesses that hitchhiked along with the deposits. Arthropods, like beetles and mites, are largely abundant in any habitat (Robinson 1996, 5). Their sturdy chitinous exoskeletons allow them to be preserved in the archaeological record. The use of these remains and their ecological implications are a useful way to separate the cultural from the natural formation processes, but they are often neglected in archaeological research (Elias 2010). In the search for anthropogenic activities, those arthropods that are known to interact with and benefit from humans and man-made environments form great indicators. These species are called synanthropes. For example, the grain weevil *Sitophilus granarius* cannot survive without indoor stored grains (King *et al.* 2014), and forms an indication for grain storage, consumption and waste-disposal.

Using ecofacts, or ‘culturally relevant nonartifactual data’ (Binford 1964, 432), as indicators for C-transforms is in sharp contrast with Schiffer’s pioneering work on formation processes, where he considers ecofacts solely as natural formation processes (Schiffer 1987, 290-291). Since then, people have argued against this, showing that ecofact assemblages can well be a cultural formation process (Welinder 1991). The aim of this article is not to define which arthropod groups are indica-

tors for a certain activity or feature as with indicator packages (*sensu* Kenward and Hall 1997), nor to describe species associations from urban deposits like Carrott and Kenward (2001) have done, but to create a preliminary arthropod-based model for understanding cultural formation processes, using an urban archaeological rubbish/cesspit as example. Urban in this sense refers to a human society where people occupy permanent domestic dwellings, with properties linked to those dwellings.

The trajectory of a deposit from the context of origin to the moment of final deposition can be described as the transition from systemic to archaeological context (*sensu* Schiffer 1972). In the example of the rubbish/cesspit, this feature is considered the archaeological context, and the conceptual systemic contexts are defined using concepts as described in Robinson’s work on urban entomology. Conceptual systemic origins and synanthropicity are used to make cultural formation processes visible, by a number of subdivisions of the overall arthropod assemblage.

Between natural and cultural formation processes: defining systemic and archaeological contexts

The difference between a natural and a cultural formation process lies in the movement from the systemic to the archaeological context. In order to define move-

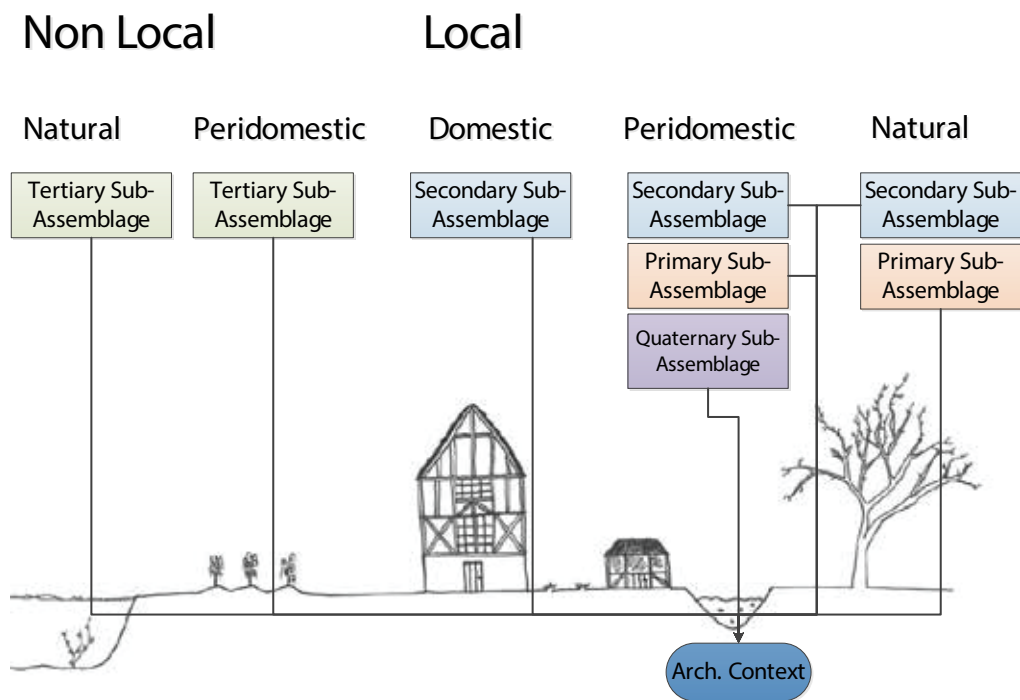


Figure 1. Representation of the sub-assemblages and their trajectories from systemic contexts of origin towards the archaeological context.

ment, i.e. a transform, the contexts need to be defined. Robinson (1996, 85-88) distinguishes a domestic, peridomestic and natural environment. For practical purposes, the peridomestic and natural areas here are subdivided into a local and a non-local area, to distinguish autochthonous from allochthonous taxa (figure 1). The domestic area is the local dwelling that is attached to the local peridomestic area. A house in an urban setting would have a property where activities take place that are linked to those in the home. For example, food preparation and consumption results in waste that may be deposited in features in the garden. There are many possible peridomestic features, such as a vegetable plot or a cesspit, or buildings such as stables, which are never domestic dwellings themselves. The local natural area encompasses the natural features in close proximity to or overlapping the peridomestic area. The non-local natural area is located elsewhere, and may be represented through imported

natural resources. The non-local peridomestic area is any peridomestic area not directly attached to the home, and may be represented through imported cultivated resources. These make up five conceptual systemic contexts, while the archaeological context is the waste- or cesspit, a peridomestic feature. The possible movement of arthropods, whether as individuals or within a deposit, between these systemic contexts towards deposition is represented in figure 2, also showing the different trajectories of N- and C-transforms.

The assemblage movement from and between the systemic contexts will ultimately result in deposition in the archaeological context. Therefore, the arthropod assemblage of a pit is an accumulated mixture of assemblages. In order to separate these, the overall assemblage is subdivided into four sub-assemblages.

Sub-assemblages: a division based on systemic context origin

Separating species communities allows for a better understanding of a deposit, but it will also make interpretation of the relative abundance of species possible, as there may have been a natural or anthropogenic selective process that resulted in over- or underrepresentation of species. Dumping a weevil-infested bag of grain into a pit will make a vast majority of the sample grain weevil, while this is solely based on one event, possibly blurring out other less abundant species. Although it is useful to identify an event, the superabundance of a taxonomic group might overshadow the ecological implications of smaller groups, for example statistically or in a visual representation.

The four sub-assemblages are based on the original systemic contexts, and have travelled a certain relative distance before deposition. Faunas originating from a non-local source need to pass through the local area before reaching the archaeological context (figure 1). The sub-assemblages are subdivided into synanthropic and natural groups, showing what the relationship in regards to human activity is. In a local systemic context, the ecological implications of taxa can indicate the intermediate actor of deposition, either a natural cause or an anthropogenic one for synanthropic taxa. This does not necessarily account for non-local faunas because a direct importation from a non-local source to the local peridomestic area is likely to be an anthropogenic activity. The sub-assemblages with ecological groups and the depositional implications is given in table 1.

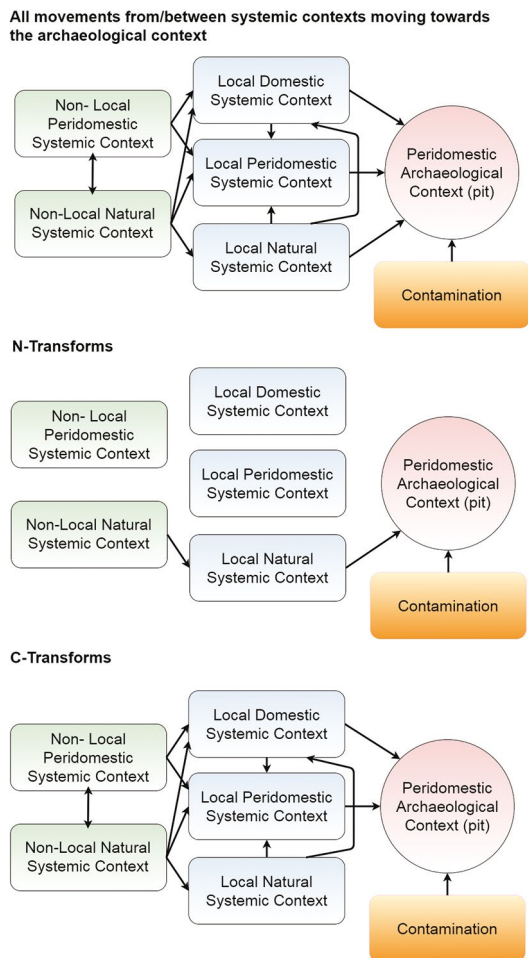


Figure 2. Assemblage movement from and between systemic contexts towards deposition and the distinction between N- and C-transforms.

Sub-assemblage	Synanthropicity	Depositional implication
Primary sub-assemblage	Synanthropic	Independently deposited due to attractive circumstances in and around the archaeological context.
	Natural	Independently deposited, but incidentally.
Secondary sub-assemblage	Synanthropic	Deposited through an anthropogenic activity.
	Natural	Deposited through a natural activity.
Tertiary sub-assemblage	Synanthropic	Deposited through anthropogenic activity with a minimum of one previous systemic context.
	Natural	Deposited through anthropogenic activity with a minimum of one previous systemic context.
Quaternary sub-assemblage		Contamination from neighbouring sediments / deposits and modern faunas.

Table 1. An overview of the four sub-assemblages with the depositional implications of the synanthropic and natural groups.

The primary sub-assemblage encompasses all taxa that have independently deposited themselves. This is the fauna that was effectively alive at the time of deposition. The synanthropic group includes the fauna that was attracted to specific circumstances in and around the pit at the time. This forms an indication of the presence of certain materials in a specific state, such as water, carrion, or excrements. The natural group deposited itself by accident, meaning that there are no beneficial factors for them, with the pit becoming their death trap. This group can be considered background fauna (*sensu* Kenward 1978) from the local natural area, like carabid beetles that wandered into a cesspit.

The secondary sub-assemblage indicates that there is either a natural or anthropogenic intermediary depositional actor between the systemic and archaeological context on a local level. The taxa in this sub-assemblage are not necessarily alive during deposition or able to survive inside the archaeological context. The synanthropic group includes the taxa that are either moved from their systemic context in the domestic or peridomestic area by anthropogenic

action, for example the disposal of straw flooring. All other deposits which have occurred without involvement of people are included in the natural group, such as arthropods deposited through illuviation or bird pellets (Kenward 1978, 7).

The tertiary sub-assemblage encompasses the taxa that were imported from a non-local natural or peridomestic source. These deposits have had at least one intermediary systemic context. Both the synanthropic group and the natural group would have been imported by humans, before being brought into the (peri-)domestic area, as migrating faunas from a non-local natural source would become part of a local area first. These natural faunas could only be differentiated from one another if the ecological circumstances differ greatly, for example through niche modelling. The synanthropic group is likely to include agricultural pests, being imported along with fresh produce from a non-local peridomestic source. The natural group could contain either intentionally or unintentionally imported arthropods from a natural source through anthropogenic activity. Intentionally imported taxa could in-

clude edible crustaceans, whilst the unintentionally imported taxa could be any species that lived or are living in or on imported natural resources (Kenward 1978, 11-12). This could be inhabitants of imported wood, but also older sub-fossils present in peat.

The quaternary sub-assemblage represents contamination in the form of remains from neighbouring deposits or sediments, or modern arthropods. This assemblage may not hold information on the past environment or human actions, but may originate from other contexts, for example due to the collapse of a wall or mixing due to flooding, or a more recent taphonomical process, such as ploughing, and became part of the current archaeological context.

Visibility of C-transforms through synanthropes: commensals and pests

Biological and ecological data is needed to trace the meaning of the sub-assemblages. Synanthropic species and communities have proven useful to reconstruct human activities (King 2014, Forbes and Milek 2014). However, in separating the natural from the cultural formation processes in a pit that forms an accumulation of deposits, understanding synanthropic ecologies and species associations is a helpful aid. The applicability and potential of synanthropic ecological data to determine specific anthropogenic actions is presented in a case study on Icelandic turf buildings (Forbes and Milek 2014, 197-198). Nowadays, insect ecological data can be easily accessed through the *BugsCEP* database, which is still being improved (Buckland 2014).

