THE URBAN GRAVEYARD

ARCHAEOLOGICAL PERSPECTIVES

edited by
R.M.R van Oosten, R. Schats, K. Fast,
N. Arts & H.M.P. Bouwmeester

URBAN GRAVEYARD PROCEEDINGS 2

THE URBAN GRAVEYARD

Sidestone Press

THE URBAN GRAVEYARD

ARCHAEOLOGICAL PERSPECTIVES

edited by
R.M.R van Oosten, R. Schats, K. Fast,
N. Arts & H.M.P. Bouwmeester

URBAN GRAVEYARD PROCEEDINGS 2

Published by Sidestone Press, Leiden
www.sidestone.com

Lay-out & cover design: Sidestone Press
Cover illustration: Laurens van Maren

ISBN 978-90-8890-502-5 (softcover)
ISBN 978-90-8890-503-2 (hardcover)
ISBN 978-90-8890-504-9 (PDF e-book)

Rijksdienst voor het Cultureel Erfgoed
Ministerie van Onderwijs, Cultuur en Wetenschap

Contents

Preface

Only a few generations ago, death was never far away: mortality rates were significantly higher than they are today.[1] For example, in early modern times, a city like Amsterdam was faced with the deaths of approximately 40,000 individuals every year who had to be interred in one of the city's cemeteries.[2] Generations before us lived with the idea that Death could come knocking at any time (Fig. 1). In 18th-century Holland, the inevitable end was well prepared for; even for those who 'hardly had anything on the wall', a burial shroud and hat lay in wait until the appointed time.[3] This comment was made by Johannes le Franq of Berkhey (1729-1812) in his book *Natuurlyke historie van Holland*, in which he gave an almost anthropological treatise on the habits and customs of the Dutch. For decades, historical research focused on the experience of death, mourning and remembrance, shedding light on our mortuary behaviour in the past.

Fig. 1: Death with a scythe in his hand knocks at the door. Cornelis van Noorde, c. 1767, Rijksmuseum Amsterdam, http://hdl.handle.net/10934/RM0001.collect.163657.

1 The annual mortality rates in cities in Flanders in the late medieval period was estimated to be 40 ‰ (Stabel 1997, 117, van Bavel 2010, 284). During the 19th century, a clear demographic transition took place from high mortality and fertility rates to low mortality and fertility rates (Devos 2006, 12-13). Currently, the annual mortality in the Netherlands is 8‰ (www.cbs.statline/sterfte). For international comparisons see www.indexmundi.com.

2 Van Leeuwen & Oeppen 1993, 70, table 2. Research concerns the years between 1681 and 1920.

3 Le Francq van Berkhey 1772-1776, part 3, 1834.

Archaeological research into funerary practices in the Late Middle Ages and the Early Modern period does not have such a long history; the same is true for the study of human skeletal remains. During the past two decades, archaeological research into historical cemeteries has increased immensely. However, the majority of archaeological research that was carried out prior to 2000 has not been published. Newer research is published but comparative perspectives are still rather rare. Moreover, the results have not been accessible internationally. Therefore, the Faculty of Archaeology at Leiden University, the Cultural Heritage Agency, and the Association of Dutch Municipal Archaeologists organised a conference on the 12th and 13th of December, 2013 at the Cultural Heritage Agency, entitled 'The urban graveyard: The Low Countries in a European perspective'. We are very pleased that most of the presenters were willing to convert their presentation into an article. In these proceedings, four main themes are addressed: cemeteries in urban contexts, the management and organisation of cemeteries, social, cultural, and religious differences in burial rituals, and bioarchaeological aspects of the buried individuals themselves. The articles are divided into a Dutch-language volume and an English one.

Although we do not claim to provide an exhaustive overview, thanks to the contributions from many Dutch and Flemish researchers, these urban graveyard volumes represent the first general overview of research that has been conducted on the topic. We hope the information and results presented in these books will serve as a stepping stone to more comparative studies and analytical research on a larger scale.

Roos van Oosten & Rachel Schats, Spring 2017.

Bibliography

Devos, I., 2006: *Allemaal beestjes. Mortaliteit en morbiditeit in Vlaanderen, 18de – 20ste eeuw,* Gent.

le Franq van Berkhey, J., 1772-1776: *Natuurlyke historie van Holland. Deel 3*, Amsterdam.

van Bavel, B., 2010: *Manors and Markets: Economy and Society in the Low Countries 500-1600*, Oxford.

van Leeuwen, Marco H.D. & J.E. Oeppen, 1993: Reconstructing the Demographic Regime of Amsterdam 1681-1920, *Economic and Social History in the Netherlands*, 61-104.

Stabel, P., 1997: *Dwarfs among Giants. The Flemish Urban Network in the Late Middle Ages*, Leuven/Apeldoorn.

Ethical issues in human osteoarchaeology

Recommendations for best practice in the Netherlands

Andrea L. Waters-Rist, Rachel Schats & Menno L.P. Hoogland

Introduction

"*When is it okay to dig up the dead*?" An article with this headline was published on the website of National Geographic in April 2016[1] in which an elaborate ethical discussion on the excavation, analysis, and curation of archaeological human remains was put forward. From this article, it becomes clear that contested views exist with regard to research on archaeological skeletons. Opponents of skeletal research often express "*the discomfort of disturbing a person's final resting place to satisfy idle curiosity"* or state "*they do not ethically have the right to study ancestors of people who haven't given their consent"*.[2] The fact that the skeletal remains were once living humans imbues them with special meaning and, therefore, they require ethical considerations above those that pertain to other classes of archaeological material. Researchers working in this field increasingly have to demonstrate the 'importance' of their studies (however defined), far more so than the other archaeological research fields.[3] The question, is it ethical to excavate and study human remains, is common, exemplifying the special nature of this type of material.

Especially in North America and Australia,[4] where First Nations peoples were typically the main object of osteoarchaeological research, ethical concerns go far beyond the bones, involving issues of power and oppression, and complex social, economic, and political factors. Legislation concerning the skeletal remains of First

1 Straus 2016.
2 Straus 2016.
3 Martin, Harrod & Pérez 2013, 8-9.
4 Arnold and Jeske 2014, 326,332-334.

Nations people (and sometimes their archaeological material culture) is debated and contested on a regular basis.[5] Laws such as the Native American Graves Protection and Repatriation Act (NAGPRA) passed in 1990 regulate, but also limit research focused on indigenous human skeletal remains in the USA.[6] Additionally, several North American physical anthropological associations have devised codes of ethics and practice offering recommendations for best practice of the treatment of First Nations human skeletal remains.

In Europe, human remains are not as contested as they are in North America and Australia, in large part because usually the remains that are excavated are from the same, or at least a similar, culture as the people who excavate them.[7] However, also in Europe, particularly in England, issues pertaining to the excavation and analysis of human skeletal remains have become more common in the last decade.[8] A good example of this is the claims made by Druids on the remains excavated from Stonehenge (Fig. 1).[9] As a result, British archaeologists and osteoarchaeologists felt there was a need to create ethical guidelines concerning research on human skeletons. Several professional organisations have developed ethical codes and in 2004 the Human Tissue Act was passed which deals explicitly with the repatriation

Fig. 1: Druids celebrating at Stonehenge (Wikimedia Commons).

5 Martin, Harrod & Pérez 2013, 8-9.
6 Martin, Harrod & Pérez 2013, 8-9; Scarre & Scarre 2006, 8-9.
7 Arnold & Jeske 2014, 334.
8 Arnold & Jeske 2014, 334.
9 Blain & Wallis 2006, 217.

of human remains from British museums.[10] In the Netherlands, the Museum Association drafted a similar Code of Ethics in 2007.[11] However, while human skeletal remains are commonly encountered in Dutch archaeological excavations, specific recommendations or ethical codes for dealing with this type of find, are lacking from the current archaeology (and also history) legislation. This chapter will demonstrate the necessity for ethical guidance in osteoarchaeology specifically by discussing several issues, such as excavation, analysis, reburial, and repatriation, pertaining to human skeletal remains. The authors will present ethical recommendations for best practice for the treatment of human remains from archaeological contexts to serve as a starting point for the development of a code of ethics in the Netherlands.

Ethics in archaeology

Worldwide, the practice of archaeology has changed substantially over the last few decades. The expansion of the archaeological profession outside of academia has resulted in an increase in voices that need to be heard. The multitude of actors currently involved in the archaeological dialogue and the commercialisation of the research field demonstrate the need for proper ethics policy. [12] In response to this, archaeological associations such as the Society of American Archaeology (SAA) and the European Association of Archaeologists (EAA) have devised ethical guidelines and codes of practice to establish standards of conduct for their members to follow in fulfilling their responsibilities, both to the community and to their professional colleagues.[13] The NVvA, the Dutch Association for Archaeologists, has drafted a similar document which provides their members with guidance on ethical issues and best practice.[14] The main principles in these ethical codes from around the world are comparable, focusing mainly on topics such as stewardship, accountability, commercialisation, public outreach, intellectual property, publication, preservation, and training. Although this is a promising development, and the outlined principles should in theory apply to all archaeological practice and material categories, the specific nature and meaning associated with human skeletal remains requires more extensive ethical considerations than just these proposed principles. As will be demonstrated below, the excavation, analysis, and conservation of human remains by osteoarchaeologists has sparked debates both within and outside our field, not common to other archaeological materials.

Ethics in osteoarchaeology

There are several levels at which concepts of right and wrong behaviour regarding human remains from an archaeological context can conflict. Since the research field of osteoarchaeology lies at a crossroads of many scientific disciplines, even within our field there are contesting views regarding ethical conduct. The divide between the more anthropological approach and the more natural sciences approach can

10 Van der Maas 2014, 141.
11 Van der Maas 2014, 141.
12 Lynott 1997, 589-590.
13 EAA, Code of practice 2009: SAA, Principles of Archaeological Ethics, 1995.
14 NVvA, Gedragscode voor Beroepsarcheologen, 2001.

be quite striking in terms of research. For example, a medical researcher may think it is perfectly fine to take a bone or tooth sample from an archaeological skeleton for DNA research, as the more data that is collected, the more accurate our interpretations will be; while a cultural anthropologist may argue that this is unethical considering the beliefs of the culture of the deceased individual, regardless of the information that may be gained. While discussion exists within the research field, outside the discipline there are also contesting views on the what is ethical behaviour when it comes to human remains. The fact that skeletons are the remains of once living individuals often results in a clash between science and society. For scientists, the dead hold a wealth of information, while for society the dead may be imbued with specific emotional and social connotations. From the scientific point of view, a bone may be no more animate than a stone, but for someone else the same bone may represent a person they once loved and cherished.[15] As archaeology increasingly finds its way outside of academia, commercialisation and the increased role of people other than archaeologists have made it abundantly clear that skeletons are not just another material category: skeletons are people. Osteoarchaeologists study these deceased individuals, but we have to keep in mind that these ancient dead are linked with the living through political, economic, social, and ancestral ties.[16]

Reburial and repatriation

Archaeology developed within European colonialism which resulted in the investigation and sometimes removal of many items of social value including, in some cases, human remains. For example, Justinus Brugmans, an 18th century scientist from Leiden, collected over a 100 skulls from different parts of the world.[17] Of course today, this would be viewed as a markedly unethical practice, but not even one hundred years ago it was not considered particularly problematic or unethical. This demonstrates that ethical concepts and behaviours are a product of their time. Most conflict concerning human skeletal remains and other archaeological finds has taken place in countries where European colonial authority was, and in some cases still is, the most powerful; for example, in North America, South Africa, and Australia.[18] During the second half of the 20th century, many indigenous peoples took steps to undo past injustices by reclaiming cultural property, advocating for the non-disturbance of graves, and requesting re-burial of their ancestors. As mentioned, in the USA this resulted in the passing of NAGPRA (Native American Graves Protection and Repatriation Act).[19]

NAGPRA dictates that any institution receiving federal funding is required to compile inventories of the Native American remains in their facilities and return them for reburial upon request.[20] Before remains are repatriated, the cultural identity of the material has to be firmly established. NAGPRA, however, does

15 Scarre 2006, 181.
16 Parker-Pearson 1999, 173.
17 Berveling 2014, 221.
18 Parker-Pearson 1999, 174-177.
19 Lynott 1997, 590-591; Parker-Pearson 1999, 173-175.
20 Parker-Pearson 1999, 173-175; Turner, Toebbe & Armelagos 2006, 208-210.

Fig. 2: Tomb of King Richard III, Cathedral Church of St. Martin, Leicester. Photograph by jaceksphotos.

not limit the evidence that can be used to demonstrate such cultural affiliation, which has led to several conflicts over the years.[21] One example of this particular contention is the human skeleton known as Kennewick Man. The cultural affiliation of this 9300-year-old, well-preserved skeleton, found by the Columbian river in Washington State, was a highly contested legal affair. Although the skeleton was claimed by a coalition of Native American tribes, the fact that its biological and cultural identity was not firmly established sparked significant disagreement and debate. Several biological anthropologists, who on this basis, considered that the tenets of NAGPRA did not apply, put forward a claim themselves. After eight years of debates and appeals, the court ruled that a cultural link between Kennewick Man and any known Native American tribe could not be firmly established and that the skeletal remains therefore do not fall under NAGPRA.[22] Recently however, a new DNA study has shown that Kennewick Man is in fact closely related to one of the five Native American groups that claimed affiliation resulting in a new claim for repatriation.[23] It must be noted, that from the beginning biological anthropologists advocated for this DNA research (the first attempts were unsuccessful; positive results only came with technological advances), as well as access to the skeletal remains for analyses of a host of markers of biological ancestry and other life history variables, such as diet, disease, activity, and mobility. The reburial of the skeleton would have prevented such findings.

21 Turner, Toebbe & Armelagos 2006, 208-210.
22 Turner, Toebbe & Armelagos 2006, 208-210.
23 Rasmussen 2015, 458.

This controversy demonstrates the multiple, and often contesting, views that surround human skeletal remains. Although Europe is not as affected by repatriation and reburial issues as North America and Australia, human skeletal remains have also fuelled debates here. For example, the find of the skeleton supposedly belonging to King Richard III, in a Leicester car park in August 2012, resulted in a heated ethical discussion. The city of Leicester wanted to rebury the remains of the last Plantagenet king in its cathedral. However, this plan was challenged in court by a group calling itself the Plantagenet Alliance, which argued that Richard had no connection with Leicester beyond his death near the city and subsequent "*despoliation and appalling burial*".[24] They stated it was the medieval King's wish to be buried in the city of York, the city they claim was closest to his heart. Both parties drew up plans for the coffin in order to be allowed to bury Richard III. In May 2014, judges ruled his funeral should be held in Leicester as originally planned (Fig. 2).[25] These examples of high-profile cases illustrate the complicated nature of human skeletal remains from archaeological contexts.

Ethical issues with human remains in the Netherlands

Excavation

Although all cemeteries and human burials are associated with ethical concerns, the excavation of historic cemeteries osteoarchaeologists is faced with additional considerations. One is that we usually have a good understanding of the ideological-religious beliefs of the people we are excavating. Most Judeo-Christian ideologies view the sanctity of the grave as permanent. This is related to the Christian view of the afterlife where the physical body is needed during resurrection on Judgement Day. In the Bible it is stated that when Jesus returns to earth, he will physically raise all those who have died, giving them back the bodies they lost at death. Therefore, Christians buried "*their dead in sure and certain hope of resurrection*".[26] Although today this view has changed in favour of immortality of the soul instead of the body,[27] and hence now even cremation is permitted by the most Christian religions, deliberately disturbing Christian cemeteries is considered disrespectful by many.

While these beliefs are not gone, to date, excavating historic cemeteries in the Netherlands has not been an ethical issue. In the large burial excavation carried out in Middenbeemster in 2011 it was even the church itself that instigated the recovery of the skeletons as was the case for the planned cemetery excavation in Delft. This casual attitude towards the unearthing of their parishioners may be related to the present burial practices in the Netherlands, where burial is clearly not for eternity. In fact, if family members do not pay extra, burial in a cemetery is only for 10 years after which the bones will be removed and the grave will be given to someone else. Even though it may seem like this attitude in the Netherlands is

24 Meikle 2013, *The Guardian*; Watson 2013, *BBC News*.
25 Smith-Spark 2014, *CNN*.
26 Jupp 2007, 99.
27 Jupp 2007, 100.

advantageous for osteoarchaeological research, this 'just-get-it-out-of-the-ground' approach is not in any way contributing to solid scientific research of archaeological human remains. This problematic aspect will be further explored below, when we discuss recommendations for best practice in the Netherlands.

Repatriation and reburial

Reburial of archaeological skeletal collections excavated in the Netherlands has become more common in the last decades. In Den Bosch, 421 individuals were reburied in 2011 after osteological analysis was performed.[28] The same happened to skeletons unearthed in Doorn. The St. Martens church requested the skeletal remains to be reburied out of respect for the living descendants. Interestingly, only the younger skeletons post-dating 1700 were given a second funeral in the graveyard, the older remains are being researched by the University of Amsterdam, indicating that the dating of the skeletons clearly matters in determining the appropriate ethical response.[29] The skeletons excavated in the Botermarkt in Haarlem were also recently reburied after they had been studied osteologically.[30] Considering that reburial of archaeological human remains has become increasingly common, the need for a code of practice in which actions before reburial are specified, is now more necessary than ever.

Although repatriation and reburial requests made to museums are uncommon in the Netherlands, the National Museum Association has ethical codes pertaining to this particular subject (*Ethische Code Commissie voor Musea* 2007). The code states that preservation of human remains for future generations is of the highest importance with human remains only to be exhibited for educational, scientific, or research purposes. Only when clear cultural affiliation can be established on the basis of DNA or other evidence, is repatriation of human skeletal remains deemed appropriate. An example of a Dutch repatriation and reburial request is the case of the 'Skulls from Urk'. In 1877, six skulls from a cemetery on the Dutch island of Urk were taken because the inhabitants from Urk were considered to be genetically 'pure'. Their skulls were thought to embody authentic 'Dutchness'.[31] In 2004 some Urk residents became aware of the fact that these skulls were studied and displayed in the University Museum of Utrecht, and approached the museum about possible repatriation. Initially the University Museum decided not to return the skulls. Thus, in 2007 the *Comité Urker Schedels* was formed (the Committee for the skulls from Urk) whereupon a formal request was sent to the University Museum for repatriation of the six skulls. Both parties agreed to bring the case to the Museumvereniging and accept the decision of the ethical committee as binding. In 2009, the Museum Association advised that the skulls be returned for reburial[32] stating:

---

28 Schaatsbergen 2011, *Archeologie Online*.
29 Luksen-IJtsma 2011.
30 Breukel 2014, *RTVNH nieuws*.
31 Van der Maas 2014, 141.
32 Ethische codecommissie voor Musea, 2009.

The request for restitution was filed with the explicit intention to re-bury the skulls within their own community, consistent with the religious beliefs of the people of Urk. The University Museum does not contest the fact that the skulls were obtained from the island of Urk. The request for restitution was not filed by a person of direct descent, but a community of representatives. The skulls are not more than three hundred years old. The Comité Urker Schedels has offered to bury the skulls above ground in a special coffin, to keep the possibility for future scientific research open.

The ethical committee advises the Museum to return the six skulls, under the strict condition that they will be re-buried and no longer be items of cultural heritage as in the sense of article 6.2 of the Code of Ethics. This can be done in a special coffin, as suggested by the Comité Urker Schedels. Because the Comité Urker Schedels is considered representative for the people of Urk, no DNA research is required to prove direct decent.[33]

In 2010 the skulls were reburied in the cemetery from where they were taken. Clearly, the ethics commission sided with the Urk claim for return and reburial, and the religious beliefs of the Urk community were seen as an important factor in granting this return. The Museum perhaps did not get the verdict they wanted, but the compromise whereby the skulls are buried in such a way which keeps them accessible for potential future research, demonstrates that the community and the commission are able to see the scientific value of human osteological remains and research.

Current state of legislation in the Netherlands

In the Netherlands, there are multiple government bodies concerned with archaeology and archaeological excavation. The RCE (Cultural Heritage Agency of the Netherlands) is the highest organisation responsible for monitoring and enforcing the laws pertaining to archaeology. This institution offers information and advice, but is also in charge of issuing excavation permits. On a more local level, the Dutch provinces (12 provinces) are responsible for the mapping of archaeological sites. Further down the line, there are the municipalities (40 municipalities and 3 special municipalities) each functioning as the proper authority (*bevoegd gezag*) and responsible for archaeological law enforcement. The larger municipalities have an archaeological department in their organization which is allowed to excavate in the municipal area. Additionally, there are numerous commercial archaeological companies carrying out all aspects of archaeological research. All these organizations need to be in the possession of an excavation permit, which will be granted by the RCE if the conditions outlined in the Monuments Act are met. Considering the multiple levels and organisations involved in archaeological investigation in the Netherlands, ensuring that all work is carried out according to set standards is important. Therefore, quality control is defined in the KNA (*Kwaliteitsnorm*

33 Ethische Code Commissie voor Musea 2009, 3-4, Text from and translation by van der Maas 2014, 148.

Nederlandse Archeologie (Dutch Archaeology Quality Standard)) which is regularly evaluated by the SIKB (*Stichting Infrastructuur Kwaliteitsborging Bodembeheer*).[34] In the coming years, legislation will be revised and the several laws pertaining to archaeology that currently exist will be combined into one law (*Erfgoedwet)* which will have an effect on the certification of professionals.

This gives the impression that archaeological practice is well regulated in the Netherlands, and for most classes of archaeological material and excavations this is indeed the case. There is, however, a lack of specific legislation or recommendations concerning human remains. If human remains derive from a context that is less than around fifty years old, they have medico-legal relevance and the Burial and Cremation Act (*Wet op de Lijkbezorging*) applies. In most cases, human remains older than this (i.e., pre-dating ~1950-1960) are deemed archaeological and require formal laws and proper guidelines about required procedures and best practice. In the KNA 3.2 of 2010, there was no mention of how to deal with human remains at all.[35] In the newest version, there are some recommendations for the excavation, cleaning, and storage of human remains.[36] However, there are still no formal guidelines concerning the ethical issues surrounding human skeletal remains.

This lack of ethical consideration might be related to a broader European problem. In the Netherlands, as in most European countries, laws protecting cultural heritage are based on the European Convention on the Protection of the Archaeological Heritage, more commonly known as the Valetta convention of 1992.[37] Remarkably, their definition of archaeological heritage does not include human skeletal remains. In article 1.3, the Council of Europe states that "*The archaeological heritage shall include structures, constructions, groups of buildings, developed sites, moveable objects, monuments of other kinds as well as their context, whether situated on land or under water*".[38] If human remains are not even recognised as cultural heritage by the Council of Europe, it is not that surprising that laws and recommendations, specifically ethical considerations, pertaining to skeletal remains are absent in Dutch archaeology.

In the Netherlands, there are currently several universities offering courses in human osteoarchaeology at a Bachelor and Master's level. In addition, the NVFA (*Nederlandse Vereniging voor Fysische Antropologie* (Dutch Association for Physical Anthropology)) provides recommendations on data collection and interpretation of human skeletal material in accordance with internationally recognized standards. This organization of professionals involved in human osteoarchaeology meets regularly ensuring an active dialogue about the state of our methods and scope of our research. This demonstrates that the proper education, knowledge, and professionalization are in place in Dutch archaeology to allow human remains to be studied with the skill they deserve. What is lacking are guidelines specifically about archaeological human remains that provide ethical recommendations to achieve the best possible treatment of the past individuals and, if applicable, respect of their living ancestors and culture groups.

---

34 Smits 2011, 209-211.
35 SIKB 2010.
36 SIKB 2013.
37 Smits 2011, 309-312.
38 Council of Europe 1992.

Osteoarchaeology recommendations for best practice

Several other countries have already devised ethical codes and recommendations for best practice. In the USA, the American Association of Physical Anthropology (AAPA) has devised ethical codes pertaining to the treatment of human remains, made available on their website. The aim of this code is to "*provide physical anthropologists with the tools to engage in developing and maintaining an ethical framework, as they engage in their work*".[39] Similarly, the British Association for Biological Anthropology and Osteoarchaeology (BABAO) has published a Code of Ethics and a Code of Practice which are both available through their website. The BABAO ethical code focuses on several aspects of skeletal research such as excavation and analysis, but also teaching and the dissemination of results (see appendix 1).[40]

In addition to the BABAO code, which is adhered to by professional organisations in England, Simon Mays from English Heritage, together with the Church of England, devised a book containing guidance for best practice for the treatment of human remains excavated from Christian burial grounds in England. This book is a product of three years' deliberations by a Working Group convened jointly by these two organisations. The document discusses the current legal framework for the treatment of human remains, religious and ethical issues, public attitudes, and the value and benefit of the scientific study of human remains, but is less focused on retention and education.[41]

Best practice in the Netherlands

These examples of ethical codes show that the main principles defined by the Dutch Association for Archaeologists (NVvA) are not covering the specific nature of human skeletal research. Given the pace of modern development in the Netherlands, hundreds to thousands of burials are excavated each year in advance of construction projects, so the need for ethical guidance in this area is pressing. Here, we put forward and discuss a few concepts that are important ethical issues for best practice of treatment of human skeletal remains.

Respect

As was expressed in the examples of ethical codes above, it is clear that human skeletal remains should be treated with respect and dignity. However, we suggest that this concept of respect should be better defined. Respect is a culturally mediated concept as much as any other and what is considered respectful treatment by one group might not be the same as another group, be it between (or even among) groups such as osteoarchaeologists, anthropologists, religious professionals, or community members. It is of course easier to define egregious, disrespectful practices, but without proper operationalisation of the concept of respect, it is not sufficiently clear what respectful behaviour actually entails.

---

39 AAPA 2003.
40 BABAO 2010.
41 Mays 2005, 4; Mays 2017, 3-5

Excavation, analysis, and storage

The decision to excavate human skeletal remains is not one to make lightly. If there is not enough budget to do everything, including analysis and curation, properly, it is better to not excavate the remains. One aspect of respect that should be included in best practice recommendations is the proper treatment of the human remains during *and* after excavation; if this is not possible, the human remains should not be excavated. Proper treatment entails careful and meticulous excavation, detailed skeletal analysis, and proper storage and curation. Just getting the skeletons out of the way of development without any further analysis is not proper conduct, not for science nor for the past individuals.

In relation to this, we recommend that if skeletal remains are likely to be encountered during an excavation, a human osteoarchaeologist should already be involved in the early stages of planning and budgeting. In the Netherlands, human osteoarchaeologists are often faced with situations in which they cannot carry out all the components of the job, particularly post-excavation analyses, because the necessary amounts of time and money were lacking in original plan (PvE, *Programma van Eisen*, the design brief). Often osteoarchaeological analyses are an after-thought, thus either not getting done at all because there is simply no money, or getting done on a shoe-string budget at a level below best practice. Furthermore, this has ramifications for the personnel who are tasked with such analyses, as it is possible that the level of expertise required is not fully understood by those doing the hiring, resulting in inadequately trained personnel conducting the work with little to no supervision concerning the appropriateness of methods and accuracy of results. Personnel with more extensive human osteoarchaeology training may be more expensive and thus not hired, or only compensated for a portion of the job. Therefore, we think it is of fundamental importance that all design briefs (PvE's, *Programma van Eisen*) include time and finance considerations for all aspects of human skeletal research, not just their removal. Furthermore, it is extremely important that osteoarchaeological research is only carried out by well-trained professionals who are fairly compensated for their work. This is necessary to ensure the work is done according to international scientific standards, and also to make sure the past individuals are treated in the proper manner. A fundamental part of ethics must be the quality of the research and the qualifications of the investigator.

Although we, as osteoarchaeologists, aim to preserve as much information as possible for use by current and future generations, feelings and views of living members of the community should be considered, even if this results in the eventual reburial of the skeletal remains.

Public outreach and education

We are all human and are intrinsically interested in our own development. The research we do aims to shed light on the human past by studying the people themselves. Unfortunately, this is not always well understood by members of the public. Televisions shows such as Bones and CSI have sensationalised what we do to a great extent and they often present a quite distorted image of what we actually do and are capable of. Therefore, we feel that public outreach and education is very important in skeletal research. If possible, it can be mutually

beneficial to involve the community at several stages in the research. In our research about the community of Middenbeemster in the province of North-Holland, via excavation of over 450 skeletons from the predominately 19th century Middenbeemster cemetery, we gave tours on site and involved some enthusiastic and committed members of the community in certain preliminary but important aspects of analysis. Stemming from this relationship, the historical society of Middenbeemster aided greatly in archival research about the community, which has been of great value for our interpretations of past lifeways. We meet with members of this society several times a year to exchange information and ideas. In 2015, the historical society of Middenbeemster and our laboratory (the Leiden Laboratory for Human Osteoarchaeology) even co-organised a symposium in the church in Middenbeemster where both groups presented their research to an audience of over 120 community members as well as the local press. From our lab both staff and graduate students presented their research, after which we gave workshops to any interested attendees (Fig. 3 and Fig. 4). Overall, we think it is vital to inform all interest groups about what we can and cannot do with our research. Giving public lectures in which our methods are explained and in which we emphasise why this type of research is a great contribution to the field is essential to create more awareness and support amongst the public and archaeologists.

Here, we have discussed some important issues in the study of human skeletal remains. This is, however, not enough. What is needed is a formal ethical code specifically dedicated to the study of human remains from archaeological contexts that provides guidelines for everyone involved in skeletal research. A

Fig. 3: Symposium in the church of Middenbeemster (12-12-2015).

special working group which includes members of the Dutch Association for Physical Anthropology (NVFA), the University Faculties/Departments that grant graduate degrees in human osteoarchaeology (Leiden University, the University of Amsterdam), the Cultural Heritage Agency of the Netherlands (RCE), professional archaeological organisations (e.g., NVvA, VOiA), and delegates from the most common religious organisations would be best able to formulate proper ethical guidelines.

Fig. 4: Dr. Andrea Water-Rist explaining some of the findings to a member of the Middenbeemster community (12-12-2015).

Conclusion

This chapter discussed some of the issues pertaining to human skeletal research in order to illustrate the necessity of an ethical code for guidance on best practice for the treatment of human remains in Dutch archaeology. Best practice can only be achieved by a balanced consideration which recognises the legitimacy of views, whether based on religious faith, secular concepts of decency and respect for the dead, or on science. We have put forward some issues we think are pertinent to discuss in this respect and would like to advocate for the development of a formal ethical code in which these and other issues related to skeletal research are properly addressed. Considering the vital importance of skeletal remains to the understanding of the human past, osteoarchaeological investigation is invaluable to archaeology. However, our studies cannot exist without a thorough consideration of ethical issues from within and outside of our discipline. When legislation surrounding cultural heritage is revised in the upcoming years, ethical conduct should be an integral part of this.

Bibliography

Arnold, B. & R. Jeske, 2014: 'The archaeology of death: Mortuary Archaeology in the United States and Europe 1900-2013', *Annual Review of Anthropology* 43, 325-346 (DOI: 10.1146/annurev-anthro-102313-025851).

Blain, J. and R.J. Wallis, 2006: 'Pasts and pagan practices: moving beyond Stonehenge', *Public Archaeology* 5 (4), 211-222 (DOI: 10.1179/pua.2006.5.4.211)

Breukel, B., 2014: 'Eeuwenoude Haarlemmers vanmiddag herbegraven', RTVNH Nieuws. 13/11/2014. Retrieved on 6 April 2017, from: (http://www.rtvnh.nl/nieuws/154421/eeuwenoude-haarlemmers-vanmiddag-herbegraven).

Berveling, J., 2014: *Op het tweede gezicht: De relatie tussen gelaat en karakter,* Amsterdam: Uitgeverij Balans.

Ethische codecommissie voor Musea, 2009: 'Advies Urker schedels', 11/09/2009. Retrieved on 6 April 2017, from: https://www.museumvereniging.nl/Portals/0/Documents/Producten%20en%20diensten/12_ethiek_schedels_090911.pdf.

Fieser, J., 2009: 'Ethics', *Internet Encyclopedia of Philosophy (IEP). A peer-reviewed Academic Resource*, Retrieved from http://www.iep.utm.edu/.

Jupp, P.C., 2007: 'Religious Perspective on the Afterlife. Origin, Development, and Funeral Rituals in Christian Tradition', in: B. Brooks-Gordon, F. Ebtehaj, J. Herring, M.H. Johnson & M. Richards (eds.), *Death Rites and Rights*, Oxford: Hart Publishing, 95-116.

Lynott, M.J., 1997: 'Ethical Principles and Archaeological Practice: Development of an Ethics Policy', *American Antiquity* 62-4, 589-599 (DOI: 10.2307/281879).

Luksen-IJtsma, A., 2011: 'Graven in het hart van Doorn, archeologisch onderzoek', 'Graven in het Groen 1 (Nieuwsbrief gemeente Utrechtse Heuvelrug), 1-2. Retrieved on 6 April 2017, from: file:///C:/Users/Gebruiker/Downloads/Graven%20in%20het%20hart%20van%20Doorn%20(1).pdf

Maas, D. van der, 2014: 'Debating the restitution of human remains from Dutch museum collections: The case of the skulls from Urk', in: L. Thythacott & K. Arvanitis (eds.), *Museums and restitution. New practices, new approaches*, Farnham: Ashgate Publishing Limited, 139-150.

Martin, D.L., R.P. Harrod & V.R. Pérez, 2013: *Bioarchaeology: An integrated approach to working with human remains,* New York: Springer (Manuals in archaeological method, theory and technique).

Mays, S., 2005: *Guidance for Best Practice for Treatment of Human Remains Excavated from Christian Burial Grounds in England*, English Heritage and Church of England.

Mays, S., 2017: *Guidance for Best Practice for Treatment of Human Remains Excavated from Christian Burial Grounds in England, second edition*, English Heritage and Church of England.

Meikle, J., 2013: 'Richard III remains: York v Leicester legal battle to be laid to rest', *The Guardian* 26/11/2013. Retrieved on 6 April 2017, from: http://www.theguardian.com/uk-news/2013/nov/26/richard-iii-remains-york-leicester-legal-battle-laid-rest.

Parker-Pearson, M., 1999: *The Archaeology of Death and Burial*, Stroud: Sutton Publishing.

Rasmussen, M., M. Sikora, A. Albrechtsen,T. Sand Korneliussen, J.V. Moreno-Mayar, G.D. Poznik, C.P.E. Zollikofer, M.S. Ponce de León, M.E. Allentoft, I. Moltke, H. Jónsson, C. Valdiosera, R.S. Malhi, L. Orlando, C.D. Bustamante, T.W. Stafford Jr, D.J. Meltzer, R. Nielsen & E. Willerslev, 2015: 'The ancestry and affiliations of Kennewick Man', *Nature* 523, 455-458 (DOI:10.1038/nature14625)

Scarre, G., 2006: 'Can Archaeology Harm the Dead?', in: C. Scarre & G. Scarre (eds.), *The Ethics of Archaeology. Philosophical Perspectives on Archaeological Practice*, Cambridge: Cambridge University Press, 181-198.

Scarre, C. & G. Scarre. 2006: 'Introduction', in: C. Scarre & G. Scarre (eds.), *The Ethics of Archaeology. Philosophical Perspectives on Archaeological Practice*, Cambridge: Cambridge University Press, 1-9.

Schaatsbergen, R., 2011: '421 Bosschenaren herbegraven', Archeologie Online, 3/11/2011. Retrieved on 6 April 2017, from: http://archeologieonline.nl/nieuws/421-bosschenaren-herbegraven.

SIKB (Stichting Infrastructuur Kwaliteitsborging Bodembeheer), 2010: *Kwaliteitsnorm Nederlandse Archeologie. Versie 3.2.*, Gouda.

SIKB (Stichting Infrastructuur Kwaliteitsborging Bodembeheer), 2013: *Kwaliteitsnorm Nederlandse Archeologie. Versie 3.3*, Gouda.

Smith-Park, L., 2014: 'Leicester will be final burial place of King Richard III, found under a parking lot', CNN, 23/5/2014. Retrieved on 6 April 2017, from: http://edition.cnn.com/2014/05/23/world/europe/uk-richard-iii-reburial/index.html.

Smits, E., 2011: 'The Netherlands', in: N.M. Grant & L. Fibiger (eds.), *The Routledge Handbook of Archaeological Human Remains and Legislation: An International Guide to Laws and Practice in the Excavation and Treatment of Archaeological Human Remains*,London: Routledge, 309-315.

Straus, M., 2016: 'When is it okay to dig up the dead', *National Geographic*, 7/4/2016. Retrieved on 6 April 2017, from: (http://news.nationalgeographic.com/2016/04/160407-archaeology-religion-repatriation-bones-skeletons/).

Tarlow, S., 2006: 'Archaeological Ethics and the People of the Past', in: C. Scarre & G. Scarre (eds.),*The Ethics of Archaeology. Philosophical Perspectives on Archaeological Practice*, Cambridge, Cambridge University Press, 199-218.

Turner, B.L., D.S. Toebbe, & G.J. Armelagos, 2006: 'To the Science, to the Living, to the Dead: Ethics and Bioarchaeology', in: G.T.H. Ellison & A.H. Goodman (eds), *The Nature of Difference. Society, Science, and Human Biology*, New York: Taylor & Francis Group, 203-224.

Watson, G., 2013: 'The Plantagenet Alliance: Who do they think they are', BBC News, 13/9/2013. Retrieved on 6 April 2017, from: http://www.bbc.com/news/uk-england-leicestershire-23929989.

Codes of practice/ethics used

AAPA (American Association of Physical Anthropology), 2003: *Code of Ethics of the American Association of Physical Anthropologists* (www.physanth.org). Retrieved on 6 April 2017, from: file:///C:/Users/Gebruiker/Downloads/ethics.pdf.

BABAO (British Association for Biological Anthropology and Osteoarchaeology), 2010: Code of Ethics (www.babao.org.uk). Retrieved on 6 April 2017, from: http://www.babao.org.uk/assets/Uploads/code-of-ethics.pdf.

Council of Europe, 1992: European Convention on the Protection of the Archaeological Heritage. Valletta, Malta (revised) Retrieved on 6 April 2017, from: http://wetten.overheid.nl/BWBV0002031/2007-12-12#VertalingNL

EAA (European Association of Archaeologists), *The EAA Code of Practice (2009)* (www.e-a-a.org). Retrieved on 6 April 2017, from: https://www.e-a-a.org/EAA/About/EAA_Codes/EAA/Navigation_About/EAA_Codes.aspx?hkey=714e8747-495c-4298-ad5d-4c60c2bcbda9#practice

NVvA (Nederlandse Vereniging van Archeologen), *Gedragscode voor Beroepsarcheologen van de NVvA. Ethische principes en gedragsregels voor Nederlandse archeologen,* 2001 (www.nvva.info). Retrieved on 6 April 2017 from: https://bpstatic.nl/user/nvva/Beroepscode_NVvA.pdf.

SAA (Society for American Archaeology), 1995: *Principles of Archaeological Ethics* (www.saa.org). Retrieved on 6 April 2017, from: http://www.saa.org/AbouttheSociety/PrinciplesofArchaeologicalEthics/tabid/203/Default.aspx.

Appendix 1: Examples Ethical codes pertaining to human remains

General principles BABAO Code of Ethics

- The generation of knowledge about past human lifeways using archaeological data is a worthy goal. Human remains are our most direct source of evidence in this respect. Their study is therefore central to our understanding of the human past.
- By virtue of their status as the remains of once living people, treatment of human remains requires ethical considerations over and above those that pertain to other classes of archaeological materials.
- Human remains should always be treated with dignity and respect regardless of age or provenance.
- Given the importance of human remains as a source of information about our past, osteoarchaeologists should work toward the long-term conservation of the osteoarchaeological record.
- Osteoarchaeologists should be committed to public education and promote the value of the scientific study of ancient human remains.

General principles English Heritage Code of Ethics

- Human remains should always be treated with dignity and respect.
- Burials should not be disturbed without good reason. It was noted, however, that the demands of the modern world are such that it may be necessary to disturb burials in advance of development.
- Human remains, and the archaeological evidence for the rites which accompanied their burial, are important sources of scientific information.
- There is a need to give particular weight to the feelings and views of living family members when known. There is a need for decisions to be made in the public interest, and in an accountable way.

Rural cemeteries, cult places and community identities in the Central Middle Ages in the Kempen region (southern Netherlands)

Frans Theuws

The archaeology of post-Merovingian rural cemeteries is not well developed in the Netherlands.[1] Few cemeteries or churchyards of the Carolingian period and the Central Middle Ages have been excavated extensively, and no synthetic research is available. However, in the later 20th century, several rural cemeteries of the Central Middle Ages were excavated at Luiksgestel, Dommelen, Reusel, Bergeijk, and Aalst in the Kempen region in southern Netherlands (Figs. 1 and 2).[2]

International research

Recent historical and archaeological research in general and in France and England specifically, shows how the creation of cemeteries and churches was a crucial element in the constitution of local communities.[3] Research of parish cemeteries in France is of special importance to the analysis of cemeteries in the southern Netherlands because identical processes seem to have unfolded in both regions. The development of local cemeteries exclusively reserved for the members of the

1 For an analysis of an important burial place in an early medieval centre (Maastricht) see Panhuysen 2005. Post-Merovingian burial grounds (Carolingian period and the Central Middle Ages) in Dutch 'towns' have not been subject to intensive research. Those of the *emporium* Dorestat are now studied in the context of the *Vicus Famosus* project: http://ich.uva.nl/research/research-programmes/content/archaeology/bio-archaeology/dorestat-vicus-famosus.html (visited 27 November 2013).

2 Arts 2013.

3 See, for example, Durant 1988; Fixot & Zadorra-Rio 1989; Fixot & Zadorra-Rio 1994; Galinié & Zadora-Rio 1996; Zadora-Rio 2003; Blair 2005; Delaplace 2005; Zadorra-Rio 2005. The presence of a church and churchyard was considered a crucial element in the French debate on the nature of the village and village development after c. AD 1000. Today the validity of this condition is debated because early medieval settlements at times show the presence of a cult place and churchyard (Peytreman 2003, I, 310-316; Cattedu 2009, 137-157, esp. 156-157).

Fig. 1: The location of the Kempen region in The Netherlands.