On a somewhat larger ecological scale than species communities, a differentiation is made between commensals and pests. The commensals are those synanthropes that benefit from man-made environments without causing any harm or nuisance. If humans deposit their cess in the back of the garden, any dung beetles that may be attracted to that will not have any negative influence on the people's daily lives. Pests on the other hand do inflict damage on humans directly, to their food resources or possessions (Robinson 1996, 56). The more stenotopic, or confined to a small range or environmental conditions, the present species are, the more detailed the information is that we can retrieve from the remains. The aforementioned *Sitophilus granarius* can only thrive on stored grains, while the blind and wingless beetle *Aglenus brunneus* has been found in different anthropogenic habitats with organic components (Kenward 1975, Buckland *et al.* 2009). Many *Staphylinidae* beetles are likely to occur in human environments to hunt other arthropods, but

are eurytopic and unsuitable for the reconstruction and differentiation of deposits (Kenward 1978, 5-6). Also peridomestic pests can be encountered (Robinson 1996), feeding on crops or occurring on livestock as parasites. Parasites do not directly affect the produce, but can be a nuisance to their hosts. Some are seemingly peridomestic, such as *Damalina ovis* or the sheep louse, forming an indicator for the presence of sheep, whilst *D. bovis* points archaeologists in the direction of cattle presence (Smith 2012, 55-56). Correct interpretation is not too easy, as these species are more likely to have occurred on the hides than on the animals themselves (Smith 2012, 55-56). Although these are then not an indication for the presence of live animals, they can form an indication for the processing of hides and carcasses, possibly in the domestic area.

The commensals and pests are all part of larger communities, which may or may not be observed in the archaeological record, depending on the selective process of deposition and over- or underrepresentation as well as post-depositional taphonomic processes. Figure 3 gives examples of such faunal groups, as can be observed in waste/cesspits and where they would fit in the grand scheme of deposit origins.

Archaeological applicability and future prospects

Understanding depositional trajectories allows understanding of 'invisible' stratigraphies and functions. A pit may have gone through successive phases of use during its life-span on which arthropod remains can shed new light. Also, as a part of an interdisciplinary research, it can be of aid to simply reconstruct the function of a pit in the first place. The identification of features in the field is not always done correctly, for which manure pits as found in Dutch medieval contexts form a great example. A vast number of relatively shallow, rectangular features with organic fillings are described as manure pits, but differ greatly in arthropod composition (Aerts, in prep.), thus indicating different characteristics and function. Interpreting and describing manure pits as seemingly uniform has caused confusion, but can be avoided through a more in-depth analysis (Aerts, in prep.). An interdisciplinary specialist study would help prevent such misinterpretations from seeping into the academic and grey literature, allowing archaeologists to do better research. It provides researchers with a more objective toolkit to interpret features. Arthropod remains can indicate the importation of resources, and which materials were discarded, how and where. They can help understand in what state the deposited materials

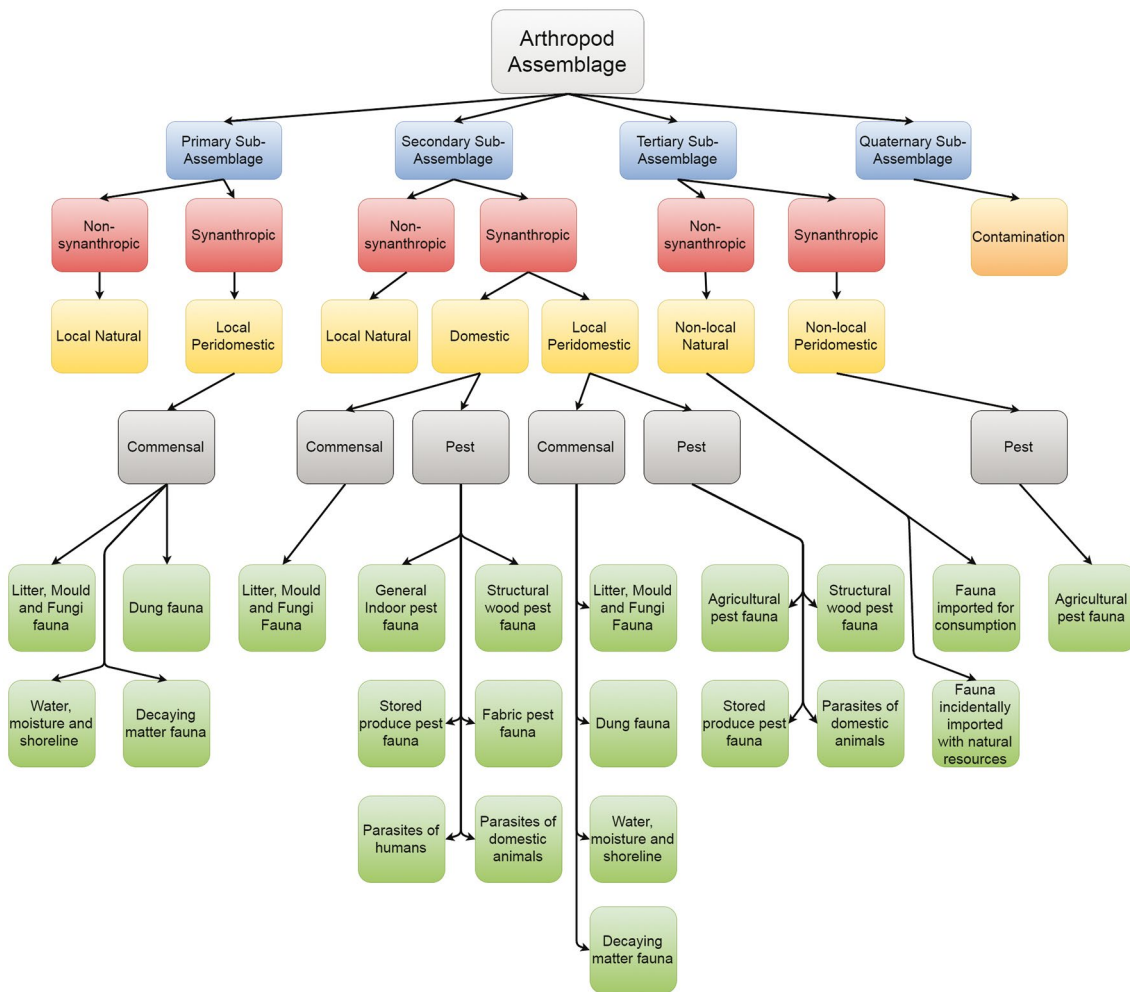


Figure 3. The overall proposed subdivisions of an arthropod assemblage.

were at the time of deposition, and explain why they were discarded. It can also provide information on the circumstances under which this happened, what the state of the feature was, for example open, closed, waterlogged or dry. Specific faunas can help to place a feature in a wider environmental context and understand its taphonomy. Overlaps in systemic contexts and ecological ranges of the arthropods will form limitations to some extent, and need to be dealt with cautiously through the correct use of modern habitat data. Ecological niche modelling can be a useful tool, if we can statistically deal with the differences in representation of taxa from different origins. It would be a step closer to a better understanding of our archaeological features, and a step towards a more fine-tuned cooperation between fieldwork and lab work.

Conclusion

This article has shown on the basis of a conceptual model that it is possible to trace deposit movement from systemic to archaeological context through arthropod remains, and how these movements indicate formation processes. It has also shown that synanthropicity is a way to differentiate the natural from the cultural transforms, as well as utilising arthropod ecologies to distinguish allochthonous from autochthonous faunas.

Pinpointing cultural formation processes through arthropods does not only refute Schiffer's theory that ecofacts are only indicators of natural formation processes, but it also has a practical applicability. Tracing C-transforms provides information on the anthropogenic (successive) uses and impact on an archaeological feature. This implies more precise interpretations of archaeological features and better (future) research by studying insects, arachnids and other arthropods.

Acknowledgements

I would like to thank the following people, without whom this paper could not have been realised: the editorial board of *INTER-SECTION*, for giving me this opportunity and their full support, Drs. Tom Hakbijl (Naturalis Biodiversity Center) for sharing his knowledge with me, Dr. Roos van Oosten (Leiden University), for always willing to discuss and correct my writing, and my anonymous peer reviewer for providing me with great feedback. I also want to thank my friends who read the paper in various stages to help me improve my writing, you know who you are.

Bibliography

Aerts, S., in prep. *Medieval Manure Pits: a Coleopteran Evaluation* (preliminary title). Leiden (upcoming MSc thesis University of Leiden).

Binford, L.R., 1964. A Consideration of Archaeological Research Design. *American antiquity*. 29(4), 425-441.

Buckland, P.C., E. Panagiotakopulu and P.I. Bukland, 2004. What's eating Halvdan the Black? Fossil insects in the study of a burial mound in its landscape context, in J.H. Larsen and P. Rolfsen (eds.). *Halvdanshaugen- arkeologi, historie og naturvitenskap*. Oslo: Universitetets kulturhistoriske museer, 353-378.

Buckland, P.I., 2014. The Bugs Ecology Package (BugsCEP) database: 1000 sites and half a million fossils later. *Quaternary International* 341, 272-282.

Buckland, P.C., E. Panagiotakopulu and G. Sveinbjarnardóttir, 2009. A failed invader in the North Atlantic, the case of *Aglenus brunneus* Gyll. (Col., Colydiidae), a blind flightless beetle from Iceland. *Biological Invasions* 11 (6), 1239-1245.

Carrott, J. and H. Kenward, 2001. Species Associations Among Insect Remains from Urban Archaeological Deposits and their Significance in Reconstructing the Past Human Environment. *Journal of Archaeological Science* 28, 887-905.

Elias, S.A., 2010. *Advances in Quaternary Entomology*. Amsterdam: Elsevier (Developments in Quaternary Sciences 12).

Forbes, V., and K. Milek, 2014. Insects, activity areas and turf building's interiors: An ethno-archaeoentomological case study from 19th to early 20th century Pverá, northeast Iceland. *Quaternary International* 341, 195-215.

Kenward, H.K., 1975. The Biological and Archaeological implications of the beetle *Aglenus brunneus* (Gyllenhaal) in Ancient Faunas. *Journal of Archaeological Science* 2, 63-69.

Kenward, H.K., 1978. *The Analysis of Archaeological Insect Assemblages: A New Approach* York: Council for British Archaeology. (The Archaeology of York Principles and Methods 19/1).

Kenward, H.K., and A. Hall, 1997. Enhancing Bioarchaeological Interpretation Using Indicator Groups: Stable Manure as a Paradigm. *Journal of Archaeological Science* 24, 663-673.

King, G.A., 2014. Exaptation and synanthropic insects: A diachronic interplay between biology and culture. *Environmental Archaeology: The Journal of Human Palaeoecology* 19(1), 12-22.

King, G.A., H. Kenward, E. Schmidt and D. Smith, 2014. Six-Legged Hitchhikers: An Archaeobiogeographical Account of the Early Dispersal of Grain Beetles. *Journal of the North Atlantic* 23, 1-18.

Robinson, W.H., 1996. *Urban Entomology: insect and mite pests in the human environment*. London: Chapman & Hall.

Schiffer, M.B., 1972. Archaeological Context and Systemic Context. *American Antiquity* 37(2), 156-165.

Schiffer, M.B., 1987. *Formation Processes of the Archaeological Record*. Albuquerque: University of New Mexico Press.

Smith, D.N., 2012. *Insects in the City: An archaeoentomological perspective on London's past*. Oxford: BAR Publishing (BAR British Series 561).

Smith, D.N., 2013. Defining an indicator package to allow identification of 'cesspits' in the archaeological record. *Journal of Archaeological Science* 40, 526-543.

Welinder, S., 1991. Ecofacts and the transition from systemic to archaeological context. *Laborativ Arkeologi* 5, 27-36.

MOLLUSC COLLECTION AND SALT PRODUCTION

RESOURCE PROCUREMENT AND DISTRIBUTION IN THE GULF OF FONSECA

Marie M. Kolbenstetter

R.M.A. candidate Leiden University

Abstract

Using case studies from El Salvador, Honduras and Nicaragua, this article discusses the collection of molluscs and the production of salt in the Gulf of Fonseca in the Late Classic and Early Postclassic. Based on the case studies, different models of procurement and redistribution are presented: specialized in-settlement production, centralized production and redistribution, and, finally, procurement and redistribution through seasonal mobility. These models are used to discuss the technical traditions associated with the foraging of resources, and furthermore used to present hypotheses on how the challenge was met in different localities. In this perspective, I explore the advantages of the Gulf region for economic activities. I also discuss the role of the environment for foraging techniques and distribution practices.

This article relates directly to other ethnoarchaeological and archaeological salt studies from neighbouring areas. Moreover, it aims to present compiled information from three countries to give a regional overview as a first step towards the documentation of the Gulf of Fonseca as an entity.