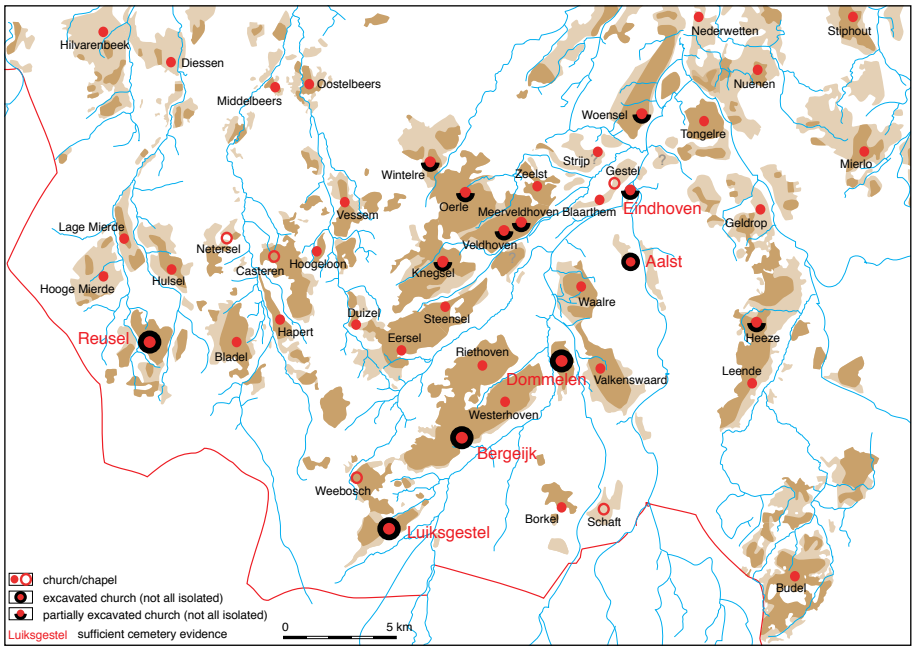


Fig. 2: Churches and chapels in the Kempen region. Most churches and chapels remained in place after habitation in their environs had disappeared in the 13th century. Brown indicates habitation/cultivation with settlements and arable fields of the Early and Central Middle ages. The other areas were hayfields along the streams and heather fields. The thick red line is the Belgium/Dutch border.

Christian community in a specific parish, a process that in France is dated to the 10th and 11th centuries, follows a Carolingian phase in which field cemeteries were still a regular phenomenon.[4] The Central Middle Ages thus saw a diffusion of the parish cemetery, probably controlled by the clergy. I define field cemeteries as cemeteries that were not connected to a cult place. They could be related to all kinds of spatially defined groups or culturally defined communities, whether an entire local group or a family or a segment of a local group. There is a great diversity in size and location of field cemeteries.[5] Next to these field cemeteries, small, early medieval cult buildings, often no more than a rectangular stone building, with large numbers of graves around them have been excavated in France in recent years.[6] The status of these cult buildings and their liturgical function is not always clear, and many do not seem to have been in use in later medieval times. They may not have had the status of parish churches or mother churches with baptismal rights and regular services but could have been local chapels established by a landowner to commemorate his ancestors. The concentration of burials around the chapel may be an element of the Christianization of the population but it may also have social connotations in that dependency on a landlord is expressed through burial next to his commemorative chapel. Such cult places and burial grounds could thus be both an expression of manorial relations *and* an element in establishing such relations. In early medieval northern France, burial grounds did not yet seem to have a fixed place in relation to settlements. This began to change in the course of the 10th and 11th centuries when a 'sedentarisation' of cemeteries took place.[7] According to Elisabeth Zadora-Rio, it was the primary churches, or 'mother churches', that obtained the exclusive right to bury the dead of the religious community in their churchyards. This led to the abandonment of older cemeteries as well as chapels associated with them. Finally, she concludes that the creation of new Christian cemeteries was not a direct consequence of Christianization but of a slow process of 'rapprochement' of the living and the dead.[8] Other explanations can be added to this one but before doing so I will explain how I conceptualize the long-term process of Christianization.

Christianization can be divided into three phases.[9] The first phase is that of *Christianization as a private practice* whereby people accept the Christian faith and try to live accordingly, with or without the help of clerics. The second is the phase of *clericalization*, that is, the phase of growing control by the clergy of

4 For the definition of various cemeteries see below.

5 Peytremann 2003.

6 Helpful examples can be found in Cattedu 2009, 156-157. The developments discussed here concern mainly northern and central France. Developments in southern France differed at times considerably from those further north.

7 Term taken from Bourin & Durant 2000, 61.

8 Zadora-Rio 2005, 21. This process started already in the late Merovingian period when the first burials appeared in the settlements (Peytremann 2003, 310-316).

9 Another phase of Christianization is offered by Milis (1990). His phasing is difficult to operationalize archaeologically.

various forms of Christian practices and life-cycle rituals.[10] An important aspect of this is the sacralization of space.[11] The third phase is that of *institutionalization* whereby the Church transforms clerical power into institutions. Together with initiatives by local people (see below) and the 'rapprochement' of the living and the dead, I suggest that the creation of cemeteries (and in a number of cases, parish churches) was an important means of institutionalizing clerical power.[12] It is also related to changing local power relations and the rise of powerful local families that were able to establish themselves as aristocracies in the late 10th to 12th centuries.[13] Finally, it is related to the development of local group and community identities in contrast to estate identities.[14] It took another two centuries before institutionalization could be considered a success and the parish organisation was fully embedded in society. Parishes became fixed territories rather than vaguely defined groups attached to a church.

An analysis of the excavated cemeteries in the Kempen region can thus contribute to an international debate on four important research topics: the evolution of the Christian cemetery, the process of Christianization, the development of local power relations, and the creation of local community identities.

To conclude this introduction, a few words on concepts used in this archaeological paper are due. The word 'church' is used for two phenomena; 'church' (lower case c) is used for a building, 'Church' (upper case C) for the institution. I refer to a 'church' when the cult building was, according to the written sources, a parish church or could be expected to have had that status. An important condition for this status is the right to administer baptism.[15] However, this cannot easily be established archaeologically. New cult places created by local elites in the 11th and 12th centuries may not have been churches in this sense but might have become parish churches later when the control of the Church became tighter. Other cult places with uncertain status are referred to as 'chapel'. Chapels could become churches but this was not a necessary development. A 'field cemetery' is a cemetery without a cult place whatever its size (it can be next to a settlement, in a settlement, or further removed from habitation). A 'churchyard' is a burial ground related to a pre-existing cult place whatever the status of the cult place. A 'field cemetery' may become a churchyard after the creation of a cult place, examples of which will be shown below. 'Burial ground', 'burial place', and 'cemetery' are neutral terms for any site with burials.

---

10 The growing control of the burial ritual by the clergy and the Church is an insightful example of this process (Paxton 1990; Treffort 1996, esp. 60-62; Effros 1997; Lauwers 1997, 2005; Treffort 2001). Treffort uses the concept of clericalization in a different context, that of the clericalization of monastic life (Treffort 1996, 95).

11 Treffort 1996, 141-143.

12 Not all new churches can necessarily be correlated to the institutionalization of clerical power; churches established by local elites helped institutionalize local secular power as well.

13 For the Kempen region, see the numerous studies by Bijsterveld. An extensive list of his work can be found in Bijsterveld 2007.

14 Theuws 2010.

15 In the past, the right to bury the dead in the churchyard was also considered an important condition, but this can be discarded on the basis of archaeological research such as presented in this chapter.

Cemeteries in the Kempen region

In a recent article, Nico Arts presented the first results of a number of cemetery excavations in and around the town of Eindhoven.[16] His chronological scope is somewhat larger than mine because he includes the modern period; I will confine myself to the 10th to 13th centuries. Verwers and Stoepker discussed a number of wooden chapels from the Central Middle Ages in the province of Noord-Brabant.[17] In passing, they discussed burials on sites with wooden chapels. Their focus was on the architectural characteristics of the wooden buildings. I will begin by briefly presenting the results of four cemetery excavations in various stages of analysis.[18] They are, in chronological order of excavation, the cemeteries of Luiksgestel (1958), Bergeijk (1974), Dommelen (1982), and Reusel (1995-1997) (Fig. 2).[19] The first three of these were within the ancient parish of Bergeijk. Reusel was a parish in its own right in later medieval times.

Bergeijk

The church of Bergeijk was the centre of a large parish (Fig. 3). The present Gothic-style church dates to the Late Middle Ages and early modern period. In the 19th century, a part that had collapsed in the 17th century was rebuilt.[20] It is mentioned in 1137 as the *ecclesia in eiusdem loci*, which is Bergeijk.[21]

The excavations in the church in 1974 revealed, among other features, the foundations of a Romanesque church, a series of older burials, and some postholes (Figs. 2, 3 and 4). Later excavations in the 1980s and in 2011 revealed the existence of a series of moats and traces of habitation around the church dating from the 10th to the 13th century.[22] The Romanesque church is difficult to date. It was suggested by the excavator that it dated to the 11th century because of the existence of a sturdy foundation between the presbytery and the nave. This suggests the presence of a wall separating the two spaces with only a small access way into the presbytery instead of a larger arch.[23] The excavator suggested that such a wall would have been an early element but does not substantiate this claim. The archaeological evidence poses a problem because it is not yet possible to disentangle the relation between the oldest graves and earliest churches. A clear configuration of postholes, which would indicate an older, possibly wooden, predecessor of the Romanesque church is not present. The few postholes discovered cannot with certainty be assigned to a wooden church or chapel. If there would have been a wooden church or chapel, it is hard to imagine that it stood at the same location as the Romanesque church

16 Arts 2013.
17 Verwers & Stoepker 2002.
18 Bergeijk and Luiksgestel were analysed by myself. Only the excavations of Luiksgestel are published. Dommelen and Reusel, excavated under my direction, have been studied by students under my supervision at the Faculty of Archaeology of Leiden University.
19 Luiksgestel and Bergeijk were excavated by the State Archaeological Service (ROB), as was Dommelen. However, it was re-excavated by the University of Amsterdam. Reusel was excavated by the University of Amsterdam.
20 Strijbosch 1995, 37-44.
21 Camps 1979, nr 38.
22 Dijkstra 2015.
23 Halbertsma 1975.

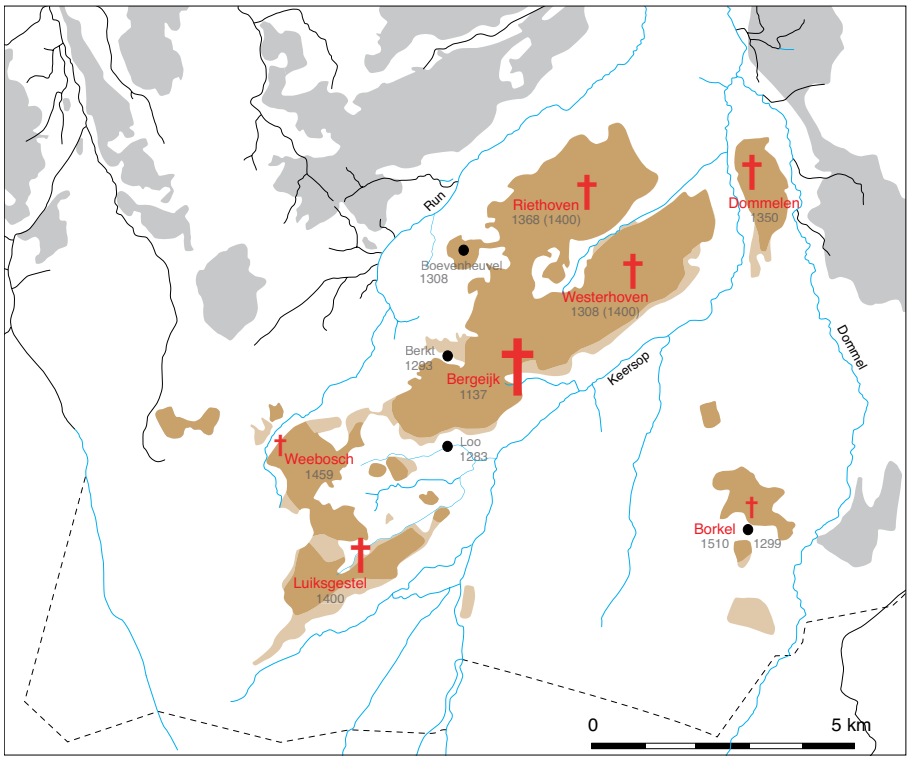


Fig. 3: The parish of Bergeijk according to later medieval sources. Black dots are settlements that were located in the parish of Bergeijk according to written texts. The dates of the churches indicate the earliest mention of a church/chapel in the written sources (after Theuws 1981).

(as was the case in Reusel, see below). The foundations of the Romanesque church cut through many graves that are therefore older. These graves could not have been dug if walls of a wooden cult place were present in those places. The graves and a wooden cult place could not have existed at the same time at the location of the later Romanesque church. There are two alternative interpretations.

One, there was no wooden predecessor; the Romanesque church was built on an older field cemetery. Two, a wooden church stood next to the excavated burials. The first possibility seems unlikely. The cult site was one element of a moated, elite complex that came into being in the middle or second half of the 10th century.[24] A cult building, rather than just a field cemetery, is likely to have been an original element of such a complex. The cult site thus probably dates to the middle or second half of the 10th century. The second interpretation is attractive were it not that the oldest excavated burials (at excavation level 8) give the impression that they were located *in medio ecclesiae*. This is of course impossible because the Romanesque church did not exist at that time. Were these burials located *in medio ecclesiae* of a pre-existing wooden church? It seems almost impossible in view of the many burials at places where one expects the postholes of a wooden church.

24 Theuws 1989; Verhoeven 1989; Dijkstra 2014.

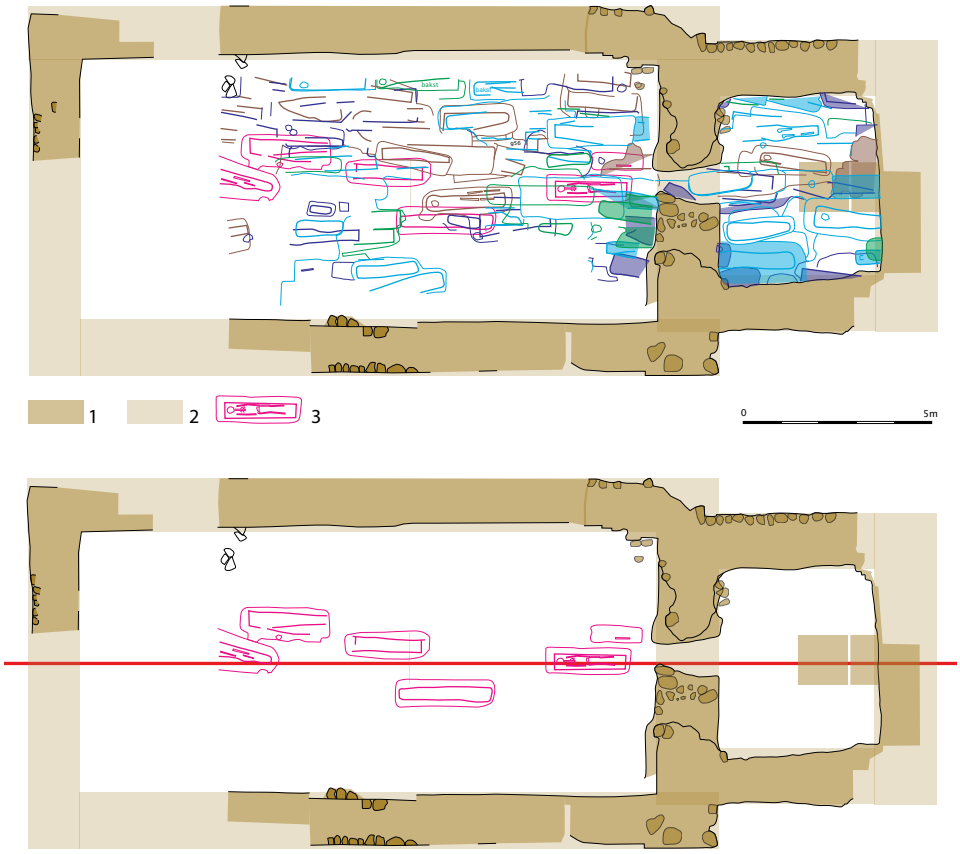


Fig. 4: Bergeijk, church excavation 1974. The remains of the Romanesque church and the graves that are older than the foundations of the church. Each colour refers to the excavation level at which those graves were first recorded. The thick red line indicates the central axis of the church. 1. foundations of Romanesque church. 2. reconstruction of foundations. 3. graves only recorded at the deepest excavation level 8.

Another possibility is that the burials were located to the north of a wooden church or chapel and that the few postholes found relate to such a cult building. At the moment it is impossible to disentangle the early history of the site. We date the oldest burials and the creation of the first cult building to the 10th century on the basis of contextual evidence (pottery from the oldest moats), although some Carolingian pottery was found in the 2011 excavations next to the church.[25]

25 Dijkstra 2014. To me, these do not seem to be present in sufficient numbers to date the first habitation activities (a moated site) in the immediate environs of the church to the Carolingian period. Maybe there was some habitation in the Carolingian period nearby that cannot be excluded in view of its geographical location.

The chapel of Luiksgestel

The medieval chapel of Luiksgestel is a secondary chapel within the parish of Bergeijk.[26] It is mentioned for the first time in 1400 but must be older.[27] Inside the foundations of the Gothic building, the remains of a wooden chapel and an older cemetery were discovered (Figs. 2, 3 and 5). The postholes of the wooden three-aisled chapel (and later postholes, the result of repairs) were dug through older

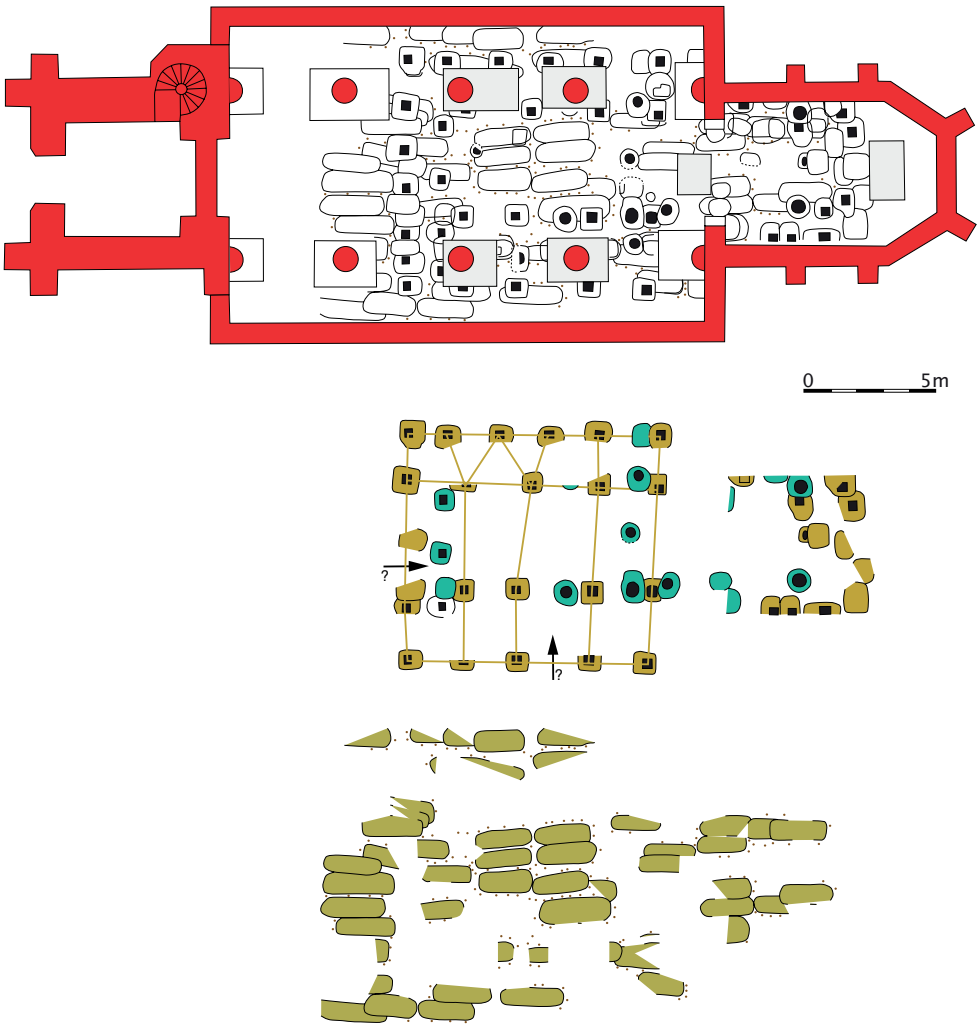


Fig. 5: Luiksgestel, church excavation 1958. Top: excavated area within the foundations of the Gothic church (red). Middle: plan of the configuration of postholes of a wooden church (brown: postholes of the original building, green: later postholes). Bottom: plan of the graves that are older than the wooden chapel (note the stakes around the graves) (after Theuws 1981).

26 Theuws 1981; Strijbosch 1995, 90-92.

27 For detailed references to written sources see Theuws 1981.

graves.[28] The cemetery seems to have been a field cemetery because the excavators observed the remains of stakes driven in that probably served to make a wickerwork fence around the graves. The cemetery may not have been much larger than the chapel, which means that the wooden chapel was placed exactly on top of it. The excellent preservation of the postholes indicates that no burials took place in this area after the wooden chapel was built because later burials would have destroyed the postholes. Nor is it likely that many burials were placed inside the chapel between the postholes. The cemetery and wooden chapel cannot be dated on the basis of sound archaeological evidence, but it is suggested that the cemetery dated to the 11th or 12th century and the wooden chapel to the 12th or 13th century.[29] An important question remains: was this chapel the first one on the site or was there an older predecessor next to the cemetery? We cannot establish this because no trenches were dug outside the Gothic building.[30]

On the basis of results of excavations near cult places in other parishes in the Kempen region (Bladel, Hulsel, Dommelen, Aalst, Reusel) we can expect that a settlement dating from the Merovingian period to the Central Middle Ages was nearby. The inhabitants from this settlement in Luiksgestel must have decided to bury their dead next to or in the settlement, probably at a time when there was no cult place present.

The chapel at Dommelen

The medieval chapel at Dommelen is the third one excavated in the old parish of Bergeijk. It was mentioned for the first time in 1350.[31] The Gothic chapel, which since the 13th century stood isolated in the fields, was demolished in the 19th century and replaced by a new church near the actual habitation in Dommelen.[32]

The excavations of the site of the cult building revealed the foundations of the demolished Gothic building and many graves of an older cemetery (Figs. 2 and 6). Moreover, the remains of a Carolingian farmyard were discovered and a series of postholes of which we do not know their function. To the south of the cemetery was a farmstead dating to the second half of the 11th/beginning of the 12th century.

All the graves indicated in figure 6 are older than the brick Gothic chapel, which was built in the late 14th or 15th century. However, already in 1350 a church was mentioned, which means there must have been an older wooden predecessor to the

---

28 Verwers & Stoepker (2002, 102-103) found a few extra postholes on the original field drawings. I based my reconstruction on the ready made publications drawings by Halbertsma. He (and thus I) might have missed some postholes visible in the sections. However this does not alter the reconstruction of the original chapel. Verwers and Stoepker suggest that the remaining postholes could belong to a possible second building, rather than being postholes related to repairs. The reconstruction of this building, which would be newer than the original chapel, is most probably not correct. It would mean that a shoddily built hut stood on site between the original chapel and the brick Gothic church.

29 Theuws 1981, 202-203; Verwers & Stoepker 2002,102.

30 The present modern church was built immediately to the south of the location of the medieval church. Unfortunately, the building trench was not excavated to check for the presence of graves or the remains of a cult place or habitation. The implicit research questions at the time of the excavation were exclusively related to the architectural history of the cult building.

31 See Theuws 1981, 190 for further references.

32 Strijbosch 1995, 57-58.

Gothic chapel. However, we cannot identify the remains of a wooden chapel with certainty. It is remarkable how different the preservation conditions of wooden cult buildings are on church sites in the Kempen region. Why this is the case cannot be established without further detailed comparative research of the sites.

The graves have several orientations. The orientation of a large group of graves corresponds to the orientation of the farm directly to the south of the cemetery (the red graves in Fig. 6), the orientation of another group to that of the newer Gothic chapel (the green graves in Fig. 6). The Gothic chapel was thus probably oriented in the same way as its wooden predecessor which determined the orientation of most of the excavated graves. Although the red graves, oriented to the farmstead, were not always the oldest ones in a stratigraphic sense, I suspect that they belong among the oldest in the cemetery. The earliest burials (11th century) probably took place in the southern part of the cemetery with burials oriented to the farm. With the construction of a wooden chapel, which had a slightly different orientation–

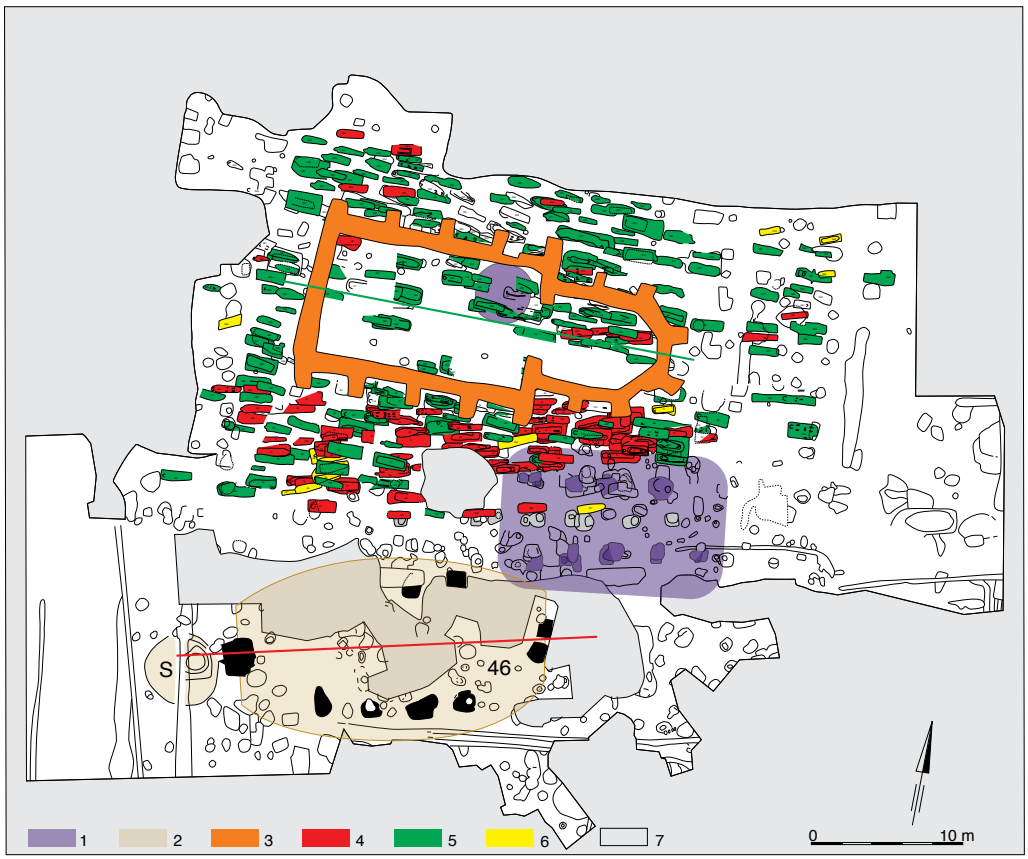


Fig. 6: Dommelen, church site excavations 1982. This excavated area is part of a larger excavation. 1. Carolingian farmhouse and well. 2. farmhouse (nr 46) and well (S) from the second half of the 11th century. 3. foundations of the brick Gothic chapel. 4. graves older than the Gothic chapel with the same orientation as the 11th-century farmhouse. 5. graves older than the Gothic chapel with the same orientation as the chapel. 6. graves older than the Gothic chapel with another orientation. 7. unexcavated area.

the ideal orientation is east-west–a change in orientation occurred. It is expected that the chapel was built to the north of the earliest burials. The cemetery then grew around this chapel with graves oriented to the chapel.

A small hoard of four silver coins dating to the years around 1100 in one of the oldest graves indicates that burial may have started in the second half of the 11th century.

This date corresponds to the date of the farmstead just south of the cemetery.[33] As far as we can tell, there is no chapel related to the early cemetery, which would make it a field cemetery close to one of the farmsteads of the local group.[34] This situation could resemble that in Luiksgestel. Was the creation of the field cemetery in Dommelen in the 11th century an initiative by local dwellers or was the clergy or the Church involved? The absence of a chapel suggests that we are dealing with a local initiative. I come back to this problem after I briefly present the evidence from another parish, Reusel.

The church/chapel at Reusel

A church or chapel at Reusel is mentioned for the first time in 1173 (*ecclesie de Rosole*, *cimiterium in Rosele*).[35] The excavations of the church site revealed several building phases of a brick Gothic church, the foundations of a rectangular Romanesque church or chapel with an apse in brick added to it in later times, and finally the remains of a wooden cult building with a churchyard around it.[36] The wooden church/chapel was *not* created on an existing cemetery. The churchyard developed around the cult building. No contemporary burials were found inside the Romanesque church/chapel and the older wooden building. It is thus the first undisputed churchyard discovered in the Kempen region (Figs. 2 and 7). The oldest graves date to the middle and second half of the 10th century.[37] Because the wooden chapel and the cemetery were created at more or less the same time, the ^{14}C dates of graves indicate that both came into use somewhere around the middle or the second half of the 10th century. This church was thus constructed at more or less the same time as the one in Bergeijk. Remains of farmsteads dating to the eleventh/twelfth centuries discovered in the trenches to the west of the church site indicate that it was constructed next to a settlement. No excavations could be carried out in the other directions where we expect the core of the medieval settlement Old-Reusel, to have existed.

---

33 This date was established on the basis of pottery finds on this farmstead (research carried out by Dr. A. Verhoeven, University of Amsterdam).

34 One other farmstead of that grouping has been excavated further to the west. There must have been more such farmsteads in the environs that made up the local grouping.

35 Camps 1979, nr. 69. On this exceptional charter see Bijsterveld 1999, reprinted Bijsterveld 2007, 83-123.

36 Strijbosch 1995, 113-114; Seijnen 1996; Van Kempen & Van der Kamp 1998. The study of the churchyard was the subject of an MA thesis by Catelijne Nater (Nater 2016) under the supervision of the author (Faculty of Archaeology, University of Leiden). See also the chapter by Nater in this volume. Much preliminary research was carried out by drs. M. Seijnen.

37 This date was established on the basis of a as yet insufficient series of ^{14}C dates.

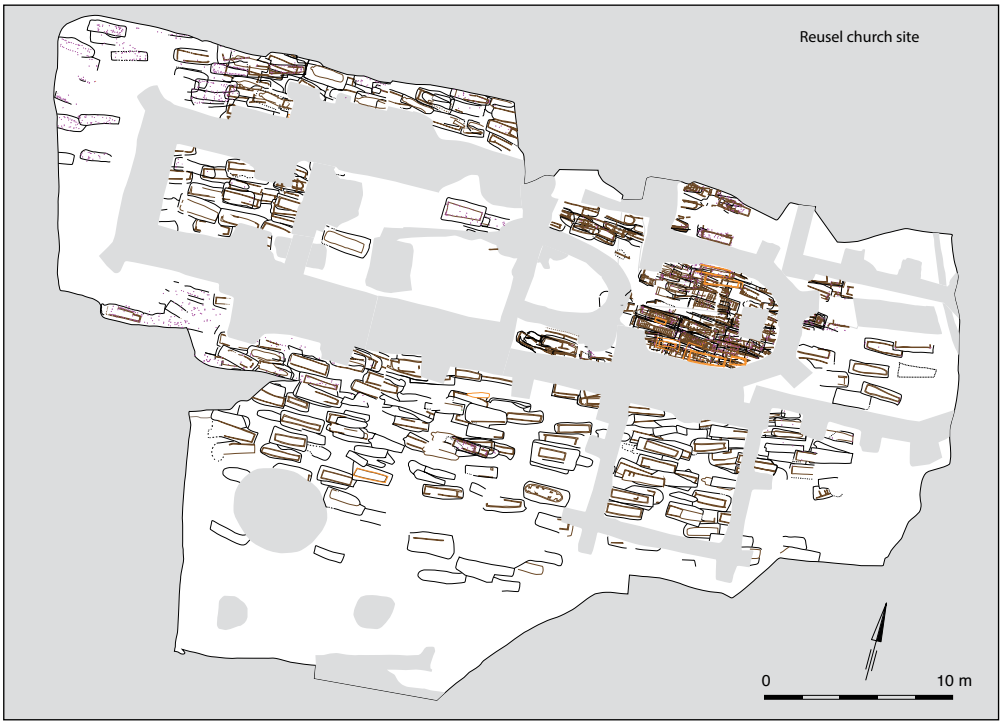


Fig. 7: Reusel, church site excavations 1995-1997. Plan of all graves, dating from c. 940-1350/1400, recovered, indicating the type of grave. In the middle of the cemetery is an area without graves contemporary to the Romanesque church (after Nater 2016).

The chapels at Aalst

In addition to the cemeteries and cult places discussed above, the excavations of the cemetery at Aalst in the parish of Waalre should be mentioned (Figs. 2 and 8).[38] At this site, the remains of two successive wooden buildings (nrs 6 and 7), which were considered cult buildings by the excavator, were found next to the faint remains of a late medieval Gothic brick chapel and a number of graves. Moreover, remains of habitation dating to the Roman and Carolingian periods and the Central Middle Ages were discovered. The wooden buildings were dated to the 12th century.[39] The excavator interpreted the wooden buildings as cult buildings (chapels) because of the exceptional form of the outlines of the buildings. This interpretation is contested because the buildings are considered too small to be cult buildings.[40] The presbytery of one of the buildings was also considered too small to house an altar. Verwers and Stoepker suggest that it was a granary and that both buildings had a secular use. However, there are no close parallels in the rural architecture of the

38 Strijbosch 1995, 35-36; Arts 1998.
39 Arts 1998, 30.
40 Verwers & Stoepker 2002, 104.

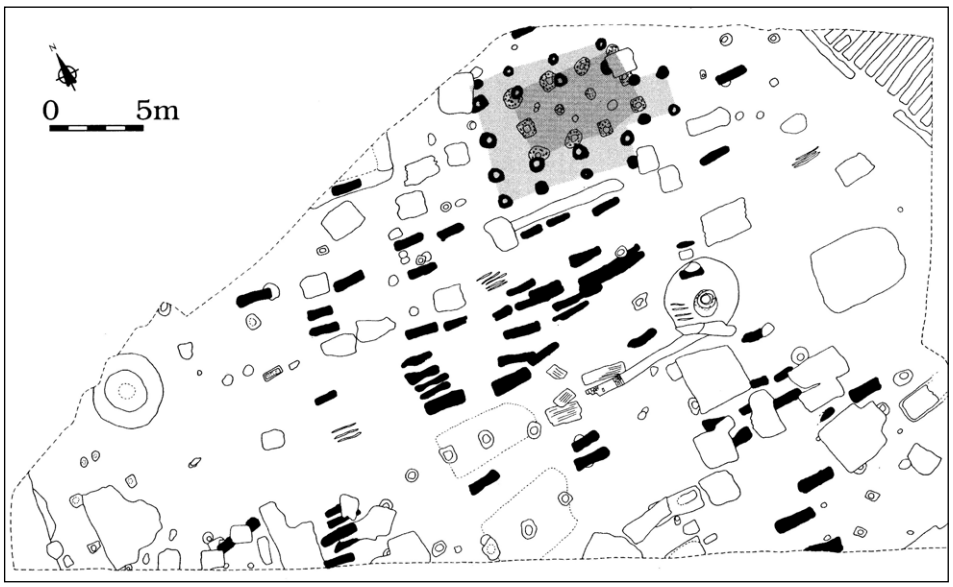


Fig. 8: Aalst, church site excavations. The graves and postholes of the wooden chapels are indicated in black, the surface of the wooden chapels in grey. Other features relating to habitation and the remains of the brick chapel are indicated with open outlines (Afeter Arts 1998).

region with the outlines of buildings 6 and 7, not even without the presbytery.[41] Moreover, the size argument does not seem to be valid. The cemetery chapel at the site of Raunds Furnells, an excellently excavated cemetery in England, has the same internal dimensions.[42] The presbytery of that chapel measures 2.75 by 1.90 metres. Wooden chapels in northern France are often not much larger.[43] There is no evidence for a tufa church on the site in Aalst. The Gothic chapel dates to the 15th century, but *investitos de Alst et Cneczele* were mentioned in 1281.[44] This suggests that a wooden chapel must have been present in Aalst already by that time, but no postholes of such a chapel were found at the location of the Gothic chapel. Postholes of other buildings from the 12th century were found, so it is safe to assume that the absence of postholes at the location of the Gothic church indicates that no wooden predecessor was present. The features of both wooden

41 Verwers & Stoepker 2002, 103-104. Contemporary secular buildings have been excavated in great numbers (Huijbers 2007, especially 143-207) so that it is safe to suggest an other than secular use. The secular buildings presented by Verwers and Stoepker are an odd mix of early and later medieval buildings (houses and outbuildings) and do not add much to their argumentation. Moreover, they suggest that one posthole, not included in the plan of building 7 by Arts, should be added to the plan. However, this posthole would then be an exceptional one within the plan. It is safe to assume that this posthole does not belong to building 7 but would be better included in other phases in the habitation on the site.

42 Boddington 1996.

43 Peytremann 2003, 298.

44 Camps 1979, nr 373; Bijsterveld 1998.

chapels were recovered just north of the Gothic church. The two buildings are thus most likely to be chapels, although small.[45]

As already stated, the later Gothic chapel at Aalst was not built on the same spot as the wooden buildings, but just south of them. As in Luiksgestel and Dommelen, no chapel built of tufa stone was present between the wooden buildings and the Gothic church.[46] The Aalst excavations suggest that a wooden predecessor need not be at exactly the same place as the later Gothic building. In Aalst, the excavated graves that must have been more or less contemporary with the wooden chapels were mainly found to the south of these buildings. Some graves were located to the west and east and one grave to the north. However, the excavation did not extend in a northerly direction much beyond the wooden chapels. Moreover, as in Dommelen, Carolingian habitation at the site continued into the Central Middle ages. The cemetery and chapel were both located next to this settlement.

Discussion

We have seen two cult buildings at Bergeijk and Reusel that were the primary churches in their parishes. They were probably originally built to be parish churches. At Reusel, the churchyard developed around the church after it was built, as it was situated in the middle of the churchyard. No burials took place inside the wooden church or the Romanesque church. At Bergeijk, the relation between a wooden church and the oldest excavated burials is not clear. The Romanesque church was built on top of an older cemetery.

In the case of Bergeijk, the Bishop of Cologne probably instigated the development of the site, which was enclosed with a deep ditch or moat.[47] We do not know who the original owner and creator of the Reusel cult site was.

Next we have two secondary cult sites in Luiksgestel and Dommelen. In Luiksgestel, a wooden chapel was built exactly on the location of an older cemetery, and in the case of Dommelen, just next to it.[48] Both these cemeteries were established without a cult place. One wonders who established these cemeteries. The relationship between the orientation of the oldest graves and a farmstead in Dommelen suggests that the local community was responsible.

A number of interesting observations can be made related to the primary 10th-century churches and cemeteries and to the secondary 11th/12th-century cemeteries and chapels.

First, the oldest cemeteries we have identified to date can be dated to around the middle of the 10th century. They were new cemeteries at that time and most of them have remained in use into recent times. These cemeteries show that developments in the Kempen region are in line with observations in France where

45 In the end, we cannot be certain of course. *Horrea* are said to be present in cemeteries. An interesting passage from the same charter, dealing with the cemetery at Oerle states: 'quibusdam arboribus et lignis quercinis sitis in fossato, circa et infra fossatum quo vallatur cymiterium et ecclesia de Orle, et super quodam orreo sito infra fossatum predictum et ecclesiam' (Camps 1979, nr 373, lines 3-5).

46 The same observation was made about Baarle Nassau (Verwers & Stoepker 2002).

47 For a reconstruction of the property history in Bergeijk see Theuws 1989, Theuws & Bijsterveld 1991.

48 In Dommelen, it is possible that the wooden chapel overlapped the existing cemetery.

a sedentarisation of burial grounds was also dated to the 10th century. These new cemeteries in the Kempen region must have replaced a series of cemeteries of the Carolingian age that we do not yet know about. Strangely enough no Carolingian rural cemeteries have been found, although large-scale excavations of settlements and their environs have been carried out since the 1980s in the Kempen region and the eastern part of the province of Noord Brabant. Carolingian rural cemeteries were probably located at the limits of the inhabited/cultivated areas or just beyond them like most Merovingian cemeteries.[49] In most cases, Merovingian cemeteries have been discovered because of the presence of grave goods, but Carolingian graves lack those grave goods. As in Merovingian graves, the skeletons are probably completely decayed. Therefore, many Carolingian cemeteries may already have been destroyed unnoticed. Merovingian cemeteries had all fallen into disuse by the first half of the 8th century at the latest. In the Carolingian age new (Christian?) cemeteries must have been created. Most of them were probably field cemeteries. This shuffle is the first medieval cemetery shuffle in the Kempen region. No burials have been found in Carolingian settlements yet. There is thus a significant gap in our knowledge of burial rites of the Carolingian age (Fig. 9).[50] Nevertheless, a second shuffle of burial grounds led to the creation of new cemeteries connected to a wooden church around the middle or second half of the 10th century. This innovation came about because of several developments.[51]

First, it might be related to attempts to restore estates by large landowners (predominantly large monastic communities) after the estates suffered from decline in the late ninth and first half of the 10th centuries.[52] The new churches, with rights of baptism and burial, functioned as the first parish churches and as focal points within estates. It would be of great importance to know who originally created these new cult sites. In the case of Bergeijk, it was probably the bishop of

---

49 See, for example, the situation in Bergeijk (Theuws 2012). On habitation/cultivation areas and their significance for understanding early medieval habitation patterns see Theuws 2010.

50 The Kempen region is not exceptional in this. Carolingian cemeteries have not yet been found in many regions of the Netherlands.

51 My views differ from those formulated by Huijbers (2007, 378-381). She considers the building of churches in the 10th century as part of a re-Christianization after a period of a return to paganism in late Carolingian times. This suggests a somewhat too undifferentiated concept of Christianization and a too strong Christian-Pagan opposition. The unexpected large number of cremation graves in cemeteries of the middle Dutch river area such as Rhenen (Wagner & Ypey 2011) and Wageningen (Van Es 1964) dating to the 8th and early 9th century indicates that we have to develop very nuanced perceptions of religious transformation accepting that a change from inhumation to cremation is related to conceptions of personhood, the nature of life-cycles, and the imaginary world. On the other hand, her discussion of baptism and baptismal fonts in relation to peasant cultural concepts is also interesting in the context of the creation of local identities.

52 In the Kempen region some settlements such as Dommelen, Geldrop and Nederweert show a decline in habitation (or even absence) in the later ninth and tenth centuries. The number of house plans dating to the 10th century (especially type H0) recorded by Huijbers is relatively small compared to those from later ages (Huijbers 2007, 99-107). Other settlements however come into being, such as Eindhoven-Blixembosch (Arts 1993), but these seem to be of another character. There is, as far as can be seen on the basis of the present data, no simple continuity of habitation from Carolingian times to the central Middle Ages. Moreover, new types of elite settlements appear in the middle and second half of the 10th century, such as Bergeijk (Theuws 1989; Dijkstra 2014) and Sint-Oedenrode (Peters 2010).

Cologne.[53] In that case, this first development may have been combined with the second development.

Second, the creation of these churches and burial grounds might be related to an attempt by the Church to stabilize and institutionalize clerical power. This may not have been the case in all instances because bishops created only a minority of the cult places. Parishes with churches established by bishops, however, could have been at the forefront of this process. In other cases, the Church had to bring into its orbit the churches created by monasteries and secular lords.

Third, the creation of new churches and cemeteries might be related to changing power relations at the local level. Former large landowners may not have been capable of establishing their former position. New local powerbrokers (such as *ministeriali*) strengthened their position, for instance, by creating new elite sites including new cult places. In this they could have followed the example of more important lords. Excavations and related historiographical research show that Sint-Oedenrode might be an example of such a development.[54]

In each of these cases, the creation of these cult sites has to do with to creating, re-creating or reinforcing local social coherence and related identities based on *vertical* power relations. The church and cemetery were linked to estates and their owners and for that reason the community identities created can be seen as estate identities. This process thus merges with the start of the third phase of Christianization: the institutionalization of clerical power, although this process continued into later centuries. The creation of these sites was a top down attempt to bring the rural population into its web of religious and power structures.

How different this seems to be from the second wave of cemetery development in the eleventh and twelfth centuries. The creation of new cemeteries next to farmsteads in relatively small settlements was most likely an initiative by local groups. If so, why would they breach the 'burial rights' of the primary churches? Some preliminary considerations are relevant.

First, we do not yet know the nature of the 'burial community' related to these cemeteries. Did all dwellers of the Dommelen habitation/cultivation area (or the community covered by the collective name of 'Dommelen') bury their dead in this new cemetery or was it only a small part of the population that did?

Second, we do not know exactly what the relation was between the small local groups and the at times distant churches in the 11th century. Dommelen, which we know later belonged to the parish of Bergeijk, may have counted only 5 to 10 farmsteads in the 11th century (of which only two, both which were a walking distance of 6.6 kilometres from the church at Bergeijk, have been excavated). The parish organisation was not yet fully developed. Moreover, not all inhabitants of a certain area were dependent on an estate and the church built by its owner. We do not know whether free dwellers were living in the Kempen region in the tenth to twelfth centuries and, if so, how many. It would be very interesting to know how such free dwellers were related to a church, whether they related to one church

53 Theuws 1989; Theuws & Bijsterveld 1991.
54 Peters 2010.

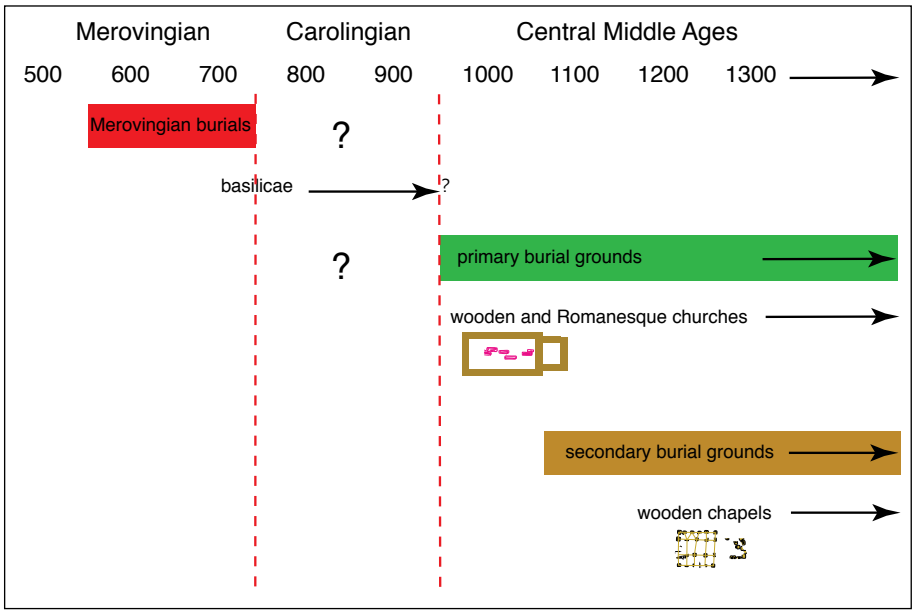


Fig. 9: A schematic representation of the chronological development of cemeteries and cult places in the Kempen region. Note the important lacuna in the Carolingian age.

only and if attaching themselves to a church of a large landowner affected their status and independence.

We might even consider the possibility that not all of the population attended church on a regular basis, or in other words, not everyone at that time considered themselves Christian. This may have made them pagan in the eyes of the clergy even if they did not consider themselves as such.[55]

I suggest that the creation of new field cemeteries near settlements within the orbit of an estate church, which might even have been a parish church for those not connected to an estate, contributed to a growing local self-awareness amidst an expanding population in the eleventh and twelfth centuries, an expansion which we can clearly observe in the archaeological record. The new field cemeteries do not only *represent* this self-awareness, but their creation can be considered a performative act, important in defining the local group/community and creating local identities. By creating cemeteries of their own, the dwellers of Luiksgestel and Dommelen defined themselves as local communities in their own right.

However this may be too simple a description of what happened. Local communities at that time might have been complex entities of dwellers with various legal, social, and economic statuses.[56] Two different processes of identity formation might have been at work: an external process in which identities were defined vis-à-vis other similar groups in the region and an internal one in which various

55 I acknowledge that there might be a difference between how people perceived themselves vis-à-vis Christianity and the religious practices they performed.

56 This is what one expects. The archaeology of rural settlements, however, shows a remarkably limited variability in houses and farmyards. See, for instance, Huijbers 2007.

families or households began to consider themselves, for example, as members of the Dommelen community instead of members of an estate community. In the past, neighbours might have been members of different estate communities and gone to different churches. Parishes were in that case groups of people who went to a single church irrespective of the location of their house. In this process, the names of the local communities (such as 'Dommelen') might receive a new meaning. In the past the names might have referred predominantly to a *place*. One was living at a *place* called Dommelen and those who were living in this place (which I define as a group) might belong to various communities, some of which reached beyond the place (e.g., those related to an estate). Many names of local groups in the region reference a forest, which would suggest that the people's identity was in some way defined by a forest. Hulislaum (710, today Hulsel), for example, means holly wood,[57] and in the Early Middle Ages, the people of Hulislaum were those who exploited a specific forest with that name. They were related to the forest or rather the forest and the people were one, the people *were* the forest.[58] In the Central Middle Ages, such names increasingly referred to a local group, a group of people that identified itself as those of Dommelen or Hulsel and who started to bury their dead in one place.

We do not yet know *who* at the local level was responsible for creating the new cemeteries. In the case of Dommelen, the cemetery was created next to an existing farmstead. Why *this* farmstead? Did the farm household establish the new cemetery? Did other households begin to bury their dead at this place at the same time or did the use of the cemetery by other households gradually expand as part of the internal process of defining a local identity?

The transformation in the nature of local communities occurred at a time when older estates were breaking apart. Traditional landowners, who could have held that position since the early 8th century, began to lose their grip on their estates, which led to their fragmentation by the end of the 10th century. This was the case in Reusel, as well as in Bergeijk (see Figs. 10 and 11). This fragmentation went hand in hand with a population expansion. To create a new cemetery at the local level, next to a farmstead of one of the inhabitants, can also be seen as a symbolic act challenging the rights of an early mother church associated with an old estate.

It is important to underline that local communities created cemeteries but did not seem to build cult places at the same time. That was probably considered too big a challenge to the balance of power at the local level. However, the creation of field cemeteries will not have pleased local elites nor the Church in that it challenged clerical power and the institutionalization of that power. The building of wooden chapels on top of the new cemeteries can be considered a counter reaction of the Church or local elites controlling the mother church. Nor should we be surprised that people were buried in the new cemeteries without Christian burial rites. Normally the residents of, for instance, Dommelen would have had to carry the corpses of deceased family members to Bergeijk in order to perform Christian rites and then carry them back to the new cemetery to be buried. A priest

57 Camps 1979, nr. 4.
58 Theuws in prep.

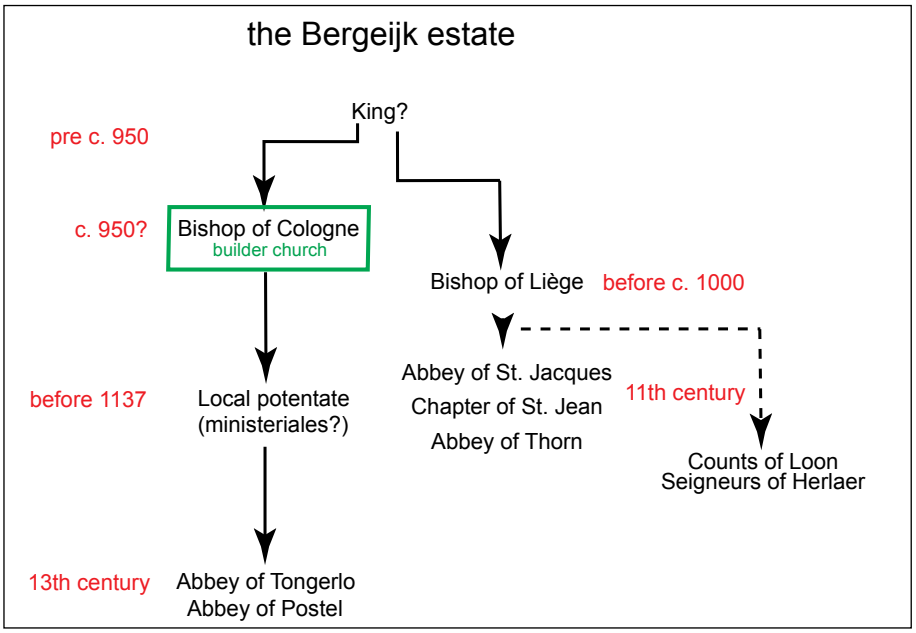


Fig. 10: A schematic representation of the fragmentation of the Bergeijk estate in the second half of the 10th and 11th centuries.

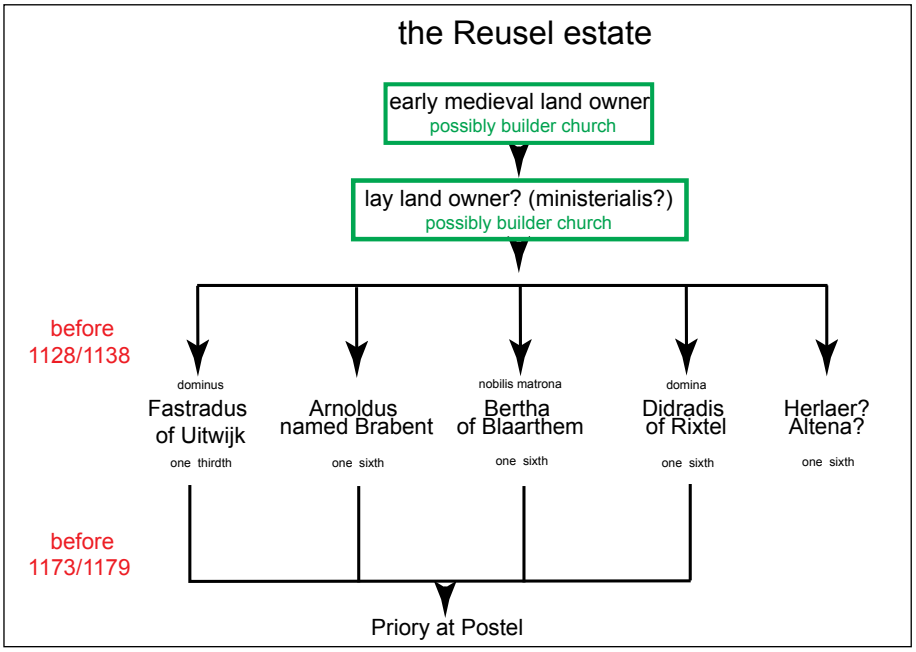


Fig. 11: A schematic representation of the fragmentation of the Reusel estate in the 11th and 12th centuries.

might have gone to the settlement to carry out the proper rites, but many dead might have been buried without Christian rituals even if their families considered themselves Christian.

The new cemeteries were brought back into the orbit of the local mother church with the building of chapels on top of them possibly related to a consecration of the cemetery. Building the chapels might thus be a further element of both the clericalization and institutionalization of Christianity by the Church. By building these chapels, the parish organisation received new impetus. So at the same time secular estates were disintegrating, another institution, but this time a religious one, the parish, was gradually bringing the peasantry into its orbit. At the same time, it was transformed into a territorial unit from being a collection of people. The parish as a local organising principle became so strong that after the middle of the 13th century, 'in the parish of' became a much-used designation in charters to locate a hamlet or field. Prior to this, a simple 'in' plus a name was sufficient. This shows that by the middle of the 13th century the formation of parishes was more or less complete. It also shows that the church and especially its patron saint became the central focal point of the local community and the central focal point in the creation of local identities. This process did not stop in the 13th century. In the fourteenth and fifteenth centuries, a boom in building activities resulted in the creation of a whole series of Gothic style churches.[59] This went hand in hand with the building of towers that could be seen from far away because by that time the landscape, dominated by heather fields, had become much more open. The region obviously experienced a period of great wealth based on the raising of sheep and the production of wool.[60] The region became integrated into developing commercial systems. Now these open heather fields became a source of wealth whereas they had not been very productive in the subsistence economy of the previous ages. Numerous documents testify to the disputes between local communities over the possession of the heather fields. The towers became an important medieval 'GPS system' because everyone could, on the basis of the towers, determine where he/she was. The towers thus became the symbol par excellence of the local community and its claim to the surrounding territory. But it was also an element of a cult place. The towers, representing local patron saints, dominated this landscape. Economic gains were important at the time and economics would, in time, begin to define the landscape, but for the time being, the towers created a religious Christian landscape that no one could escape.

59 Strijbosch 1995.

60 Theuws 1989; De Wachter 2000, 2002.

Bibliography

Arts, N., 1993: 'Middeleeuwse hoeven op Blixembosch bij Eindhoven', in: N. Roymans & F. Theuws (eds.), 1993: *Een en al Zand. Twee jaar graven naar het Brabantse verleden*, 's-Hertogenbosch, 106-115.

Arts, N., 1998: 'Het archeologisch onderzoek. Doel, methode en resultaten', in: N. Arts, A.-J.A. Bijsterveld, Th. Van Dijk, J. Hagen & J. Walinga, 1998: *De schaduw van een heiligdom. De geschiedenis van Aalst en zijn middeleeuwse kerk*, Waalre, 15-42.

Arts, N., 2013: 'Begraven op de Brabantse zandgronden. De archeologie van veranderende grafrituelen, circa 1000-1900', in: P. Bitter, V. Bonenkampová & K. Goudriaan (eds.), 2013: *Graven Spreken. Perspectieven op grafcultuur in de middeleeuwse en vroegmoderne Nederlanden*, Hilversum, 23-35.

Bijsterveld, A.-J.A., 1998: 'De parochie, de kerk en de pastors tot 1648', in: N. Arts, A.-J.A. Bijsterveld, Th. Van Dijk, J. Hagen & J. Walinga, 1998: *De schaduw van een heiligdom. De geschiedenis van Aalst en zijn middeleeuwse kerk*, Waalre, 59-88.

Bijsterveld, A.-J., 1999: 'Gift exchange, Landed Property, and Eternity. The foundation and endowment of the Premonstratensian priory of Postel (1128/1138-1179)', in: F. Theuws & N. Roymans (eds.), 1999: *Land and Ancestors. Cultural dynamics in the urnfiels period and the middle ages in the southern Netherlands*, Amsterdam (Amsterdam Archaeological Studies 4), 309-348.

Bijsterveld, A.-J.A., 2007: *Do ut Des. Gift giving, Memoria, and conflict management in the medieval Low Countries*, Hilversum.

Blair, J. 2005: *The church in Anglo-Saxon society*, Oxford.

Boddington, A., 1996: *Raunds Furnells. The Anglo-Saxon church and churchyard. Raunds Area Project*, London.

Bourin, M. & R. Durand, 2000: *Vivre au village au Moyen Âge. Les solidarities paysannes du XIe au XIIIe siècles*, Rennes.

Camps, H.P.H., (ed.), 1979*: Oorkondenboek van Noord-Brabant tot 1312. I. De Meierij van 's-Hertogenbosch (met de Heerlijkheid Gemert). Eerste stuk (690-1294)*, 's-Gravenhage.

Cattedu, I., 2009: *Archéologie médiéval en France. Le premier Moyen Âge (Ve-XIe siècle)*, Paris.

De Wachter, A., 2000: 'Over schapen en wol en de rol van de hertog in de 13de-eeuwse Kempen', in: J. Bastiaens (ed.), *Zand op de schop. Een archeologische kijk op de Kempen*, Oud-Turnhout, 85-97.

De Wachter, A., 2002: *De toepassing van wereldsysteem-analyse op geografische streken. Twee casestudies: de Kempen en noordelijk Ghana*, Gent (proefschrift Universiteit Gent).

Delaplace, Chr., 2005: Avant-Propos, in: Chr. Delaplace (ed.): *Aux origines de la paroisse rurale en Gaule méridionale IVe-IXe siècles. Actes du colloque international 21-23 mars 2003*, Paris, 7-9.

Dijkstra, M.F.P., 2015: *Rondom de kerk van Eicha. Archeologisch onderzoek bij de herinrichting van het centrum van Bergeijk (2011),* Amsterdam.

Durant, M., 1988: *Archéologie du cimetière medieval au sud-est de l'Oise du VIIème au XVIème siècle. Relations avec l'habitat, evolution des rites et des pratiques funéraires, paleodémographie*, Amiens (Revue Archéologique de Picardie, numéro special)

Effros, B., 1997: Beyond cemetery walls: early medieval funerary topography and Christian salvation, *Early Medieval Europe* 6, 1-23.

Fixot, M. & E. Zadora-Rio (eds.), 1989: *L'église, le terroir*, Paris.

Fixot, M. & E. Zadora-Rio (eds.), 1994: *L'environnement des églises et la topographie religieuwse des campagnes médiévales. Actes du IIIe congers international d'archéologie medieval (Aix-en-Provence, 28-30 septembre 1989)*, Paris.

Galiniè, H. & E. Zadora-Rio (eds.), 1996: *Archéologie du cimetière chrétien. Actes du 2e colloque ARCHEA, Orleans, 29 septembre-1er octobre 1994*, Tours.

Halbertsma, H., 1975: Archeologisch Nieuws: Bergeyk, *Bulletin van de Koninklijke Nederlandse Oudheidkundige Bond* 74, 51-53.

Huijbers, A.M.J.H., 2007: *Metaforiseringen in beweging. Boeren en hun gebouwde omgeving in de Volle Middeleeuwen in het Maas-Demer-Scheldegebied*, Amsterdam.

Lauwers, M., 1997: *La mémoire des ancêtres, le souci des morts. Morts, rites et société au moyen age (diocèse de Liège, XIe-XIIIe siècles*, Paris.

Lauwers, M., 2005: *Naissance du cimetière. Lieux sacrés et terre des morts dans l'occident médiéval*, Paris.

Milis, L.J.R., 1990: Monks, mission, culture and society in Willibrord's time, in: P. Bange & A.G. Weiler (eds.), 1990: *Willibrord, zijn wereld en zijn werk. Voordrachten gehouden tijdens het Willibrordcongres Nijmegen, 28-30 september 1989*, Nijmegen, 82-92.

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).

Panhuysen, R.G.A.M., 2005: *Demography and health in early medieval Maastricht: prosopographical observations on two cemeteries*, Amersfoort.

Paxton, F.S., 1990: *Christianizing Death. The creation of a Ritual Process in Early medieval Europe*, Ithaca/London.

Peters, S., 2010: *Sint-Oedenrode Kerkstraat. Archeologisch onderzoek*, 's-Hertogenbosch/Deventer.

Peytremann, E., 2003: *Archéologie de l'habitat rural dans le nord de la France du IVe au XIIe siècle,* I and II, Saint-Germain-en Laye.

Seijnen, M., 1996: Oud-Reusel, het dorp en zijn bewoners. Het archeologisch onderzoek, *De Schéép*er 30, 8-13.

Strijbos, H., 1995: *Kerken van heren en boeren. Bouwhistorische verkenningen naar de middeleeuwse kerken in het kwartier Kempenland*, 's-Hertogenbosch.

Theuws, F., 1981: De oerparochie in de Kempen en haar belang voor het nederzettingsonderzoek I, de latere middeleeuwen, *Brabants Heem* 33, 184-207.

Theuws, F., 1989: Middeleeuwse parochiecentra in de Kempen; in: A. Verhoeven & F. Theuws, (eds.), 1989: *Het Kempenprojekt 3. De middeleeuwen centraal*, Waalre (Bijdragen tot de studie van het Brabantse heem, 33), 97-216.

Theuws, F., 2010: Early Medieval Transformations: aristocrats and dwellers in the pagus Texandria. A publication programme, *Medieval and Modern Matters* 1, 37-72.

Theuws, F., 2012: De Kattenberg te Bergeijk. Een behekste heuvel en haar geheim ontfutseld?, *InBrabant* 3, 56-65.

Theuws, F., in prep: The Colonisation of the Kempen region (sixth-seventh centuries).

Theuws, F. & A.-J. Bijsterveld, 1991: Der Maas-Demer-Schelde-Raum in Ottonischer und Salischer Kaizerzeit, in: H.W. Böhme (ed.): *Siedlungen und Landesausbau zur Salierzeit. Teil 1. In den nördlichen Landschaften des Reiches*, Sigmaringen, 109-146.

Treffort, C., 1996: *L'église carolingienne et la mort. Christianisme, rites funéraires et pratiques commémoratives*, Lyon.

Treffort, C., 2001: Consécration de cimetière et contrôle episcopal des lieux d'inhumation au Xe siècle, in: M. Kaplan (ed.), 2001: *Le sacré et son inscription dans l'espace à Byzance et en Occident. Études comparées*, Paris, 285-299.

Van Es, W.A., 1964: Het rijengrafveld van Wageningen, *Paleohistoria* 10, 181-316.

Van Kempen, P. & M. van der Kamp, 1998: De opgraving van de middeleeuwse kerk van Reusel in 1997, *De Schéép*er 36, 13-21.

Verhoeven, A., 1989: Middeleeuws aardewerk uit Bergeyk, in: A. Verhoeven & F. Theuws (eds.), 1989: *Het Kempenprojekt 3. De middeleeuwen centraal*, Waalre (Bijdragen tot de studie van het Brabantse heem 33), 217-243.

Verwers, W.J.H. & H. Stoepker, 2002: 'De houten kerken in Brabant', in: P.J. Woltering, W.J.H. Verwers & G.H. Scheepstra (eds.): *Middeleeuwse toestanden, Archeologie, geschiedenis en monumentenzorg, aangeboden aan Herbert Sarfatij bij zijn 65e verjaardag*, Amersfoort, 93-118.

Wagner, A. & J. Ypey, 2011: *Das Gräberfeld auf dem Donderberg bei Rhenen. Katalog,* Leiden.

Zadora-Rio, E., 2003: 'The making of churchyards and parish territories in the early-medieval landscape of France and England in the 7th-12th centuries: a reconsideration', *Medieval Archaeology* 47, 1-19, http://dx.doi.org/10.1179/med.2003.47.1.1.

Zadora-Rio, E., 1989: 'The role of cemeteries in the formation of medieval settlement patterns in western France', in L. Redman (ed.), *Medieval archaeology: papers of the Seventeenth Annual conference of the Center for Medieval and Early Renaissance Studies*, Binghampton, 171-186.

Zadora-Rio, E., 2005: L'historiographie des paroisses rurales à l'épreuve de l'archéologie, in Chr. Delaplace (ed.): *Aux origines de la paroisse rurale en Gaule méridionale IVe-IXe siècles. Actes du colloque international 21-23 mars 2003*, Paris, 15-23.

Social differences in burial practices in the medieval cemetery of Reusel

An osteoarchaeological and mortuary archaeological study of burial practices in the southern Netherlands during the Central Middle Ages

Catelijne Nater

Introduction

The aim of this study is to contribute to the knowledge of burial rituals and the development of cemeteries in the Central and Late Middle Ages, to see if local variations are present, and to learn more about the social implications of differences in these burial rituals.[1] In order to do so, the cemetery of Reusel (mainly 10th to 13th century), a village in the province of North Brabant in the southern part of the Netherlands, will be studied (Fig. 1). Both human remains and information on the distribution of the graves in the cemetery were available for analysis. Combining these two sets of data provides sufficient information to draw conclusions on social differences as expressed through burial practices.

The overall chronology of the cemetery was determined using the stratigraphic relations between the graves and church foundations. Then, the various morphological characteristics of graves, such as orientation and grave morphology, were described, and distribution maps were made of these characteristics. Several characteristics were then considered in relation to each other. In addition, the skeletal remains were studied in order to determine the demographic composition of the sample by estimating sex, age at death, and stature of the individuals.

1 This article is an adaptation from my Master thesis (Nater 2016).

Fig. 1: Location of Reusel and other relevant locations in the Netherlands and Belgium.

Materials

The cemetery of Reusel

The medieval cemetery of Reusel was excavated between 1995 and 1997 by archaeologists from the University of Amsterdam. The excavation resulted in the recovery of the foundations of three churches, 492 graves, and a series of other features related to habitation and other activities (Fig. 2). Several articles have been published about the cemetery and the churches, but no full analysis had been made yet.[2]

Historical knowledge about the settlement is limited. Immediately to the west of the church, the remains of a settlement were found, dating from both the Merovingian period and the 11th/12th centuries. It is likely that most of the settlement was located on the eastern side of the church; however, this part could not be excavated. Further to the west were the remains of a settlement dating to the Merovingian period. In 1828, a cadastral map was made of the village of Reusel (Fig. 3). It shows that by that time the church stood on its own, apart from the village, with the village located to the north of the church.

2 Van Kempen & Van der Kamp 1998; Hagen & Janssen 1995; see the chapter by Theuws this volume.

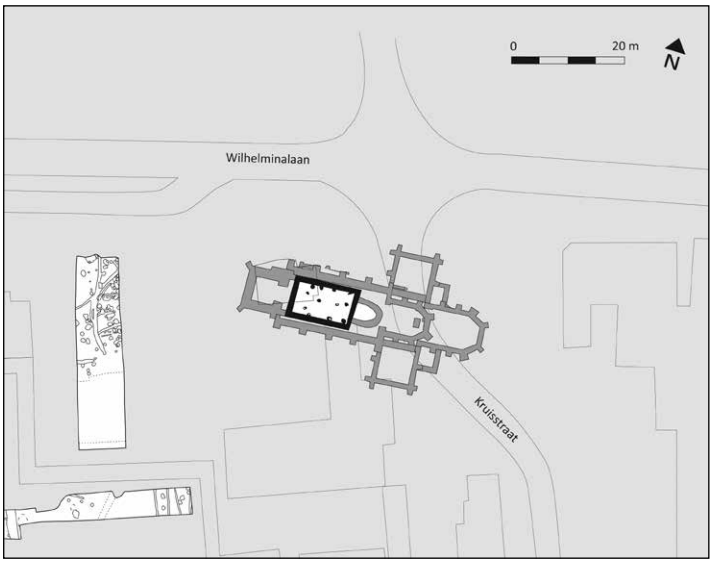


Fig. 2: Map of the excavation area. The church is located near Wilhelminalaan and Kruisstraat. West of the church, features of a Merovingian settlement and a settlement from the Central Middle Ages were found (Theuws, personal communication).

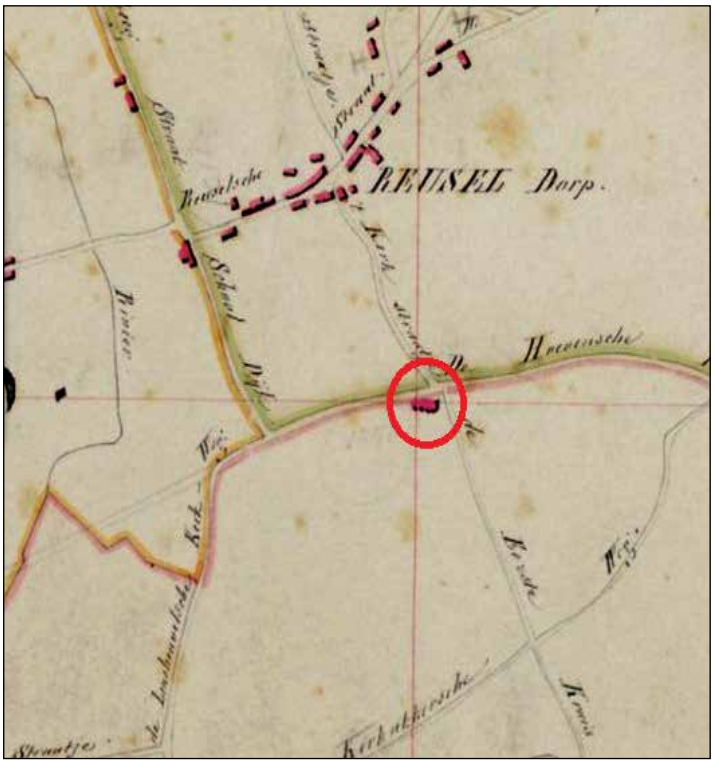


Fig. 3: Part of the cadastral map of 1828. The red circle marks the church. The village of Reusel was, in this period, located to the north of the church (after watwaswaar.nl, accessed on 1 October 2015).

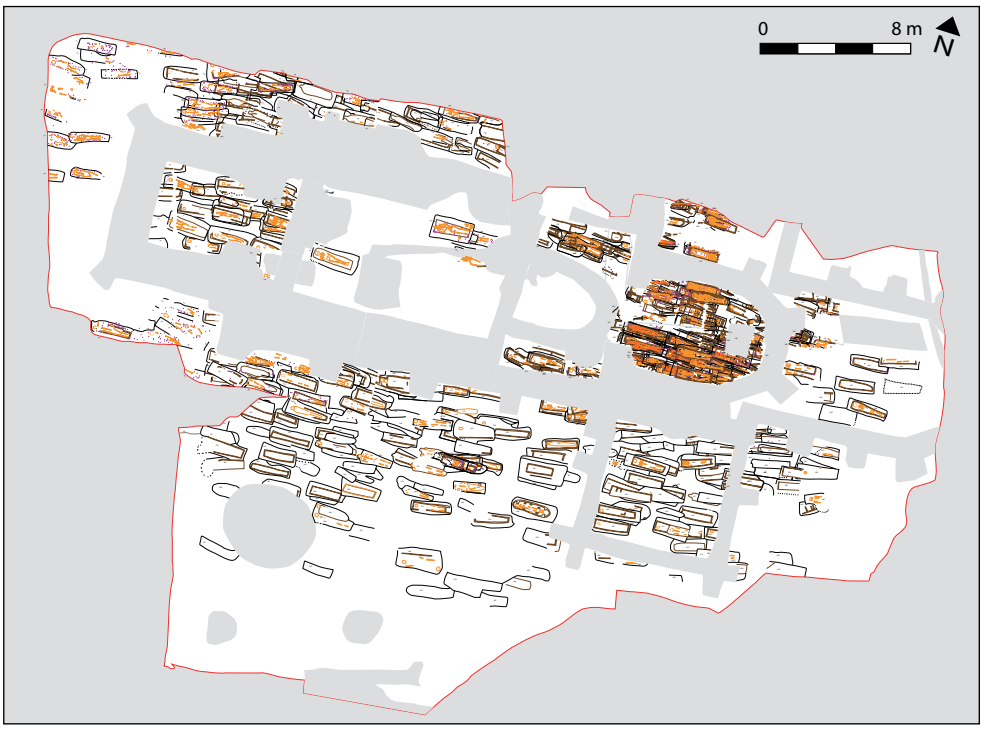


Fig. 4: Map of the cemetery showing the location of all the graves.

Development of the site

It appears that the development of the site began with a timber church, followed by a Romanesque church and tower, and later a larger Gothic church. A cemetery was established around the early wooden church.[3] Both the church and the cemetery are mentioned in a document from 1173,[4] meaning they can with certainty be dated from before this date. The cemetery was in use for a long time, possibly up to the 19th century. However, most of the post-medieval graves were demolished, either to make space for new graves or during more recent building activities. As a result, only the older graves were still present when the excavation started. A map of all the graves is shown in Fig 4.

Skeletal material

The excavation of the almost 500 graves of the cemetery yielded a large number of human remains. The preservation of the skeletal material varied tremendously. In total, skeletal material was preserved from approximately 200 individuals. This consisted of partial skeletons, ranging from only small fragments to almost complete skeletons. Due to the fragmentary state of the human remains, a thorough examination of them was only possible for a small portion of the collection. Yet all skeletal material with a clear archaeological context was considered, even if it was very fragmented.

3 See the chapter by Theuws, this volume.
4 Camps 1979, 109; 113.

Dating

Relative dating of graves

To provide relative dates for the graves, stratigraphy, AOD (Amsterdam Ordnance Datum) values, alignment, and grave morphologies were used. Seriation, which is a useful method for relative dating,[5] could not be used because hardly any artefacts were found. Which methods were used to determine the chronology differed per situation. Where possible, stratigraphy was used, since that is the most reliable method. A clear example of this is given in Fig. 5; grave 124 cut through grave 214. Grave 214 thus has to be older than grave 124.

In order to analyse certain parts of the cemetery separately, the cemetery was divided into ten areas, determined by the foundations of the churches, that is, the arrangement of the church walls (Fig. 6). Thus, burials that were, for example, located in what is indicated as the second presbytery were not necessarily originally buried inside this presbytery, but could as well have been buried at that location before the presbytery was built. In other words, the labels given to the areas are purely practical in nature and do not tell us anything about intramural or extramural burial.

If graves had no direct stratigraphic relation with other graves or church foundations, alignment and AOD values were used. For every layer, the range of upper AOD values (the AOD value on which the grave was first seen) in that layer were determined. Upper AOD values were chosen because they represented the chronology of the graveyard better than the lower ones. In lower (or floor) values, more variation was expected, because the depth of a grave can vary a lot. Layers were then linked to each other to obtain the chronology of the cemetery in its entirety, based on matching AOD values.

Floor AOD values showed that all graves were dug to more or less the same depth, except the graves from the Romanesque church and the tower. Those from the Romanesque church, in particular, were located higher up, which suggests that the floor at this location was elevated. In other words, although those graves were lying relatively high, they were not necessarily more recent than the rest of the graves.

To document the sequence of graves and the different horizons, a Harris matrix was used.[6] This resulted in a stratigraphic sequence consisting of 33 layers, in which each layer represented contemporary graves. Because it is difficult to spot patterns in 33 layers, the layers were grouped into seven phases. Additionally, the church's history is represented by five phases (discussed below). The church and cemetery histories combined are therefore divided into twelve phases, which are shown in Fig. 7 in relation to each other. All graves, except for a few that could not be dated, were assigned to phases 2 (the oldest), 4, 5, 6, 8, 10, or 12 (the newest). The divisions between the horizons were chosen to have as little overlap as possible and to be in accordance with the five development phases of the churches.

---

5 Renfrew & Bahn 2012, 125.

6 Harris 1989, 34-6.

Consequently, divisions were in some cases arbitrary, but necessary to ensure readability of the maps.

The site history began with a timber church, of which postholes were found. Their date is difficult to establish (Fig. 8, church phase 1),[7] but probably lies before the second half of the 10th century. The lack of graves within the area of this church suggests the cemetery was laid out after the construction of the church. It is most likely that the wooden church was built before any burials took place. About the time of the construction of the timber church, maybe slightly later (phase 2), some graves were established to the west and east of the church and within the church. It is uncertain if the graves within the church were from the same period, but the matching depths of graves in both areas does suggest so. In the 10th to 12th centuries (phase 3, church phase 2A), a tuff church was built,[8] to which a presbytery was added around the 13th century (church phase 2B).[9] No burials were found within this presbytery. This can mean two things: either no one was buried close to the eastern wall at the time of the Romanesque church, which would be surprising, or another, wooden, presbytery was built at this location earlier, of which no archaeological evidence remains.

The cemetery then expanded towards the east and south of this church (phases 4 and 5). In phase 6, the cemetery grew further to the north and southwest of the church. In the next phase (phase 7, church phase 3A), around 1400,[10] a tower was added to the church. During these phases, people were not buried close to the church, even though this was generally considered to be preferable. In phase 8, two burials may have taken place inside the tower, and the cemetery was expanded around the tower. Around this time, in the 15th century,[11] the church was enlarged with a new presbytery (the second presbytery). The construction of this presbytery disturbed many graves that were located directly east of the church. It appears that in the following phase (phase 10), some burials took place inside this presbytery and a few more around it.

In phase 11 (church phase 4B/4C), which was around 1530, two transepts and a new presbytery (the third presbytery) were added.[12] Later in the 16th century, two sacristies were built next to the choir. This brought the church to its final form (church phase 4C; see Fig. 9). And finally, or perhaps simultaneously, the newest graves were dug northwest of the church. A few centuries later, between 1820 and 1830, both transepts were destroyed (church phase 5A).[13] From 1897-1898, the rest of the church was demolished as well, since a new church had been built.[14] It is likely that after this the cemetery remained in use, but these 19th and 20th century graves may have been removed later on, so these could not be recovered.

---

7 Van Kempen & Van der Kamp 1998, 13.
8 Van Kempen & Van der Kamp 1998, 13-14.
9 Van Kempen & Van der Kamp 1998, 13-14.
10 Van Kempen & Van der Kamp 1998, 15.
11 Van Kempen & Van der Kamp 1998, 15.
12 Van Kempen & Van der Kamp 1998, 16.
13 Strijbos 1995, 114.
14 Strijbos 1995, 113; Van Kempen & Van der Kamp 1998, 17.

Fig. 5: Intercutting of graves. Grave 124 has to be more recent than grave 214.

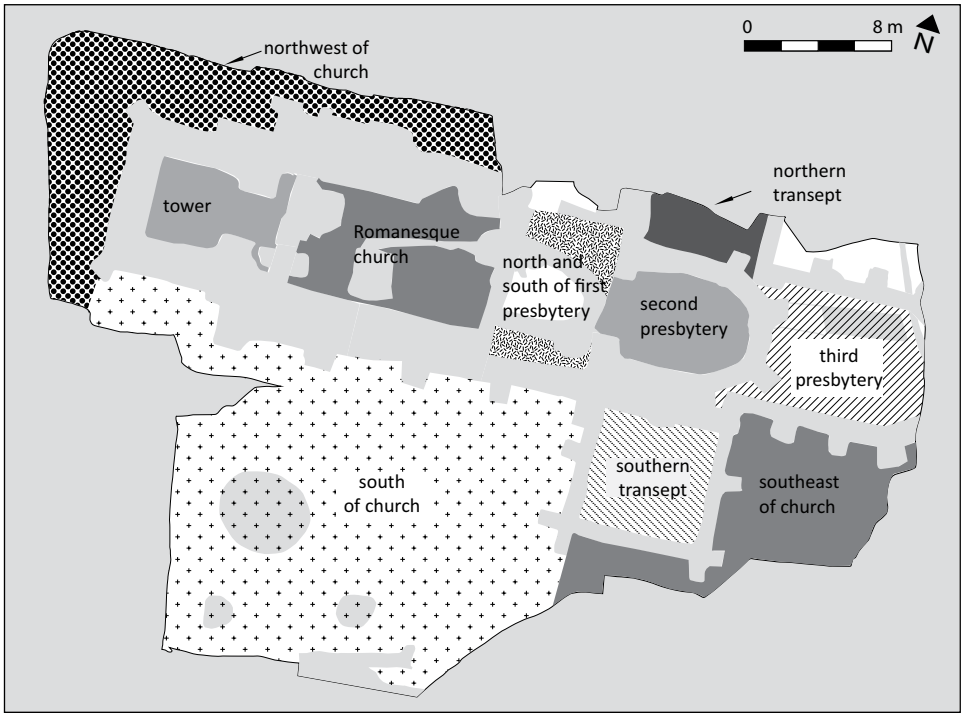


Fig. 6: The ten areas into which the cemetery was divided.