Keywords

Seasonality; Central America; sal cocida; procurement strategies; briquetage

E-mail address: marie.kolbenstetter@live.fr

Academia: <http://leidenuniv.academia.edu/MarieKolbenstetter>

Introuction

Today, one rarely considers the origins of the salt they consume on a daily basis. Yet, in the past, salt extraction was a laborious activity and control over the best salt sources would have been highly valued (Andrews 1983). This phenomenon can be observed in the archaeological record throughout the world (i.e. Adshead 1992, 20; Baudez 1973; Burley *et al.* 2011; McKillop 2002, 1; Muller 1984). This article will focus on how the ethnic diversity of a small area such as the Gulf of Fonseca would have affected procurement and distribution of a valuable resource such as salt. In this research, I will associate salt production with the harvesting of molluscs; the presented case studies will demonstrate how the two are associated, not only through the areas in which they occur but also through the redistribution strategies associated with them. Lit-

tle is known about this area, but the archaeological record illustrates the importance of both activities in the everyday life of pre-Columbian populations, and ethnographies exemplify their continued importance for people living there in the present day. The primary social processes that will be discussed in relation to resource procurement are mobility and seasonality. These processes are intimately bound to the environmental conditions present within the Gulf of Fonseca. In fact, the Gulf region seems in all aspects to have been a prime location for settlement.

To address the interconnections between mollusc harvesting, salt production, culture and environment, I will present the environmental setting within the Gulf area, I will provide information on the cultural landscape in the Gulf of Fonseca be-

tween 550 CE and the contact period. I will finally present three case studies from which procurement and redistribution models will be drawn. Those will in return be linked to different ecological surroundings. I will subsequently address diachronic changes observed in salt production and mollusc foraging in the region.

Background to the Research

Geographical and Environmental Setting

The Gulf of Fonseca is situated on the Pacific Coast of Central America (fig.2). This body of water is shared between three nations: El Salvador to the north, Honduras to the east and Nicaragua to the south. The Gulf is environmentally diverse. Aside from the numerous volcanic islands in the waterway, the Gulf’s littoral consists of two ecologically distinct zones. At the bottom of the mountains in El Salvador, an alluvial plain is traversed by several rivers. This plain then transitions into mangrove forests, home to a complex network of estuaries (Baudez 1973, 509). On the Nicaraguan side, the plain is dominated by a volcano, the Cosiguina. This diverse environment certainly offered advantages to dwellers; the naturally saline waters are rich in molluscs, and the volcanic activity produced fertile soils. The Gulf itself offers a natural harbour, and the numerous estuaries and rivers provide an inland connection.

Chronology

The chronology for the Gulf was established in 1966 by Claude Baudez and will be utilized within this paper (fig.1). It is based on Baudez’ survey, test pitting and excavation of 20 different sites in the Honduran portion of the Gulf, from which he was able to establish a ceramic sequence. Through the comparison of this sequence to other existant sequences in Honduras, along with carbon dating, this chronology was established. This is the only chronological framework available for the region of the Gulf of Fonseca.

Cultural Landscape

It has proven difficult for scholars to establish with certainty the date of arrival of individual groups in the Gulf of Fonseca, as in much of Lower Central America little research has been conducted and the obtained results are inconclusive to prove such migrations. Nonetheless, there is evidence of linguistic diversity at the time of conquest in the Gulf of Fonseca region (Brown 2013, 15; Gomez 2010, 13; Healy 1984, 116).

Periods Mesoamerica	Choluteca	Dates
Late Post-Classic	Malalaca	1500
		1400
		1300
Early Post-Classic	Amapala	1200
		1100
		1000
Late Classic	Fonseca	900
	San Lorenzo	800
		700
Early Classic	Chismuyo	600
		500
		400
		300

Figure 1. Chronology of the Gulf of Fonseca compared to Mesoamerican Chronology (after Baudez 1970, 221)

At time of contact, the presence of Lenca and Matagalpan speakers was recorded around eastern El Salvador and southern Honduras (Healy 1984:116), as reported by colonial sources. While Nahua speakers were also documented in the region at time of conquest, it is not possible with the available data to assert that their presence was due to a large migration.

There has been a long and still ongoing debate concerning the existence of migrations into the region during the Fonseca Phase. Based on tentative ethnolinguistic and archaeological evidence, it is believed that Oto-Manguean groups replaced the influence of the Lenca people around the Gulf in the as early as 800 CE (Chapman 1960; Martinez 1979; Healy 1980: 335-37 and 1984:116). It has also been proposed that Nahua speakers entered the region during a later migration wave from Central Mexico. The existence and date for this migration is also frequently contested, as the changes identified in the archaeological record cannot be linked with certainty to the arrival of new groups in the region (i.e. Constenla 1991, 1994; Lothrop 1926; Haberland 1986; Healy 1980, 20-21; Salgado 1996, 21; Niemel 2003, 16; Steinbrenner 2010, 80). They are believed to have coexisted alongside the Chorotega people in the Early Postclassic within the territory surrounding the Gulf of Fonseca.

If the Gulf was a linguistically heterogeneous region, how would this translate in the archaeological record? The following case studies will address this larger question through the lens of diversity in procurement methods in the Gulf region.

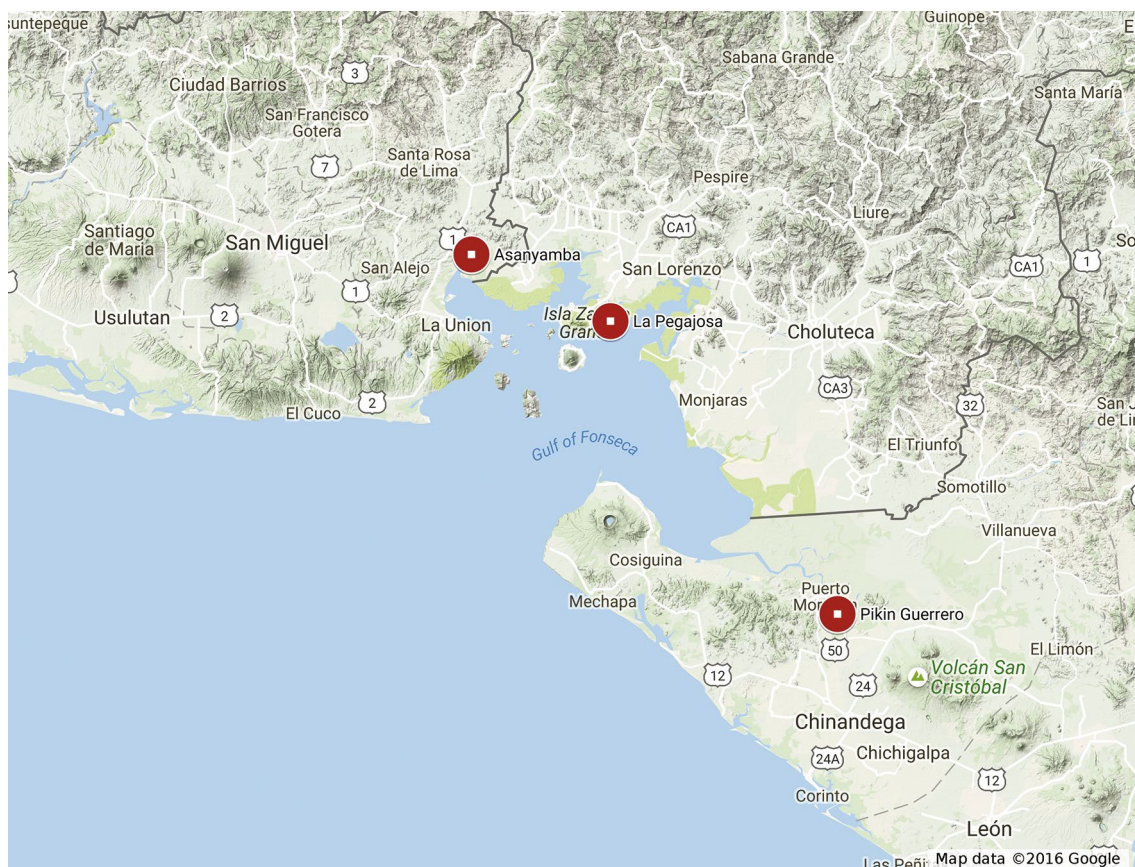


Figure 2. Map indicating the location of the three case study sites.

Case Studies

Nolasco, Camaronera and Pikin Guerrero, Nicaragua

The Nolasco, Camaronera and Pikin Guerrero sites are situated in the *departamento* de Chinandega in north-western Nicaragua. These sites are located close to the Estero Real. (Brown *et al.* unpublished, 163). Because of their proximity (less than 300 metres), I would argue they were once different parts of one single site. Some overlap in the ceramic material from Camaronera and Pikin Guerrero does support contemporaneity between both sites and points towards a middle to terminal classic occupation. Due to destruction of the sites, Pikin Guerrero is composed only by one large mound which appears as an island in the middle of a shrimp farm. Camaronera only yields remains from bulldozed mounds within the walls of a shrimp pond. More interestingly, the Nolasco site shows two mounds.

The ceramic material in Camaronera is finer, while at Pikin Guerrero the material appears to be primarily utilitarian. At Nolasco, however, the ceramic material that was recognizable on the surface was exclusively briquetage. Interestingly, the

mound with which this material was associated had a shell layer made of oyster shells. Locals confirmed that this mollusc most likely came from the Estero Real, which is only 2 kilometres away from this site, and most accessible by canoe through a network of streams. It is unclear if the mollusc layer observed in the mound is an architectural component or if the mound is in fact a shell midden. As the site still serves today as a natural harbour for fishermen's canoes, it is not unlikely that it might also have been used as such in the past.

Asanyamba, El Salvador

Asanyamba is a site situated on the coast of El Salvador, inside the Gulf of Fonseca, within the estuary of Chapernalito (Valdivieso 2006, 119). In its early descriptions, the site was referred to as a "puerto precolombino dedicado al comercio y productos del mar, especialmente sal" (Jorge Mejía, as cited in Valdivieso 2006, 119). It yielded a significant amount of lithic materials, ceramics and shell mounds with burials (Valdivieso 2006, 119). Due to modern agricultural activities, there are little more than 20 mounds observable (Valdivieso 2006, 119). Some of the structures incorporate a base of basalt; others consist almost exclusively of shells that were



Figure 3. Overview Picture of the Nolasco Site, Mounds on the left (Courtesy of the Proyecto Arqueológico Chinandega 2016).

commonly used within this region as building material (Valdivieso 2006, 122). Based on the ceramic material, it can be dated to the san Lorenzo and Fonseca Phase (550-1000 CE) (Amador, unpublished; Beaudry 1982; Valdivieso 2006, 120).

Numerous ceramics that could be associated with salt production were recovered (Beaudry 1982, 8). Asanyamba has therefore been identified as a major site for salt production (Valdivieso 2006, 121). Considering the quantity of shell found, it could be hypothesized that molluscs were also harvested in the vicinity as trade objects for export. The importance of the shell in regional cosmologies would have made them a valuable trade good, both for food consumption and for the associated symbolism (Valdivieso 2006). At the inland site of San Andres, in El Salvador, shells from the same species as those found in great number at Asanyamba were documented (Valdivieso 2006, 123), suggesting the possibility of a trade route beginning at Asanyamba and extending inland (Valdivieso 2006, 123).

La Pegajosa, Honduras

La Pegajosa is situated on the small volcanic island of Güegüensi, which in turn is located close to the Honduran mainland. The island is positioned in the general vicinity of two estuaries leading inland (Baudez 1973, 509). On the southeast end of

Güegüensi, a patch of land is seasonally flooded and becomes a 10 cm deep lagoon in the wet season. La Pegajosa is located on the edge of and extending into the lagoon where certain elevated parts form small islands (Baudez 1973, 509). Based on its ceramic material this site can be dated to the Amapala phase (1000-1200 CE).

One aspect of the site is particularly striking: an elevated stretch surrounded by small mangrove trees that is covered in shells (Baudez 1973, 509). Several shell middens can be found in the direct vicinity of the site. At the surface, numerous ceramic bowls of a type that has been associated with salt production have been found (Baudez 1973, 512). In the central section of the site, 36 trenches were discovered with traces of firing. It is argued by Baudez that, considering the maximum occupation of the site has been limited to 20 individuals and for only a few months per year, this plethora of trenches would have been excessive for culinary use (Baudez 1973, 511). The archaeological remains provide evidence for an extensive exploitation of salt in the method known as *sal cocida*, which consists of heating receptacles containing brine prior to recovering salt through evaporation (Baudez 1973, 515). This method produces so-called briquetage, a diagnostic ceramic debris associated with salt production (Robinson & McKillop 2014, 98). This salt pro-

duction in heavy quantities could be hypothesized to have been sold or transported to the settlement of origin of the seasonal workers, or to have been traded inland through the network of estuaries. The onsite association with molluscs suggests that both mollusc collecting and salt production were practiced at La Pegajosa.

Discussion

The three sites offered as case studies present three different methods of resource procurement.

In the first case, a form of specialized area production is observable within a large settlement. The Nolasco site seems to correspond to an area of the settlement specialized in salt making and potentially connected to the mollusc foraging. A specialized task force could have travelled there daily, defining the site exclusively as an activity area. Since other sites with concentrations of briquetage have been identified in the vicinity of this site, it is quite unlikely that the salt production was aimed towards trade. It seems more likely that both the harvesting of *ostiones* and the salt production aimed to supply the settlement in order to make it self-sufficient.