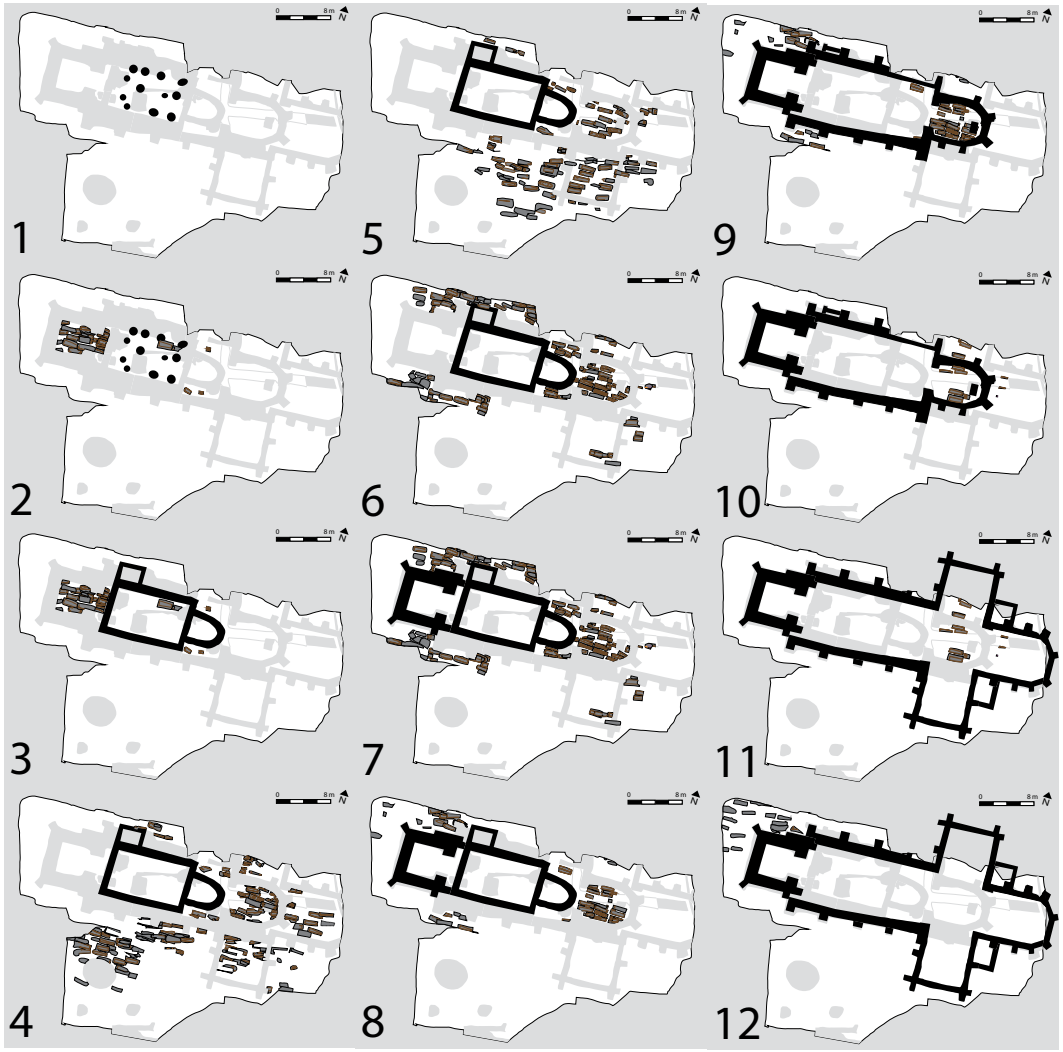


Fig. 7: The phases of the church and the cemetery.
Phase 1: timber church (date unknown)
Phase 2: graves in the tower area are constructed (some of these have been radiocarbon dated to between the 10th and 13th centuries)
Phase 3: Romanesque church (10th to 12th centuries)
Phases 7-10: tower (c. 1400) and Gothic church (15th century)
Phases 11-12: transepts (c. 1530) and third presbytery (mid-16th century).

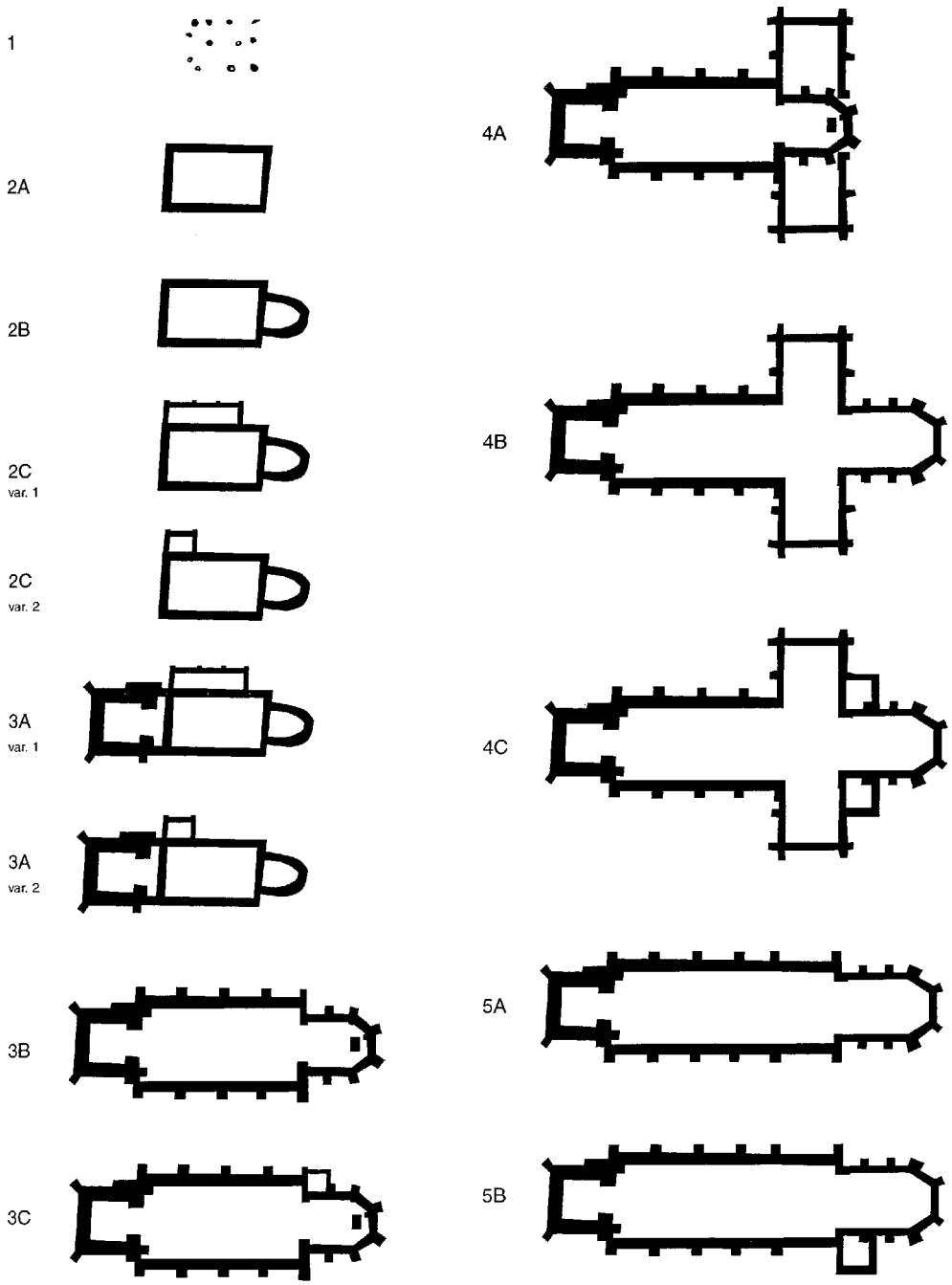


Fig. 8: The phases of the old church of Reusel (Source: Van Kempen & Van der Kamp 1998, 14). These phases are also shown in Figure 7, which shows the development of the cemetery.

Phase 1: timber church (date unknown)

Phase 2: Romanesque church (10th to 12th centuries)

Phase 3: tower (c. 1400) and Gothic church (15th century)

Phase 4: transepts (c. 1530) and third presbytery (mid-16th century).

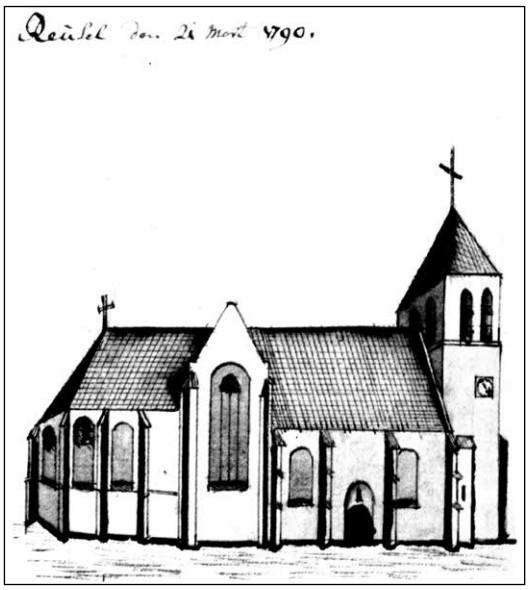


Fig. 9: Drawing of the church of Reusel from 1790, as seen from the north, by Hendrik Verhees (Regionaal Historisch Centrum Eindhoven (RHCe), identification numBer 227206).

Absolute dating of graves

Apart from relative dating, absolute dating of the graves was necessary. A few methods were employed for this. Five graves were radiocarbon dated to provide absolute dates for the cemetery (Table 1). Based on this, the establishment date of the cemetery was estimated to be in the second half of the 10th century. Most excavated graves were estimated to be from between the 10th and 13th centuries. The absolute radiocarbon dates were then used to provide a chronological context for the graves from the seven phases that were determined using relative dating methods.

Additionally, in some cases the study of the skeletons was helpful in dating because it could be determined that some individuals were pipe smokers. Pipe smoking was not introduced in the Netherlands until the beginning of the 17th century,[15] which indicates these particular skeletons were buried after this date. Two individuals were determined to be pipe smokers, and one a potential pipe smoker. The individuals who were identified as pipe smokers were from graves 36 (Fig. 10), 58 (the possible smoker) (Fig. 11), and 125 (Fig. 12). The first two were located close to one another in the north-western part of the cemetery (Fig. 13). It is possible that these more recent graves were accidentally left intact when the graveyard was cleared. The third pipe smoker was located in the second presbytery, and was expected to be less recent. Yet, it is not unlikely this grave is of a more recent date. Alternatively, it could be that other activities were responsible for the damage on the dentition. For instance, clamping nails between teeth[16] can damage them, although one would expect the holes caused by this to be smaller than those caused by pipe smoking. In any case, while such dental wear can be useful for dating purposes, one has to be careful when interpreting it.

15 Parra 2012, 28.
16 Arts 2013a, 174.

Grave	C14 date (years BP)	date (σ=1)	date (σ=2)
7	1015±45	970-1040 AD	950-1160
11	985±40	990-1050 AD	980-1160
90	775±45	1220-1285 AD	1160-1300
102	3200±80	1530-1390 BC	1690-1290 BC
107	940±40	1080-1160 AD	1010-1190

Table 1: The absolute dating of graves. Grave 102 is dated to the prehistoric period, which suggests something went wrong in the dating of this sample.

Fig. 10: The jaw and dentition of grave 36, showing a pipe notch.

Fig. 11: The dentition of grave 58, showing what is probably a pipe notch.

Fig. 12: The jaw and dentition of grave 125, showing a pipe notch.

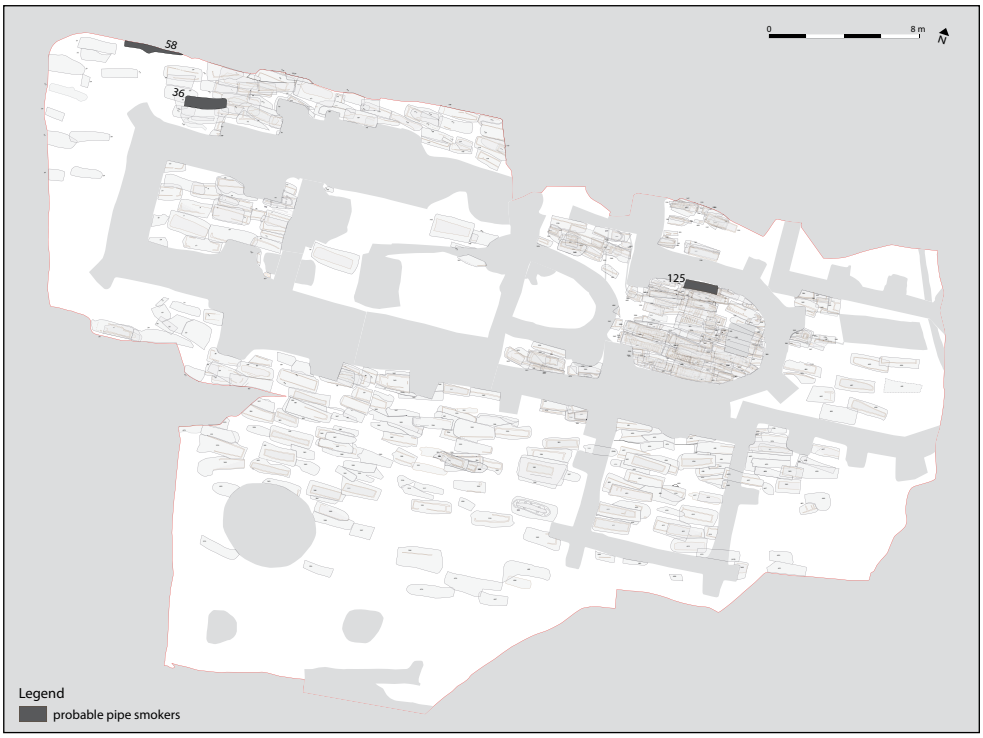


Fig. 13: The location of the three burials that were identified as probable pipe smokers.

Funerary data analysis

General distribution and preservation

Fig. 4 shows all of the 492 graves spread over ten areas. In Table 2 the number of graves per area and the population density are displayed (in graves per square meter). Burials surrounded the church, but the most striking aspect of the map

is the concentration of graves in the second presbytery. The population density of this area (3.19 graves/m^2) is almost three times as high as the average (1.23 graves/m^2). Since some of these graves (although not the ones in the higher levels) are intersected by the presbytery, we can deduce that those graves predated the Gothic church, probably from around the time of the Romanesque church (11th–13th centuries). Also notable is that there are hardly any people buried within the church (2% of the entire number of graves at most); most graves that lie within the walls were there before the walls were built. Of the burials that were not intersected by church foundations, it cannot be said with certainty that these were intramural. The small number of intramural burials may be related to the early date of the cemetery.

Most of the graves contained one individual in a more or less anatomical position. In a few exceptional cases the remains of multiple individuals were found in one grave. In most cases, these extra individuals were represented by only one or two bones. Such commingling is very common in cemeteries. A large number of skeletal elements from a second individual were found only in three graves (graves 27, 37, and 103). Only grave 27 was likely a double burial; in the other two the extra bones were most likely secondary burials. Apart from these reburials, a large charnel pit was found (S368) on the south-eastern side of the water well. Human bones were found inside the well as well. Because these bones were out of their original context, they were not studied.

One grave was a double grave, bringing the total number of excavated individuals to 493. In this study, 146 individuals were studied (29.6% of the total number of burials). The rest were either too insufficiently preserved to be able to draw any conclusions or their context within the cemetery was unclear. Preservation of the 146 individuals studied varied from almost complete skeletons to only one tooth or bone present.

Area	Number of graves	Area (m^2)	Graves/m^2
Romanesque church	7	49.1	0.14
second presbytery	114	35.7	3.19
third presbytery	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 and south of first presbytery	35	18	1.94
north of first presbytery	20	11.8	1.69
south of first presbytery	15	6.2	2.42
Total	**492**	**764.7**	**1.23**

Table 2: The number of graves per area and the population density of every area. The last two rows north and south of the first presbytery were split into the northern and southern part.

Grave morphologies

At the cemetery, people were buried in a variety of containers. Five types were distinguished (Fig. 14): anthropomorphic (*antropomorf*), log coffin (*boomstam*), coffin without protrusions (*kist zonder uitsteeksels*), coffin with protrusions (*kist met uitsteeksels*), and ladder. Every grave was assigned to one of these categories or was assigned to the categories 'unknown', 'undefined' or 'unsure'. The different types of containers are defined below.

An *anthropomorphic grave* is a burial without a coffin; the shape of the grave thus more or less follows the contours of a body. Sometimes a niche had been made for the head. People buried this way were probably wrapped in a shroud, but these had not been preserved.

A *log coffin* burial consists of a hollowed out log that serves as a coffin. They can be recognised by their rounded form and thick sides.

Of the timber coffin two types were found: *with* and *without protrusions* at the corners. In coffins with protrusions the planks parallel to the body extended somewhat beyond the planks for the head and foot ends. It is likely that these differentiations had to do with the method of construction. A variation on the coffin with protrusions was a coffin with extended protrusions that might have been used to carry the coffin. However, most coffins had protrusions too short to be functional for this purpose.

The last type of grave that was encountered in Reusel was the *ladder grave*, which is essentially a coffin with a bier underneath it. Biers were commonly used for the transportation of bodies.[17]

If the type of container was entirely unclear, for example, when only a corner of a grave was excavated, it was assigned to the category 'unknown'. If there were traces of a coffin but it could not be determined what type of coffin because they were fragmentary or unclear, the grave was assigned to the category 'coffin

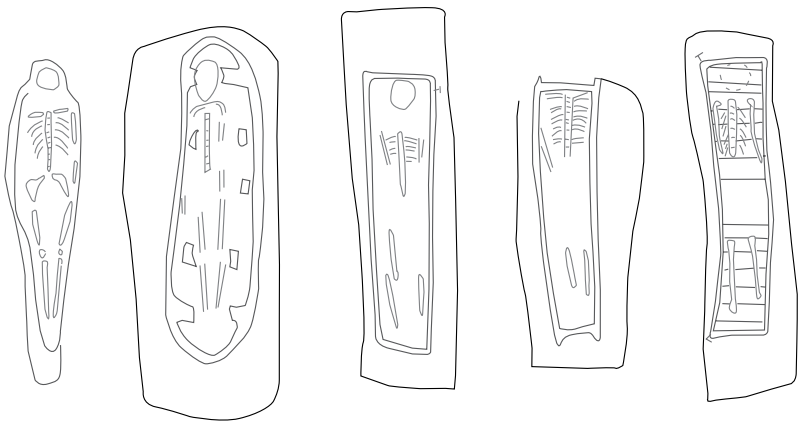


Fig. 14: The five types of containers. From left to right: anthropomorphic, log coffin, coffin without protrusions, coffin with protrusions, and ladder grave.

17 Kok 2005, 109.

undefined'. If there was doubt between two types of containers, the grave was assigned to the category 'unsure' (not to be confused with 'unknown').

Table 3 shows the number of the various grave morphologies throughout the cemetery. From this, it becomes clear that by far the most burials took place in coffins with or without protrusions (41.6% of all containers with known typology). Ladder coffins, anthropomorphic burials, and log coffins were relatively rare in Reusel. The type of container could not be determined for 84 burials, and of four burials the type was questionable. Figure 15 shows the relative number of the various grave morphologies per area. Below, the distribution of every container is individually discussed.

Type of container	Number	Percentage	Percentage (unknown/ unsure excluded)
anthropomorphic	21	4.3	5.2
log coffin	3	0.6	0.7
coffin without protrusions	115	23.4	28.3
coffin with protrusions	54	11.0	13.3
coffin undefined	178	36.2	43.8
ladder	33	6.7	8.1
unknown	84	17.1	-
unsure	4	0.8	-
total	**492**	**100**	**100**

Table 3: The number of the various containers throughout the cemetery.

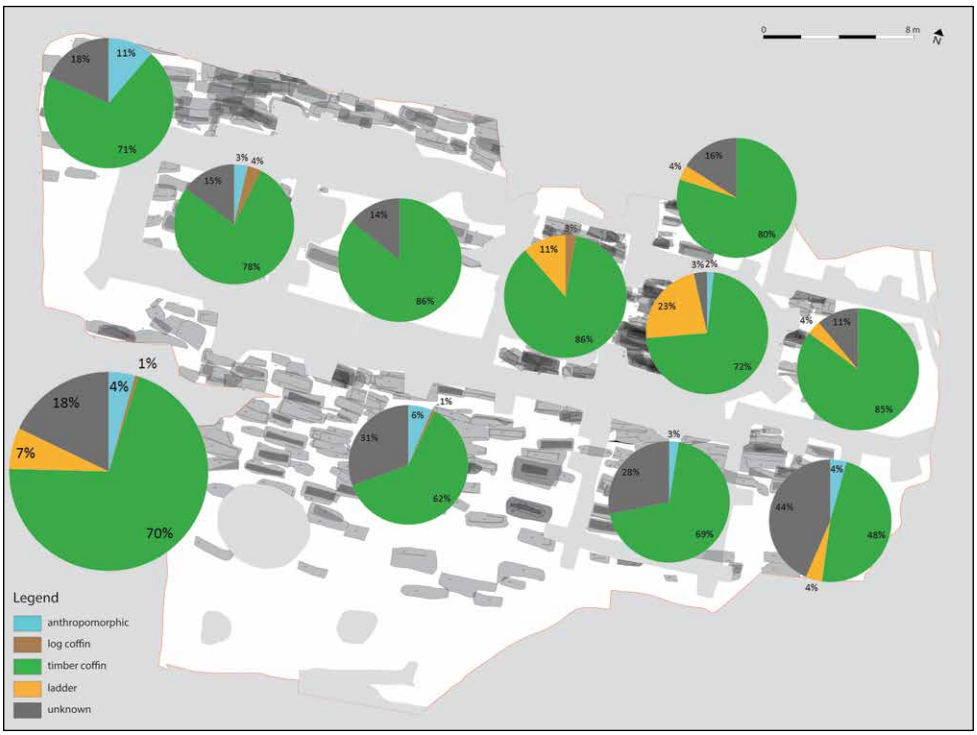


Fig. 15: The relative number of grave types per area, with total.

Anthropomorphic graves were spread throughout the cemetery, although there appears to have been some clustering. Most anthropomorphic burials appeared in the south and especially in the northwest of the church. Only two anthropomorphic burials were located within the second presbytery. Since this part of the cemetery was densely populated, the lack of anthropomorphic burials is even more remarkable. However, there were also other areas in which no anthropomorphic burials were present.

Log coffins were very rare in the Reusel cemetery. Only three graves of this type were encountered. These burials were located north of the first presbytery, in the tower, and south of the church. Burial in such a container was clearly an exception.

More remarkable was the distribution of ladder coffins. No less than 79 per cent of ladders (26 out of the total of 33) were located in the second presbytery. The remaining 21 per cent were located near this location, namely in the northern transept, north and south of the first presbytery, and in the third presbytery. One ladder grave deviated slightly from this pattern in that it was in the area southeast of the church. However, all of these graves were located in the eastern part of the cemetery. The graves in the second and third presbytery are definitely older than the foundations of the second presbytery and were thus dug east of the church. This cannot be said with certainty of the graves surrounding the first presbytery, but these were probably dug before the Gothic church was constructed and were thus located next to the church (Fig. 7). The area of the second presbytery may have been the most favourable place in the cemetery,[18] which was confirmed by the number of burials in this area. Perhaps the reason for this is that it was the sunny side of the church. The fact that the ladder graves cluster in this specific area suggests that this type of container was reserved for specific people, possibly either clergy or wealthy laymen. This theory is reinforced by the fact that only men seem to be buried in this type of grave (see below). If this was the case, one would expect to see this wealth reflected in the grave architecture. Yet, this is not clearly the case; containers of most types were found throughout the cemetery. Only ladder coffins appeared exclusively in the eastern part of the cemetery.

It is remarkable that to the south of the church, relatively many graves were of unknown morphology; in other areas, graves of unknown morphology were much scarcer. It is possible that preservation conditions were poorer to the south, which resulted in degradation of grave architecture to the point where identification became impossible. Alternatively, this clustering of unknown graves may be related to their morphology. For example, in the area northwest of the church, burials were as unclear as they were in the south. However, these burials often contained a significant number of nails, suggesting a coffin was originally present. It is possible that many graves to the south were also coffin burials, but coffins that had been constructed without nails.

Coffins were commonly used in the cemetery. In every part of the cemetery, except for the area southeast of the church, more than half of the burials were coffin burials. Coffins with protrusions were especially well represented in the tower, while coffins without protrusions appeared mostly in the second and third

18 Blair 2005, 471; Boddington 1996, 36-37; Huijbers 2007, 409.

presbyteries. On the whole, it can be stated that coffins were located throughout the cemetery. Remarkably, coffins were relatively rare in other cemeteries in the region (such as Dommelen). It is possible that this has to do with the chronology of the cemeteries or with the status of the cult place (mother or daughter church). The cemetery of Reusel is approximately a century older than other cemeteries in the region, including Dommelen and Luyksgestel,[19] and is accompanied by a primary parish church. It is possible that coffin burials were common in a slightly earlier period than anthropomorphic burials. On the other hand, anthropomorphic burials were present in Reusel as well, although scarcer. Anthropomorphic burials occurred in most phases, except for the last two (10 and 12), which were the periods of the Gothic churches. This places those graves in between the 10th and 15th centuries, which is still a wide range. Coffin burials occurred in these phases as well, suggesting that there must be other reasons for the variation in containers. It may be related to the status or wealth of the buried individual, or his or her family. Alternatively, it could be a matter of personal choice, the showing of piety or even a practical reason such as trying to preserve a body longer (for instance during a warm summer).

The chronological development of grave morphologies is not particularly clear; coffins with protrusions became less common during the later phases in favour of coffins without protrusions. The latter were more often constructed using nails. Anthropomorphic burials appear to have fallen into disuse in the later phases, although this could also be due to the small sample size. The same goes for ladder graves, which were only present from phase 4 to 8. In short, some chronological development was certainly evident, but the evidence was not overwhelming.

Orientation

The orientation of the graves was determined from the head to the feet of the skeleton. If the position of the head inside the coffin was unclear, the orientation was not determined. Determining the orientation was possible for 194 out of 492 graves (39%). The majority of the graves of which it was possible to determine an orientation were more or less oriented west-east, with a few exceptions. Figure 16a shows a histogram of the number of graves per orientation interval; figure 16b shows the directions of the orientations.

Notable is that the graph data is skewed towards the left, meaning that most graves were oriented slightly northwest-southeast, rather than exactly west-east. This could well be connected to the orientation of the church, which was -3.7° (slightly southeast). However, most of the graves were within the -10° to -5° range, thus deviating from the orientation of the church. Nineteen per cent of the graves were oriented between -2° and +2°, which is exactly west-east. Finally, none of the graves were orientated north-south or south-north, and only three graves were oriented east-west. In the Middle Ages, it was believed that Jesus would return in the east. People were buried with their heads in the west so that they would be

19 Huijbers 2007, 23; See the chapter by Theuws, this volume.

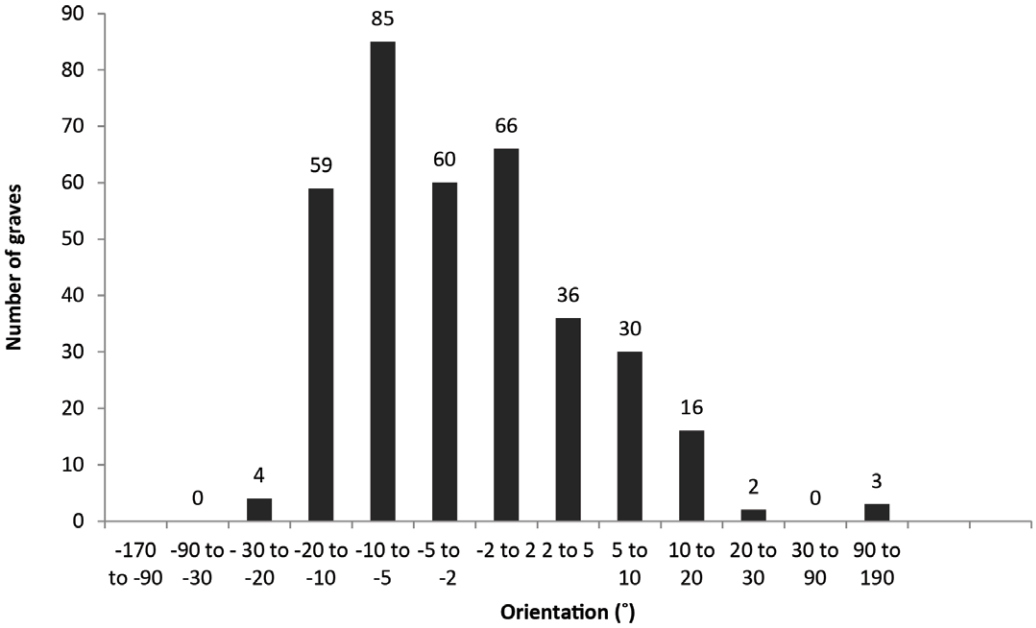


Fig. 16a: Number of graves per orientation interval. To make sure all graves that were orientated with the head to the east were in the same interval, it was decided to determine the last interval up to 190° (instead of 180°). Only graves in which it was clear on which side the head was are included.

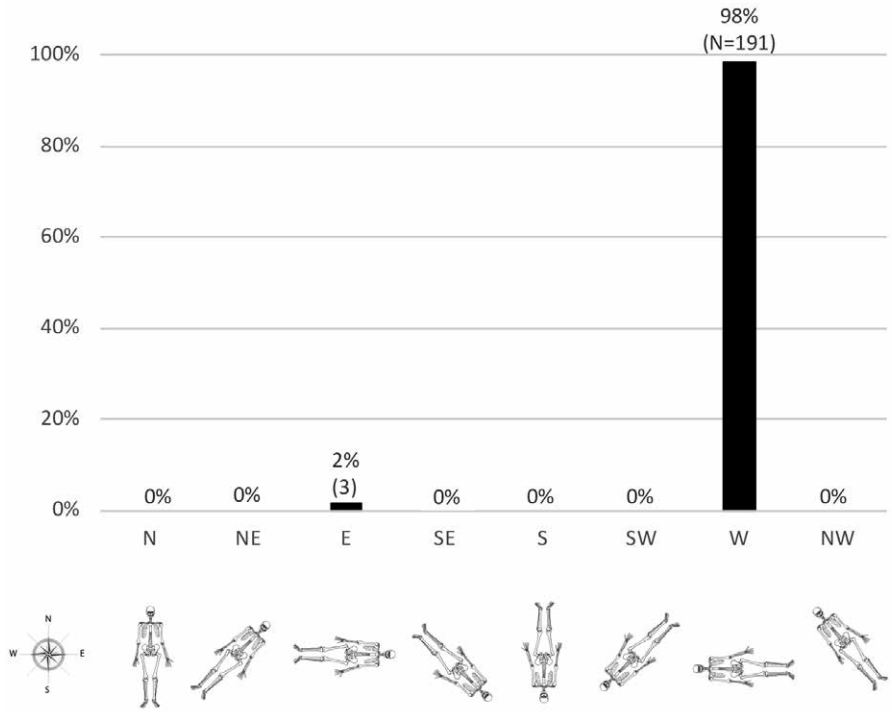


Fig. 16b: Orientation. N-known 194, N-unknown 298.

able to rise to meet him.[20] Priests were required to watch their followers, and were therefore buried the other way around.[21] This suggests that these exceptions were priests.

However, the skeletal material suggests otherwise. No skeletal material was recovered from graves 286 and 189 (their orientations were determined using the layout of the graves and the body silhouettes). In grave 128, skeletal material was preserved, and this individual was determined to be an older woman. This could mean that in Reusel, east to west burials were not reserved for priests only, contrary to common practice. It could also mean that this society had progressive ideas about the roles of females, or potentially that this was a nun. Or perhaps family members were buried in close proximity to each other.

All east to west burials were located near the second presbytery. However, at least two of them (189 and 286) were there before the presbytery was built. Bearing that in mind, they were buried rather far from the church. Furthermore, they are not buried in the extension of the church, although grave 189 was near the middle. The surrounding graves were all orientated from west to east. This suggests that priests and nuns were not buried in a specific location (if that is what these individuals were). On the other hand, we should not forget that the orientation could be determined for only 39 per cent of the graves; there may thus have been more burials from east to west than those that were found.

It is of course possible that not much attention was paid to the location or orientation of burials. Yet, this would be surprising, given that several sources state that burial locations were of vital importance in the Middle Ages.[22] It seems more likely that people were buried at certain locations and in certain ways for a reason. However, today we can only make an educated guess at what those reasons may have been.

Comparing characteristics

Apart from analysing characteristics individually, certain traits were also compared to other traits to see if any patterns emerged. First, the relation between grave morphology and the number of nails is discussed. Some of the coffins contained nails, although the number of nails per coffin varied widely; a relatively large number of graves had 1 to 10 nails, and there was one grave with 73 nails. Most coffins had no nails at all. Figure 17 shows that the larger number of nails appeared in coffins without protrusions, and that there were relatively few ladder coffins without nails. On the other hand, there were relatively few anthropomorphic graves with nails. This seems logical, since no nails would be needed if a body was covered in nothing more than a shroud, while a coffin with a floor made of several planks would require a large number of nails. The coffins that were not constructed using nails were most likely constructed with mortise and tenon.

---

20 Augenti and Gilchrist 2011, 504; Binski 1996, 56; Daniell 1997, 148; Kok 2005, 67; Parker Pearson 1999, 6.

21 Arts 2013a, 123; Arts 2013b, 30; Arts & Nollen 2006, 88.

22 Binski 1996, 34; Daniell 1997, 79; Effros 1997, 4-5; Parker Pearson 1999, 14; Treffort 1996, 153; 174.

Figure 18 shows the percentages of nails in graves per chronological phase. Because the last two phases contained only a small number of graves, these were combined in the graph. Graves with larger numbers of nails were more commonly found in the later phases. The more common use of nails in later graves makes sense, given that metal was expensive during the first half of the Middle Ages[23] and became more commonplace later on. The number of nails in a grave could be a good indicator of the phase the grave belonged to.

Based on the graph, a trend becomes clearly visible. In the later phases, the percentage of graves without any nails diminished, whereas the number of graves with many nails (more than 20) increased dramatically. Graves with few nails were present throughout all phases. In the oldest phase, two graves contained more than 10 nails, which is remarkable. However, it is possible that these two, 103 and 104, were dated incorrectly and may be of a later date. Grave 104 is stratigraphically

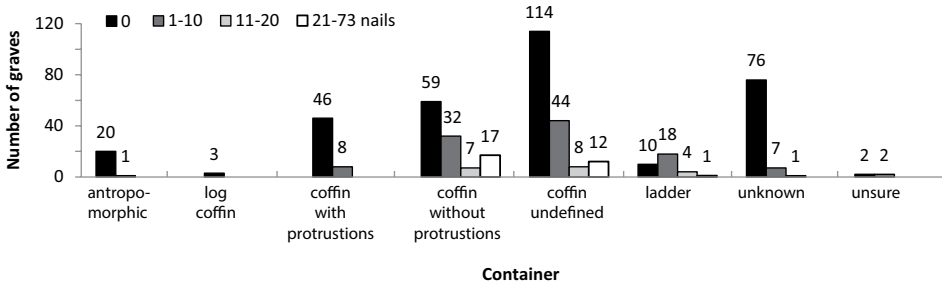


Fig. 17: The number of nails per container.

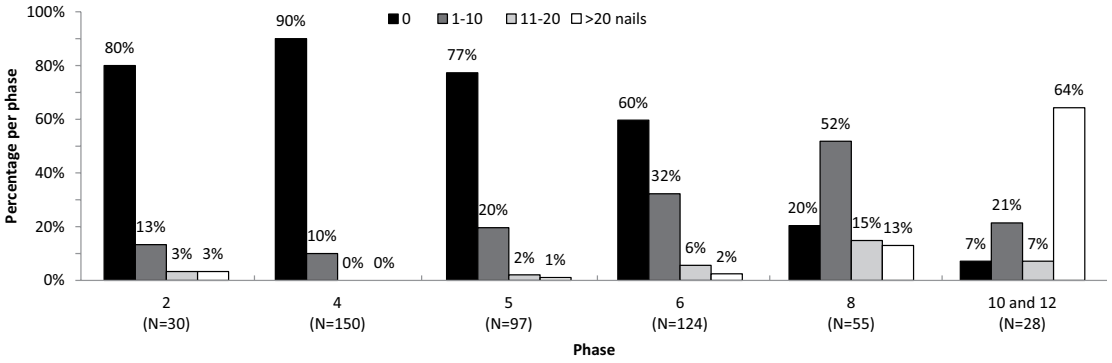


Fig. 18: The number of nails in graves per chronological phase, shown in percentages. The two most recent phases were combined because they contained only a small number of graves.

23 Le Goff 1980, 82.

just below 103, and in 103 a piece of slag was found, suggesting it may be much more recent. If this is the case, the number of nails found in these graves would fit better within the overall pattern.

Another chronology-related analysis involves the relation between grave morphology and phase, which is shown in Figure 19. Here, patterning is not very clear. Coffins were used in every phase, although there was a slight shift from coffins with protrusions to coffins without protrusions. The construction method of coffins without protrusions probably required nails (as is shown in Figure 17). When such coffins became more commonplace, the number of nails per grave increased as well (as is shown by Figure 18).

Anthropomorphic burials were absent in the last two phases, which can mean two things: either such burials fell into disuse as time passed or the decline has to do with the sample size. The last two phases (10 and 12) combined represent only 28 graves. Ladder coffins were absent in the first and the last two phases, but present in all other phases. However, this may also be due to the sample size, since the first phase contained only 28 graves as well. Alternatively, it could be explained by the spatial development of the cemetery; ladder graves were concentrated in one part of the cemetery (see below), which was not yet in use during the earliest phase.

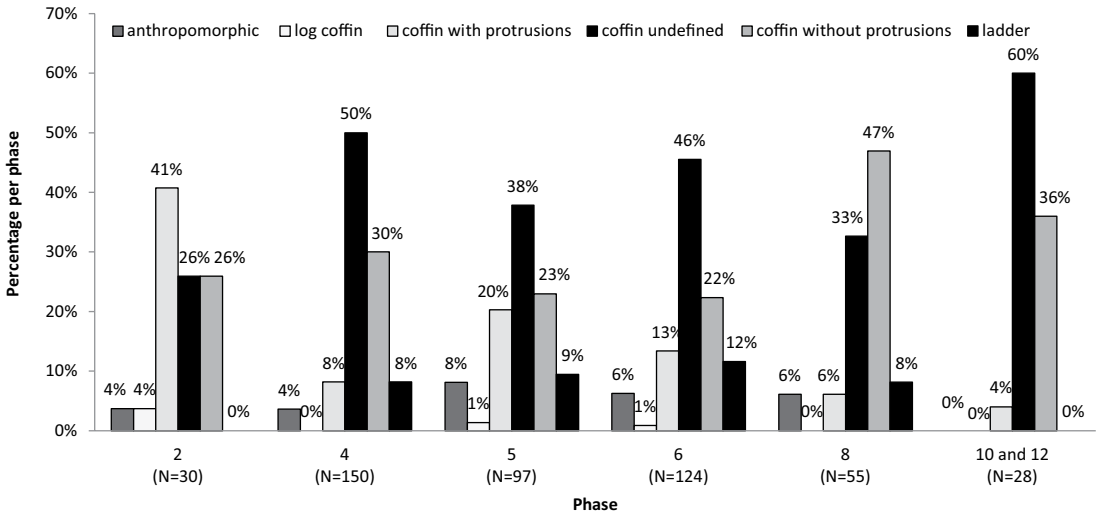


Fig. 19: Grave morphologies per phase, shown in percentages. The two most recent phases were combined because they contained only a small number of graves. 18% of the graves were of unknown morphology. These are not displayed in the figure.

The skeletal remains

General study of human skeletal material

Archaeological samples are never complete and seldom perfectly documented. As a result, there are always bones in an archaeological study that lack a find number or grave number, which obscures their archaeological context. Since this study focused on the spatial distribution of the graves, it was decided to study only skeletons with a clear archaeological context. Burials that were likely to be secondary were not taken into account.

Sex estimation and distribution of sex

Sex estimation in adults is commonly done by assessing multiple traits from the pelvis, which is the most reliable,[24] and the cranium.[25] The conventional methods of estimating the sex based on the traits of the pelvis and skull as outlined by the Workshop of European Anthropologists were used here.[26] Additionally, a few other traits of the skull and pelvis were scored.[27] Furthermore, several post-cranial measurements were taken.[28]

If estimates were contradictory, the sex estimate from the pelvis was taken as determinative, both because this is the most reliable indicator and because population differences are less likely to be an issue in morphological traits than in the metric-based estimates.[29] If only a few traits could be observed, the individual was categorised as a probable or possible male or female, depending on how certain the estimate was. This was especially true for cases in which only less reliable traits could be observed, such as the mandible in Dutch females.[30] Because skeletal material was preserved in only 30 per cent of the burials, it is hard to say much about the demography of the site. However, it was still possible to gain some interesting insights.

Of all 146 burials studied, estimation of sex was possible for 63 individuals (43%). When plotting the sexes on the map, it appeared that, in general, men and women were buried unsegregated (Fig. 20 and 21). Only in the tower and the Romanesque church did the sexes appear to have been separated. As far as could be determined, only females were present in the tower, whereas in the Romanesque church and in the north and south of the first presbytery, only males appear to have been buried. In the transepts and the third presbytery, males were overrepresented as well. Altogether, there is a slight overrepresentation of females on the western side of the church and a male overrepresentation on the eastern side. It is possible that in some cases males and females were treated differently, although this may very well have to do with something other than sex itself, such as profession.

---

24 Ubelaker 1978, 41-42; Ubelaker 2008, 51.
25 White *et al.* 2012, 412.
26 Workshop of European Anthropologists, 1980.
27 Bass 1987, 81, 108; Loth & Henneberg 1996; Phenice 1969; Schwartz 2007, 294; Ubelaker 1978, 42.
28 Bass 1987, 123, 220.
29 Buikstra and Ubelaker 1994, 16.
30 Maat *et al.* 1997, 578; 580.

Alternatively, the unequal distribution may be coincidental, particularly since in more than half of the skeletons, sex estimation was not possible. In the tower, sex estimation was possible for only 2 out of 27 graves. What is remarkable, is that in the tower, females were buried in places that were considered important, directly in front of the church doors and along the path leading to the entrance.[31] Either this location was, for unknown reasons, considered to be suitable for women, or the result was due to the small sample size. As far as could be determined, the burials within the Romanesque church were all male, suggesting females could not be buried intramurally.

A graph was made to determine if there was a correlation between the sex of individuals and the types of containers they were buried in (Fig. 22). For the sake of clarity, only two categories were used: 'male, probable and possible male', and 'female, probable and possible female'. This graph shows that the different containers were equally distributed between the sexes, apart from the ladder coffin, which was used only for male burials. This might say something about the meaning of this burial type. However, sex could be assigned to only four individuals from ladder graves. Thus, the difference may also be due to the small sample size.

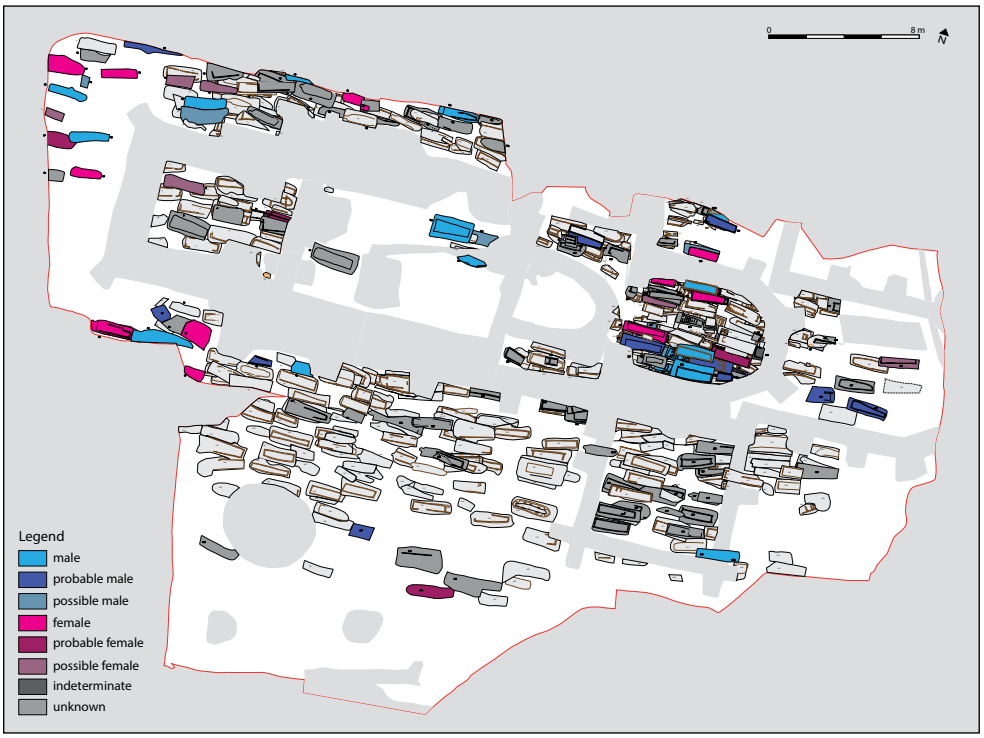


Fig. 20: The distribution of males and females in the cemetery.

31 Effros 1997, 22; Meier & Graham-Campbell 2013, 436-437.

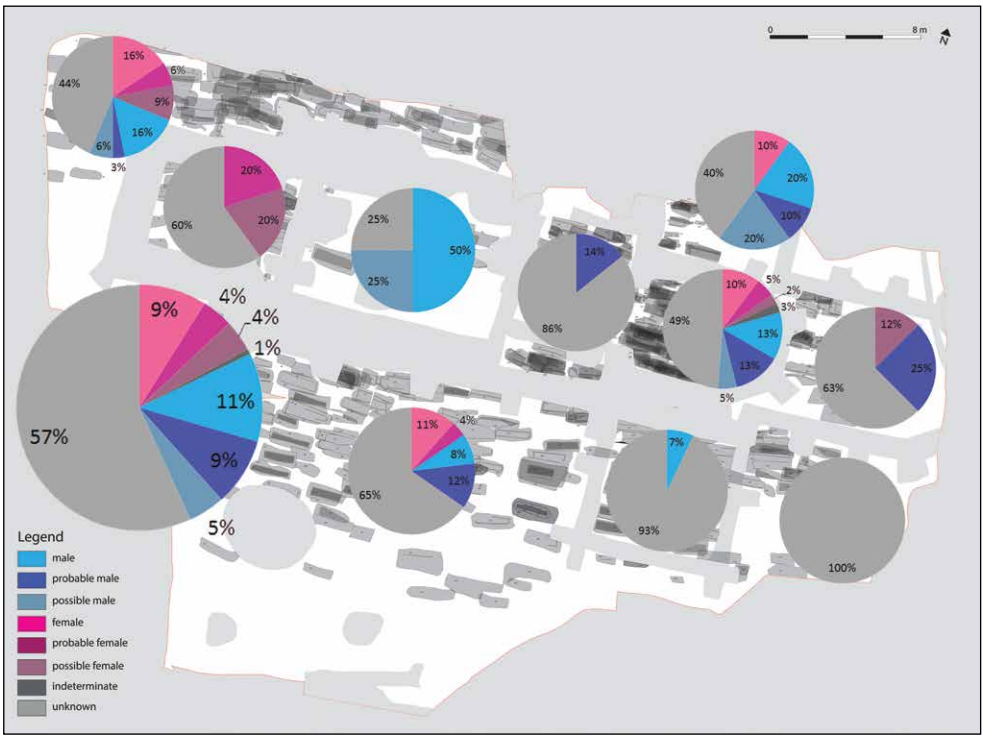


Fig. 21: The relative number of males and females per area, and total.

Fig. 22: The number of individuals buried in each type of container, sorted per sex.

Age-at-death estimation and distribution of age

To estimate the age at death of adult individuals, several methods were employed: the morphology of the auricular surface of the ilium,[32] the degree of ectocranial suture closure,[33] the morphology of the pubic symphysis,[34] the amount of dental attrition,[35] and the sternal end of the fourth rib.[36] If the fourth rib was not available or could not be identified with certainty, the third, fifth, or sixth rib was used.[37] Lastly, some late fusing epiphyses were studied to estimate age in young adults.[38]

For an individual who has not reached adulthood, an age-at-death estimate is often much more precise than for older individuals. Two methods were employed to estimate age at death for subadults. First, closure and fusion were recorded for a range of bones.[39] Second, dental eruption and mineralization were examined to estimate age.[40] If the results of methods differed, dental formation was taken as leading, because it is less dependent on external factors than epiphyseal closure[41] and greater similarity exists between the sexes than in bone development.[42]

The following age categories were distinguished: foetus (unborn), perinate (around birth), infant (0-12 months), infant (13-24 months), child (25 months-4 years), child (5-6 years), child (7-12 years), adolescent (13-17 years), early young adult (18-25 years), late young adult (26-35 years), middle adult (36-49 years) and old adult (≥50 years). If that an individual died in adulthood was the only determination that could be made, they were assigned to the category adult (≥18 years). If the only determination that an individual had not reached skeletal maturity could be made, they were assigned to the category subadult (<18 years). Combinations of age categories were possible as well, such as late young/middle/old adult (when it was possible to say the individual was over 25 years of age). When age estimations contradicted each other, the preponderance of evidence and/or the results from the most reliable method were taken as leading.

Age estimation was possible in 143 individuals. Eleven individuals were estimated to be subadults (<18 years), which is only 7.7 per cent of all individuals for whom age could be estimated. However, 29 individuals (20.3%) were estimated as adolescents or adults. It is likely that most of these were, in fact, adults, but this cannot be said with certainty. If only the individuals of whom it could be determined whether or not they were adults were taken into account, 11 out of 114 (9.6%) were under 18 years of age, and the remaining 103 (90.4%) were over 18. Figures 23 and 24 show the distribution of age categories throughout the cemetery.

---

32 Buckberry and Chamberlain 2002.
33 Meindl and Lovejoy 1985.
34 Brooks and Suchey 1990.
35 Maat 2001.
36 İşcan and Loth 1986a.
37 İşcan *et al.* 1984, 155.
38 Buikstra & Ubelaker 1994, 43; Schaefer *et al.* 2009, 150; Scheuer & Black 2000, 61, 251, 365, 372; Standring 2008, 918; WEA 1980, 531.
39 Scheuer and Black 2000; Standring 2008, 918.
40 Harris & Buck 2002; Moorrees *et al.* 1963; WEA 1980, 528-529.
41 Saunders 2008, 126.
42 Saunders 2008, 123.

There was no clear division of ages present in the cemetery, but some patterns were visible. Subadults (infants, children, and adolescents) were present in only 5 out of 10 areas: the north and south of the first presbytery, the second and third presbyteries and the southern transept–mainly on the eastern side of the cemetery. Unfortunately, for many individuals it could not be determined whether they were adolescents or adults (shown in light blue), so it is possible that adolescents were buried throughout the cemetery.

It is noteworthy that infants were not buried under the eaves of the church, contrary to what is often mentioned in the literature.[43] Furthermore, there was no space reserved for children; although there were concentrations of children, adults were buried in those parts as well. If there was a separate location for the burial of young children, for instance unbaptised children, it was probably not located anywhere near the church, since most of the area around the church was excavated. Since almost all individuals studied were older than one year, they were likely to have been baptised. The only exception was the infant in the double grave (grave 27) found northwest of the church. Why this individual was buried with an adult is unclear. If its young age (estimated at 1-2 months) was the only concern, one would expect to find more double burials of this type in the cemetery. It is possible that mother and child were buried together, which may also have influenced the

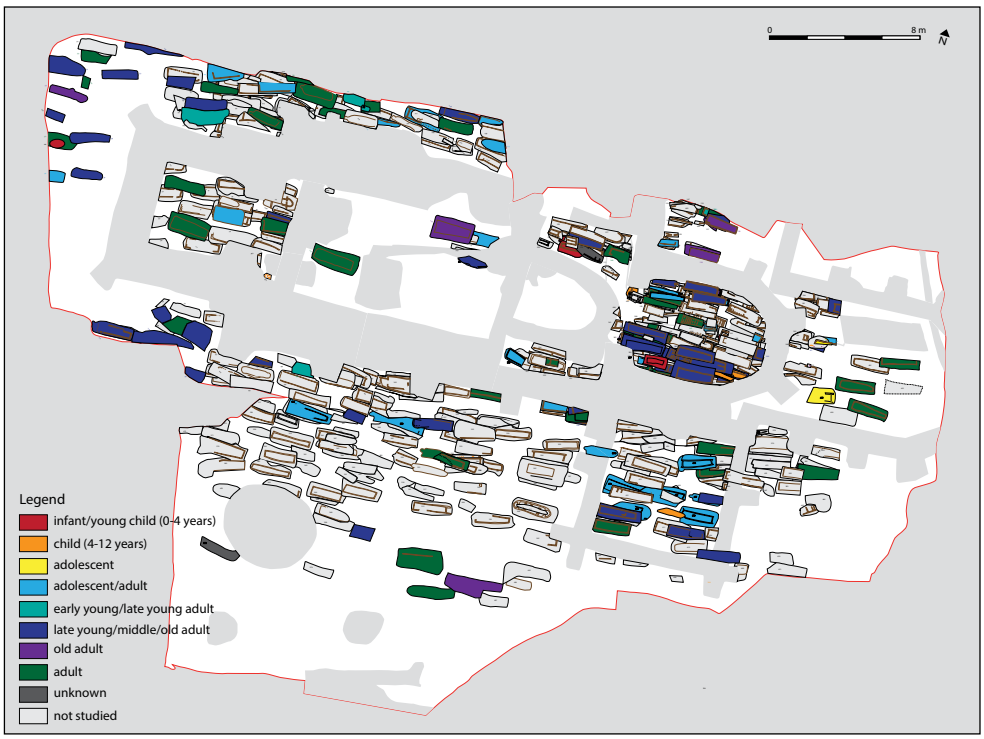


Fig. 23: The distribution of age categories.

43 Daniell 1997, 118; Treffort 1996, 147.

location choice. The lack of young children buried can be explained by a separate cemetery elsewhere for them, or by preservation issues; since preservation in the cemetery was not very good in general, the small and fragile bones of the young may have decomposed. This could also explain the lack of children to the south, since preservation in that area was, in general, poorer.

That children were buried among adults gives the impression that children were not viewed as fundamentally different from adults in regards to mortuary rituals and place in the afterlife. Furthermore, the number of burials on the eastern side of the church shows that this was considered to be a good burial place. It is possible that this part was reserved for pious people and those who were still innocent. This hypothesis is backed up by the three burials oriented west to east, supposedly priests; all of those were located east of the Romanesque church.

To determine if there was a connection between age and grave morphology, a graph was made (Fig. 25). Because only the individuals for whom osteological data were available were taken into account, some containers do not appear in the graph. The graph shows no clear patterns; almost all container types were used within each age group. Apparently, age was not a factor in container choice.

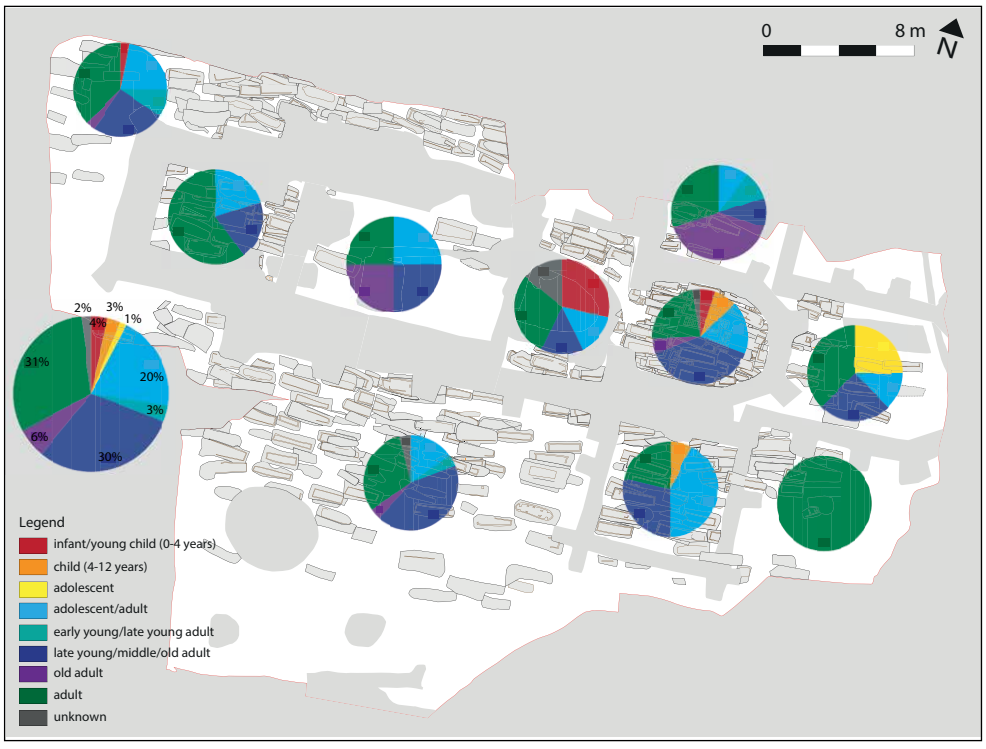


Fig. 24: The relative number of graves with age categories per area, including total.

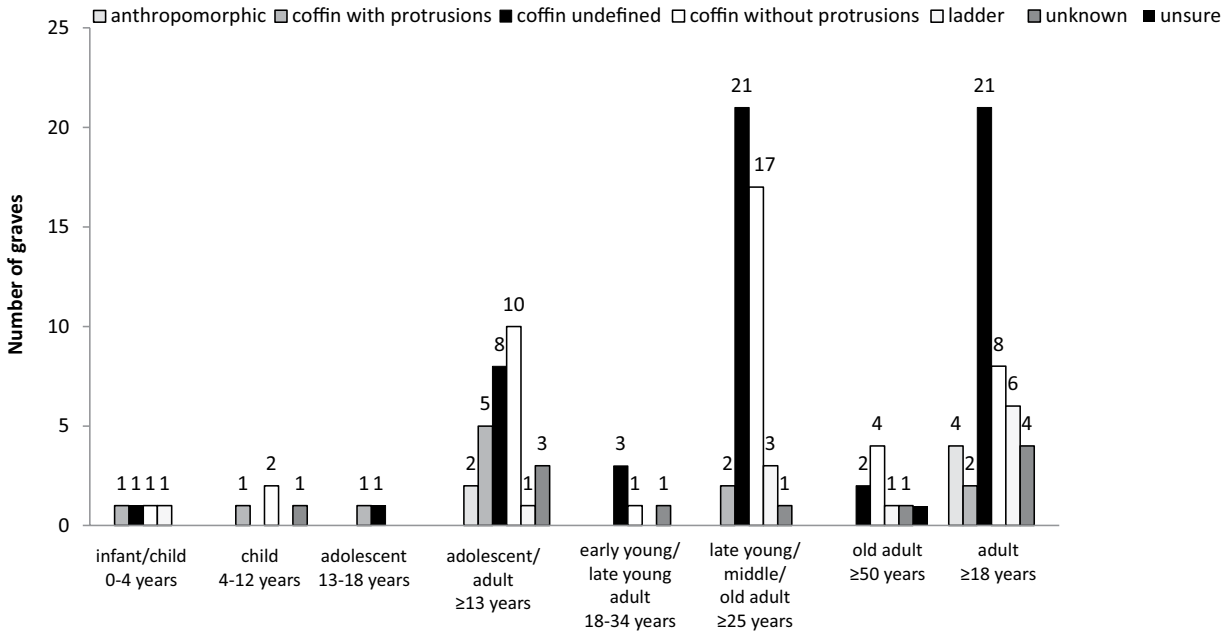


Fig. 25: The number of individuals buried in each type of container, per age group. Twelve individuals were buried in containers of unknown morphology. These are not displayed in the figure.

Estimation of stature of adults

The Breitinger method was used for the estimation of the stature of males.[44] Additionally, the equations for white males and females by Trotter,[45] Ousley[46] and Wilson *et al.*[47] were used. The equation with the smallest standard deviation was chosen. The tibia was not used because of a lack of clarity in how to measure it.[48] Finally, stature was estimated by taking the average stature of all methods that were applicable, thus combining the average from the Breitinger equations with the equations with the lowest standard deviation from Trotter, Ousley, and Wilson *et al.*

Estimation of adult stature was possible for only 34 individuals, which is a very small portion of the entire sample. Because women tend to be shorter than men, individuals were sorted by sex. To create adequately sized categories, possible and probable males and females were gathered under the categories male and female.

Figure 26 shows a normal curve for the male portion of the population, which is what one would expect. The female curve is less clearly in the normal distribution range. This probably has to do with the small sample size. Furthermore, in general men were taller than women, which is also in line with expectation. The average female stature was 161.2 cm (standard deviation 5.68 cm), and the average male

44 Breitinger, 1937, 266.
45 Trotter, 1970.
46 Ousley, 1995, 772.
47 Wilson *et al.* 2010.
48 White and Folkens 2005, 399-400.

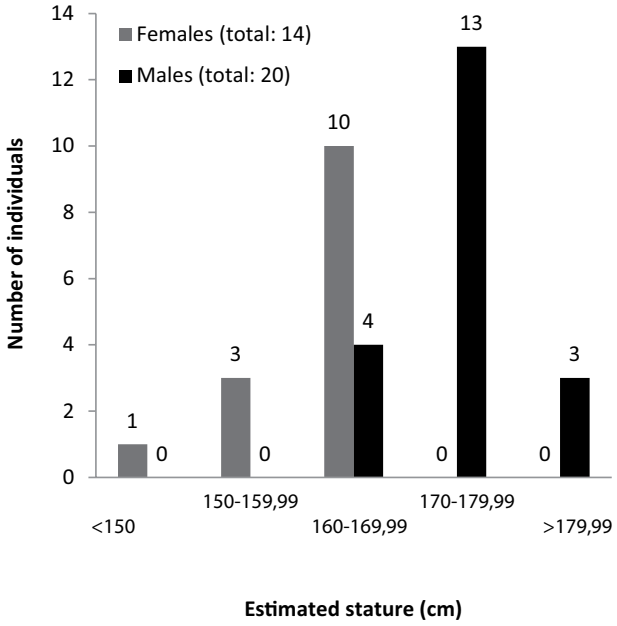


Fig. 26: The estimated stature of individuals by sex.

stature was 173.3 cm (standard deviation 6.21 cm). Individuals in this sample were on the taller end of the normal range of this time period. The average male stature was comparable to or slightly taller than that of several other sites from this period.[49] For Dutch females, average stature estimates for the Central and Late Middle Ages vary between 160.9 cm and 164.4 cm.[50] British medieval females had a mean stature of 159-161 cm. The average female stature in Reusel fits within these ranges.

Demographic composition of the sample

In a communal graveyard, one would expect to find a more or less representative reflection of the inhabitants of the village. It is expected that in a village, the number of males and females would be more or less equal. In the cemetery, males were slightly overrepresented, but not to such an extent to be out of the ordinary. The age distribution of adults was in line with expectations as well; the category 'late young, middle or old adult' was relatively large, which was to be expected for several reasons. First, this was a large category in and of itself; it represents everyone over 25 years of age that could not be aged more precisely. In a healthy dead population, many individuals would fall into this category. Second, the physical anthropological methods used to determine age tend to converge on middle-aged adults older individuals tend to be aged too young, whereas younger individuals

49 Arts 2013a, 170; Boddington 1996, 117; Lefever *et al.* 1993, 185; Maat 2005, 278; Roberts and Cox 2003, 396.

50 Arts 2013a, 172.

tend to be aged too old. This made the middle adult category appear larger than it would have been in reality.[51] A third reason is that incomplete skeletons are difficult to age precisely. When evidence for a certain age is weak or when different indicators yield different age ranges, it is better to provide a wide age range that is likely to be correct than a small range that is more likely to be incorrect. Furthermore, the category 'early/late young adult' (18-35 years) was small. People in this age category were not likely to die, although in preindustrial societies, death in young adulthood was not uncommon.

The number of individuals classified as old adults (≥50 years) was small. This was in part due to the way in which the categories were made. Some old adults probably ended up in the late young/middle/old adult (≥26 years) category because there was insufficient evidence to label them as old adults. In addition, it may be related to the life expectancy of the society. Many people in preindustrial societies did not live to old age.

Apart from assessing the composition of the population, it was also possible to make a rough estimate of the size of the population that was using the Reusel cemetery in the different phases. Of course, there are many unknown variables that defy making an accurate estimate, but making an educated guess is, nevertheless, useful. It was possible to establish the southern and eastern boundaries of the cemetery with a fair degree of certainty. On the other sides, however, the cemetery probably extended further than the excavated area. It is fair to assume that the cemetery was about twice the size of the excavated area (especially when we take into account that most of the village's children were not represented in the sample), which results in a population of about 1,000 individuals. The cemetery was in use from around 950 to 1400 (apart from a few more recent graves that were accidentally left intact when the cemetery was cleared). If we assume one generation is 20 years, that would mean that within this time span there were 22.5 generations of 44 people each. If, on average, people live to be 40 years old, that means that, on average, about 88 people were living in the village at any given time. Of course, the population fluctuated throughout the phases. So, at the time of the first church we expected the population to be smaller, perhaps 20 individuals (about four households), whereas around 1400 it may have risen to 150 individuals (about 30 households). Such an increase seems reasonable and in accordance with the enlargement of the churches. Furthermore, 30 households is a reasonable amount to form one village, suggesting that the cemetery of Reusel catered to the inhabitants of the village itself, rather than of the surrounding area. However, it has to be kept in mind that such calculations are speculative and the real values might differ.

Whereas the number of adults did not differ much from what was expected, the number of subadults (<18 years) did. One-hundred-and-three individuals in the sample could be determined to be adults (≥18 years) and only 11 subadults (9.6%). Estimates of infant mortality in preindustrial societies are divergent. Some scholars estimate subadult mortality to be between 25 and 50 per cent.[52]Although there is

51 Chamberlain 2000, 105.

52 Arts 2013a, 166; Buckberry 2000.

little agreement in the literature on this matter, the 9.6 per cent of subadults in this sample was lower than what was to expected from an archaeological population.

Of particular interest was the number of infants in the sample; only one child below the age of one year was found. This child was presumably buried together with an adult. One possible explanation for the lack of infants could be that bones of children are more susceptible to decay and are not always recognized.[53] As a result, children are often underrepresented in archaeological samples.[54] Furthermore, subadult graves can be shallower than adult graves and are therefore more easily disturbed. However, because slightly older children were recovered, a lack of recognition or shallowness of graves does not seem to be the main issue here. This suggests that these young children were buried elsewhere.

To summarize, it seems like the cemetery provided a fair reflection of the inhabitants of the village it belonged to. It is possible that all or almost all adult inhabitants were buried in the cemetery; the adult sex, age, and stature distribution was in line with what was to be expected from a relatively healthy preindustrial society. However, most children, and in particular infants, were likely to have been buried elsewhere. The low number of graves that were recovered suggests that not all the villagers were initially buried there, but of course it is unknown how much of the cemetery was left unexcavated. Furthermore, it cannot be determined if the people who were buried in Reusel were in fact the inhabitants of the village or from other parishes. In principle, people were to be buried in their own parishes, but this did not always happen. Eventually, regulations on this matter were imposed to ensure that people were buried in their own parishes.[55]

Conclusions

Although it is impossible to state with certainty, it seems fair to conclude that most people from the parish community were buried in the Reusel cemetery. Exceptions are infants below the age of one year, whose remains were probably disposed of in another way. Older children were buried in the churchyard, but not as many as would be expected. Apparently, most older children were buried elsewhere (in an unexcavated part of the cemetery or at an entirely different site). Adults were probably all buried in the cemetery.

There were differences in the way that particular people were buried; ladder coffins and subadult graves were almost exclusively found in the eastern part of the cemetery. Males were buried in the Romanesque church, whereas females were found directly west of the Romanesque church. However, not many clear patterns emerged. There is doubt about the meaning of west to east burials at this site (see below), no meaningful variation in orientation of graves was found, and most grave morphologies were found throughout the cemetery.

---

53 Chamberlain 2000, 105.

54 Chamberlain 2000, 105; Maat *et al.* 2005, 10; Martin *et al.* 2013, 132; Pinhasi and Bourbou 2008, 32.

55 Blair 2005, 464; 470.

Many graves predated the church and were oriented approximately west to east. Three bodies were buried from east to west, which would suggest they were priests, given Christian tradition. Yet at least one of these individuals was a woman, who was in all likelihood not a priest. The individuals were all buried more or less directly east of the church, which was probably an important location.[56]

Furthermore, it is notable that five different types of containers were present. It is still unclear whether these differences related to different phases, the wealth of the buried individuals, or something else. It does, however, seem that the number of nails in graves increased over time; more recent graves contained more nails than older ones. On top of that, ladder coffins appear to have been preferred for individuals buried in the eastern part of the cemetery.

Males and females were buried unsegregated, leading to females being buried in favourable places as well. This could suggest that women were considered equal to men when it came to burial practices in this community, or that spouses were buried in proximity to each other.

This study shows that in the Reusel community, some practices, such as the orientation and location of burials, were in accordance with those in other medieval societies, although others, such as the 'priest burials' and sex equality, 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, provide their own interpretation of Christian rituals. In future cemetery studies, such local variations have to be taken into account.

Bibliography

Arts, N. (ed.), 2013a: *Een knekelveld maakt geschiedenis. Het archeologisch onderzoek van het koor en het grafveld van de middeleeuwse Catharinakerk in Eindhoven, circa 1200-1850*, Utrecht.

Arts, N., 2013b: Begraven op de Brabantse zandgronden. De archeologie van veranderende grafrituelen, circa 1000-1900, in: P. Bitter, V. Bonenkampová & K. Goudriaan (eds.), *Graven spreken. Perspectieven op grafcultuur in de middeleeuwse en vroegmoderne Nederlanden*, Hilversum, 23-35.

Arts, N. & J. Nollen, 2006: *Een bed van botten. Het archeologisch onderzoek van de middeleeuwse Catharinakerk in Eindhoven in beeld,* 's-Hertogenbosch.

Augenti, A. & R. Gilchrist, 2011: 'Life, Death and Memory', in: M. Carver & J. Klápště (eds.), *The Archaeology of Medieval Europe. Vol. 2. Twelfth to Sixteenth Centuries*, Aarhus, 494-515.

Bass, W.M., 1987: *Human Osteology. A Laboratory and Field Manual*, Springfield.

Binski, P., 1996: *Medieval Death. Ritual and Representation*, London.

Blair, J., 2005: *The Church in Anglo-Saxon Society,* Oxford.

Boddington, A., 1996: *Raunds Furnells. The Anglo-Saxon church and churchyard*, London.

Breitinger, E., 1937: 'Zur Berechnung der Körperhöhe aus den langen Gliedmassenknochen', *Anthropologische Anzeiger* 14, 249-274.

56 Blair 2005, 471; Boddington 1996, 36-37.

Brooks, S. & J. Suchey, 1990: 'Skeletal age determination based on the os pubis: a comparison of the Acsádi-Nemeskéri and Suchey-Brooks Methods', *Human Evolution* 5-3, 227-238. DOI: 10.1007/BF02437238.

Buckberry, J.L., 2000: 'Missing, Presumed Buried? Bone Diagenesis and the Under-Representation of Anglo-Saxon Children', *Assemblage: University of Sheffield Graduate Student Journal of Archaeology*, 1-17. URI: http://hdl.handle.net/10454/676.

Buckberry, J.L. & A.T. Chamberlain, 2002: 'Age Estimation From the Auricular Surface of the Ilium: A Revised Method', *American Journal of Physical Anthropology*, 119-3, 231-239. DOI: 10.1002/ajpa.10130.

Buikstra, J.E. & D.H. Ubelaker (eds.), 1994: *Standards for Data Collection from Human Skeletal Remains*, Fayetteville.

Camps, H.P.H. (ed.), 1979: *Oorkondenboek van Noord-Brabant tot 1312. I: De Meierij van 's-Hertogenbosch (met de heerlijkheid Gemert)*. 's-Gravenhage.

Chamberlain, A.T., 2000: 'Problems and Prospects in Palaeodemography', in: M. Cox & S. Mays (eds*), Human Osteology: In Archaeology and Forensic Science*, Cambridge, 101-115.

Daniell, C., 1997: *Death and Burial in Medieval England 1066-1550,* London.

Effros, B., 1997: 'Beyond cemetery walls: early medieval funerary topography and Christian salvation', *Early Medieval Europe* 6-1, 1-23. DOI: 10.1111/1468-0254.t01-1-00001.

Hagen, J.W. & G. Janssen, 1995: *Acht eeuwen kerken in Reusel*, Reusel.

Harris, E.C., 1989: *Principles of Archaeological Stratigraphy*, London.

Harris, E.F & A.L. Buck, 2002: 'Tooth mineralization: A technical note on the Moorrees-Fanning-Hunt standards', *Dental Anthropology*, 16-1, 15-20.

Huijbers, A.M.J.H., 2007: *Metaforiseringen in beweging. Boeren en hun gebouwde omgeving in de Volle Middeleeuwen in het Maas-Demer-Scheldegebied* (PhD thesis, University of Amsterdam). Amsterdam.

İşcan, M.Y., S.R. Loth & R.K. Wright, 1984: 'Metamorphosis at the Sternal Rib End: A New Method to Estimate Age at Death in White Males', *American Journal of Physical Anthropology*, 65-2, 147-156. DOI: 10.1002/ajpa.1330650206.

İşcan, M.Y. & S.R. Loth, 1986a: 'Determination of Age from the Sternal Rib in White Males: A Test of the Phase Method', *Journal of Forensic Sciences* 31-1, 122-132. DOI: 10.1520/JFS11866J.

İşcan, M.Y. & S.R. Loth, 1986b: 'Determination of Age from the Sternal Rib in White Females: A Test of the Phase Method', *Journal of Forensic Sciences,* 31-3, 990-999. DOI: 10.1520/JFS11107J.

Kok, H.L., 2005: *Thanatos. De geschiedenis van de laatste eer*, Heeswijk.

Lefever, L., P. van der Plaetsen & H. Verbeek, 1993: 'Het middeleeuwse grafveld', in: F. Vermeulen, M. Rogge & L. van Durme (eds.), *Terug naar de bron. Kruishoutem archeologisch doorgelicht*, Gent, 175-196.

Le Goff, J., 1980: *Time, Work, and Culture in the Middle Ages,* Chicago.

Loth, S.R. & M. Henneberg, 1996: 'Mandibular ramus flexure: a new morphologic indicator of sexual dimorphism in the human skeleton', *American Jopeurnal of Physical Anthropology*, 99-3, 473-485. DOI: 10.1002/(SICI)1096-8644(199603)99:3<473::AID-AJPA8>3.0.CO;2-X.

Maat, G.J.R., 2001: 'Diet and age-at-death determinations from molar attrition. A review related to the Low Countries', *The Journal of Forensic Odonto-Stomatology*, 19-1, 18-21.

Maat, G.J.R., 2005: 'Two Millennia of Male Stature Development and Population Health and Wealth in the Low Countries,' *International Journal of Osteoarchaeology*, 15-4, 276-290. DOI: 10.1002/oa.785.

Maat, G.J.R., R.W. Mastwijk & M.A. Jonker, 2005: *Citizens buried in the 'Sint Janskerkhof' of the 'Sint Jans' cathedral of 's-Hertogenbosch in the Netherlands ca.1450 and 1830-1858 AD* Leiden (Barge's Anthropologica 8).

Maat, G.J.R., R.W. Mastwijk & E.A. van der Velde, 1997: 'On the Reliability of Non-metrical Morphological Sex Determination of the Skull Compared with that of the Pelvis in The Low Countries', *International Journal of Osteoarchaeology*, 7-6, 575-580. DOI: 10.1002/(SICI)1099-1212(199711/12)7:6<575::AID-OA308>3.0.CO; 2-4.

Martin, D.L., R.P. Harrod & V.R. Pérez, 2013: *Bioarchaeology. An Integrated Approach to Working with Human Remains*, New York.

Meier, T. & 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, 420-449.

Meindl, R.S. & C.O. Lovejoy, 1985: 'Ectocranial Suture Closure: A Revised Method for the Determination of Skeletal Age at Death Based on the Lateral-Anterior Sutures', *American Journal of Physical Anthropology* 68-1, 57-66. DOI: 10.1002/ajpa.1330680106.

Moorrees, C.F.A., E.A. Fanning & E.E. Hunt, 1963: 'Age variation of formation stages for ten permanent teeth', *Journal of dental research* 42-6, 1490-1502. DOI: 10.1177/00220345630420062701.

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).

Ousley, S., 1995: 'Should We Estimate Biological or Forensic Stature?', *Journal of Forensic Sciences*, 40-5, 768-773. DOI: 10.1520/JFS15381J.

Parker Pearson, M., 1999: *The Archaeology of Death and Burial*, Stroud: Texas.

Parra, S.L., 2012: De pijp als indicator van onmatigheid. Over de relatie tussen de pijp en gender in de schilderijen van Jan Steen (MA thesis Utrecht University).

Phenice, T.W., 1969: 'A Newly Developed Visual Method of Sexing the Os Pubis', *American Journal of Physical Anthropology*, 30, 297-302. DOI: 10.1002/ajpa.1330300214.

Pinhasi, R. & C. Bourbou, 2008: 'How Representative Are Human Skeletal Assemblages for Population Analysis?', in: R. Pinhasi & S. Mays (eds.), *Advances in Human Palaeopathology*. Chichester, 31-44.

Renfrew, C. & P. Bahn, 2012: *Archeaology. Theories, Methods and Practice*, London.

Roberts, C.A. & M. Cox, 2003: *Health & Disease in Britain. From Prehistory to the Present Day*, Gloucester.

Saunders, S.R., 2008: 'Juvenile Skeletons and Growth-related Studies', in: M.A. Katzenberg & S.R. Saunders (eds.), *Biological Anthropology of the Human Skeleton*, Hoboken, 117-147.
Schaefer, M., S. Black & L. Scheuer, 2009: *Juvenile Osteology. A Laboratory and Field Manual*, San Diego.
Scheuer, L. & S. Black, 2000: *Developmental Juvenile Osteology*, San Diego.
Schwartz, J.H., 2007: *Skeleton Keys. An Introduction to Human Skeletal Morphology, Development, and Analysis*, New York.
Standring, S. (ed.), 2008: *Gray's Anatomy: The Anatomical Basis of Clinical Practice*, London.
Strijbos, H., 1995: *Kerken van heren en boeren*, 's-Hertogenbosch.
Treffort, C., 1996: *L'Église Carolingienne et la mort*, Lyon (Collection d'histoire et d'archéologie médiévales 3).
Trotter, M., 1970: 'Estimation of Stature from Intact Long Limb Bones', in: T.D. Stewart (ed.), *Personal Identification in Mass Disasters*, Washington, 71-83.
Ubelaker, D.H., 1978: *Human skeletal remains. Excavation, analysis , interpretation*, Washington.
Ubelaker, D.H., 2008: 'Forensic Anthropology: Methodology and Diversity of Applications', in: M.A. Katzenberg & S.R. Saunders (eds.), *Biological Anthropology of the Human Skeleton*. Hoboken, 41-69.
Van Kempen, P. & M. van der Kamp, 1998: De opgraving van de middeleeuwse kerk van Reusel in 1997. *De Schéép*er, 36-4, 13-21.
White, T.D., M.T. Black & P.A. Folkens, 2012: *Human Osteology*, Burlington (MA).
White, T.D. & P.A. Folkens, 2005: *The Human Bone Manual*, Burlington (MA).
Wilson, R.J., N.P. Herrmann & L.M. Jantz, 2010: 'Evaluation of Stature Estimation from the Database for Forensic Anthropology', *Journal of Forensic Sciences* 55-3, 684-689. DOI: 10.1111/j.1556-4029.2010.01343.x.
Workshop of European Anthropologists, 1980: Recommendations for Age and Sex Diagnoses of Skeletons, *Journal of Human Evolution* 9-7, 517-549.

Buried in Alkmaar: Historical and archaeological research on urban cemeteries

Peter Bitter

Alkmaar, a medium-sized town in the province of North Holland that has been a regional centre for centuries, began as a 10th-century market centre. This has left its mark on the town centre, particularly its lay-out with streets and canals lined with historic houses. During Alkmaar's Golden Age between circa 1500 and 1650, the town boomed and population numbers went from around 4,000 to around 13,000 inhabitants. The following two centuries were a period of slow but steady decline, and population numbers were reduced to about 8,000 inhabitants. In the late 19th century, prosperity returned and has remained into modern times.

Alkmaar has had municipal archaeologists since 1991, and they have undertaken more than 250 excavations in the town centre in the past 25 years. In the publications that have come out of that research, the archaeological data have usually been combined with information from written sources, thus making a valuable contribution to the study of Alkmaar's history.

Cemeteries have been the subject of four archeological excavations in Alkmaar.[1] The research questions were focused on the locations and chronology of cemeteries, physical anthropological data, and burial customs of different social and religious groups. The result of these investigations are summarized in the first part of this article. The second part deals with a multi-disciplinary research project on burial customs in 18th- and early 19th-century Alkmaar.

1 The excavations discussed here were all done by municipal archaeologists, except for the site of the Paardenmarkt in 2010, which was excavated by the firm Hollandia archeologen in cooperation with Leiden University. An overview of the data on the Alkmaar monasteries is published in Bitter 2014a.

Urban cemeteries of Alkmaar

Sites and sources

The medieval cemeteries of Alkmaar were located inside or near the chapels of several religious houses, inside the Kapelkerk in the eastern part of the town, and of course at the parish church of St. Lawrence. In the Reformation of 1572,[2] when most towns in the Netherlands were invaded by the troops of William of Orange, all Catholic institutions were abolished, their goods confiscated, and their buildings repurposed. As a result, written sources on Alkmaar's Church of St. Lawrence, Kapelkerk, and monasteries as well as their cemeteries from before 1572 are very scarce. There were three women's convents of the Third Franciscan Order in Alkmaar: the Oude Hof, founded in 1394, and the Jonge Hof and the Middelhof, which were both established slightly later (they were first mentioned in 1414 and 1430, respectively).[3] These were quite extensive building complexes, as can be seen on the 1597 map of Alkmaar by Drebbel (which was drawn after the dissolution of all Catholic institutions during the Reformation of 1572). The Minderbroederskloosters, a Franciscan friary, was founded in 1448. It had a very large chapel, but the layout and size of the rest of the monastery is unclear. The Augustine women's monastery, De Witte Hof, was established in 1486. Its modest size reflects the low number of nuns inhabiting the convent. In 1505, the Clarissenklooster, a women's monastery of St. Clair, was built just outside the western town gate. Little is known of its appearance, other than the rough sketch by Van Deventer, as it was demolished in 1572.

These religious houses were concentrated in the western and northern parts of the town (Fig.1 and 2). It is often thought that most urban convents and monasteries were founded in vacant, open areas, away from the main streets. This is, however, not the case in Alkmaar. The three Third Order Franciscan convents all began with the donation of a pre-existing house, and they expanded by purchasing neighbouring houses. Most likely their choice of locations was determined only by their proximities to the main church.

There are archaeological and/or historical data on cemeteries associated with only a few of these religious houses: the Jonge Hof and the Franciscan friary. However, written sources on Alkmaar from before 1500 are quite scarce, so it is possible that more monastic cemeteries existed.[4]

There are no data on a graveyard at the Oude Hof. The site is archaeologically lost as a result of 19th- and 20th-century building activities, but as one of the most prominent convents in the town, it is to be expected that it had a private graveyard

---

2 The Dutch Reformation took place in the spring of 1572 as part of the Dutch Revolt, which began in 1568 as a reaction to, among other things, the Spanish Inquistions' ban on Protestantism and the issuing of death sentences for Protestants. In 1572, William of Orange's troops traversed the Netherlands and most towns went over to the side of William of Orange, as did Alkmaar in June 1572.

3 I use the word 'convent' for the three institutions connected to the Third Franciscan Order. These tertiaries had a lighter regime than the stricter rules of the monasteries of the First Franciscan Order and of the Orders of St. Augustine and St. Clair.

4 An up-to-date overview of written and archaeological data on convents and monasteries in Alkmaar is presented in Bitter 2014a. A recent review of the few written sources is provided by Drewes 2011.

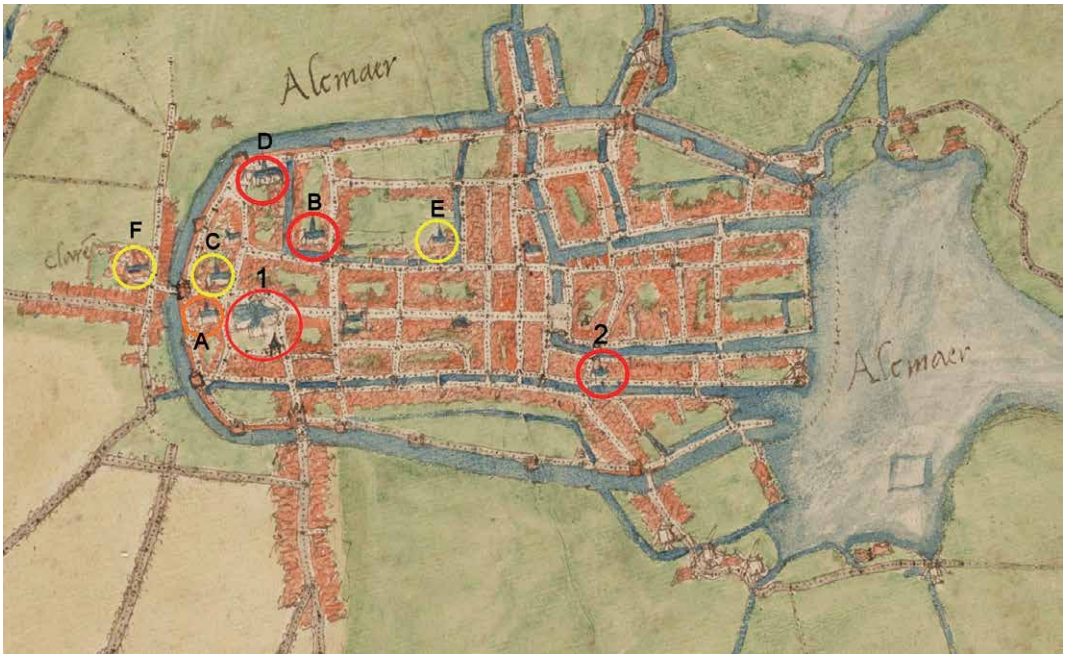


Fig. 1: Map of Alkmaar by Jacob van Deventer, circa 1561 (Noord-Hollands Archief Kaartencollectie Provinciale Atlas, inv.nr. 2425). Sites mentioned in the text: A. Oude Hof, B. Jonge Hof, C. Middelhof, D. Minderbroederklooster, E. Witte Hof, F. Clarissenklooster, 1. Grote Kerk, 2. Kapelkerk.