For the second case, I considered a habitational centre of regional importance (Valdivieso 2006) that is also both a production and distribution centre. The evidence of simultaneous intense salt production and mollusc harvesting could point to a production for distribution further inland. This model is not unknown to Central American archaeology; salt works found around Wild Cane Cay in Belize seem to follow a similar organisation, where salt is produced in the bay area and distributed inland through canoe travel on small estuaries in the Late Classic (McKillop 2002, 2005). Sites following the same model of procurement and distribution can be found on the Honduran side of the Gulf, generally situated at the deltas of the estuaries (Baudez, unpublished manuscript).

The third case study presents a model of resource procurement and distribution through seasonal mobility. A group would travel from an inland settlement to the island seasonally to produce salt to later distribute inland. A distribution of the collected molluscs may also have occurred from La Pegajosa. It is possible to consider both activities as the work of specialized task groups, especially if this site was part of a particular group's seasonal round (Binford 1978; 1980). A similar site exhibiting traces of seasonal mobility for mollusc and salt foraging purposes is Porterillos, situated in the delta of an estuary in the Gulf of Fonseca. This site dates to the Malalaca

phase, but offers similar material culture to La Pegajosa (Cruz Castillo 2007).

Baudez (1973, 507-508) discusses how in the 1960s inhabitants of this area were still seasonally mobile. Fisherman families from San Lorenzo left the mainland with their canoes in November to establish a seasonal camp until March around areas notoriously rich in molluscs. Baudez (1973, 509) draws a comparison between this seasonal movement and the archaeological remains found at La Pegajosa. It could therefore be hypothesized that La Pegajosa was visited by a few families, since salt production and the mollusc collection can be realized by all members of a family.

Conclusion

It is interesting to see that in all cases, the sites of procurement and distribution are situated in the vicinity of the delta of estuaries and, generally speaking, in similar environments. It could be argued that distribution occurred inland by means of canoe travel on the estuaries, as was the case for the Belize salt works around Wild Cane Cay (McKillop 2002, 2005). This is further supported by salt being generally regarded as a precious trade good in the neighbouring Maya world (Andrews 1983; McKillop 2002, 1). Even in cases where distribution did not occur, the position of the sites indicates the importance of mobility within the region. This mobility was very likely associated to the procurement and trade of resources in some way.

An interesting aspect of the different models is that there is yet no archaeological evidence for the first two presented models of procurement to have been used later than the Fonseca phase, while seasonal camps exist in both the Fonseca Phase and the Amapala Phase. Because those seasonal camps are only known from Honduras, could it be that the environment on that side of the Gulf was less advantageous for year round salt production? Or was seasonality merely a necessity for acquiring salt for inland settlements? This would point towards a lack of trade between inland and coastal settlements in that part of the Gulf. Could this have been due to ethnolinguistic heterogeneity? Unfortunately, it is not possible to answer these questions at this stage of the research and within the limits of this dataset.

Further research within this area will be able to substantiate questions regarding site size and organization, the connection of coastal sites with inland sites, and the important question of chronology.

Acknowledgements

I would like to thank Dr. Alexander Geurds for his guidance and advice on this research. I would also like to thank Dr. Clifford Brown for welcoming me in the Proyecto Arqueológico Chinandega 2016 and for generously sharing data and thoughts with me on the subject.

Bibliography

Adshad, S. A. M., 1992. *Salt and Civilization*. New York: St. Martin's Press.

Andrews, A. P., 1983. *Maya Salt Production and Trade*. Tucson: University of Arizona Press.

Amador Berdugo, F. E., unpublished. *Atlas Arqueológico de la Región de Oriente de El Salvador*. <http://www.famsi.org/reports/07070es/index.html>, accessed on 2 September 2016.

Baudez, C.-F., 1966. Niveaux Céramiques au Honduras: une Reconsidération de l'Évolution Culturelle. *Journal de la Société des Américanistes*, 55(2), 299-342.

Baudez, C.-F., 1970. *Central America*. London: Barrie & Jenkins.

Baudez, C.-F., 1973. Les Camps de Saliniers de la Côte Méridionale du Honduras: Données Archéologiques et Documents Historiques, in M. Sauter (ed.), *L'Homme, Hier et Aujourd'hui, Recueil d'Études en Hommage à André Leroi-Gourhan*. Paris Edition Cujas, 507-520.

Baudez, C.-F., 1976. Llanura Costera del Golfo de Fonseca, Honduras. *Vínculos*, 2(1), 15-23.

Beaudry, M., P., 1982. *Preliminary Classification and Analysis, Ceramic Collection, Asanyamba*. Presented to the National Museum, El Salvador. http://www.fundar.org.sv/referencias/beaudry_asanyamba.pdf, accessed on 2 September 2016.

Binford, L.R., 1978. *Nunamiut Ethnoarchaeology*. New York: Academic Press.

Binford, L. R., 1980. Willow Smoke and Dogs' Tails: Hunter-gatherer Settlement Systems and Archaeological Site Formation. *American Antiquity* 45 (1), 4–20.

Brown, C., García Vásquez, R., Espinoza Vallejos, S., Williams, M., Beach, T., and C. Giomar Sánchez, unpublished. *Proyecto de reconocimiento, prospecciones y excavaciones arqueológicas en el Departamento de Chinandega*. Internal Report. Patrimonio Office Managua.

Brown, C., 2013. *Reconocimiento, Prospecciones y Excavaciones en el Departamento de Chinandega, Nicaragua, Temporada 2, Informe Preliminar*. Internal Report. Patrimonio Office Managua. <http://wise.fau.edu/~ctbrown/NicaraguaResearch.html>, accessed on 2 September 2016.

Brown, C. and R. G. Vasquez, 2014. *Reconocimiento, Prospecciones y Excavaciones en el Departamento de Chinandega, Nicaragua, Temporada 2, Informe Final. Internal Report. Patrimonio Office Managua*. <http://wise.fau.edu/~ctbrown/NicaraguaResearch.html>, accessed on 2 September 2016.

Burley D. V., K. Taché, M. Purser and R. J. Balenaivalu, 2011. An archaeology of salt production in Fiji. *Antiquity* 85, 187-200.

Carmack, R.M. and S. Salgado, 2006. A World-Systems Perspective on the Archaeology and Ethnohistory of the Mesoamerican/Lower Central American Border. *Ancient Mesoamerica* 17, 219-29.

Chapman, A., 1960. *Los Nicaraos y los Chorotega segun Fuentes Historicas*, San Jose: Editorial de la Universidad de Costa Rica (Serie Historia y Geografía 4).

Constenla Umaña, A., 1991. *Las lenguas del Area Intermedia: Introducción a su estudio areal*. San Jose: Editorial de la Universidad de Costa Rica.

Constenla Umaña, A., 1994. Las lenguas de la Gran Nicoya. *Vínculos* 18-19, 191-208.

Cruz Castillo, O.N., 2007. La Cultura Chorotega en el Departamento de Valle, Honduras, Golfo de Fonseca. Posibles Evidencias de su Cultura Material. *Yaxkin* 23(1), 55-65.

Erquicia, J. H., 2006. Arqueología del Golfo de Fonseca: Un Panorama de la Investigación Científica, in F. Valdivieso (ed.), *El Golfo de Fonseca: Colección de estudios culturales*. San Salvador, Casa de las Academias, 30-49.

Escamilla, M., 2005. *Investigaciones arqueológicas en la zona del Golfo de Fonseca, El Salvador*. San Salvador: Universidad Tecnológica de El Salvador (Colección Arqueología 2).

Escamilla, M. and S. Shibata, 2006. Punta Chiquirin: Un Conchero Prehispanico del Golfo de Fonseca, in F. Valdivieso (ed.), *El Golfo de Fonseca: Colección de estudios culturales*. San Salvador: Casa de las Academias, 90-188.

Fowler, W. R., 1981. *The Pipil-Nicarao of Central America*. Calgary: AB (Ph.D. dissertation Department of Archaeology, University of Calgary).

Gomez, E., 2002. *Informe Preliminar de los sitios y rasgos arqueológicos y otros de valor histórico en el Golfo de Fonseca, El Salvador*. Unpublished Report San Salvador.

Gomez, E., 2010. *Archaeology of the Colonial Period Gulf of Fonseca, Eastern El Salvador*. Berkeley (PhD Dissertation University of California).

Haberland, W., 1986. Settlement Patterns and Cultural History of Ometepe Island, Nicaragua: A Preliminary

- Sketch, in F. W. Lange and L. Norr (eds.), *Prehistoric Settlement Patterns in Costa Rica*. Urbana (IL): Journal of the Steward Anthropological Society, 369-86.
- Healy, P. F., 1980. *Archaeology of the Rivas region, Nicaragua*. Waterloo (ON): Wilfrid Laurier University Press.
- Healy, P. F., 1984. The Archaeology of Honduras, in F. Lange and D. Stone (eds.), *The Archaeology of Lower Central America*. Albuquerque (NM): University of New Mexico Press, 113-161.
- Ito, N. (ed.) 2011. *Concheros en Punta Chiquirín, Departamento de la Unión*. San Salvador: Dirección de Publicaciones e Impresos (Colección Arqueología)
- Lange, F. W., and D. Z. Stone (eds), 1984. *The Archaeology of Lower Central America*. Albuquerque (NM): University of New Mexico Press.
- Lothrop, S.K., 1926. *Pottery of Costa Rica and Nicaragua*. New York (NY): Museum of the American Indian, Heye Foundation.
- MacKenzie Jr, C.L. and L.L. Stehlik, 1996. The crustacean and molluscan fisheries of Honduras. *Marine Fisheries Review* 58(3), 33-44.
- Martinez, E., 1979. Los Chorotegas de Mesoamerica meridional. *Yaxkin* 3, 1-25.
- McKillop, H., 2002. *Salt: White Gold of the Ancient Maya*. Gainesville: University Press of Florida.
- McKillop, H., 2005. *In search of Maya sea traders*. College Station: Texas A&M University Press.
- McKillop, H., 2005. Finds in Belize document Late Classic Maya salt making and canoe transport. *Proceedings of the National Academy of Science of the United States of America* 102 (15), 5630-5634.
- Muller, J., 1984. Mississippian Specialization and Salt, *American Antiquity* 49(3), 489-507.
- Niemi, K., 2003. *Social Change and Migration in the Rivas Region, Pacific Nicaragua (1000 BC - AD 1522)*. Buffalo, NY (Ph.D. dissertation, State University of New York).
- Robinson, M. and H. McKillop, 2014. Fuelling the Ancient Maya Salt Industry, *Economic Botany*, 68(1), 96-108.
- Salgado González, S., 1996. *Social Change in a Region of Granada, Pacific Nicaragua (1000 B.C. - 1522 A.D.)*. Albany, NY (Ph.D. dissertation, State University of New York).
- Steinbrenner, L., 2010. *Potting Traditions & Cultural Continuity in Pacific Nicaragua, AD 800-1350*. Calgary: AB (PhD Dissertation. Department of Archaeology, University of Calgary).
- Valdivieso, F. (ed), 2006. *El Golfo de Fonseca: Colección de estudios culturales*. San Salvador: Casa de las Academias.
- Valdivieso, F., 2006. Asanyamba: Importante Sitio en las Costas del Golfo, in F. Valdivieso (ed.), *El Golfo de Fonseca: Colección de estudios culturales*. San Salvador: Casa de las Academias, 119-169.

THE ‘LIVELY’ STREETS OF CLASSICAL OLYNTHOS

A SPATIAL ANALYSIS OF URBAN LIFE ON THE NORTH HILL, 432 – 348 BCE

Elena Cuijpers

*Ph.D. student, Rheinische Friedrich-Wilhelms-Universität Bonn, Classical Archaeology
Alumna, Leiden University, Faculty of Archaeology*

Abstract

During the last decades growing attention has been paid to the way ‘space’ is organised in both houses and settlements and the way that this organisation influences human life. The study of ‘space’ as an important force in the shaping of social processes, identities and other aspects of life has become as important for understanding past societies as the study of their artefacts and architectural remains (Blake 2004, 234). Spatial studies have revealed patterns of social interaction and deeper insights into the functioning of settlements, neighbourhoods and houses (e.g. Stöger 2011; 2014). The article presented here builds on pioneering studies by applying similar methods in a thus far unexplored area as it seeks to shed light on various aspects of Olynthian society in Northern Greece through a spatial examination of its built and non-built environment. Especially since the siege and subsequent destruction of the city by Philip II’s army had important consequences for the state of the material record, the employment of spatial analyses offers an additional perspective on Olynthos’ urban life, and more precisely on movement, social activity areas and matters of social control and privacy in the city’s streetscape.

Keywords

classical Greek archaeology, street networks, urban space, space syntax, Depthmap

E-mail address: elena.cuijpers@live.nl

Academia: <https://www.uni-bonn.academia.edu/ElenaCuijpers>

LinkedIn: <https://www.linkedin.com/in/elena-cuijpers-04578759>

Introuction

Archaeology in the past has focused largely on architectural features, ground plans and the material culture that has survived. The study of non-built spaces like streets and squares has not attracted much attention until fairly recently, as these open spaces might have appeared empty and less appealing when compared to the designed and planned architecture surrounding them (Hartnett 2008, 91-92). However, streets and squares are important networks in a settlement and represent platforms where all sorts of activities of urban life may have taken place. In an attempt to reconstruct such dynamic environments in ancient cities scholars have to rely on syntactic analysis tools that provide a shift from the static built environment represented by the archae-

ological record to the dynamics that were generated along the streets. This can be achieved with the help of space syntax tools that simulate past environments. This article provides a first in-depth spatial examination of the street network on Olynthos’ North Hill. First, it seeks to reconstruct the potential movement flows of people in the streets generated by the city’s spatial layout. Subsequently, it looks at the positioning of doorways to reveal dynamics between private and public space in a smaller section of the hill.

The city of Olynthos

The original settlement of Olynthos was located on the steeper South Hill dating back to the fourth millennium BCE (Mylonas 1929, 1-12). Accord-

ing to historical sources, the city expanded towards the end of the fifth century BCE due to a migration movement (known as the *anoikismos* of 432 BCE) with the intention to form a larger and better defensible city in preparation for the rebellion against Athens (Thuc. 1.58; Diod. Sic. 12.34.2). However, it is unclear which cities or specific populations joined this movement and how large the flow of migrants must have been. The archaeological record of Olynthos shows how a sudden growth in population size around this time resulted in the construction of a new residential area on the North Hill, laid out in Hippodamian fashion, with avenues running north-south and *streets* following an east-west direction (Robinson and Graham 1938, 13-14).¹ The newly constructed area was, however, short-lived, as the army of Philip II brought about the city's destruction in 348 BCE. By then some inhabitants might have already left the city with their belongings in advance. Those who remained must have been undoubtedly affected by the siege.

Methodology and theoretical framework

The archaeological dataset available for the spatial analyses are the streets and the houses on the North Hill of Olynthos as published by Robinson (1929-1952) and Cahill (2002). The theoretical framework at the basis of space syntax was formulated by architectural and urban morphologists Hillier and Hanson (1984). The spatial boundaries for the analysis of movement flows are the natural contours of the North Hill in the west, north and east (fig. 1²). These coincide with the possible circuit of the city's fortification walls (Robinson and Graham 1938, 39-40). The southern boundary is Street -I. To reconstruct the movement flows within Olynthos' street network, an axial analysis is conducted. In this analysis the street network is divided into the least and longest straight lines that connect the entire street space. Depthmap software,³ subsequently, calculates the level of accessibility and integration of all the lines within the network. The results are shown in a colour-coded map with a spectral range from red, for the highest integrated lines, to blue, for the lowest integrated lines. The integration value correlates to the potential amount of pedestrians moving

along each line (natural movement flows) (Hillier 1996, 119). A visibility graph based on visual integration and a positive correlation between visibility and movement potential complements the findings; the higher the visual integration of spaces, the more movement they attract (Stöger 2011, 194). Again the spectral range goes from red, for the most visible areas, to blue, for the visually most segregated spaces.

Next, the attention turns to an analysis of doorways. Doorways are physical and symbolic points of transition where private life opens up to, closes off from, and intersects with public life (Laurence 2007; van Nes 2011, 101). The location of doors, therefore, reflects how the urban environment was experienced and where potential activity areas of human interaction between the private and public sphere could have occurred. The spatial boundaries for this analysis are House A1 and Street IX, Avenue B, House A12 and the southern edge of Block A IV, and the western edge of Row A (fig. 3). These boundaries enclose a completely excavated area with sufficient data on the architectural remains necessary for the analysis.

The analysis begins with looking at the connection of building entrances to streets. The entrance can be either directly accessible to a street or separated from it by a fence or front yard, providing some form of seclusion and privacy. An examination of which street(s) a building connects to can also give information on its relation to public space. The number of doorways opening onto a street, then, directly reflects the amount of social activity and chances for interaction that might have occurred in the streets (van Nes 2011, 111). For a comparative survey of these *activity areas* across the entire street network all streets have to be divided in segments of similar lengths. By measuring the occurrence of doorways (number of doors per x meters) per segment, then, the potential activity areas are representatively revealed (Laurence 2007, 103).

Lastly, the way that entrances are positioned to each other influences the probabilities for social control (van Nes and Lopéz 2007, 23.7-23.8; van Nes 2011, 111-113). This article, therefore, reports the number of times that entrances are placed directly across from each other, enjoying an *inter-visibility* rate of a 100 percent. This implies that the inhabitants might have experienced high levels of social control.

¹ In this article a distinction is made between the terms '*street(s)*' as opposed to avenues (in italics or with a capital when it refers to a specific *street*, e.g. Street V), and '*street(s)*' for the collection of all avenues and *streets* in general.

² The small alleys, *stenopoi*, running from east to west in the middle of each house block are excluded from the analysis, as they were mainly used for drainage and not for passage (Robinson and Graham 1938, 33-39; Nevett 1999, 55-56). Another hypothesis is that the alleys serve as light sources, allowing light to enter the houses through windows placed along the walls (Graham 1958, 322).

³ Depthmap software is created by UCL's Bartlett School of Architecture.

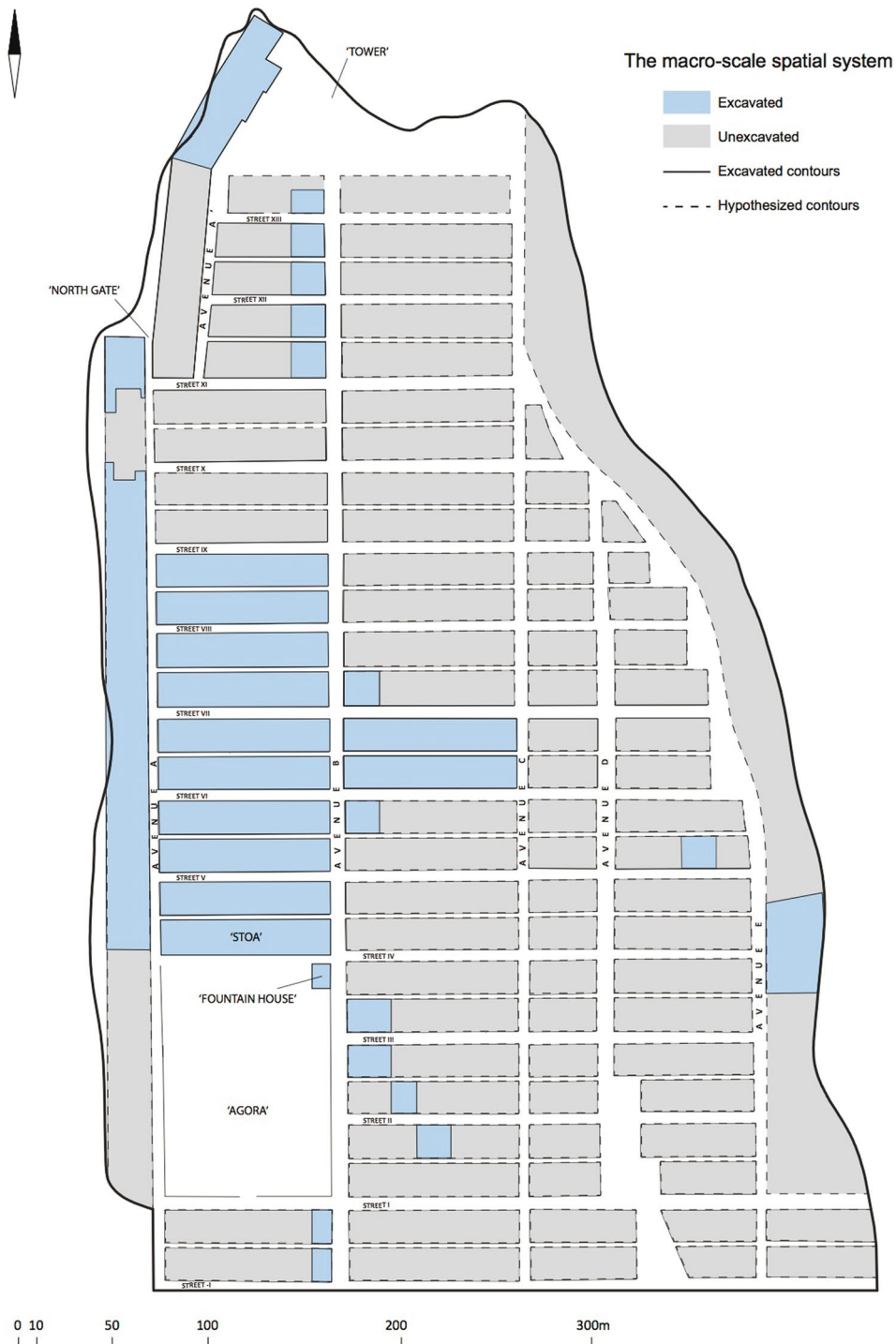


Figure 1. The macro-scale spatial system under study (after Robinson 1946, plate 271)

Macro-scale analysis: the street network

Figure 2 shows the axial map (2a) and the visibility graph (2b) resulting from Depthmap. The integration value per axial line together with the street name that each line represents, is listed in table 1.⁴

⁴ As the axial lines have to be straight for the analysis, Avenues D and E consist of more than one axial line, respectively two and three, since they are curved. The different segments are numbered in table 1 according to their position from north to south.

The results reveal that the axial line with the highest integration corresponds to Avenue C (line 5), followed by Avenue B (line 4). There is also a noticeable difference between the integration values of *streets* (14 in total), representing east-west movement, and the ones of *avenues* (9 in total), representing north-south movement. The four axial lines with the highest integration values are all (parts of)

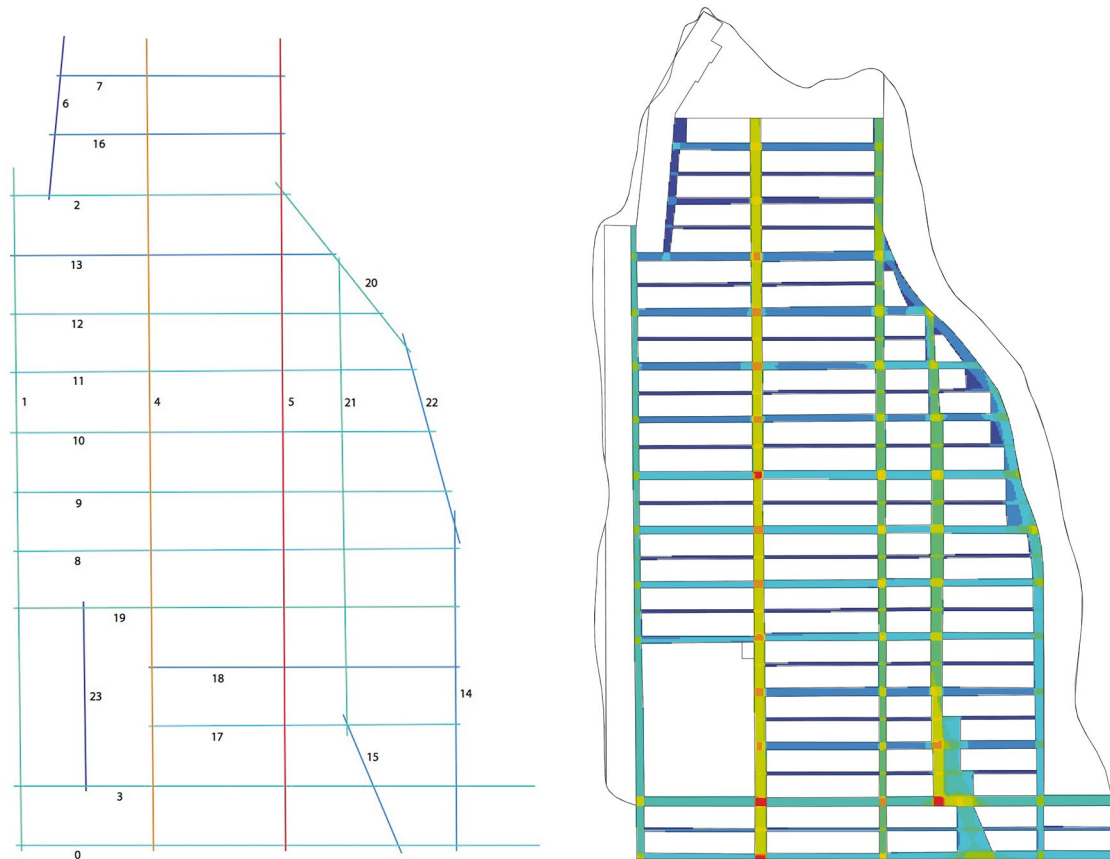


Figure 2. Left: the axial analysis; Right: visibility graph (both created with Depthmap)

avenues. This suggests that the movement of people in north-south direction might have exceeded movement in other directions on the North Hill. The visibility graph, then, demonstrates that, although the range of colours on the map is not far apart and there are only a few highly visible areas, Avenue B probably had the highest visible importance compared to the other streets.