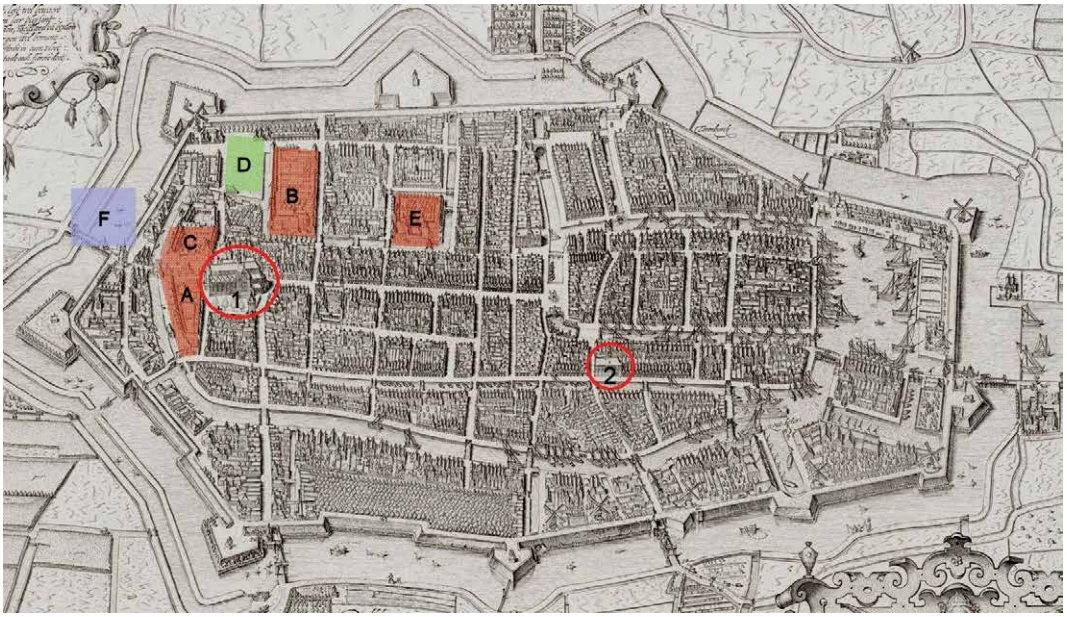


Fig. 2: Map of Alkmaar by Cornelis Drebbel, 1597 (Regionaal Archief Alkmaar, PR 1006000). Sites mentioned in the text: A. Oude Hof, B. Jonge Hof, C. Middelhof, D. Minderbroederklooster, E. Witte Hof, F. Clarissenklooster, 1. Grote Kerk, 2. Kapelkerk.

for the deceased sisters of the convent. From 1998 to 2000, large-scale excavations were done at the site of the women's convent Middelhof, at the present-day square Canadaplein. It was established that there were no human remains near or inside the chapel.[5] There is no written information on the subject from the Witte Hof, but it may well have been too small to have its own graveyard. Virtually nothing is known of the monastery of St. Clair, as it was only short-lived; it was abandoned in 1572 and demolished in 1573 when new town moats were dug through the site.

Much of Alkmaar's late medieval lay-out has been preserved. The monastic buildings, however, have almost all disappeared, since they were given new uses after the Reformation of 1572 and eventually were replaced by other buildings. In the following centuries, burial sites were limited to the Church of St. Lawrence and its graveyard, and the Kapelkerk. In 2002 a small-scale excavation was done inside the Kapelkerk. At the Church of St. Lawrence the excavations of 1994-1995 were followed by a thorough analysis of the written sources in the assessment of the excavation results.

After the prohibition of burials within towns in 1827, most cemeteries in Dutch towns were closed. At Alkmaar, the burials inside the Grote Kerk (St. Lawrence) and in the adjacent graveyard ceased in 1830, when a new General Cemetery was opened one kilometer southwest of the town.

A convent's cemetery at the Jonge Hof

Very few written records from the women's convent Jonge Hof have survived the Reformation. The chapel, located near the southeastern corner of the convent's courtyard, is first mentioned in 1433 but its date of construction remains unknown. There are no written data on a cemetery. The convent's buildings were converted to an orphanage in 1576 and some parts of it even outlasted the changes to other uses in the 19th and 20th centuries.

During the demolition of the 19th-century orphanage in 1984, some remains of the chapel of the Jonge Hof were documented. Surprisingly, there also were a few human remains, amongst others, a single human inhumation neatly buried between two buttresses next to the north side of the chapel.[6] It may have come from a graveyard for deceased sisters, next to the chapel in the southeastern corner of the courtyard.

In 2009, a small site at the northern end of the former courtyard was investigated archaeologically in the context of a rearrangement of fences and a garden. During this excavation, one of the 16th-century waste pits of the convent rendered a sinister find. Among the ashes and garbage like bones, sherds, fish remains and other dirt, nine human skulls were found. Other human bones were absent. According to physical anthropologist Steffen Baetsen, seven skulls were female, while the sex of the other two was indeterminable.[7] The skulls were found in a cluster and may have been contained in a textile bag and dumped

5 Bitter & Van Zanten 2013. In the extensive excavations of the chapel and adjacent area in 2000 not a single human bone was found.

6 Cordfunke 1985. There was no excavation during the demolition and subsequent building at the site. Still, some archaeological features were documented by a volunteer.

7 Baetsen 2001.

together. The skulls may have been stumbled upon during construction of new buildings of the convent in the proximity of a cemetery near the chapel. Judging from the appearance of the buildings on Drebbel's 1597 map and parts that have been incorporated into present-day houses, the convent must have had new wings built along the Doelenstraat in the 15th and 16th centuries. Whoever found the skulls may have been involved in the construction work and secretly disposed of them in this disrespectful manner. It would be reasonable to assume that the skulls originated from a private convent cemetery, which would fit with the physical anthropological data on the sex of the crania.

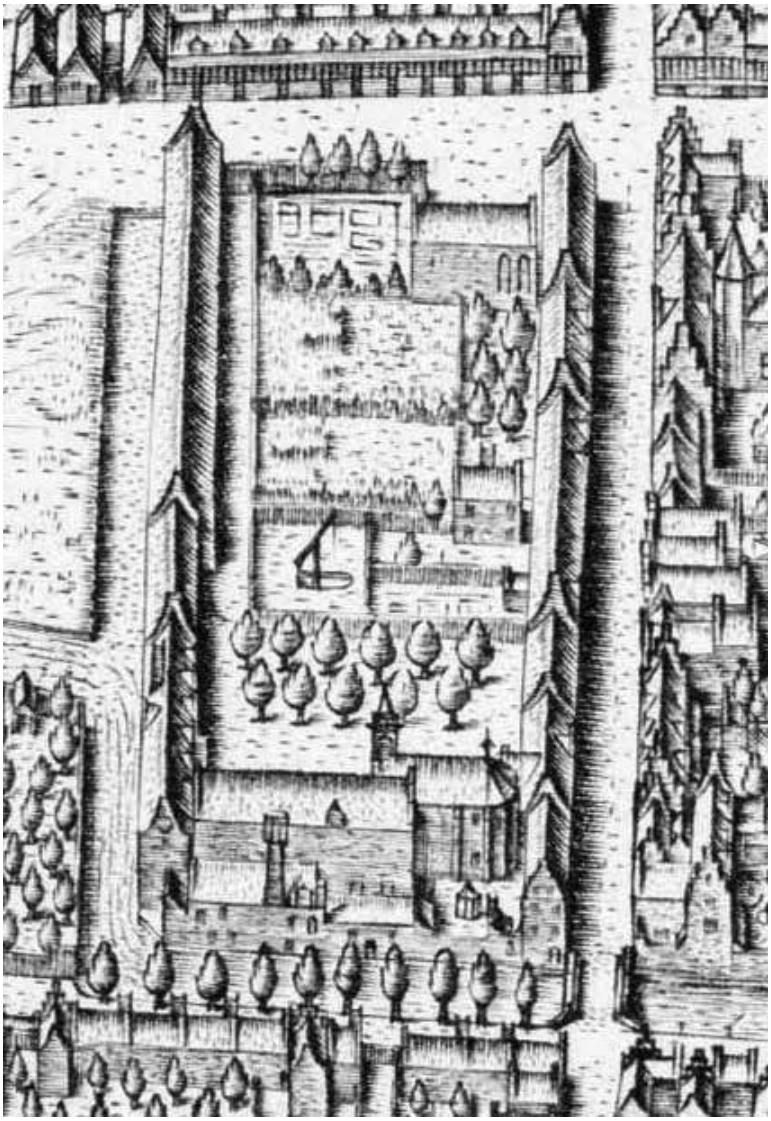


Fig. 3: The Jonge Hof in the map of Cornelis Drebbel, 1597 (Regionaal Archief Alkmaar, PR 1006000).

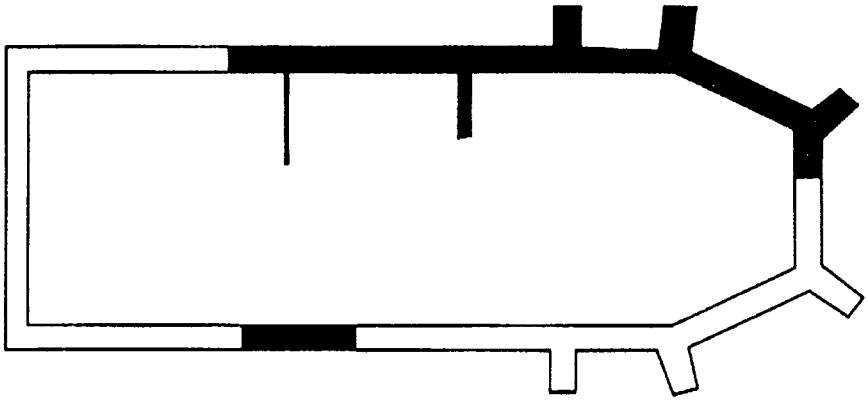


Fig. 4: Remains of the chapel of the Jonge Hof, found in 1984 (after Cordfunke 1992, fig. 46).

Fig. 5 (above): Doelenstraat 2009: nine human skulls found in a 16th-century waste pit.

Fig. 6: Doelenstraat 2009: observations on the skulls by Steffen Baetsen.

Common citizens buried 'with the Franciscans'

The Franciscan friary was the only male monastery in Alkmaar. While the women in the convents were mainly from Alkmaar families, most of the friars came from elsewhere. The friary was founded in 1448, and the chapel was consecrated in 1486. However, it was demolished within a century, as the monastic site was converted into the Paardenmarkt (Horse Market) immediately after the Reformation. Human bones were found in 1800 during the planting of trees in the market square and in 1853 when the north side of the square became the location of a gas factory.

The layout of the Franciscan friary is only known in rough outlines, as the buildings were all destroyed in 1574. In the excavations of 2009 and 2010, few building remains were found.[8] The outlines were, however, sketched by Jacob van Deventer on his circa 1561 map and shown in two paintings and an engraving, all made after 1574. It appears that the chapel was built on the north side almost directly against the town's defence ramparts. To the east of the monastery was the Nieuwesloot Canal bordering the adjacent Jonge Hof, and to the west was the Paternosterstraat. The southern limit may have been marked by a thick brick wall, the foundations of which were excavated in 2010. On the map by Van Deventer, only the chapel was sketched, but the other buildings along the eastern side of the courtyard were roughly marked in red, and the yard marked green. The presence of a secular cemetery inside the monastery is documented in 16th-century written sources. It remains unclear if the cemetery was begun after the consecration of the chapel in 1486 or perhaps already in the first decades of the monastery when a moat was dug that more or less surrounded the cemetery.

In 2009, an excavation was done at the gas factory site on the northern side of the square. Remains of town walls were documented, but there were very few traces of the chapel. Unfortunately, the heavy foundations of the gas factory, combined with a cluster of a sewer, gas pipes and telephone cables, had destroyed most traces of the chapel and of the cemetery inside it.

In 2010, plans to renovate the Paardenmarkt square, involving the planting of 17 new trees and relocating underground garbage containers, sewers and cables, made excavation unavoidable.[9] Naturally, any archaeological excavation involving human skeletons draws a lot of attention and, therefore, information was provided to the public on site. The excavation got national fame because of the extraordinary find of two mass graves that can be linked to the 1573 Spanish Siege of Alkmaar. We now think that one represents the anonymous grave of 22 soldiers and the other the grave of nine civilians, some of them showing the obvious trauma of war casualties.

The secular cemetery was at one time bounded by a moat to the north and west and a solid brick wall to the south. Unfortunately, virtually nothing has remained of the monastic buildings that once stood to the east and perhaps also to the south of the courtyard. The cemetery seems to have occupied the northern half of the former courtyard.

---

8 Bitter 2010 (RAMA 16); Griffioen *et al.* 2015; De Raad 2015.

9 The cemetery was excavated with the help of 35 students who were minoring in human osteo-archaeology at the University of Leiden. Prof. Dr. Menno Hoogland's field assistant was Dr. Rachel Schats, who, together with other specialists, wrote the physical anthropological chapter in the excavation report (Schats et al. 2015), and recently she defended her PhD in which the Alkmaar remains play an important role.

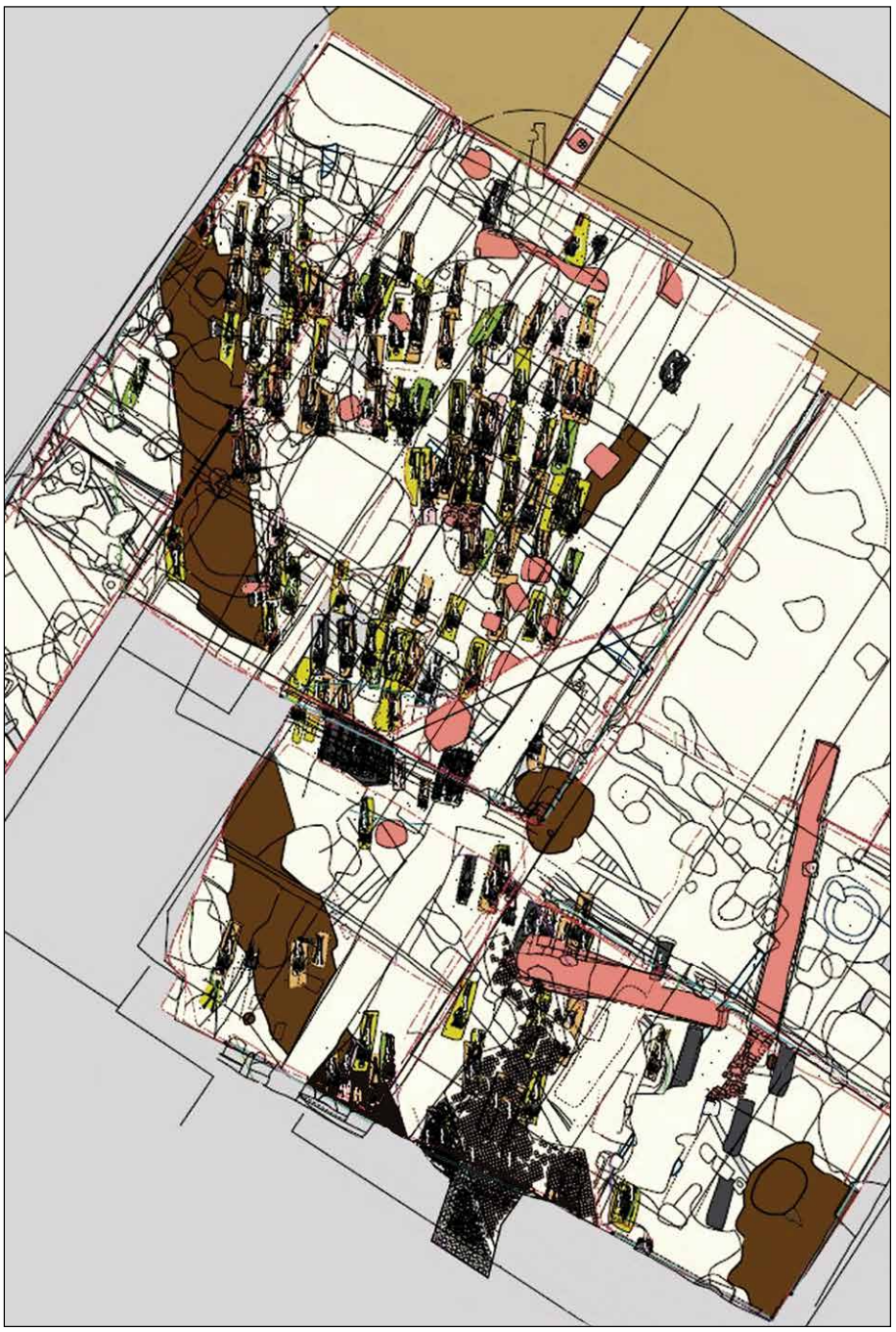


Fig. 7: Paardenmarkt 2010: excavation plan of the cemetery (after Griffioen et al. 2015).

Fig. 8: Paardenmarkt 2010: students of Leiden University excavating the medieval cemetery, just beneath the surface of the former parking lot (Foto: Hollandia Archeologen).

Fig. 9: Paardenmarkt 2010: three coffins buried lengthwise in a row instead of side by side (Foto: Hollandia Archeologen).

During the excavation, to the amazement of the spectators, the graves were only 40 centimetres below the former parking lot. Yet disturbance was limited to perhaps one-third of the entire graveyard. We found 189 coffins, with only 24 of the deceased under the age of 18. Almost as many male adults (65) were found as female (83), while the sex of 41 skeletons could not be determined. Only one grave contained a priest. As was customary for priests but not for laity, he was buried in an easterly orientation. Presumably, the friars themselves were not buried in the secular graveyard but inside their chapel. The medieval adults show quite a young average age of death: 38 years for males and 34 for females. There are some indications of nutrient deficiency: hypoplasia (flaws in teeth development at a young age) was found in no less than 50 per cent of all individuals and cribria orbitalia (a pathology resulting in indentations in the upper parts of the eye orbits) in 22 per cent of the skulls (this may also have been caused by malaria). A rather high number of individuals suffered from arthrosis of vertebrae and some individuals showed traces of hypertension of the knee ligaments that may have been related to working in a squatting position.[10] Based on the oldest Grave Book, an incomplete list of 112 names of deceased who were '*begraven bij de Minderbroeders*' (buried with the Franciscan friars) between the years 1540 and 1560 was compiled.[11] The buried were registered here on account of the financial compensation of 20 *stuivers* (1 guilder) that the vicar of the Church of St. Lawrence received for each burial outside the common graveyard at the church. These records, however, are limited to the burial dates and the names of the deceased. Neither their age at death, their professions, social status and family relations, nor why they were buried in this graveyard instead of the customary burial grounds are known. The main reasons why they were buried here may have been their piety and a sympathy for the ardent Christian friars.

Buried inside the Kapelkerk

The common graveyards were inside the parish church of St. Lawrence and in the adjacent cemetery and, secondly, inside the Kapelkerk that was connected to the parish church. Since the 17th century, the floors of both churches have consisted entirely of tombstones. Unfortunately, most of the records of the Kapelkerk were lost in the 19th century, including many of the grave books. During a restoration of the Kapelkerk in 2002, a building history research project was carried out and a small-scale excavation was done.[12] Two main research questions guided the project. The first has to do with a controversy surrounding the earliest building phase of the Kapelkerk that was thought to have begun as a much smaller single-nave chapel. The debate focused on the date of construction of this original building and the role it played in the early development of this section of Alkmaar. However, the building history research project proved that construction of the chapel began no earlier than circa 1500 and that it was finished around 1540. The building

10 Schats *et al.* 2015.

11 De Raad 2015. Regionaal Archief Alkmaar, het Oudste Begraafboek 1540-1601.

12 Bitter 2004; Van der Hoeve & Tel 2005, 20-21. The Kapelkerk was a freestanding building in the eastern part of town, but fell under the care of the parish church of St. Lawrence.

was renovated twice in the 18th century, but at present it still maintains most of its 16th-century features. The second research question dealt with the chronology, lay-out and burial customs of the graveyard inside the Kapelkerk. According to written sources, the Kapelkerk was first used as a cemetery following a decision of Alkmaar's burgemeesters in 1575, when the fast growing population was causing overcrowding in the cemetery at the Church of St. Lawrence.

The entire floor of the Kapelkerk is covered with tombstones of a tripartite type, the so-called *drielingen* of *stapstenen*, square stones that could easily be raised for a single burial.[13] In the excavation, 15 coffins were uncovered. To our surprise, the *stapstenen* did not correspond with fixed graves, as the upper coffins that were excavated quite often overlapped the earlier burials by one-third or two-thirds.

The wood of some coffins was sufficiently well-preserved to allow for dendrochronology. Surprisingly, two of them proved to be much older than 1575; one was dated after 1460 and the other one, after 1461. Perhaps the use of the Kapelkerk as a cemetery had begun already around 1540. According to the surviving burial records, the cemetery was mainly used by middle-class citizens. In the 18th century, the numbers of funerals each year rarely exceeded a dozen and the last burial probably took place in 1806.[14]

Fig.10: Exterior of the Kapelkerk.

13 Rogge 2005.
14 Bitter 2002, 185.

Inside and outside the Church of St. Lawrence

Alkmaar's main cemetery was located at the parish church, dedicated to St. Lawrence, but in written sources it was usually referred to as the *Grote Kerk* (Great Church). The church was probably founded around 980 by the count and/or the abbot of Egmond as a chapel of the ancient parish church of Heiloo. In 1116, the people of Alkmaar made financial arrangements with the abbot for the burial rights, and the chapel of Alkmaar was probably raised to the status of a parish church shortly before.[15] It is uncertain if the cemetery already existed before that date. The present-day church was built between 1470 and 1520 in the Brabant gothic style.

In 1994-1995, large-scale excavations were done inside the Grote Kerk prior to the construction of floor heating and the restoration of the tombstone floor.[16] The research questions were focused on the graveyard inside the church and on remains of earlier church buildings.[17]

The present-day gothic church replaced an earlier building, of which remains were excavated. The oldest phase discovered was a tufa stone church of an unknown date, perhaps erected after the demolition of Alkmaar and its church in conflicts in 1132 and 1169. Its predecessor may have been built of wood. The tufa church was enlarged in several brick building phases in the 14th and 15th centuries. One of the extensions was the creation of a second church dedicated to St. Mathias that was built against the south side of the Church of St. Lawrence in 1382.

Since at least 1116, a churchyard has existed outside the Church of St. Lawrence. It is unknown when burials inside the church began.[18] In the present-day church, the oldest existing tombstones are from the 16th century. They are the remains of very large tombstones of red sandstone and white Gobertanger limestone as well as tripartite tombstones of blue-grey ashlar, *stapstenen* like in the Kapelkerk, that once surrounded the large tombstones. In 1624-1630, the layout of the floor was rearranged and the floor was entirely covered with 1,755 blue-grey ashlar tombstones. Each grave was registered with a number engraved on the

---

15 The earliest written sources, which are medieval, were deemed medieval falsifications by the historian Opperman who based his judgement on linguistic arguments on anachronistic language used in the medieval copies of the lost originals. Recently it has been argued that the copies were made because the contents of the documents were still valid and that the changes were only intended to modernize the wording. Thus, most of the information from these documents that was previously rejected, is now considered reliable. As a result, the validity of several written sources on Alkmaar in the 10th – 12th centuries has been reconsidered; *cf.* Bitter 2014b.

16 The project involved a large team of three archaeologists, 58 volunteers and students, two physical anthropologists, two numismatics and two historians. The site attracted no less than 23,000 visitors.

17 All results of the excavations, which were fully financed by the town of Alkmaar, are published in detail. See Bitter, Boulonois & De Ridder 1996 (Roman period pottery wasters); Baetsen 2001 (physical anthropology); Bitter 1999, 2008 (textile finds); Bitter 2013 (burial customs). The finds were assessed in combination with extensive research of written sources on the history of the churches and on burial customs. See Bitter 2002 (doctoral dissertation).

18 In general, burials inside churches began only in the 11th and 12th centuries, when royalty and prominent clergyman were placed inside in sarcophagi above ground. Over the course of the 13th to 15th centuries, underground burials inside churches began appearing, with coffins placed in vaults or in the soil underneath tombtones. At the same time, the custom was extended to important wealthy citizens as well. *Cf.* Binski 1996.

tombstone.[19] These grave numbers were connected to the grave administration by the church masters and grave digger of burials and of grave ownership, in the grave books that are preserved in the archives of Alkmaar. Unlike several churches elsewhere, very few burial vaults existed in Alkmaar. Three were designed in 1470 and situated underneath the private side chapels; three others were fitted under the tombstone floor during the 17th and 18th centuries. All other burials were graves containing wooden coffins buried in the sand beneath the tombstones.

The coffins were layered underneath each tombstone. If there was no more room under a tombstone but another coffin had to be buried, the grave could be cleared to a depth of over two meters, that is, as deep as the ground water table. In theory, this would create room for four coffins, but in fact there could be more because the wooden coffins collapsed under pressure. Depending on the number of inhumations after the last clearing of the grave, the number of coffins excavated varied from one to six per tombstone. We could not excavate the entire church floor, but still recovered 901 coffins and 62 bone boxes. Approximately 4-6,000 coffins are still buried in the sand beneath the floor.

For each individual burial, the tombstone on the grave was lifted. As a result, the excavation plan of the graves mirrors the layout of the tombstone floor. The tombstones were still in their original location, each one with the grave number carved at the bottom end. As the burial administration of the church are still preserved, it was possible to identify many of the individual burials. Surprisingly,

Fig. 11: Exterior with south entrance of the Grote Kerk.

19 Bloys van Treslong Prins & Belonje 1928; Rogge 1995.

the high number of burials each year led to the removal of most graves from before the mid-18th century. Of the 298 graves identified, 22 per cent dated from between 1716 and 1780 and no less than 78 per cent from 1781 to 1830.

Historians often suggest that burials inside churches are always of high status individuals. Indeed, this also was the case for the late 18th- and early 19th-century graves in the *Grote Kerk* of Alkmaar. By that period, the graveyard outside was used by middle- and lower-class citizens. Surprisingly, in an analysis of the church records it was discovered that this situation was quite different in the period before circa 1780. I will return to this in the paragraph on 'Changing burial customs'.

A sample of 250 skeletons uncovered inside the church was examined by physical anthropologist Steffen Baetsen.[20] The sample indeed proved to reflect the lifestyle of upper-class citizens. The average age at death of the 105 adult females in the sample was 55 years and of the 89 adult males was 60 years. Thus, the average life expectancy of this 18th-century population was fairly high, albeit not unusual for the period. However, in other osteological studies, it has been observed that the males of the population on average usually died earlier than the females. Possibly the males in this population had a higher life expectancy because they were not involved in hard physical labour. In the female group, there was a high death rate in the ages between 20 and 49 years, which could be related to the risks of childbearing. Remarkably, the teeth of most individuals strongly evinced bad hygiene, possibly the result of the consumption of luxury foods with sugar. Diseases resulting from bad nutrition or physical stress were found in comparably low numbers. Only 28 per cent of the adults had hypoplasia in their dental enamel, just one individual had cribra orbitalia and one had residual rickets ('English disease' caused by a vitamin D deficiency).

A recurrent problem in archaeological sites is the statistical under-representation of children's graves. At Alkmaar, however, this proved not to be the case. There were concentrations of children's graves in separate parts of the church, notably along the edges of the floor, where there was not enough room for adult graves. Oddly enough, in the burial records these were registered as having been buried under the family tombstones, when in fact they were not actually buried there.

Of the 55 young persons in the archaeological sample, six individuals (11%) were between 15 and 20 years of age, 10 individuals (18%) were between five and 15 years of age and 35 individuals (71%) were under five years; the mortality rate appears to have been especially high for infants and toddlers. The number of graves of children under 15 years accounted for 19 per cent of all individuals in the sample. This is far more than the percentages buried inside according to the burial records in the same period (a total of 5% between 1750 and 1818),[21] but we must bear in mind that adolescents of 12 years and older were registered (and billed) as adults. Also, the graves along the floor edges probably were not cleared as often as the other graves.

---

20 Baetsen 2001.

21 'Child' is noted for 394 of 8011 burials inside the church in the grave administration from samples of the periods 1750-1754, 1794-1803 and 1811-1818.

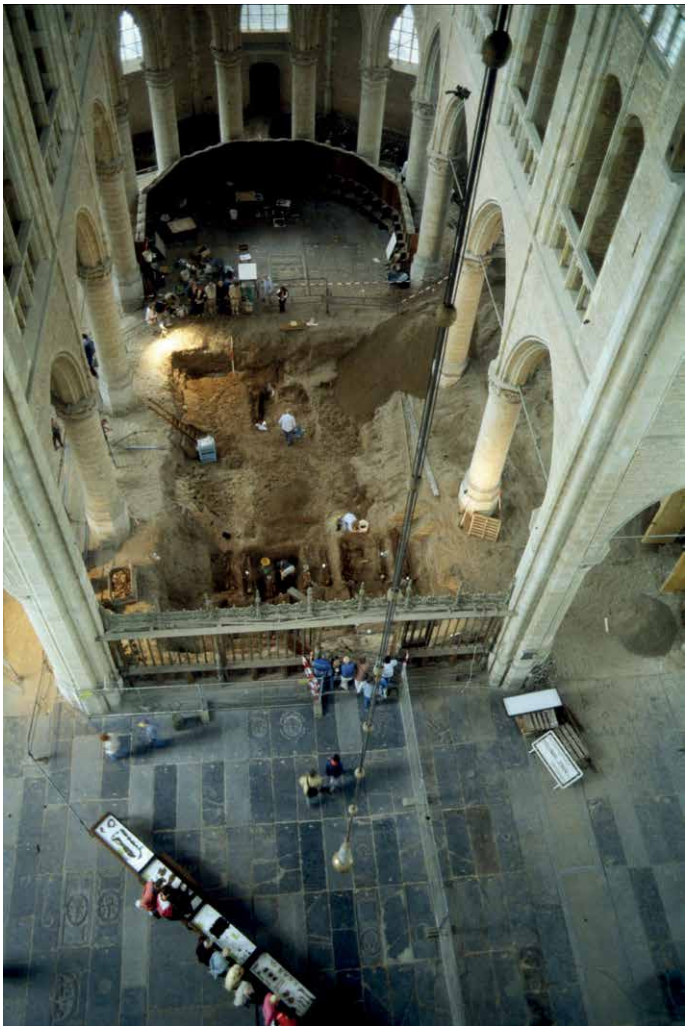


Fig. 12: Grote Kerk 1994: view of the excavation in the choir, with the tombstone floor of the nave still in place.

Fig. 13: Grote Kerk 1994-1995: view of the excavation in the northern transept. The coffins mirror the pattern of the tombstones in the church floor.

According to the burial records, the majority of the children were buried outside. Even if the child mortality rate was lower in wealthier households, there is a big difference between inside and outside average numbers in the period (5% compared to 33%).[22] This can only be explained if it was customary for wealthy deceased children to be buried in the cemetery outside as well.

Burial customs in 18th- and early 19th-century Alkmaar

Sources of information

In the assessment of the 1994-1995 excavation of the Grote Kerk, it was decided to take a further look at the written sources on burials inside the church. At first, the intention was to find written sources that could help with the interpretation of some of the archaeological phenomena we observed. But soon the project grew into an in-depth analysis of all kinds of sources on the graveyard and its inhumations. From just the records of the grave administration, the research was extended first to the management of the cemetery and organisation of funerals, and then to 18th- and early 19th-century burial customs at Alkmaar in general. A variety of written sources were used, mainly from the Regionaal Archief Alkmaar: requests submitted to the burgemeesters, resolutions passed by the burgemeesters and by the council, guild regulations, grave books with administration of the ownership and of the number of burials per grave, financial records of the church, financial records of the orphanage, probate inventories, bills of sale of graves, and eye witness reports, including one from Le Franq van Berkhey. Remarkably, the archaeological and written data are highly complementary, with less overlap than expected. In what follows, I will summarize the results of this multi-disciplinary project.[23]

Management of the graveyard

The cemeteries inside and outside the church were managed by the grave digger, who supervised the actual digging by his assistants, arranged special funeral ceremonies at the church, and took care of the maintenance of the tombstone floor.

The grave plots inside the church were privately owned, like small pieces of real estate. A plot could be bought, sold or inherited like any plot of land or a house, without interference from religious authorities. Many families had their own grave inside the church. In 1751, no less than 1,359 of the 1,755 graves inside the church were in private hands. In a town of circa 2,000 households, this meant that burials inside the church had become the norm even for middle-class citizens, and the churchyard had become designated for the burial of the very poor! Evidently, contrary to general belief amongst historians, in those days burials inside churches were not only associated with wealthy citizens.

---

22 'Child' is noted for 2650 of 8011 burials outside in the churchyard in the grave administration from samples of the periods 1750-1754, 1794-1803 and 1811-1818.

23 This chapter summarizes the research of Bitter 2002. Detailed references to the written sources are found there.

The continuous opening of graves and the use of wooden coffins that collapsed in due time, made it necessary to remove the entire church floor every eight years or so, level it with sand and then re-lay the tombstones in their original places. Tombstones broken in more than three pieces were replaced. The cost was billed to the owners of the graves. If for some reason they did not pay, the grave could be confiscated and sold on public auction.

The funeral ceremonies and the floor maintenance were an important source of income for the church masters, who were responsible for the maintenance of the church, finances and management of all employees, including the parish clerk (*koster*). The burials provided for 30-45 per cent of all financial income of the church.

Death and mourning

By far the majority of people in Alkmaar died at home in their own beds. Evidence that sick people remained at home–earthenware albarelli, glass medicine bottles, glass urinals, and earthenware bedpans–have been found in cesspits and waste pits. Funerals were arranged by guilds for their members, by neighbours or next of kin, or by an undertaker. The latter was usually hired for the more elaborate funerals of the higher classes.

For the wealthy, a funeral was also a display of social status. There were several ways of presenting the status of the deceased, and thereby of the relatives, in the funeral arrangements. In an elaborate funeral, many things had to be organized. Firstly, there were the display of the deceased at home and preparations for the funeral: employing an undertaker (*aanspreker*), distributing invitations to family and friends, arranging for a priest, 'putting into mourning' the death house (the necessary black carpets, curtains, lamps, etc. could be rented from the Orphanage), arranging for a mortician (*aankleder*), procuring the coffin, and attending to the ownership and burial rights of the grave. Next, there were many funeral details to arrange: pallbearers (guild members, relatives or friends), the bier (*baar*) and a pall (*baarkleed*) supported by a peaked wooden frame called the *roef* (provided by the guild, rented from church and orphanage, or privately owned), a burial shield (from the guild or privately owned), ceremonies, like ringing of church bells or arriving 'too late' at the church (this was done deliberately, resulting in an expensive fine, as arranged with the grave digger), a grave digger, a decorated tombstone (which was expensive), an epitaph hung on the church wall (very expensive), and a funeral meal. An important source of information on funeral practices are probate inventories, that sometimes have a list of death costs (*doodskosten*) added to the list of debts in an inheritance (Fig. 14).

The making of coffins fell under the surveillance of the carpenters' guild. According to guild regulations, coffins had to be waterproofed with tar and lined with coffin textiles. Each coffin was tested by the guild masters before delivery. There was a great variety in the quality with prices varying from six to 60 guilders. In the 1788 regulations of the carpenters' guild, the prices were fixed for oak

Inv.nr.of notary deed	473-43	476-287	481-649	481-616	480-587	480-571	473-61	479-522	482-656	476-274	480-588	482-667	475-226	480-549
Year	**1706**	**1715**	**1727**	**1726**	**1725**	**1725**	**1711**	**1722**	**1727**	**1715**	**1725**	**1728**	**1715**	**1724**
MOB	**61**	**34**	**32**	**31**	**31**	**17**	**15**	**15**	**15**	**6**	**6**	**6**	**3**	**3**
Grave digger (grave, 'extra')	42	32	12	39	40		8	29	23	10	11	11	9	0
Morticians	40	20		31	25	12	12	14	15	16	10	10	4	9
Undertakers	54	36	17	51	35	21	18	29	14	14	13	15	5	6
Pallbearers	300	80		117	101	40	48	64	49	56	21	29		
Police escort	12	8	1	6		2	1		1	3	1	1	1	
other costs	10	67		3	39	30		21		6	2	4		
Coffin	**30**	**31**	**24**	**0**	**25**	**28**	**29**	**16**	**22**	**25**	**24**	**10**	**8**	**0**
Pall rented	10	10	9	10	10		8		10	8	3	11	8	8
Mourning coats rented	24	45	6	32		12	13		14	13	6	9	1	8
Clothes, house in mourning	100	365	44	307	79	63				46		30	20	
Bread, biscuits etc			8					1			8			2
Meat	30			11										
Wine	75	57	17	44	31		38	16	20	48	49	49		20
Beer		14	3		26	3						6	16	3
Coffee, tea			6									8		
Tobacco, clay pipes		4					1			2		4		2
other costs funeral meal	91	26		35	1	8	29	8		21		31	9	
Total costs	879	829	179	717	443	236	220	213	183	274	154	234	84	61

Fig. 14: Funeral costs in 14 probate inventories at Alkmaar, 1706-1728. The items are explained in more detail in the section 'The funeral'. MOB was a tax on wealth.

coffin type	price
a 3-inch coffin and lid	f60
a 2½-inch coffin with a 3-inch lid	f50
a 2½-inch coffin and lid	f42
a 2-inch coffin with a 2½-inch lid	f37
a 2-inch coffin and lid	f31
a 1½-inch coffin with a 2-inch lid	f26
a 1½-inch coffin and lid	f22
a child's coffin less than 2 feet long	f3

Fig. 15: Oak coffin types and their prices, as fixed in the carpenters' guild regulations of 1788.

coffin type	price
a 2-inch deal coffin, best quality	f18
2-inch deal coffin, common quality	f16
a 1½-inch deal coffin, best quality	f11
a 1½-inch deal coffin, common quality	f10
a 1¼-inch deal coffin, best quality	f9
a 1¼-inch deal coffin, common quality	f8
a 1¼-inch pine coffin, best quality	f7
a 1¼-inch pine coffin, common quality	f6

Fig. 16: Deal and pine coffin types and their prices, as fixed in the carpenters' guild regulations of 1777.

coffins of various wood thicknesses (Fig. 15).[24] In 1777, prices were fixed for cheap wooden coffins (Fig. 16).

As revealed in the excavation, only thin traces of indiscriminate dark brown wood pulp remained of the coffins. The tar may have caused the brown colour of the sandy soil. Some of the coffins were equipped with decorative iron handles, with a concentration of handled coffins in the choir.[25] The concentration must have been related to the wealth of the deceased, as well as to the higher status of the choir, even for Protestants. In written records, handles are very rarely mentioned–the probate inventories contain only one bill for one set that cost eight guilders. Sometimes initials or a name were formed on the lid with copper nails. An engraved brass plate with the name of the deceased was only found on one single coffin during the excavation. Five engraved brass plates were found in one of the burial chambers.

The house of the deceased was 'put into mourning'; black textiles were draped over furniture, paintings and mirrors, black carpets were spread on the floor, the windows were shuttered and hung with black curtains, and a candleless death lantern was hung outside. These items could all be rented for the occasion from the Orphanage.

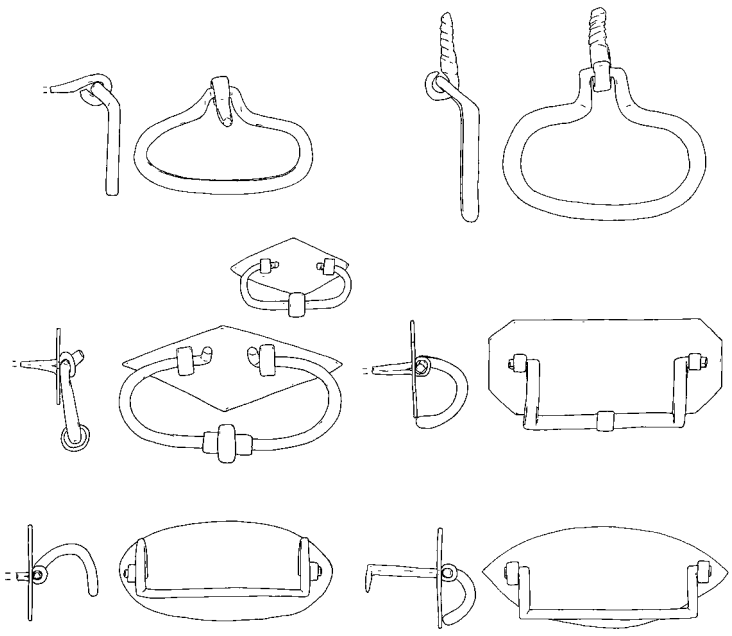


Fig. 17: Five types of iron coffin handles were distinguished (drawing by the author).

24 In the 18th century, measurements consisted of *voet* and *duim*, comparable to the present-day imperial foot and inch.

25 Handles were found fitted on 39% of 95 coffins excavated in the choir, compared to 7% of 806 coffins in all other parts of the church.

Prior to the funeral, viewing of the deceased took place at the home. The coffin, however, was closed on the day of the funeral.

There were hardly any grave gifts excavated: only two gold rings, one single golden earring and a pair of golden earrings with small diamonds. The very few precious objects excavated appear to have been left in the coffin by accident. Even metal buttons were taken out of the coffin before it was closed.

Fig. 18: Grave of Geldolph C. van Vladeracken, age 58, buried on April 14, 1821 in an oak coffin with his initials on the lid and a glass flower vase at his feet.

Interestingly, clothing remains were found in no less than 240 graves. Not only fragments, but sometimes entire garments were recovered. Textiles made of animal fibres, wool and silk, had been preserved, especially in the drier areas above ground water level and away from the outer walls of the church. Textiles made from plant fibres, linen and cotton, had all perished, leaving only silk brims, buttons or copper hook-and-eyes of the clothes. According to a few narrative sources, it was customary to be buried in a death shirt (*doodshemd*) that was supposedly given as a wedding present (how romantic!). Such a shirt was made of fine white linen and fastened with black silk ties. Indeed, remains of such ties were found, but they were far less common than suggested by the written sources. The black silk ties of the linen death shirts proved to be quite rare, found in only 35 graves; in 27 graves they were found together with other clothing. Apparently, these death shirts were not as commonly used as suggested by historians.

Many pieces of clothing proved to have been worn and repaired many times. The repairs may not have been visible as most of the body was covered by the coffin textiles. This also explains why all the clothing recovered only covered the upper body. The excavations rendered only one pair of trousers and no skirts. The finds show that textiles were indeed highly valued and even the wealthy Alkmaar classes would wear worn and repaired shirts and coats in their homes. Apparently the dressing up of the upper body of the deceased with clothes, unknown from written sources, must have been commonplace.

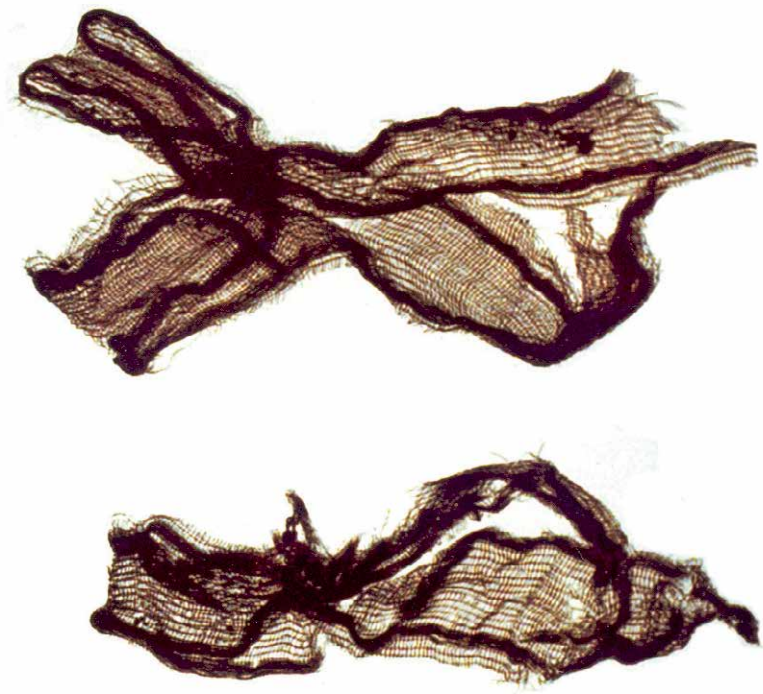


Fig. 19: Black silk ties from the grave of Hendrik Vlasboem, age 81, buried on December 22, 1820.

Fig. 20: A woollen coat over a woollen damask vest with blue and white flower motif imported from England and a red woollen towel, from the grave of Albert Valk, age 59, buried on July 4, 1778.

Fig. 21: A woollen waist band ('gezondheid') over a woollen bodice and knitted woollen wrist covers ('mitella'), from the grave of Dorothee Catharina Maria Schluters, age 44, buried on March 19, 1777.

The funeral

For the funeral, the coffin was carried from the deceased's house to the grave. It was placed on a bier and covered with a pall that could be decorated with a funeral shield. The pall was draped over a peaked wooden frame called a *roef* placed on top of the coffin. The guilds had funeral shields which could be used, but a wealthy family commonly had its own shield with its coat of armor. The funeral shield was either fixed to the pall or carried by a shield-bearer.

For the most part, women were not present at funerals, not even of their husbands or parents, except at funerals of children or of women who had died in childbirth. The funeral procession would travel from the death house to the church on foot, sometimes over great distances, for example, when the sheriff of Heiloo died in 1782, the procession covered a distance of three kilometres from his home at the far eastern part of town, where he died, to the church.

Historical literature suggests that hearses and carriages became common in the 18th century, but this proved not to be true. A hearse was first used in Alkmaar only in 1771 for the funeral of Bregitta de la Croix, the wife of mayor Carel de Dieu, one of the wealthiest men in the town. However, it would take more than half a century before hearses became more common.

A funeral of a high status individual was a great event that drew many spectators. The participants were dressed in mourning robes, that were either hired or purchased. At the church, one could indulge in expensive extras like the tolling of bells, arriving too late and putting up a memorial plaque in church.[26] One of the largest bills of a grave digger I found totalled 181 guilders.

On arrival at the church, the coffin was brought directly to the grave. Usually only a brief memorial speech was given before the coffin was interred. Funeral services for the Catholic departed were held at their homes on the evening prior to interment and/or in the Catholic 'hidden' church.[27] It must be noted that in the excavated graves no differences could be noticed between the burials of Protestants, Catholics or members of other religious groups.[28]

Coins are often found in graveyards, as was the case in Alkmaar. During the excavation, no less than 304 copper coins and one single silver guilder were collected. They are thought to have been 'coins for Saint Peter', a pre-Christian tradition also known from Greek myth as the coins paid to the ferryman to cross the Styx. In some countries in the first half of the 20th century, coins were thrown

---

26 The tolling of bells cost f.4 per period (possibly a half hour), the penalty for 'too late' was f.8, the hanging of a memorial epitaph was *f93* (just for fixing it on the nail, without the cost of the actual epitaph).

27 The first years of the Reformation were sometimes violent, but religious controversies were not as fierce in later years. Obviously, the non-Protestants were highly discriminated against; public office and government positions were denied to them. Soon, however, they were allowed to build their own churches, albeit without burial rights and without the tolling of bells for masses. The Baptist church (built in 1617), Roman Catholic churches (1622 and 1656) and the Remonstrant church (1658) were built behind houses at inconspicuous locations, but of course they were far from hidden. The deceased of all churches were buried in or next to the Great Church or in the Kapelkerk, except for Jews who established their own graveyard outside town in 1746.

28 The only exceptions were two Catholic priests, who were buried in the early 19th century in a grave owned by the Catholic community. They were dressed in formal clothes, wearing, among other things, their *tunica*, chasuble, *stola*, wig and priest's hat (*bonnet*), woolen stockings and shoes.

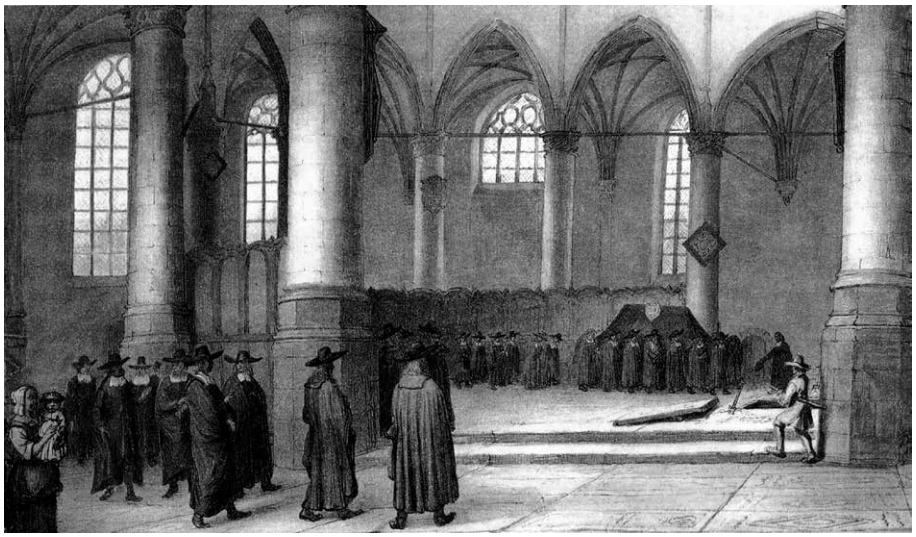


Fig. 22: Funeral in the choir of the Church of St. Lawrence, a drawing by L. Doomer in 1692 (Regionaal Archief Alkmaar, PR 1000621).

into the grave pit at Catholic funerals.[29] In Alkmaar, a few coins were found inside graves; in two graves, coins covered the eyes. Six graves with coin gifts were identified, two Roman Catholic and four Protestant graves. A remarkable singular find was a hoard of 52 silver coins, the most recent from 1677, with remains of a linen bag. The numismatic Hans Jacobi has suggested that perhaps a purse was accidentally lost somewhere outside and ended up in the church when soil was brought inside to level the floor.[30] However, a few comparable treasure finds at cemeteries have been documented, which might suggest some sort of burial ceremony involving the deposition of a purse with coins.

After the funeral, the cortege returned to the house of the deceased for a funeral meal. After 1800, this would more often be held at a local inn. In probate inventories, that were usually created for the inheritance, the expenses for the funeral were sometimes specified, especially in the late 17th and early 18th centuries. They included specifications of the funeral meal, where not only coffee, tea, rasped bread and tobacco were listed, but sometimes also a complete dinner with meat and wine, etc. Special mourning tableware, made from English blackware, could be rented in a specialised shop.[31] Not only coffee and tea cups and pots but also dishes, bowls, and cuspidors were sometimes mentioned, as well as glasses and jugs. Archaeological cesspit finds show that these mourning services were also privately owned.

29 Dezutter 1975.

30 Jacobi 2001.

31 In the first half of the 18th century references are made to a shop at Langestraat 16 owned by the family Van Rossen, where the items could be rented.

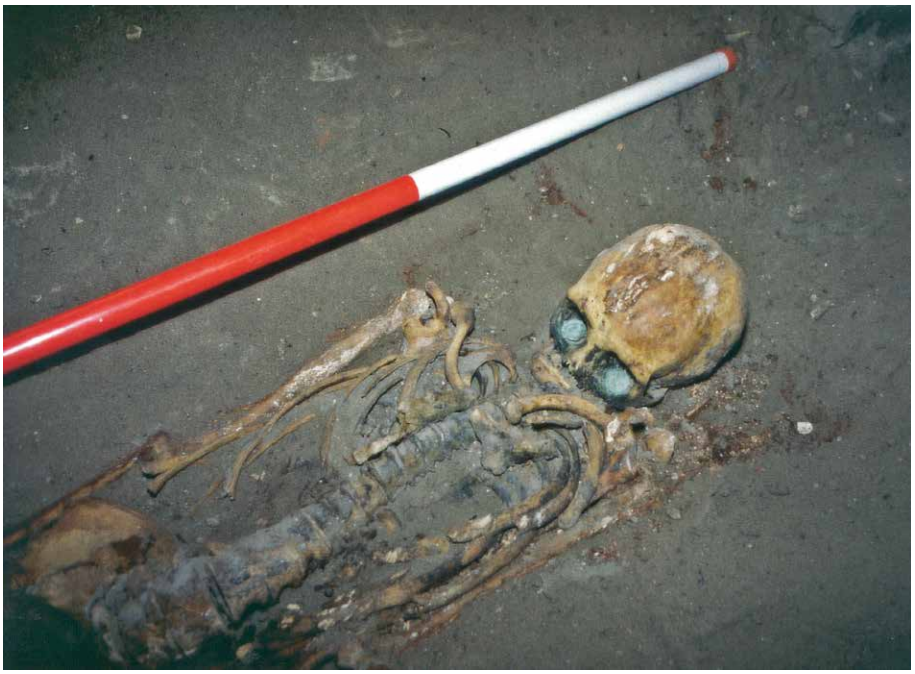


Fig. 23: Grave of an unidentified old woman, buried with copper coins of 1 Cent (after 1819) covering the eyes.

The specified funeral costs in some probate inventories provide insight into many aspects of funerary customs, albeit those of the wealthier classes. As an example, see Fig. 14 for the costs of 14 funerals between 1706 and 1728. It appears as if not all costs were always specified. Note, for instance, the absence of the price of the coffin on two occasions. Presumably the funeral meal came partly from a family's own storage supplies and most of the random items listed may refer to extra purchases. From 1695 to 1805, the State of Holland levied a special tax on burials of the rich, the *Middel Op Begraven* (MOB), based on the annual income of the deceased. If we arrange the data on funeral costs according to the MOB, we can see that the most wealthy spent large sums of money on funerals. An expenditure of 500 to 1,000 guilders for the most expensive funerals was not uncommon. This equaled the price of a mid-sized town house! Note that only two burials in our sample actually included the most expensive coffin.

There is a large difference between the cost of the most expensive funeral and the cheapest. The gravedigger's bill for a funeral inside the church could amount to more than 16 guilders for church rights and the digging of the grave. Burials in the graveyard outside would have cost seven guilders for the church rights and the coffin, or just one guilder if the body was buried in a body bag.

Changing burial customs

As shown above, in the 17th century and first half of the 18th, many people owned a family grave inside the church. By the middle of the 18th century, more than three quarters of the graves were in private hands. The number slowly declined over the course of the 18th century, from 1,359 in 1751 to about 1,200 circa 1780.

This changed drastically shortly after 1780. Many graves were confiscated by the church masters when people did not pay for the floor repair costs of 1781-1782. Around 1800 merely a quarter of the graves were privately owned. By1808, 457 graves were in private hands, in 1823 there were 584. While burials outside used to be reserved for the poor, the numbers of funerals outside increased dramatically at the beginning of the 19th century.

Changes are also reflected in the inscriptions and decorations on tombstones. In the 18th century, it became common to have a family grave covered by an old tombstone with the symbols and names of strangers on it, instead of a new tombstone with a personal design. In the present-day church, only a few tombstones bear dates from after 1750. Of the 195 decorated tombstones still present in the church, 72 per cent are from before 1700 and only 11 per cent from after 1750.

In the French period, after 1795, the number of elite funerals with tolling of bells and 'too late' arrivals rapidly declined. However, despite the revolutionary ideology and the persecution of nobility in France, elite burials did not disappear. The tolling of bells was still practiced in a dozen funerals between 1797 and 1803. In addition, a new arrangement was even introduced for elite funerals. Already in the 18th century an elite funeral was sometimes held in the evening or at night, with the funeral procession lighted by torches. Normally funerals were held in the afternoon. In 1796, the price for this 'extra late' was lowered from a steep 60 guilders to eight. In the same year, or perhaps the following year, funerals at dawn–a novelty–were introduced at the same price. Funerals at this hour, thus far unknown from any study of burial customs of the period (unknown also from French traditions), soon became a general custom for burials inside the church in Alkmaar. This 'extra early' was charged for 44 per cent of the 484 funerals in 1797-1803 and for 88 per cent of the 423 funerals of 1811-1821.

These changes may have been the result of two developments. First, by the middle of the 17th century a steady, long-term economic decay had set in, reflected, in part, in the decreasing value of real estate properties. The middle class slowly sank into poverty. Matters grew severely worse in 1780-1784 when the Republic of the Netherlands was at war with the English. Additionally, the French occupation from 1795 to 1813 brought the country close to bankruptcy.

Meanwhile, in France already by the middle of the 18th century a resistance against burials inside churches had developed. There were complaints about the smell and lack of hygiene that were denounced as a blasphemy of sacred places. Also, committees of scientists and physicians pointed to public health risks. These changing ideas inspired by the Enlightenment led to the first cemeteries in profane soil outside French towns in the 1770s. In the Netherlands, there was a more hesitant response, with several inspired speeches and publications, but little action.

Only a handful of new cemeteries were established in the countryside,[32] and people in general held onto their old customs, that is, for as long as they could afford them.

Even in the French period the old customs continued. Prohibitions of cemeteries inside town walls by the French government in 1795, 1801 and 1804 were all ignored. It seems that the practice of burying the dead in sacred grounds near or inside churches prevailed over considerations of hygiene, even allowing the continuation of smelly, unpleasant situations inside sanctuaries.

Eventually, several years after the French period, the Dutch king issued a law against burials inside towns in 1827. At Alkmaar, the General Cemetery outside the town was opened in 1830, with buildings, layout and the garden designed by Jan David Zocher, Jr.[33] The last burial inside the Church of St. Lawrence was on September 13; the first at the General Cemetery was held two days later.

Conclusion

In this article, I have shown that archaeological and written sources on cemeteries and burial customs complement each other in many ways. Archaeological finds provide data on several aspects of urban graveyards that are not documented in written records, and the other way around as well. For the medieval period, this is easily explained by the scarcity of archival material, but even in the 18th and 19th centuries, a period for which many administrative and other sources are available, archaeology provides another kind of data sets.

The research project in the Great Church of Alkmaar was in many ways a pioneer adventure in this respect. At the time of the dig, studies done in Zwolle and 's-Hertogenbosch were the only comparable studies available.[34] My study demonstrates the positive effects of a multidisciplinary approach to a subject like mortuary practices in medieval and post-medieval times.[35]

32 New 'countryside cemeteries' were opened at Scheveningen in 1777, outside Zwolle in 1779, outside Arnhem in 1783, outside Tiel in 1786, at Diemen in 1791, but in the first decades there were few burials.

33 Boots & De Reus 1996.

34 Clevis & Constandse-Westermann 1992; Portegies 1999.

35 A more recent example is Goudriaan *et al.* 2013.

Bibliography

Baetsen, S., 2001: *Graven in de Grote Kerk. Fysisch-antropologisch onderzoek in de Grote of St. Laurenskerk te Alkmaar*, Alkmaar (Rapporten over de Alkmaarse Monumentenzorg en Archeologie nr.8).

Binski, P., 1996: *Medieval death. Ritual and representation*, London.

Bitter, P. (ed.), 1999: *Goed gevonden. Textielvondsten uit archeologische opgravingen in de Grote of St. Laurenskerk te Alkmaar*, Alkmaar (Rapporten over de Alkmaarse Monumentenzorg en Archeologie nr. 7).

Bitter, P., 2002: *Graven en begraven. Archeologie en geschiedenis van de Grote Kerk van Alkmaar*, Hilversum (published doctoral dissertation, University of Amsterdam).

Bitter, P., 2004: 'Archeologische verrassingen in de Kapelkerk', *Nieuwsbrief Monumentenzorg en Archeologie gemeente Alkmaar* nr.10, 2-3.

Bitter, P., 2008: 'Goed gevonden, goed behouden. Textielvondsten uit de Grote Kerk van Alkmaar', in: N. Cassée & E. de Groot (eds.), *Jaarboek 2006: Archeologisch textiel: van vondst tot vitrine* (Stichting Textielcommissie Nederland. Jaarboek 2006, Textieldag gehouden in het Instituut Collectie Nederland in Amsterdam op 5 oktober 2006), Amsterdam, 187-199, 236-237.

Bitter, P., 2010: 'Vestingwerken en andere resten bij de Paardenmarkt (09PAA)', in: P. Bitter, R. Roedema, K. Beemster & F. van den Oever, *Die muere van onse voorouders. Opgravingen van vestingwerken aan de noordkant van Alkmaar (2006-2009)*, Alkmaar (Rapporten over de Alkmaarse Monumenten en Archeologie nr. 16), 71-104.

Bitter, P., 2013: 'Begraven onder de zerken. Archeologisch en archiefonderzoek naar 18e- en vroeg-19e-eeuwse grafgebruiken in de Grote Kerk van Alkmaar', in: K. Goudriaan, P. Bitter & V. Bonenkampová (eds.), *Graven spreken. Perspectieven op grafcultuur in de middeleeuwse en vroegmoderne Nederlanden*, Hilversum, 37-51.

Bitter, P., 2014a: 'Beguines, friars and nuns in medieval Alkmaar', in: M. Gläser (ed.), *Lübecker Kolloquium zur Stadtarchäologie im Hanseraum, IX: Die Klöster / The monasteries*, Lübeck, 117-132.

Bitter, P., 2014b: 'Alkmaar en de graaf van Holland. Enkele archeologische en archivalische gegevens nader beschouwd', in: E. Bult, T. de Ridder & E. Beukers (eds.), *Graven in Holland*, (themanummer *Westerheem*, September 2014), 32-57.

Bitter, P. & S. van Zanten (eds.), 2013: *Voor De Vest. Opgravingen van vestingwerken, een klooster, een gasthuis en andere resten bij het Canadaplein (1998-2000)*, Alkmaar (Rapporten over de Alkmaarse Monumenten en Archeologie nr. 17).

Bitter, P., M. Boulonois & T. de Ridder 1996: 'Friese ringvormige aardewerken constructies: pottenbakkersovens?', *Westerheem* 45, 70-95.

Bloys van Treslong Prins, P.C. & J. Belonje, 1928: *Genealogische en heraldische gedenkwaardigheden in en uit de kerken der provincie Noord-Holland*, Utrecht.

Boots, W. & G. de Reus, 1996: *De Algemene Begraafplaats Alkmaar. Ontstaansgeschiedenis van de buitenbegraafplaats en een inventarisatie van de grafmonumenten (1830-1950)*, Alkmaar (Rapporten over de Alkmaarse Monumentenzorg en Archeologie nr. 2).

Clevis, H. & T. Constandse-Westermann (eds.), 1992: *De doden vertellen. Opgraving in de Broerenkerk te Zwolle 1987-88*, Kampen.

Cordfunke, E.H.P., 1985: 'Alkmaar', in: P.J. Woltering (ed.), 'Archeologische kroniek van Holland over 1984, I. Noord-Holland', *Holland* 17, 321-347 (p. 336).

Cordfunke, E.H.P., 1992: Thirty years of archaeological investigation in Alkmaar's town centre, *Berichten R.O.B.* 40, 333-387.

De Raad, H., 2015: Het klooster van de Minderbroeders, *Oud Alkmaar* 39 nr.1, 10-14.

Dezutter, W.P., 1975: 'Dodenmunt, penningkeerse en absolutiebrief', in: *Miscellanea. Feestbundel voor prof.dr. K.C. Peeters,* Antwerpen, 193-206.

Drewes, J., 2011: 'Oude hoven', *Oud Alkmaar* 35, 43-50.

Goudriaan, K., P. Bitter & V. Bonenkampová (eds.), 2013: *Graven spreken. Perspectieven op grafcultuur in de middeleeuwse en vroegmoderne Nederlanden*, Hilversum.

Griffioen, A., S. Hakvoort, R. Schats, P. Bitter et.al., 2015: *Graven en begraven bij de Minderbroeders. Een archeologische opgraving op de Paardenmarkt in Alkmaar*, Alkmaar/Zaandijk (Rapporten over de Alkmaarse Monumenten en Archeologie nr. 22).

Jacobi, H.W., 2001: 'Een opmerkelijke muntvondst op een opmerkelijke plaats', in: P. Bitter & L. Noordegraaf (red.), *De Sint Laurens in de steigers. Bouwen, beheren en restaureren van de Alkmaarse Grote Kerk*, Alkmaar (Alkmaarse Historische Reeks XI), 225-235.

Portegies, M., 1999: *Dood en begraven in 's-Hertogenbosch. Het Sint-Janskerkhof 1629-1858*, Utrecht.

Rogge, C., 1995: *De grafzerkenvloer in de Grote of St. Laurenskerk te Alkmaar*, Alkmaar (Rapporten over de Alkmaarse Monumentenzorg en Archeologie nr. 1).

Rogge, C., 2005: 'De grafstenen vloer in de Kapelkerk te Alkmaar', in: L. Noordegraaf & C. Rogge (eds.), *De Alkmaarse Kapelkerk. Geschiedenis en restauratie*, Alkmaar (Alkmaarse Historische Reeks XIII), 135-168.

Schats, R., L.M. Kootker, R. Houchin & R. Hermsen, 2015: 'De menselijke skeletresten', in: A. Griffioen *et al.*, *Graven en begraven bij de Minderbroeders. Een archeologische opgraving op de Paardenmarkt in Alkmaar*, Alkmaar/Zaandijk (Rapporten over de Alkmaarse Monumenten en Archeologie nr. 22), 172-255.

Van der Hoeve, J.A. & T. Tel, 2005: 'De bouwgeschiedenis van de Alkmaarse Kapelkerk', in: L. Noordegraaf & C. Rogge (ed.), *De Alkmaarse Kapelkerk. Geschiedenis en restauratie*, Alkmaar (Alkmaarse Historische Reeks XIII), 9-100.

Medieval and post-medieval cemeteries in and around the city of Delft

Thirty years of rescue archaeology

Epko J. Bult

Introduction

In 1246, Delft was granted city rights from the Count of Holland, Willem II. From the 13th to 16th century, major transitions took place in Delft. In its formative period, the 13th and 14th centuries, Delft still resembled an agrarian village with wooden houses, livestock kept in the town, and crafts and trade mostly based on agrarian products. Its central location for agrarian producers reflects the primary function of Delft as a local and regional market place. The number of people living in the settlement during the middle of the 13th century is estimated between 500 and 2,000 inhabitants.[1]

During the 15th and 16th centuries, Delft grew into a fully developed town with brick houses. The specialised crafts of beer and cloth production became its hallmarks, and Delft expanded into a centre for inter-regional trade. In order to provide housing and space for the ever increasing population and businesses, the area within city limits quadrupled in size in this period (Fig. 1). In 1355, Delft was at its largest during the late medieval period.

Beginning in the early 15th century, the population in Delft grew from 6,500 inhabitants to around 15,000 in 1556.[2] This rapid growth made it necessary for the local government to take multiple measures to address overcrowding and environmental pollution in order to stimulate crafts and export and to reduce unemployment. Lack of food, poor quality of water in the canals, and disease during the second half of the 16th century and the beginning of the 17th century, especially during the revolt against Spain, reduced the number of inhabitants dramatically to

1 Verhoeven 2015, 75.
2 Verhoeven 1992, 8, table 2.1, item 2015, 158.

about 8,500 in 1558. According to the famous medical doctor Pieter van Foreest, the epidemic plague of 1557/58 claimed 6,500 victims in Delft.[3] He arrived in the city in February 1578 and according to his account, he passed seven funeral processions before he reached the town centre. He also noted that the city had had to raise the level of the cemetery as high as the top of the graveyard wall in order to bury all the dead.[4] Around 1600, the number of inhabitants was about 17,500[5] and in 1700, 25,000.[6]

During the medieval and early modern periods, there were at least 14 graveyards in and around Delft in active use (Fig. 2). Two of the cemeteries belonged to the medieval parish churches the *Oude Kerk* (Old Church) and the *Nieuwe Kerk* (New Church). Other graveyards were connected to monasteries, of which three were situated outside the city. At least six monasteries inside the city are known to have had cemeteries. Another important graveyard belonged to the infirmary *Oude en Nieuwe Gasthuis* (ONG),[7] while *St. Marthahuis*, a house for aged women, also had its own graveyard. In times of epidemics like the plague, temporary cemeteries

Fig. 1: The expansion of the juridical area of Delft during the Middle Ages.

3 Houtzager 1996, 101.
4 Houtzager 1996, 99.
5 Verhoeven 2015, 377.
6 Abramse & Rutte 2016, 194.
7 Known in the archaeological archive as ONG.

where used, even inside the town (e.g., Schutterstraat). From the 15th century onward, a cemetery belonging to a leper hospital was situated outside the town. In the 17th century, other cemeteries for nonreligious came into use outside the town, for example, a cemetery connected to a lazarette, a graveyard for merchants of English wool (Engels Kerkhof near the Hooikade), and a graveyard for Jews (Geertruyt van Oostenstraat), which was established in 1840.

In the last 30 years, several excavations and archaeological observations have revealed cemeteries in Delft and in locations that are closely connected to the medieval town. Six of them will be discussed in this chapter in terms of burial practices and disease in relation to the socioeconomic status of the deceased. To date, no overview article has been presented on this topic.

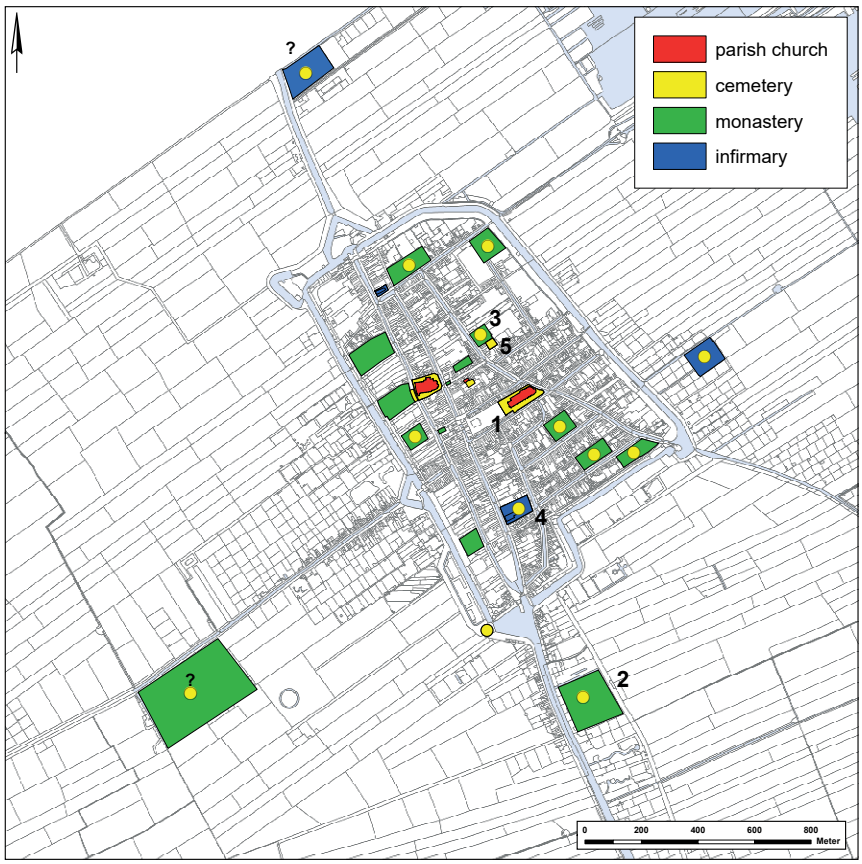


Fig. 2: The location of the graveyards in and around Delft. The five cemeteries discussed in the chapter are 1=Nieuwe Kerk; 2=Koningsveld Priory; 3=Maria Magdalena Convent; 4=Oude en Nieuwe Gasthuis; 5=Cemetery of the Plague, Schutterstraat.

It is expected that individuals were not buried randomly; the deceased were clustered by gender, socioeconomic status, and religious background.[8] The grave books of the Oude Kerk reveal the position of the graves in and outside the church in 1367, *c.* 1390, 1420, and 1470. They were arranged in numbered rows called 'pleinen', which had a north-south orientation.[9] Families who bought a grave inside the church in front of the choir had to pay about five times as much as those who purchased a plot outside the church.[10] The most prominent families of the 12th and 13th centuries were buried in front of the choir.[11] Because these graves remained in the families, sometimes for several centuries, it was not easy for later elites to buy the best plots, so they had to be satisfied with less prestigious locations in the church, further away from the altar.[12]

Burial within a priory was also perceived as more prestigious than burial in the graveyard near or in a regular parish church, and burial within the chapel was more prestigious than outside it. Individuals who died during an epidemic were often buried in plots that were specially prepared for this purpose, like the one investigated at the Schutterstraat (see below).

Since the formation of the Delft Department of Town Archaeology, the investigation of burial rites and the analyses of cemeteries has been a main focus of the archaeological research agenda of the town.[13] The aim of the research is to make a connection between the general health condition of the different social classes and their housing and material culture. Against the historical background of Delft, some questions were formulated for which physical anthropological research of the skeletons of the cemeteries might provide answers.

- Was there a difference in how the deceased were buried in the different cemeteries and between the late-medieval Catholic and the early modern Protestant periods? Was there a difference between monastic and lay burial practices?
- Which disease patterns occurred in the local population? What was the general health condition of the local population? Did life circumstances deteriorate for the inhabitants of Delft at the end of the 16th and early 17th centuries? Did the changing urban environment have an effect on this?
- Did the efforts of local government to address the health situation with their areal planning kept pace with the increasing population?
- Was the population growth a result of natural increase or of immigration? If the latter, what was the source of the immigration?

For this chapter, the main focus will be on changing burial types and practices and on changing health conditions.

8 Westen *et al.* 2012, 22.
9 Bonenkampová 2013, 194-95.
10 Bonenkampová 2013, 197.
11 Bonenkampová 2013, 203.
12 Bonenkampová 2013, 204.
13 Bult 1998, 22; Bult 2011, 53.

So far, archaeological investigations have been carried out in the graveyard of the Nieuwe Kerk, in the ONG cemetery, in the graveyards of three monasteries (Koningsveld Priory, Maria Magdalena Convent, and the Clarissen Convent)[14] and in a temporary burial place for victims of the plague (Schutterstraat). Incidental observations have been made about the Oude Kerk, three monasteries (Minderbroedersklooster, St. Ursulaklooster, St. Annaklooster), St. Marthahuis, and the Engels Kerkhof. In this chapter, the cemeteries that have been excavated are discussed in light of the research questions outlined above.

The Koningsveld Priory (1252-1573)

The Koningsveld Priory was founded in 1251 in the *curte nostra de Delf* of the Count of Holland, Willem II.[15] This complex was the centre of the Hof van Delft, a large estate with serfs who worked the land of the count. This priory was situated south of the late-medieval city of Delft between the Schie Channel and the present-day Rotterdamseweg. Its name in Latin was *Campus Regis* (King's Field) named after the count, who had by then been crowned as a rival holy Roman emperor. A year later the auxiliary bishop of Utrecht consecrated the altar and the graveyard within this newly built complex.[16] Several papal bulls and charters made clear that the convent was inhabited by nuns who followed the Second Rule of St. Augustine as prescribed by the Rule of St. Norbert.

In its early years, the Premonstratensian Order demanded asceticism, poverty, and mendicant preaching,[17] but from the 13th century onwards, the order loosened its strict rule and its focus shifted to carrying out priestly duties in parishes and managing infirmaries. Until *c.* 1400 it was the only monastery in or near Delft. The priory could accommodate a maximum of 20 nuns, due to its limited financial resources.[18] In 1573, 17 women lived in Koningsveld.[19]

According to historical sources, most of the nuns came from noble families.[20] They spent their time in prayer, meditation, and contemplation. Lay brothers and sisters, together with servants, were responsible for all manual work. Until *c.* 1450, the lay brothers and sisters were also responsible for providing care in the infirmary of the Oude en Nieuwe Gasthuis in Delft. Those who could afford it were buried in the monastery, thereby enhancing their chances of entering heaven. The wealthiest of these were buried in the chapel, but some may also have been buried in the garth.

In 1572, Delft joined the revolt against the Spanish and confiscated all Catholic properties within its territories. All buildings outside the city walls were demolished by order of Willem I of Oranje-Nassau. He feared these buildings would be used as strongholds by the advancing Spanish forces. This destruction marked the end of the Koningsveld Priory.

---

14 Van Horssen 2017b.
15 Koch, OHZ II, nr. 892.
16 Koch, OHZ II, nr. 920.
17 Westen et. al. 2012, 7.
18 Drossaers 1917, 10.
19 Verhoeven 2006, 102.
20 Verhoeven 2006, 102.

The excavation

Excavations in 1988, 2001, and 2003 revealed a moat and several other ditches, as well as structures believed to be a chapel, cloister garth, kitchen, refectory, living quarters, storage rooms, and a large granary, together with graveyards in the chapel, in the corridor of the cloister garth, and in a separate location west of the chapel (Fig. 3).[21] Due to the moist clay soil, most of the organic material like bones and wood has been well preserved.

The chapel was the oldest stone structure revealed, dating from the second half of the 13th century. It measured 37 x 9 m. and was constructed with 30 x 15 x 8 cm bricks. The walls within the complex were dated to the second half of the 13th century, based on the size of the bricks used for construction. The choir of the church was 17.6 m long and did not contain any graves. The graves were situated in the nave of the church. A cloister garth with a cistern in the middle of it was situated north of the chapel. No burials took place in the garden, but many burials had taken place in the corridor of the cloister garth. The refectory and the kitchen were located north of the garth, while the domestic housing of the nuns and lay brothers and sisters was situated on the west side of the cloister garth.[22] West of the chapel, a spot was reserved to bury other persons, among them a few very young children.

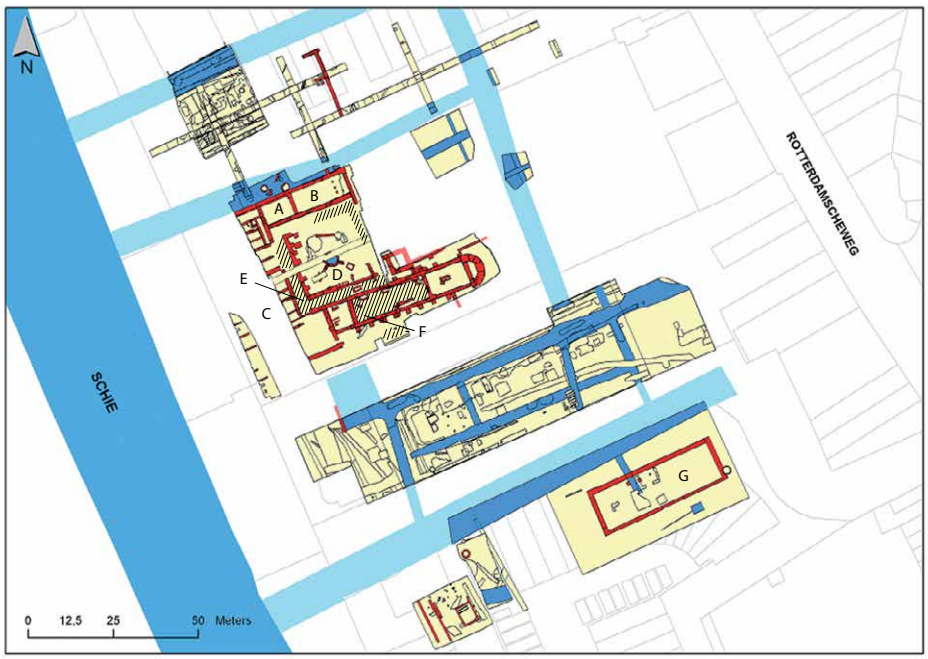


Fig. 3: Plan of the Koningsveld Priory. Legend: ditches and Schie Canal – blue; brick Priory buildings – red; burials – hatched; A – kitchen; B – refectory; C – domestic housing and storage; D – cloister.

21 Bult 2006, 115; Westen et.al. 2012; Bult 2014a, 135-36, 142.
22 Bult 2006, 114-16.

Burial types and practices

According to Premonstratensian burial customs, members of the Premonstratensian order, people associated with this order, people who came to die within the *hospitium*, and people who could afford it, were buried inside the monastery.[23] This suggests that there could be significant variation in the burial patterns within a monastery and that both religious and laity were buried in the church and garth.

Within the part of the graveyard that was excavated, 182 primary and at least 29 secondary interments were located.[24] The graveyard consisted of three separate burial grounds: (1) primary graves within the nave of the chapel, (2) primary graves within the corridors of the cloister garth, and (3) primary graves within an open area west of the chapel. As well, secondary interments were found in the three locations. The burial rites corresponded with a Christian interment. All the deceased were buried in coffins, lying extended on their backs with their heads towards the west. Arms and hands were placed on the chest or lap, or lay extended along the body.[25]

Because it is believed that people were buried according to religious and/or socioeconomic status in the late-medieval period, the hypothesis is that individuals buried within the nave of the chapel had religious importance or had a very high secular status, that the deceased buried in the garth were religious or had a high secular status, and that individuals buried in the cemetery west of the chapel probably were of a moderate secular status. It is known that members of several noble families were buried in the convent of Koningsveld, probably in the nave of the chapel.

Of the coffins, 24 were rectangular, 23 were slightly trapezoid and only three were trapezoid.[26] Forty-three percent were constructed of oak (*querqus* sp.), 30% of European silver fir (*abies alba*), and 11% of beech (*fagus sylv.*). A small number of coffins were made of willow (*salix* sp.), conifer like pine (*pinus syl.*), and larch (*picea/Larix*).[27]

In one of the graves, two St. Jacob's shells, which were carried by pilgrims who had visited Santiago the Compostello in Spain, were found. Although these pilgrim badges were usually worn on hats, these badges were found on the abdomen, indicating that the badges had probably been fastened to the waistband (Fig. 4).

In the chapel, seven tombs were discovered dating from the second half of the 13th century, probably used as a family grave (Fig. 5).[28] DNA samples were taken to verify this hypothesis, but they have not yet been interpreted. One of the tombs had a plaster wall painted yellow. A red Romanian cross was painted on the wall (Fig. 6).

---

23 Van der Perre 1998.

24 Westen *et al.* 2012, 8.

25 Westen *et al.* 2012, 9.

26 Trapezoid coffins are twice as small at the foot end than at the head end. Rectangular coffins are more or less as broad at the head end as at the foot end. Slightly trapezoid coffins are in between.

27 Wood determination by P. van de Peppel (Archaeology Delft) and Drs. C. Vermeeren (Biax Consult.

28 This date is based on the size of the bricks in the tombs. Brick size decreased from the 13th to the 16th century in several stages, which we know from buildings where the date of construction is confirmed.

Fig. 4: Pilgrim's badge of two St. Jacob's shells from Santiago de Compostello (Spain), found in a grave in the corridor of the cloister garth.

Fig. 5: Vaulted tomb in the nave of the chapel of the Koningsveld Priory.

Fig. 6: Tomb in the nave of the chapel of the Koningsveld Priory with plastered walls and a Romanian cross.

Physical anthropological analysis

The physical anthropological analysis was performed at the Department of Anatomy of the Leiden University Medical Centre, and DNA analysis of eight of the excavated skeletons was performed at the Human Biological Trace Department of the Netherlands Forensic Institute. No DNA results are yet available or interpreted. A report on a sample of 37 of the 112 skeletons excavated within the corridor of the cloister garth is already available.[29] The excavated cloister garth was dated between *c.* 1450 and 1572.[30] The analysis of the complete cemetery will be part of a dissertation by Mike Groen.