Movement through the city

In his book on Olynthian household and city organisation Nicholas Cahill claims that ‘One can easily imagine this avenue [Avenue B] as a lively, bustling thoroughfare with significant interaction between the household and the public streets, with the shops acting as intermediary spaces, accessible both to the stranger from without and to the household from within the house. This avenue thus formed an important commercial artery of the city, a sort of economic axis through the town, similar to the “Westtorstraße” at Priene.’ (Cahill 2002, 274). This statement is based on evidence from Robinson’s excavations in 1928-1938, which excludes Avenue C, as only a little part of it has been excavated (fig. 1). The axial analysis, however, demonstrates that

Avenue C would have had more natural movement opportunities than Avenue B and could therefore have been an even livelier thoroughfare. Future excavations in and around this avenue could provide remarkable information as this avenue probably carried the bulk of movement flows. Subsequently, it turns out that the avenues in general were more prone to movement flows than the *streets*. This could suggest a good connection between the earlier settlement on the South Hill and the newer constructed residential area on the North Hill.

The visibility graph reveals that the city’s grid does not seem to give a specifically high rate of visibility to one place over another. This could suggest an ideal of equality (*isonomia*) in the area’s organisation and, thus, perhaps between its inhabitants. Archaeologists Hoepfner and Schwandner recognised a form of equality in the adoption of the so-called ‘pastas’ house type (Hoepfner and Schwandner 1994, 73). This seems, however, contradicted by the housing prices in Olynthos, known from inscriptions. These indicate significant differences between the house values (Nevett 2000, esp. 338-339; Cahill 2002, 276-281). Westgate argues

REFERENCE NUMBER (n = 24)	STREET NAME	INTEGRATION [HH]
5	Avenue C	6.47143
4	Avenue B	5.75238
21	Avenue D (1)	3.23572
1	Avenue A	3.04538
20	Avenue E (1)	2.87619
3	Street I	2.87619
19	Street IV	2.87619
0	Street -I	2.58857
8	Street V	2.58857
9	Street VI	2.58857
10	Street VII	2.58857
11	Street VIII	2.58857
2	Street XI	2.46531
12	Street IX	2.46531
17	Street II	2.46531
18	Street III	2.35325
22	Avenue E (2)	2.25093
14	Avenue E (3)	2.25093
13	Street X	2.25093
15	Avenue D (2)	1.99121
7	Street XIII	1.99121
16	Street XII	1.99121
23	Agora	1.39923
6	Avenue A'	1.32747

MINIMUM	1.32747
MAXIMUM	6.47143
MEAN	2.71994

Table 1. Integration [HH] values of the street network

that differences in wealth were not visible from the outside of Classical houses. According to her, this resulted from a prejudice against the projection of economic distinctions between households, while differences in the interior were a different matter (Westgate 2007, 239). As is known from Olynthos' material record, some houses were decorated with mosaic floors or enlarged by expanding into parts of neighbouring houses. However, equality could have been the basis for the construction of the North Hill's housing district.

Micro-scale analysis: doorways

The micro-scale system counts 97 front doors: 70 single doors of little over a meter wide (72.2 percent) and 27 double doors of about two meters width (27.8 percent). There are also 18 examples of a more elaborate form of the exterior doorway,



Figure 3. Activity areas in the micro-scale spatial system (after Cahill 2002, 28 fig. 7)

the *prothyron*. This doorway is created by placing the actual entrance(s) maximum two meters inwards of the door aperture in the outer walls of the house. *Prothyra* create an extra, more private, space by distancing the door from the streetscape, while all other entrances in Olynthos are directly connected to the street (Nevett 2009, 80). To investigate whether doorways on certain streets are preferred over others, the analysis looks at the 18 corner houses of the housing blocks, as only these houses were surrounded by more than one street (fig. 3). Out of the 45 doorways, 31 are located on an avenue (68.9 percent) and 14 on a street (31.1 percent).

The analysis of doorway occurrences reveals that the lowest value of 6.188 is attributed to Avenue A3 (tab. 2). The highest value is attributed to the eastern segment of Street VII and measures

SEGMENT (n = 18)	LENGTH (METERS)	FRONT DOORS	OCCURRENCE OF DOORWAYS
Avenue A 1	49.5	6	8.250
Avenue A 2	49.5	7	7.071
Avenue A 3	49.5	8	6.188
Avenue A 4	49.5	6	8.250
Avenue B 1	44.5	5	8.900
Avenue B 2	44.5	5	8.900
Avenue B 3	44.5	6	7.417
Avenue B 4	44.5	7	6.357
Street V west	43	5	8.600
Street V east	43	7	6.143
Street VI west	43	4.5	9.556
Street VI east	43	6.5	6.615
Street VII west	43	5	8.600
Street VII east	43	4	10.750
Street VIII west	43	6	7.167
Street VIII east	43	7	6.143
Street IX west	43	2	21.500
Street IX east	43	0	0.0
MINIMUM			6.188
MAXIMUM			10.750
MEAN			6.939

Table 2. Occurrence of doorways

10.750.⁵ Following the assumption that a higher concentration of doorways increases the chances for social interaction in public space, the analysis shows two areas with the highest social activity; first, the two middle segments of Avenue A (Avenue A 2, Avenue A 3) and Street VIII; secondly, the eastern segments of Street V and Street VI and the two southern segments of Avenue B (Avenue B 3, Avenue B 4). Noteworthy is the observation that the number of doorways significantly increases when proceeding from north to south on Avenue B. And, although information of the eastern side of Avenue B is lacking, the western side already counts 23 doorways – compared to the 27 doorways for the whole of Avenue A. Further, it can be noted that 27 out of the 36 shops (75 percent) are either part of these eight segments or immediately attached to them (fig. 3).⁶

5 The southern part of Street IX has only two doorways and the north part of this street has not been excavated. The values so far, 21.500 for the western segments and 0.0 for the eastern segment, deviate significantly from the median. They are not included in the analysis to achieve a clearer distinction between the other segments in the map.

6 The designations of these shops are indicated in italics in figure 3.

The intervisibility analysis reveals only seven instances in which the doorways of opposing buildings enjoy an intervisibility of a hundred percent. In all these instances, the entrances provide access to domestic spaces, as opposed to commercial spaces. The analysis of the doorways, therefore, suggests that the residents in Olynthos probably experienced limited social control. In addition, social control could also have occurred through windows or by walking in the streets. Unfortunately, there is insufficient evidence to include these variables.

The intersection between ‘private’ and ‘public’ space

The fact that most corner houses are connected to the busier avenues rather than to the quieter *streets* could have resulted out of a desire to be part of the social activities that might have occurred in the avenues. Additionally, doorways do not only have a relation to the streets, but also to the buildings’ interiors. Therefore, it could also be due to the internal spatial organisation of the ‘pastas’ house type, which is designed in such a way that the entrance would ideally be placed in the south, east or west.⁷ Merely three houses break this ideal organization with an entrance on a *street* in the north, while they also have at least one entrance on the avenue providing access to a shop. Was this perhaps done to create a spatial boundary between the building’s public and private space?

Activity levels increase when going from the northernmost segment of Avenue B towards the south; this strongly supports the hypothesis of a commercial centre, or *agora*, to the south of Block A IV (Robinson and Graham 1938, 37; Robinson 1946, 73; Nevett 1999, 55; Cahill 2002, 32).⁸ Of the shops, 75 percent is part of the two areas with probably highest activity. The presence of these commercial spaces could, then, further reinforce the amount of activity, resulting in a clustering of shops within Olynthos’ residential quarters. The fact that not all shops are located in these areas may indicate that these relied less intensively on the daily movement of people and the activity areas to attract customers. Following this interpretation, one could argue that these shops might have been more specialized or unique in order to survive present competition.

7 It should be noted that the interior organisation of the northern houses of each block was not mirroring the one of the south, but exactly the same. This means that the courtyard in these houses was adjacent to the alley and not to the street and that one of the northern rooms served as the house’s entrance.

8 Also the inscriptions of housing prices mentioned before show a negative relationship between the property value and the distance from the agora. This open space has previously been identified as an area for military manoeuvres (Robinson and Graham 1938, 21-22) and as a sanctuary (Hoepfner and Schwandner 1994, 78-79).

Conclusion

This study provided a unique opportunity for a spatial examination of the North Hill of Olynthos in Northern Greece, using space syntax tools. The results suggest a strong connection between the former settlement on the South Hill and the new one on the North Hill. The axial analysis revealed that Avenue C played a prominent role within the street network and would probably yield a significant material culture that has not yet been explored. Furthermore, the analyses identified a possible ideal of equality as the guiding principles when the area was first developed. In addition, the doorway analyses offered insights into social matters, as notions of privacy and limited social control became apparent, and complementary data on Olynthian shops. Further research on the streets, and their connection to domestic and commercial space is desirable to strengthen the observed patterns. Comparisons between Olynthos and other settlements in the region or within the wider scope of Classical Greece or even combined with the Roman world can serve to detect larger regional similarities and differences in antiquity.

Acknowledgements

My first depth of gratitude goes out to my former supervisor Dr. Hanna Stöger for her guidance and support while undertaking this research for my Masters and subsequently while turning my thesis into an article. Secondly, I want to thank Prof. Lisa Nevett in particular and the Olynthos Project for all the help and opportunities that they have offered. I also wish to thank the *INTER-SECTION* Editorial Board and the anonymous peer-reviewers for their constructive feedback and suggestions, and the opportunity to publish this article.

Ancient sources

Diodorus Siculus, 12.34.2

Thucydides, 1.58

Bibliography

Blake, E., 2004. Space, Spatiality, and Archaeology, in L. Meskell and R. W. Preucel (eds), *A Companion to Social Archaeology*. Oxford: Blackwell Publishing, 230-254.

Cahill, N.D., 2002. *Household and City Organization at Olynthos*. New Haven (CT): Yale University Press.

Graham, J.W., 1958. Light-wells in Classical Greek Houses? *Hesperia: Journal of the American School of Classical Studies at Athens* 27, 318-323.

Hartnett, J., 2008. Si quis hic sederit: Streetside Benches and Urban Society in Pompeii. *American Journal of Archaeology* 112(2), 91-119.

Hillier, B. and J. Hanson, 1984. *The Social Logic of*

Space. Cambridge: Cambridge University Press.

Hillier, B., 1996. *Space is the Machine*. Cambridge: Cambridge University Press.

Hoepfner, W. and E.-L. Schwandner, 1994. *Haus und Stadt in Klassischen Griechenland. Second Edition*. Munich: Deutscher Kunstverlag.

Laurence, R., 2007. *Roman Pompeii: Space and Society. Second Edition*. London: Routledge.

Mylonas, G.E., 1929. *Excavations at Olynthos, Part 1: The Neolithic Settlement*. Baltimore (MD): Johns Hopkins University Press.

Nes, A. van and M. López, 2007. Micro Scale Spatial Relationships in Urban Studies: the Relationship between Private and Public Space and its Impact on Street Life, in A.S. Kubat (ed), *Proceedings of the 6th International Space Syntax Symposium, Istanbul, 12-15 June 2007*. Istanbul: Istanbul Technological University, 23.1-23.12.

Nes, A. van, 2011. Measuring Spatial Visibility, Adjacency, Permeability and Degrees of Street Life in Pompeii, in R. Laurence and D.J. Newsome (eds), *Rome, Ostia, Pompeii: Movement and Space*. Oxford: Oxford University Press, 100-117.

Nevett, L.C., 1999. *House and Society in the Ancient Greek World*. Cambridge: Cambridge University Press.

Nevett, L.C., 2000. A Real Estate 'Market' in Classical Greece? The Example of Town Housing. *The Annual of the British School at Athens* 95, 329-343.

Nevett, L.C., 2009. Domestic Facades: A 'Feature' of the Urban Landscape of Greek Poleis?, in S. Owen and L. Preston (eds), *Inside the City in the Greek World*. Oxford: Oxbow Books, 78-87.

Robinson, D.M., 1929-1952. *Excavations at Olynthos*, 14 volumes Baltimore (MD): John Hopkins University Press.

Robinson, D.M. and J.W. Graham, 1938. *Excavations at Olynthos*, Vol. VIII: *The Hellenistic House: A Study of the Houses Found at Olynthos with a Detailed Account of Those Excavated in 1931 and 1934*. Baltimore (MD): Johns Hopkins University Press.

Robinson, D.M., 1946. *Excavation at Olynthos*, Vol. XII: *Domestic and Public Architecture*. Baltimore (MD): Johns Hopkins University Press.

Stöger, H., 2011. *Rethinking Ostia: A Spatial Enquiry into the Urban Society of Rome's Imperial Port-town*. Leiden: Leiden University Press.

Stöger, H., 2014. The Spatial Signature of an Insula Neighbourhood of Roman Ostia, in E. Paliou, U. Lieberwirth and S. Polla (eds), *Spatial Analysis and Social Spaces: Interdisciplinary Approaches to the Interpretation of Prehistoric and Historic Built Environments*. Berlin, Boston: De Gruyter, 297-316.

Westgate, R., 2007. *The Greek House and the Ideology*

THESIS OVERVIEW

SEPTEMBER 2015 - AUGUST 2016

At the moment of graduation, an archaeology undergraduate student has produced a minimum of 50,000 words in total in the form of written assignments. In the graduate phase, regular master students will increase this amount by 45,000, whilst research master students produce an additional 70,000 words. The majority of these texts, including the thesis, are only read by a handful of people. Since 2009 the Faculty of Archaeology requires all theses from both graduate and undergraduate students to be uploaded in the digital repository. Currently, most people are unaware of the fact that information on these theses, including extensive abstracts and author contact information, can be found online. A substantial part of these works is openly accessible as well (<http://openaccess.leidenuniv.nl/handle/1887/16590>). In order to stimulate the use of this invaluable database, and to promote student research beyond the publications in INTER-SECTION, we have decided to provide a complete overview of new theses in every edition. The list presented here contains all theses effectuated between September 1st 2016 and August 1st 2016. We encourage our readers to consult the Leiden Repository for more information on the titles listed below.

Bachelor Theses

Bakker, T. Hominin interference at the Schöningen 12 sites. The taphonomy of the mammalian faunas of the Lower Palaeolithic Schöningen 12 sites.

Barth, R. De loden sarcofaag van Byout el-Saied in het Rijksmuseum van Oudheden te Leiden.

Beerens, T. Onderzoek naar de structuur van Merovingische nederzettingen in het Maas-Demer-Schelde gebied.

van Beest, W.J. Een culturele biografie van de Cenotes op Yucatán.

Beets, Y. Medieval animal bone waste at Oegstgeest. An exploration of the animal bones found in waste pits at Oegstgeest.

Bexc, M. Relationship between activity patterns and bone robustness within hunter-gatherer and farming societies. Demonstrated with a case study from Skateholm I and II, Sweden.

Blom, A. Ageing the 40+ category: testing the ageing method for the sternal end of the clavicle. An analysis of the use of the adult ageing technique of the degeneration of the sternal end of the clavicle on the nineteenth century Dutch skeletal collection of Middenbeemster.

Boelsma, J. Theuws versus Uden-West. Early Medieval settlement pattern - and development theory of prof. Theuws versus the H/C area of Uden-West.

Cassée, R. The place of the death. A research into the burial customs during the Pre-Pottery Neolithic B in the Southern Levant

van den Dikkenberg, L. Verleden hergebruikt. De betekenis van urnenvelden in de Midden- en Late IJzertijd en in de Romeinse tijd op de Zuid-Nederlandse zandgronden.

den Engelsman, C. Resharpener is the norm? A reduction model on the retouched blades of Aurignacian layer US04 (sup.) of Les Cottés, France.

- de Groene, D. The faunal remains of the hunted species of the Neolithic site Tell Bouqras.
- Halbertsma, D. More than a building. Re-evaluating the Iron Age IIC 'sanctuary' at Tell Damiyah, Jordan.
- van Heekeren, V. Bones tell life stories. Osteoporosis as a method to detect the impact of the Industrial Revolution in human remains from cemeteries in London, Great Britain.
- van Hees, L. Het resterend botmateriaal uit de Karolingische tijd van het Salvator-klooster in Susteren. Een archeozoologische analyse van het botmateriaal en vergelijking met het eerder geanalyseerde materiaal uit de waterloop en cisterne.
- Hietanen, R. A matter of self-representation. Interpreting anthropomorphic image on Halaf pottery (6000-3500 cal. BC).
- Jansen, A. Spatial changes in insula V ii. A spatial analysis of the changes in insula V ii in Roman Ostia, Italy, between the Severan period and 400 AD.
- Jansen, I. Selectieve depositie: Een vergelijkend onderzoek naar vier ornamentdeposities met omegavormige paletarmbanden uit de late bronstijd in de Lage Landen.
- de Jong, R. Archeologie van interneringsdepots van Belgische soldaten gedurende de Eerste Wereldoorlog in Nederland.
- Kanters, J. Applying Clarkson and Hiscock's method of measuring reduction intensity on lithic tools to an archaeological sample.
- van Keulen, F. Schelp als afvalproduct. Een onderzoek naar het schelpmateriaal in monticulo A op de site El Flaco, Dominicaanse Republiek, 2014.
- Koster, M. Publieke architectuur en romanisering. Communicatieve gebouwen in Cosa en Trier.
- Lay, S. Shipwrecked and abandoned: lost mariners from shipwrecks in the Netherlands. Understanding the taphonomic effects of marine environments in human skeletal assemblages recovered from shipwrecks.
- Leek, B. Geulen en Putten: Een vergelijking tussen zoologische materiaal in geul 2 en de waterputten van het Merovingische Oegstgeest.
- Lepage, H. Romans among the Anglo-Saxons of Great Chesterford? Biological and cultural continuity between the Romano-British and Anglo-Saxon culture in Great Chesterford.
- Lockhorst, S. Nederlands skeletarchief. Een inventarisatie en analyse van onderzoek naar menselijk skeletmateriaal uit Nederland, Late Middeleeuwen en Nieuwe tijd.
- Melman, J.G.E. Influence of the environment on childhood health. A comparison between a classical Maya coastal and inland site by means of three skeletal lesions acquired during childhood: dental hypoplasia, porotic hyperostosis.
- Meuleman, D. Groen goud. Een literatuuronderzoek naar de bat winged pendanten in zuidelijk Centraal-Amerika ten tijde van 500 v. Chr. - 900 n. Chr.
- Nobelen, J. Untangling wool. Fibre preparation for woollen threads in Dutch Early Bronze Age to Middle Iron Age.
- Otten, D. Remains of our past underwater: How do we preserve it? An assessment of the underwater cultural heritage management system on Bonaire, Saba and St. Eustatius (the Caribbean Netherlands).
- Paré, C. Sharing the landscape: an archaeobotanical reconstruction of the landscape during the Merovingian period, at Oegstgeest Nieuw Rhijngeest-Zuid.
- Peters, C. The role of hominins in the formation of the faunal assemblages of the Palaeolithic locality Schöningen, Germany.
- Pothuizen, D. Morphological analysis of Prehispanic lithics from La Pachona, Chontales, Nicaragua.
- Putters, J. The Roman nymphaea in the city of Ostia: Location, location, location.
- Rico Neves, Z. Ephesus after antiquity. A study on the transition of antique Ephesus into a Byzantine city.
- Schaap, E. Stories in archaeology: The possibilities of folkloric stories in archaeological research in the Netherlands.
- Schubert, B. Wandreliefs in context. Een onderzoek naar de ruimtelijke context van de wandreliefs in het Noordwest paleis van Assurnasirpal II, te Nimrud.
- Spithoven, M. Spitsen van been en gewei uit Zuid-Holland, Nederland. Een typologische intra-site vergelijking.
- ter Steeg, W. Het bronzen mysterie. Een onderzoek naar metaaldeposities in de bronstijd in het West-Nederlandse kustgebied.

Stikkelorum, T. Uniformity across landscapes. An inter-regional investigation of the Late prehistoric habitation of the Maaskant and Heikant Brabant, the Netherlands.

Talboom, L. A better practice to data management in the archaeological field. A case study of the PACEN research project regarding data management.

Timmer, L. What's in the name? Een analyse van de naamgeving van Homo naledi.

Verzen, V. The crumbling wonder. Evaluating environmental threats to the archaeological monuments of Petra (Jordan).

Vlieks, N. Regional diversity and connectivity during the Italian Bronze Age: the case study of Molise. A comparative study of the pottery and exotic goods at Rocca di Oratino, Fonte Maggio, Masseria Mammarella and Monteroduni.

Vocking, I. Valkenburg de Woerd (ZH). Een vergelijkende studie van zoologisch materiaal afkomstig van de vroegmiddeleeuwse opgraving Valkenburg de Woerd 1986-1988.

Walraad, K. Een studie naar herkomst en gebruik van steenmateriaal. Een vergelijking van de twee precolumbiaanse vindplaatsen Anse Trabaud op Martinique en Lavoutte op Saint Lucia op basis van de lithische assemblages.

Wauben, N. Adornos and cosmological expression: An iconographical analysis of the zoomorphic adornos found at the Amerindian site of El Flaco (13th-15th Century), Northwestern Dominican Republic.

Westelaken, A. Social Status through vertebral pathologies on post-medieval cemeteries in England

Master Theses

Amsing, E. Assessing values and interests. A stakeholder engagement in the development of archaeological site parks in The Netherlands.

Baas, S. Merovingian dams in Oegstgeest-Rijnfront. Two dams in a Merovingian settlement in Oegstgeest-Rijnfront.
van den Brand, S. Borrowed gods, holy mountains, and temples on the horizon. A view on how the Amun-Ra cult at Gebel Barkal (Sudan) influenced the greater Nubio-Egyptian relationship during the Nubian Kerma periods, and during the Egyptian Middle Kingdom period up to and including the Third Intermediate Period.

Bol, W. Lymen in Tenebrae: A comparison of images on ceramic oil lamps in three military camps on the frontier of the Roman Empire in the Lower Rhine area compared.

Bosman, A. Talking heads. Quantitative analysis of morphological variation in the human mandible during the Medieval and post-Medieval periods in the Netherlands using three-dimensional geometric morphometrics.

Buis, P. Reconstructing mint conditions. A study of two coin types struck in Dorestad under Lothar I (840-855) and to their production and organisation.

Cawthorn, M. Pariwilpa Mokarina Warai: Ancient and recent Australian desert hunter-gatherer responses to climatic variability.

Cuijpers, E. The 'lively' streets of Olynthos in the 5th/4th century BCE: a spatial analysis of movement flows and activity areas.

van Duijvenbode, L. Relief-band amphorae, trade and distribution in the early Middle Ages. Access to long-distance trade in Carolingian Netherlands.

Edens, E. Tracing the indigenous peoples of Suriname. An application of strontium stable isotope analysis on prehistoric human material from coastal Suriname.

Flanagan, K.L. Absence of Neandertals in Ireland: an issue of hominin preference or of preservation? A biogeographical perspective.

Friedler, A. A tale of two cities. Analysis of Dutch populations between the late medieval and modern period using ancient mitochondrial DNA.

Grimbergen, L. The social uses of animals in the Halaf period. On the meaning of animal remains and animal representations.

Halbrucker, E. On the sickles from Százhalombatta-Földvár. Microwear analysis of flint sickle inserts from the Bronze Age tell at Százhalombatta-Földvár.

van den Hamer, M. Stress and the city. Vertebral neural canal size in Medieval and Post-Medieval London, England.

Hebels, S. Reconstructing the ecological setting of the North Sea area: stable isotope analysis of Late Pleistocene and Early Holocene faunal remains.

den Herder, F. The effect of change. The biographies of the Paul and Dora Janssen-Arts Collection and the Barbier-Mueller Pre-Columbian Collection.

Huiskamp, R. A matter of mind and matter: Applying theories on material agency and mind-set to the objects of the Vlaardingen Culture in the Western, Central and Southern Netherlands.

van IJzendoorn, M. Mapping the ceramics. The production, distribution and consumption of Champlévé Ware in the Aegean and beyond (twelfth-thirteenth century AD).

Janssen, A. Neglecting the elderly. An osteoarchaeological investigation in to improving the methodology for skeletal age-at death estimation in older adults; using a documented 19th century collection from Middenbeemster, The Netherlands.

Jesus, A. Negotiating personhood: animal remains in mortuary practices at the beginning of the adoption of domestic animals in South Scandinavia and Netherlands.

Jongma, S. Long bone fractures in Post-Medieval the Netherlands.

Jorritsma, J. Nabatean burials before, during and after the Roman Annexation. Changes in the Nabatean funerary practices in the Nabatean kingdom under the Roman influence from the first century BC to the start of the second century AD.

Joyce, R. Congenital syphilis in the past: Improving diagnostic criteria using clinical and palaeopathological research.

Kalaj, A. The representation of the Spanish conquest of the Aztec Empire from the 16th century until the 20th Century.

Kim, H.W. Research on the reasons for the collapse of the Romano-British polity in South-Western England in the fifth to sixth centuries common Era via complexity theory.

Kotsaga, K. News distributors as stakeholders of cultural heritage. Perspectives on heritage values from the state, local communities and the general public. The case of Amphipolis.

Kremer, R. Late-Neolithic stone beads of Tell Sabi Abyad, Syria. Usage and manufacture of stone beads in the Upper Mesopotamian Late Neolithic, 7000-5850 BC.

Lee-Smith, K. Believing Bullbrook: A review of archaeological collections from Trinidad and Tobago in British Museums.

Leestemaker, L. The viewshed of Samnium in the 2nd century BC. Did visibility play a role in building Samnitic sanctuaries?

Lengkeek, S. Understanding the use of stone markers in the eastern badia, northeast Jordan. During classical antiquity and (sub) recent times.

Lensen, R. Early brick production and use in the coastal regions of the Low Countries (1200-1350).

Mackenzie, C. Possibilities of participation: Inclusive management strategies and cultural World Heritage in Turkey. An analysis of the possibilities of implementing UNESCO concepts of participatory management strategies in Turkey, using Nemrud Dag as a case study to focus research into a specific community context.

Mahoney, U. Current issues of heritage management in Pohnpei State, Federated States of Micronesia.

Mazcek, D. Is it to the water that it must return? An inquiry into the water deposition of swords in the Carolingian period (ca. 750-1000 AD) in North-western Europe.

McGeer, L.M. The domestication of water. An analysis of Drinking Water in three Early Byzantine Cities.

Mullaart, M. The functional and social role of flint scrapers from the Vlaardingen site Wateringse Binnentuinen in The Hague.

Nater, C. Social differences in burial practices in the medieval cemetery of Reusel. An osteoarchaeology and mortuary archaeology study of burial practices in the southern Netherlands during the Central Middle Ages.

Netherton, A. Bodies of evidence: Economy and identity within Kura Araxes cemeteries in Early Bronze Age Transcaucasia.

Papoutsaki, A. Theatrical elements in contemporary museums of archaeology, anthropology, and art.

Riethus, A. The Übermuseum in north-western and central Europe and its adaption to the tasks and aims of the 21st Century.

de Rouw, L. Figuring out the farmstead. A critical evaluation of the concept Iron Age farmstead in Dutch archaeological research.

Ruf, K. The re-use of Maya monumental architecture in pre- and post-colonial Yucatán. An investigation of its differing manifestations.

- Ruiter, A. A contextual analysis of Roman pewter from the Low Countries.
- Santiago, M. Run-off irrigation and terraces agriculture at Udhruh. Understanding its role in Petra's hinterland from the Nabataean to the Byzantine period in southern Jordan.
- Scheers, A.J. Where biology meets culture. A study of Bolivia's artificial cranial modification during the Tiwanaku period.
- Schinning, F. To blog or not to blog. A research looking into the contribution of blogs and social networking sites to the accessibility of archaeology - in particular in regard to young adults in The Netherlands.
- Schroots, E. Decolonizing human sacrifice and cannibalism in the archaeology and anthropology of the Aztecs. An analysis of the practice of human sacrifice and cannibalism in Sahagún's *Historia General de las Cosas de Nueva España* and *Primeros Memoriales*.
- Semeijn, R. Social organization of field systems in the Late Prehistory. A study of prehistoric ardmarks as a proxy for field systems from the Middle Neolithic to the Early Iron Age in the Netherlands
- Smyth, P. Heritage in Peril: A cross-cultural examination of the negative impacts of tourism.
- Snaaijer, A. Detecting orthopaedic healthcare practices in Late Medieval and Early Modern Netherlands. A paleopathological analysis of three infirmary collections.
- Sobonia, J. The black flag still flies: Heritage and the Golden Age of Piracy in the Caribbean.
- Soldaat, M. Psilocybin in Pre-colonial Mesoamerica. An interdisciplinary approach to sacred mushroom rituals.
- van Spelde, F. Wandering bones and peripheral bodies. Multidisciplinary analysis of the human remains from the early medieval (AD 500-700) settlement at Oegstgeest, the Netherlands.
- Spiering, C. Time for a bull-session: A combined iconographic, zoological and textual perspective on the role of the bull in Late Bronze Age Greece.
- Stuyt, T. Molluscs that matter: The use of molluscs on five late pre-colonial sites (AD1000-1500) in the north-western Dominican Republic.
- Sybinga, J. Reconstructing the local vegetation succession between the Late Bronze Age and the Medieval settlement period in Enkhuizen, West-Friesland, The Netherlands.
- van der Storm, M. Accommodation for the poor. An Archaeological and historical study of one-room houses from the 19th century.
- Veeren, A. Dutch participation in pre-World War II World Fairs.
- Vergidou, C. The Use of long bone epiphyseal scars in the resolution of large-scale commingled assemblages.
- Vleeshouwer, F. Imagining the Celts. The Celtic image as known from historical, linguistic and archaeological sources, compared to the view on the Celts in the British (popular) media of the last five years (2010-2015).
- Vos, E. Comparing the archaeological data of Neumark-Nord 2/2 with ethnographic data from North America.
- de Vries, R.J. Bronzing. Bronze as emergent technology causing changes in the late Prehistory of Europe.
- Weller, J. German imperialism and Mexican nationalism. How a relationship was formed and the effects of it on the Antiquities trade between two nations.
- Zarra, K. Hosios Loukas Monastery: a "living heritage site" and its cultural components.

Research Master Theses

- Aal, J. Between animals and bones: Reconstructing human behaviour by analysing taphonomic markers on osteological remains from Bronze Age settlement sites near Andijk, the Netherlands.
- de Bondt, E. A human cremation up close. Insights in the burial process of a Late Bronze Age/Early Iron Age human cremation grave from Apeldoorn, the Uddeler Heegde.
- Castilla-Beltrán, A. Seasonal seafarers. A complex systems exploration of Archaic Age mobility strategies and social dynamics in the North-Eastern Caribbean.
- Ernst, M. (Ex)changing the potter's process. Continuity and change in the non-European ceramics of Cotuí, the first colonial mine in Hispaniola, after 1505.
- Everts, A. Underneath the angels' wings. An archaeological investigation of the iconography and ideology of angels in Late Antique Egyptian and Nubian religious and secular life.
- Ganciu, I. Heritage for sale! The role of museums in promoting metal detecting and looting in Romania.

van der Heijden, N. Connecting the past to the present. A study on the level of community involvement during the World Heritage nomination process of the Roman Limes.

Kerkhof, S. Linking gender to teeth. Dental modification and the expression of gender at Monte Albán, Oaxaca, Mexico.

Kroon, E. J. A Study of change. An integrated technological analysis of changes and continuity in ceramic technology during the Late Neolithic of the Dutch West Coast.

Koutamanis, D. Ecology of Javanese hominins. What we can learn through isotope data from background fauna.

Langbroek, M.B. All that is gold does not glitter; A study on the Merovingian use and exchange of amber or 'northern gold' in the Benelux and the German Lower Rhine area.

Mol, K. The griffin cauldron in Greece and Italy. From origin and style to function and use. The 'Orientalizing' period reconsidered (eight-sixth century BC).

Mulder, E. The Hyettian rural landscape. Study into the Classical-Hellenistic rural sites of the Ancient Greek city of Hyettos through ceramic survey material.

Nieuwenkamp, R. On the variability of Lower and Middle Palaeolithic bifaces. Exploring chronological, techno-functional, and socio-cultural aspects of biface morphology by using bifacial tools from the southern Netherlands as a case study.

Pinchetti, L. The Biferno Valley in Late Antiquity. A multiscalar approach to rural settlement patterns of Southern Central Italy (AD 280-600).

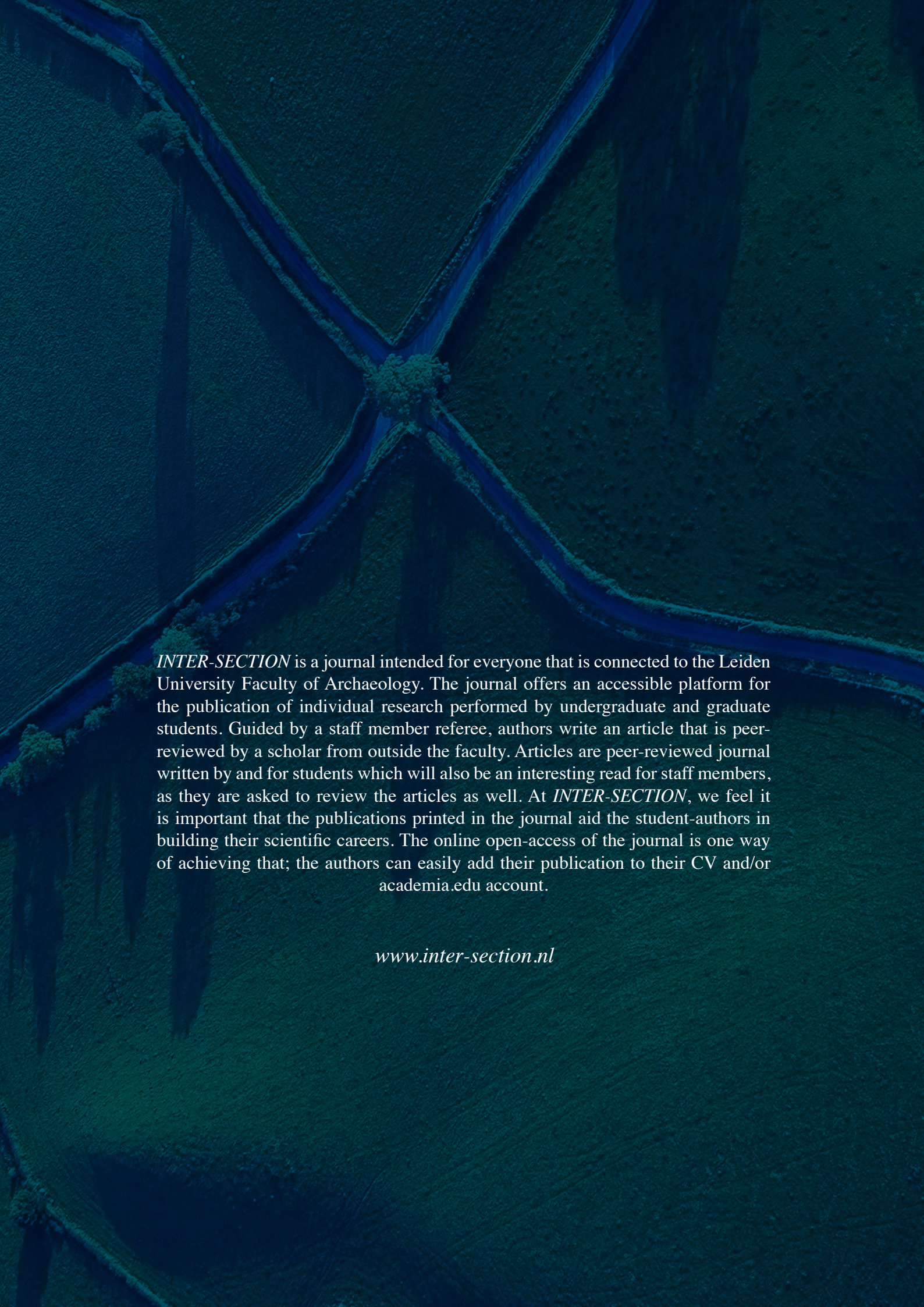
Reddington Davis, C. Ritualized discourse in the Mesoamerican codices. An inquiry into epigraphic practice.

Sipila, I. East and west, warm and cold: The evolution of Neandertal mobility behaviour in its European Palaeoenvironmental Context from the Beginning of the Late Saalian (191 ka BP) until their Demise (40 ka BP)

Steffens, B. Abandonment issues: Exploring house abandonment in the Bronze Age of North-western Europe.

Verstraaten, N. Cocijo: He who lives at the four corners of the world. An analysis of the Zapotec Cocijo effigy vessels from tomb contexts at Monte Alban, in relation to the four primary directions.

Vonk, L. Archaeology as activity in dementia: a presentation of the potential effects of an active engagement in archaeology on the wellbeing of people living with dementia.



INTER-SECTION is a journal intended for everyone that is connected to the Leiden University Faculty of Archaeology. The journal offers an accessible platform for the publication of individual research performed by undergraduate and graduate students. Guided by a staff member referee, authors write an article that is peer-reviewed by a scholar from outside the faculty. Articles are peer-reviewed journal written by and for students which will also be an interesting read for staff members, as they are asked to review the articles as well. At *INTER-SECTION*, we feel it is important that the publications printed in the journal aid the student-authors in building their scientific careers. The online open-access of the journal is one way of achieving that; the authors can easily add their publication to their CV and/or academia.edu account.

www.inter-section.nl

INTER-SECTION

Innovative Approaches by Junior Archaeologists

Volume II

15 December 2016

ISSN Printed version: 2452-266X (200 copies)

ISSN Online version: 2452-2678

www.inter-section.nl

II