Two-thirds of the examined skeletons were female, and the minority male. This is not a surprise, since the Koningsveld Priory was a nunnery. The estimated average age at death was 43 years. The age-at-death distribution shows that in the sample taken of people buried in the garth, only one child and one person over 60 years old were buried there. Most people buried there died during their 30s and 50s (Fig. 7). The average stature was 175.9 cm for males[31] and 161.8 cm for females.[32]

Given the high ante-mortem tooth loss and caries frequency, tooth decay was a serious problem. Also, in 43% of the individuals, mechanical traumata were found, which is a high percentage in comparison to other burial sites. Only 11% of the individuals showed no dental infections, which is low. This indicates that it is likely that these individuals lived in hygienic conditions. Signs of Diffuse Idiopathic Skeletal Hyperostosis (DISH) as an indication of high body weight and over eating were found in 17% of the population. This is a relatively low percentage for a monastic population.[33]

---

29 Westen *et al.*, 2012.
30 Westen *et al.* 2012, 9.
31 Trotter 1970.
32 Trotter & Gleser 1958.
33 For the criteria, the characteristics were followed as put forward in de Barge Report (Westen *et al.* 2012, 19).

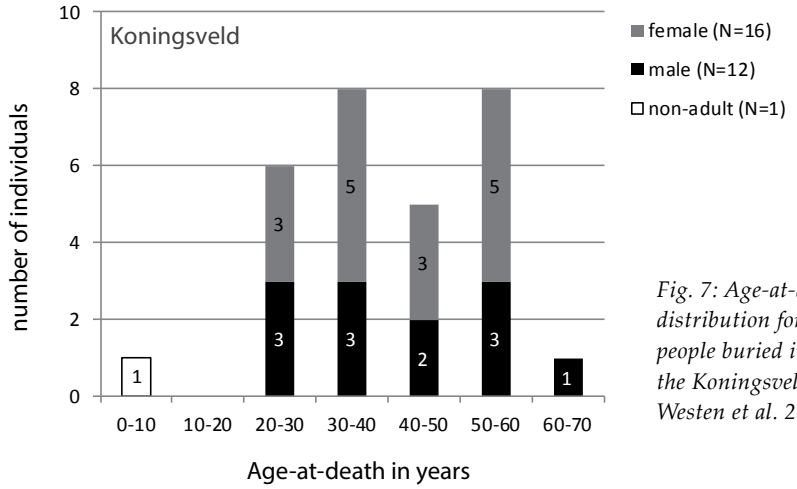


Fig. 7: Age-at-death distribution for the sample of people buried in the garth of the Koningsveld Priory (after Westen et al. 2012, fig. 5).

The average stature of the males indicates a higher socioeconomic background, while the average stature of the females buried in the garth is low compared to the female reference populations. This is remarkable since historical sources indicate that most of the nuns in Koningsveld were from noble families. Perhaps the stature of the women buried in the chapel will show a higher height and thereby indicate that the women buried in the garth were not nuns of the priory.

The Oude en Nieuwe Gasthuis infirmary (1265-1620)

The Oude en Nieuwe Gasthuis was located in the southern periphery of the medieval city of Delft, east of one of the canals, which was originally called Nieuwe Delft and later renamed Koornmarkt. It belonged to the Premonstratensian monastery of Koningsveld, which was situated outside Delft. The hospital remained on the same spot until 1968, when it was moved outside the inner city of Delft. Interestingly, public health services had been in place more than 700 years in the same location. The infirmary's existence is confirmed by a papal bull from 1252 as the *hospitale de Delft cum omnibus pertinentiis suis*.[34]

It was not unusual for Premonstratensians to run an infirmary as it was their mission to care for the poor and homeless. The purpose of this infirmary was threefold: to care for the sick and disabled, to temporarily shelter tramps and wayfarers, and beginning in the 15th century, to house aged people.[35] Probably the need for public health service in Delft became more acute as the population grew. After 1459, the Delft magistrate became almost solely responsible for the management of the infirmary.[36]

34 Gouweleeuw 1970, 1.
35 Oosterbaan 1954, 33.
36 Oosterbaan 1954, 114.

On October 24, 1265, the right to open a cemetery outside the chapel was granted to the infirmary.[37] This *ius funerandi*, the right to bury people, was limited to brothers and sisters of the infirmary and to the poor who died there. This date coincides with the archaeological evidence. The brick (31/30 x 15/14 x 9/8 cm) used for the construction of the oldest chapel was that used in Delft during the second half of the 13th century.[38]

By 1350, the old cemetery was overcrowded and a new site was needed. In 1351, the new cemetery of the infirmary was consecrated by the bishop of Utrecht, and in the same year he consecrated a second cemetery in the chapel: *intra muros ecclesiae*.[39] Probably the cemetery in the chapel was intended for the privileged.

There is no historical evidence that the original *ius funerandi* was expanded in 1351 to included other categories of people than those mentioned in the permit of 1265. But it can be deduced from historical sources that in 1422 the Oude Gasthuis possessed the rights to bury other categories of people.[40]

On January 6, 1433, Bishop Gillys of Utrecht came to the Oude Gasthuis to consecrate a new altar.[41] This accords with the archaeological data which shows us that the chapel was enlarged by a new choir. The bricks (22.5 x 10.5 x 5/5.5 cm) used for the construction of the new choir were those used in Delft during the second quarter of the 15th century.[42]

Officially, the cemetery remained in use until 1652. In practice, it was probably closed some time earlier.[43] The use of tobacco became popular in Delft after 1600 and spread quickly. Because the use of clay pipes causes wear patterns on the teeth within a couple of years, the lack of any such marks provides an indication that burials almost certainly did not take place after *c.* 1610, but probably ceased earlier when Protestantism replaced Catholicism in the 1570s.

The excavation

The excavation of the cemetery and the chapel took place in the late autumn and winter of 1985[44] and of 1993.[45] The remains of the infirmary were investigated in the years 1985-1988.[46] Frost and adverse climate conditions hampered the excavations of the graveyard, and interpretations were further hampered by the incompleteness of the excavation. Expected rescue excavations in the near future will help to make clear the relation between the chapel and the rest of the infirmary buildings.

The entrance of the chapel was situated along the building line of the Koornmarkt. Only the most eastern part of the old chapel could be investigated. The eastern part of the nave was excavated as well as the choir of the old chapel.

---

37 Oosterbaan 1954, 88.
38 Bult 1995, 102.
39 Oosterbaan 1954, 101.
40 Oosterbaan 1954, 110.
41 Oosterbaan 1954, 110.
42 Bult 1995,103.
43 Annema 1981, 59.
44 Kistemaker *et al.* 1985.
45 Bult 1995,102-6.
46 Kistemaker 1990, 127.

Fig. 8: Plan of the Oude en Nieuwe Gasthuis (ONG) infirmary. The foundations of the chapel, hospital, andcesspits are outlined in black. Legend: Location of the burials- hatched; hospital – red; chapel – blue; cesspits – green; ossuarium – yellow.

This chapel was extended in an easterly direction with a new choir being built over the former cemetery outside the old chapel during the second quarter of the 15th century. This extension was also partly excavated.

In the middle of the 15th century, a large rectangular building (25 x 25 m) was constructed north of the chapel and used as the infirmary (Fig. 8).[47] Prior to this, patients were attended to in the nave of the chapel, as was customary at that time.

Due to the wet clay soil, most of the organic material like bones, wood, and leather was well preserved. In the upper layers of the burial soil, however, conditions were less ideal because of the presence of debris and higher levels of oxygen. While the majority of the skeletons were more or less intact, others had been affect by disturbances and subsequent burials. Skeletons at the periphery of the excavated area, which extended into the pit, could only be partially recovered.

Archaeological research on the cemetery and the chapel made it possible to distinguish two burial periods. This distinction is based on the intersection of the burials and the intersection of the graves with the foundations of the chapel choirs. Burials outside the old chapel, which were partly disturbed by the construction of

47 Kistemaker 1987, 330-32.

Fig. 9: Distribution of the graves belonging to the early period. Legend: foundations of the oldest chapel – red; possible extension of the oldest chapel – grey; burials – brown, foundations of the latest chapel – hatched.

Fig. 10: Distribution of the graves belonging to the late period. Legend: foundations of the latest chapel – triangles; possible extension of the oldest chapel – red; burials – brown; foundations of the earliest chapel – hatched.

the new choir, are older than the extension of the chapel. Harris-matrix analysis identified further burials that could be added to this group. Together they are referred to as early-period burials that date from 1265 to *c.* 1433 (Fig. 9).

The graves that intersect with the foundations of the demolished old chapel choir can be dated post-1433, as that is when the chapel was enlarged. Another group of graves, which intersect with the post-1433 burials, are referred to as late-period burials and date from *c.* 1433 – *c.* 1620 (Fig. 10). Graves that did not intersect with other burials or foundations could not be dated.

Burial types and practices

No final analysis of burial types and burial practices is available yet. Nevertheless, it can be stated that the burials correspond to the common form of interment found in historical sources. As was usual in medieval Christian cemeteries, almost all individuals had a simple burial. The most frequent form of burial was in a coffin with the corpse extended on its back, the head pointing west. In most burials, the arms lay alongside the body, while sometimes one or both hands had been placed on the abdomen. Almost no grave goods or ornaments were found. The one exception was a person buried with his shoes on, but no other garments or attributes of clothing were found. This indicates that people were not buried in their clothing. On a few bones from both periods, white linen of a simple woven pattern was found, which indicates that the deceased were probably buried in a linen shroud. As many as five coffins were superimposed on each other.

A variant of the burial type was interment without a coffin. This variant was found most often in graves from the early period. They were situated in the deepest level, and these graves had an anthropomorphic appearance (Fig. 11). These burials date from the earliest of the burials. Whether these were people who could not afford a coffin is uncertain.

Of the coffins of the early period, 65.5% were rectangular and all constructed of boards of the same kind of wood. From the late period onward, only 13.7% of the coffins were rectangular and the rest had a more or less trapezoid shape; most were made of boards of different kinds of wood.

The skulls and long bones of ten individuals were reburied in an ossuarium, situated between two of the buttresses on the northeast side of the new choir (Fig. 12).[48]

Physical anthropological results

The physical-anthropological analysis was performed by Mike Groen at the Department of Anatomy of the Leiden University Medical Centre, but has not yet been published. However, a provisional publication is available, with a sample of 101 graves.[49] The analysis of the bones give an indication of the sex distribution, life expectancy, stature, and the prevalence of infectious diseases, diseases related to malnutrition, and degeneration of joints. The estimated mean age-at-death of individuals over 20 years old was 45 in the early period and 46 in the late period.

---

48 Hagers & Teeuwisse 1986, 14, fig. 4.

49 Onisto *et al.* 1998.

Fig. 11: Three anthropomorphic early-period graves in the lowest level of the cemetery of the Oude en Nieuwe Gasthuis.

Fig. 12: The ossuarium on the northeast side of the choir, dated post-1433.

The percentage of individuals under the age of 20 was 21% for the early period and 16% for the late period.[50] As can be seen in Fig. 13 and 14, the number of deaths in the age-30-40 category is relatively low.

The average stature, using Trotter and Gleser's method, of males during the 13th and 14th centuries was 171.8 cm and for males in the 15th and 16th centuries it was 170.8 cm. The average height of women was 164.4 cm in the earlier period and 162.2 cm in the later period.[51]

Many pathological bone changes were observed in the excavation. Pathologies found in the spine in both periods indicated tuberculosis. This disease is a chronic infection transmitted by air-borne bacteria (*Myobacterium tuberculosis*) or by consuming infected meat or dairy (*Myobacterium bovis*). The former is mostly associated with poverty and malnutrition, and since its transmission is air-borne,

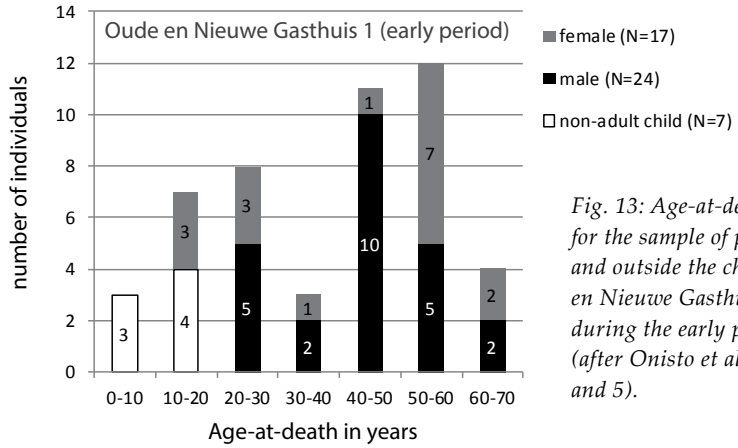


Fig. 13: Age-at-death distribution for the sample of people buried in and outside the chapel of the Oude en Nieuwe Gasthuis infirmary during the early period, 1265-1433 (after Onisto et al. 1998, tables 3 and 5).

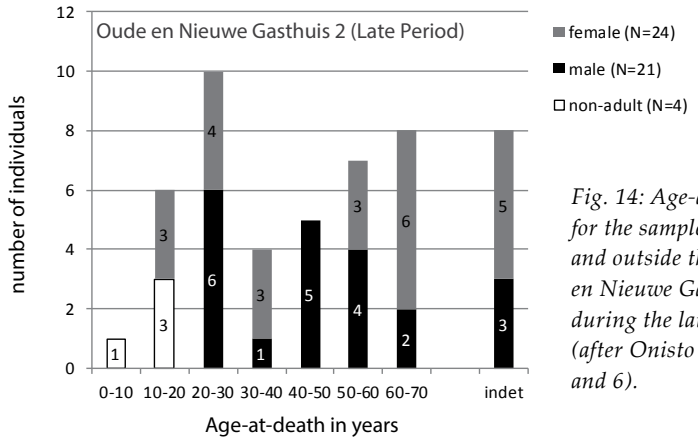


Fig. 14: Age-at-death distribution for the sample of people buried in and outside the chapel of the Oude en Nieuwe Gasthuis infirmary during the late period, 1433-1620 (after Onisto et al. 1998, tables 4 and 6).

50 Onisto *et al.* 1998, 10.
51 Onisto *et al.* 1998, 10-11.

dense population enhances its spread.[52] Evidence of both forms of tuberculosis can be visible on a skeleton, however, not everyone with tuberculosis develops skeletal lesions. It is estimated that only 2-5% of infected people will develop lesions.[53] Therefore, tuberculosis will be highly underestimated in relation to the prevalence of the disease. One of the 50 skeletons investigated in the early period, 2% showed signs of tuberculosis.

Other pathological conditions found were DISH and vertebral and periferal osteoartritus (vOA in 16% and 15% in the early and late periods, respectively[54] and pOA in five individuals and 17 individuals, respectively). These conditions are indications of, for example, mechanical stress.[55] Rickets and cribra orbitalia, among other pathological changes, are also mentioned in the report.[56]

The Maria Magdalena Convent (1400-1573)

Maria Magdalena Convent was founded originally as a nunnery between 1400 and 1450 and situated in the northeast quarter of the town.[57] The nuns followed the religious rule of St. Augustine, and their convent belonged to the third order of Franciscus.[58] From 1557 to 1653, the priory was used as an infirmary for treating victims of the plague.[59] In that period the convent was also called the Nieuwe Gasthuis.[60] In 1566, the convent as a purely religious institution closed its doors, but remained an infirmary until 1657,[61] after which the chapel was used as a *theatrum anatomicum.*[62]

The excavation

The rescue excavation took place in 1994.[63] The graveyard was discovered on land designated for a parking lot, and within four days more than hundred graves had to be attended to. The graves were measured, and the skulls and the long bones were collected to determine the sex and height of individuals.

Most of the layout of the convent remained hidden. The chapel was situated outside the area being researched. Apart from the cemetery, foundations of the convent were found and features like refuse pits and ditches from before the convent's founding were discovered. The burials were situated between the foundation of a wall from the second quarter of the 15th century (bricks were 22 x 10.5 x 4.5 cm) and a ditch. It is not known if another cemetery belonged to the convent, for example, in on around the chapel. The preservation of the

52 Manchester 1984, 162.
53 Waldron 2009.
54 Onisto *et al.* 1998, table 13 and 15.
55 Larsen 1997.
56 Onisto *et al.* 1998, table 13 and 15.
57 Brouwer 1979, 55.
58 Brouwer 1979, 55.
59 Brouwer 1979, 56.
60 Originally the Oude Gasthuis was called Gasthuis until in 1557 when the Maria Magdalena Convent was called Nieuwe Gasthuis. Since 1657 when the Oude en Nieuwe Gasthuis were joined on the location of the Oude Gasthuis, that place was called Oude en Nieuwe Gasthuis.
61 Brouwer 1979, 56.
62 Houtzager 1981, 125.
63 Bult 1996, 106-9.

skeletons and the coffins were good, since most of the burials were below the former groundwater table.

Burial types and practices

The dead were buried in rows of five or six coffins next to each other between the foundations and the ditch. Sometimes four coffins were superimposed on each other.

All the people buried next to the wall were women, most likely the nuns of the convent. All the dead were buried in the usual way, in a coffin with their head aligned to the west. The skulls of some of the women were resting on bricks (19/20 x 9 x 4 cm). This brick size was customary in Delft at the end of the 15th century and the beginning of the 16th century. The brick obviously functioned as a stone pillow. Perhaps the stone pillow served as a rest for the head of the deceased during a wake[64] or was meant to keep the face turned upward so that on judgement day the resurrected body would face Christ coming from the east.

Another striking feature was that almost all the women had their hands folded on their abdomen rather than their arms lying alongside their body. Many of these women had a bundle of twigs in their hands, probably boxwood (*buxus sempervirus*), that replaced palm leaves and functioned as a defence against doom.

A pilgrim's beeswax badge was found in one grave, stored in a small bronze box. This bronze box had a hook by which it was originally attached to the shroud of the nun. The front depicted the Lamb of God with the words AGNIVS DEI QVI.TOLLIS.PECC encircling it. On the backside, the words INNOCEN. VIII. PONTMA. AN.PRI indicated that the nun received the token in the first year of the pope's reign in 1484 or 1485 (Fig. 15). She probably went to Rome on a pilgrimage.

Fig. 15: Pilgrim's beeswax token, which was stored in a bronze box.

64 Gilchrist & Stone 2005, 126.

North of the rows of buried nuns, graves containing three males and 16 children were discovered. They probably did not belong to the convent. Their status is unknown.

Physical anthropological results

Since only the skulls and the long bones were recovered from this site, no special inferences can be made about the physical condition of the deceased. Sex determination of the skulls established that all 64 persons buried along the wall were women. Data on the age and stature of the three man and sixteen children are not available.[65]

The Nieuwe Kerk, second parish church of Delft (1384-1829)

The Nieuwe Kerk (New Church) was founded on the spot where, on the same day thirty years prior, a preacher named Simon had had a vision of a golden church in which the Holy Mother lived, situated on the east side of the market field. This location had previously had been an execution site of criminals.[66] The construction of the church began in 1381. In 1396, a section of the market field west of the newly built church, approximately 34 metres in length, was designated for a church tower and graveyard. In 1421, the cemetery was expanded on the west side of the church by another 17 meters.[67]

Interment ceased officially in 1829. However, engravings from the first half of the 18th century indicate that the graveyard on the west side of the church was already paved by that time, and there are indications that the cemetery at that location was no longer being used as early as the first half of the 17th century.[68] The cemetery on the north side of the church was used from the beginning. In 1620, small dwellings were built against the northern side of the church. This forms a *terminus post quem* for the dating of the burials north of the church.

Excavation

Excavation took place in 2004 when a trench (6-9 m. wide x 40 m. long x 60-90 cm deep) was dug in front of the church in which a row of four trees was to be planted. Only the depth required to plant the trees was investigated. The trench was dug out 0.1-0.3 cm below NAP (Fig. 16). This resulted in the excavation of two rows of the top two layers of the burials, all of which were above the groundwater level.

The number of graves in the centre of the trench was lower than on the sides of the trench, which might indicate that originally a path from the *Markt* (market) to the entrance in the church tower existed.[69]

A year later, holes were dug on the north side of the church to house underground refuse containers. These spots were archaeologically inspected during the digging of the holes and a few graves were excavated. They were investigated as deep as the lowest level of interment, about 180 cm below NAP. The lower levels of interment were below the water table.

---

65 Klaassen 1998, 24.
66 Van der Kloot Meijburg 1941, 17.
67 Canneman 1967, 229.
68 Canneman 1967, 230-31.
69 Groen 2005, 59-60.

Fig. 16: Overview of the excavation in progress, seen from the tower of the Nieuwe Kerk.

Burial types and practices

In total, 272 incomplete skeletons were excavated and investigated.[70] Indications that a double burial had taken place were present in 15 graves. At least eight locations of rubble pits with human bones were found. In seven graves, a second skull was present. It is unknown whether this was caused by contamination or a deliberate double interment.

In and around the church, the graveyard was divided into squares (*pleinen*) which consisted of a row of graves. In total, two of these *pleinen* (squares), separated by a distance of only 10-40 cm, were investigated.

On the west side of the church, almost all of the coffins were trapezoids that tapered toward the foot end. This dates the burials to the late and post-medieval periods. Most people were buried in the usual position, a west-east orientation with the head in the west. To maximize space, however, 55 out of 124 coffins on the west side of the church were placed the other way around to fit in between two other coffins within the *plein*. This would suggest that the burials were from the Protestant period when the position of the deceased was no longer important. North of the church all the 31 graves were orientated west-east and the lower coffins were all rectangular in shape.

70 Tomas-Sannen, forthcoming.

Most of the timber of the coffins (N=194) on the west side of the church was conifer wood (*pinus sylv.*, 77%) or larch (*picea/larix*, 8%). Only a small number of coffins were made of higher quality wood like oak (*quercus*, 5%) and beech (*fagus sylv.*, 3%). Almost half of the coffins were constructed from more than one species of wood, indicating that probably wood was being reused. On the north side of the church where the deepest excavation was carried out, the rectangular coffins (N=21) were mostly made of beech (70%; N of timber samples=136).

No traces of wear on the teeth of the deceased caused by smoking clay pipes were recognized. This strongly indicates that the cemetery was not being used since the second quarter of the 17th century. This provides a more accurate indication that the individuals were buried before *c.* 1625 when smoking became popular among Delft's population. Most of the deceased from the top layers of the graveyard west of the church were buried in trapezoid coffins, meaning that most individuals investigated will probably be dated from the late 15th to the first quarter of the 17th century.

Physical anthropological results

The physical anthropological analysis was performed by Pjotter Tomas-Sannen.[71] More than 50% of the 272 individuals were sub adult, which is a high percentage in comparison to the other cemeteries. There were slightly more male (23%) than female persons (20%). Of the sub-adults, most deceased were between two and 12 years old. This under representation of infants was probably caused by poor preservation circumstances. There were indications that young children were buried in the western periphery of the cemetery, which was investigated only provisionally. The estimated average age at death for people over 18 years old was 34 years. The age-at-death distribution shows that the majority of the adults died between 25 and 40 years of age (Fig. 17). This age-at-death profile resembles more an acutely inflicted population than a population marked by natural death, since in a normal age-at-death profile a bimodal profile occurs with a peak during early childhood and a peak in old age.

The average stature of the males was 173 cm and of the women, 163 cm. The average stature is relatively high for citizens of the late-medieval and the early post-medieval periods.[72]

Forty-four percent of the population suffered from infections (osteoperiostitis), which is extremely high in comparison to other populations in late-medieval historical cities like Dordrecht[73] and Gorinchem, where it was about 4-5%.[74] This indicates that a lot of people at the end of the medieval period and beginning of the early modern period in Delft had a high level of infection and systemic stress, which might have been caused by a nutrient deficiency in childhood. Although a cemetery of a parish church can be regarded as having a representative reflection of the average Delft population, the fact that only graves outside the church and not

71 Tomas-Sannen, forthcoming.
72 Westen *et al.* 2012, 55, table 55.
73 Maat *et al.* 1998, 42.
74 Maat & Mastwijk 2000.

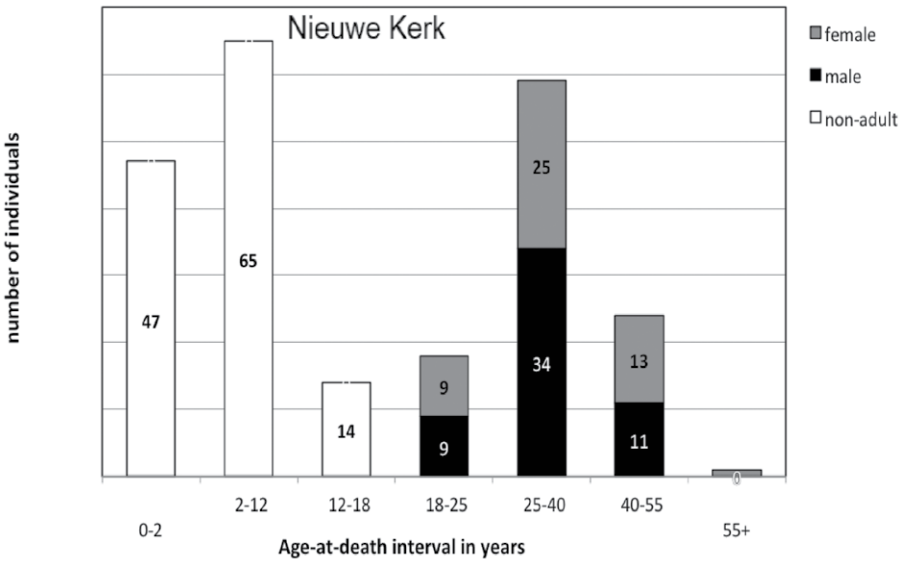


Fig. 17: Age-at-death distribution for the people buried on the west and north side of the Nieuwe Kerk in Delft (after Tomas-Sannen forthcoming).

any inside the church were studied, means only an image of the poorer segment of parishioners was investigated. The data in the age-of-death graph (Fig. 17) perhaps shows the influence of the plague at the end of the 16th and early 17th centuries, since most of the graves probably date from that period.

Cemetery of the Plague at the Schutterstraat (*c.* 1624 – *c.* 1657)

At the Schutterstraat, a graveyard was discovered of at least 114 deceased who were buried in mass graves, some of which contained more than 30 persons.

Excavation of the graveyard

The circumstances of the excavation were far from ideal. The excavation was unforeseen, since there was no known graveyard on that location as it lay just outside the boundary of the Maria Magdalena Convent. During the investigation, the excavation was hampered by night frost so at times parts of a skeleton could only be salvaged with the soil attached. This was not an official cemetery, but a site that was used during epidemics when burying the high number of dead was logistically problematic. The graveyard probably came into use with the plague epidemic of 1624, when many people in Delft died.[75] As mentioned above, the former Maria Magdalena Convent served to a hospital for plague and Black Death victims in the late 16th and early 17th centuries so it is not surprising that mass graves would be found adjacent to the convent.

75 Verhoeven 2015, 271.

Burial types and practices

The stress of burying the people during the epidemic period can be seen in how their bodies were treated. These mass graves had mostly a north-south orientation. The dead were placed next to and on top of each other in trenches. Only a few bodies were buried in a coffin; most were interred without one. Sometimes there were at least three layers of burials on top of each other. Some of the dead were placed alternately with their head to the east, so to fill in the trench in the most economical way. This indicates that they did not adhere to Roman Catholic customs of interment.[76] Probably these trenches were dug and used for one day, or at the most a few days, to bury the dead. When the trench was full, it was closed and a new trench was dug for the next wave of pest victims. No traces were found of clothing or clothing accessories, so probably the bodies were buried in linen shrouds.

Several of the victims showed traces of wear on their teeth, indicating that they smoked clay pipes (Fig. 18). This means they were buried after 1600 when smoking became a habit among the Delft population.

Later, the cemetery was used intermittently. For instance, after 1657 a skull of a deceased person was used for autopsy in the nearby anatomic theatre and it was buried in the same graveyard. The top of his skull had been sawn off for investigative purposes (Fig. 19).

Fig. 18: Wear marks on the teeth caused by the smoking of clay pipes (photo: P. v.d. Peppel, Archeologie Delft).

76 Bult 1993, 155.

Fig. 19: Cranium, sawn off for autopsy in the anatomic theatre, was buried in the Cemetery of the Plague in the second half of the 17th century (photo: P. v.d. Peppel, Archeologie Delft).

Physical anthropological results

The physical anthropological investigations were carried out by a number of students during their course in physical anthropology at the University of Leiden.[77] Although their work was checked by Prof. Dr. Maat, not all their theses cover the same subjects with respect to the palaeopathological phenomena, so no reliable statistical facts are known about the general health condition of the population in this graveyard. The skeletons of this cemetery are at the moment again being studied.[78]

However, all the theses dealt with the age at death and the stature, so these results can be used. The average height was 169.1 cm for males[79] and 159.2 cm for females.[80] The age-at-death profile of a charnel pit from that site shows a unimodal profile (Fig. 20), typical for a random sample of an acutely inflicted living population.[81]

In the theses, general pathological conditions mentioned are enamel hypoplasia, periostitis of tibiae, rickets, and cribra orbitalia.

---

77 Meijer 1992; Wiltens 1994; De Waal 1995; Boulonois 1996; De Vries 1996; Fermin 1996; Van Mousch 1996.

78 This study is being carried out by Drs. Mariska Lamens of Archeology Delft.

79 Trotter 1970.

80 Trotter & Gleser 1958.

81 Onisto *et al.* 1998, 52.

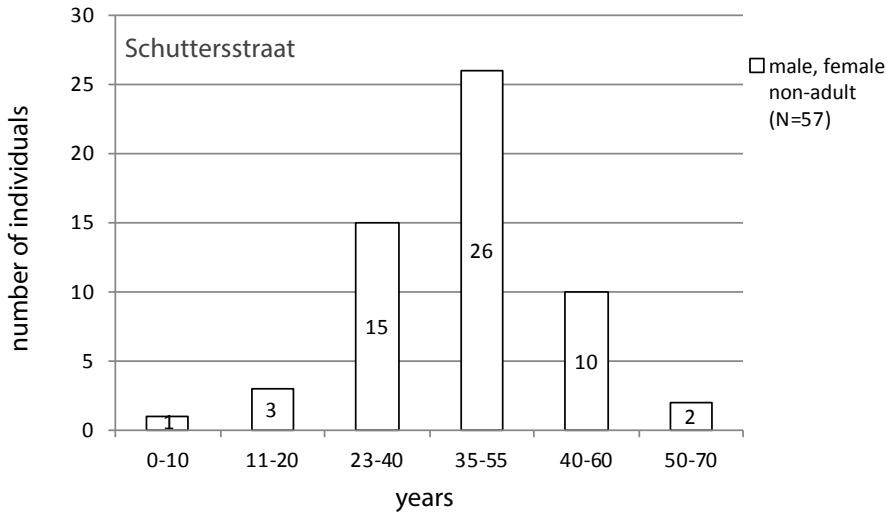


Fig. 20: Demographics of the people buried in a charnel pit at the Schutterstraat in Delft (after Onisto et al. 1998, fig. 14).

Discussion

Different treatments of the deceased

The cemeteries investigated showed a common trend: late-medieval burials took place in coffins with the deceased lying on his or her back, the head orientated to the west, and the feet to the east. Arms were usually laid out alongside the body, sometimes one or both hands were placed on the abdomen or thighs. This is the normal way Christians were buried in the late medieval period.

Fig. 21 shows the orientation of the graves of the cemeteries investigated. Most of the deceased were buried with their heads to the west/southwest in order to ensure that upon resurrection they could meet the descending Christ. A variation on the most dominant west-east orientation of the graves is found at the parish church of the Nieuwe Kerk and in the Cemetery of the Plague at the Schutterstraat. There are also some graves at the chapel of the Oude en Nieuwe Gasthuis that had other orientations.

When in need of space, like in the upper layers of the graveyard west of the Nieuwe Kerk, trapezoid coffins were placed alternately in east-west and west-east directions to allow for a greater number of burials in the same row. Probably the west-east orientation was no longer sacred with the ascendency of Protestantism in 1573.

The second exception was the Schutterstraat graveyard. Here lack of time to bury the plague victims was probably the reason why various orientations were used and why people were buried in mass graves. There was also no indication of where individuals had been previously buried so the lay out of the graves was random. And of course the graves date from after the Catholic period with its more strict custom about orientation of the graves. The deceased were buried in all orientations.

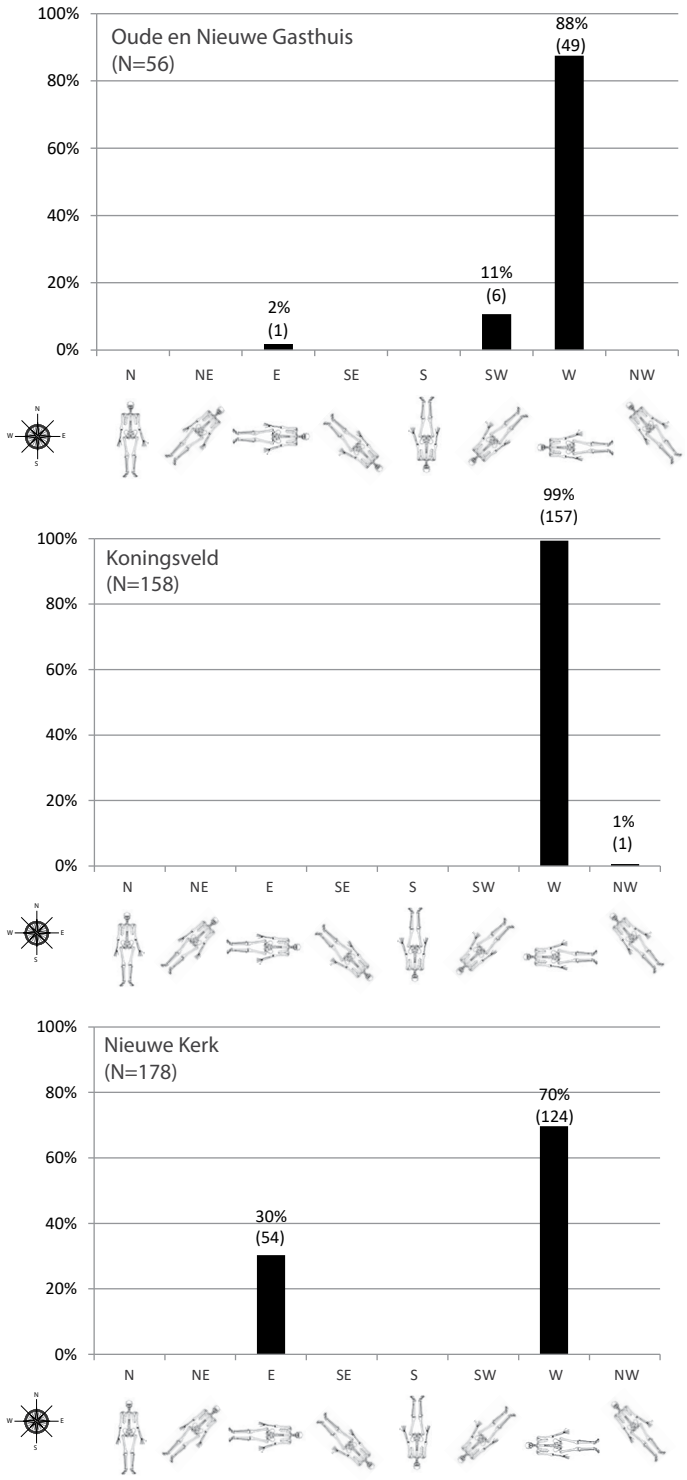
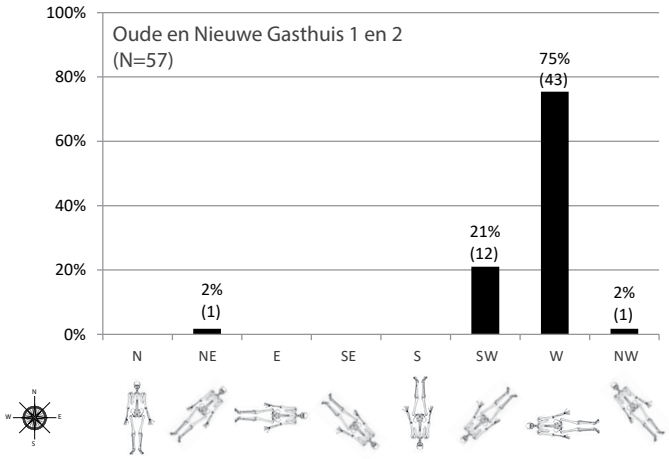
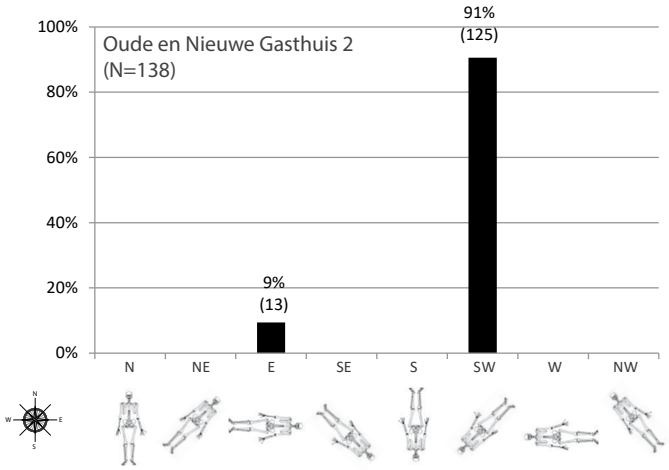
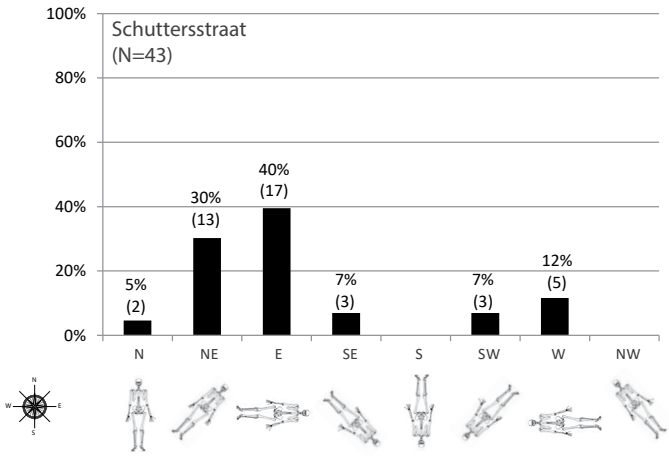


Fig. 21 (also opposite page): Orientation of the graves in the Delft cemeteries.


Oude en Nieuwe Gasthuis 1 en 2
(N=57)
100%
80%
60%
40%
20%
0%
2%
(1)
21%
(12)
75%
(43)
2%
(1)
N
NE
E
SE
S
SW
W
NW


Oude en Nieuwe Gasthuis 2
(N=138)
100%
80%
60%
40%
20%
0%
9%
(13)
91%
(125)
N
NE
E
SE
S
SW
W
NW


Schuttersstraat
(N=43)
100%
80%
60%
40%
20%
0%
5%
(2)
30%
(13)
40%
(17)
7%
(3)
7%
(3)
12%
(5)
N
NE
E
SE
S
SW
W
NW

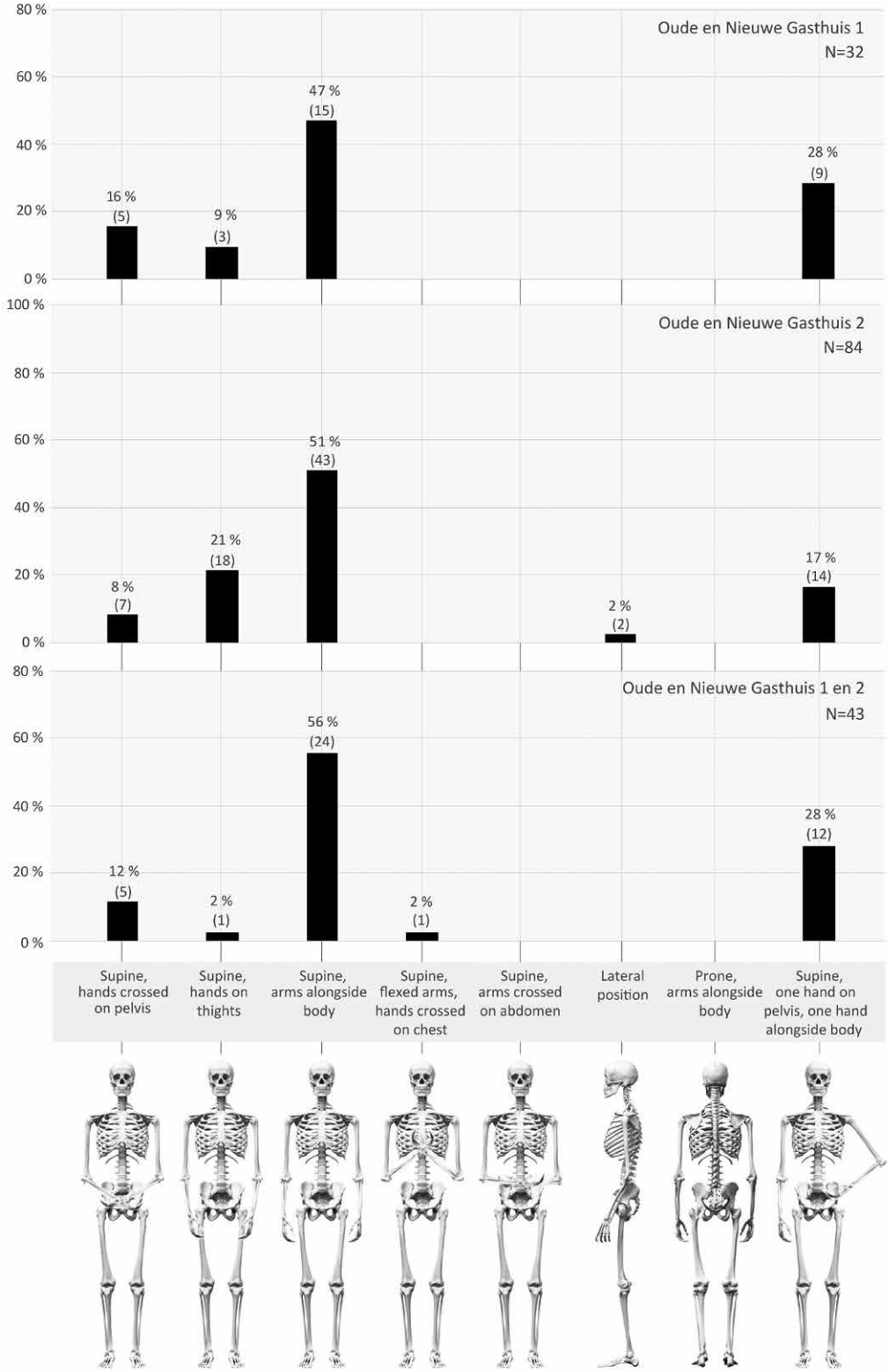
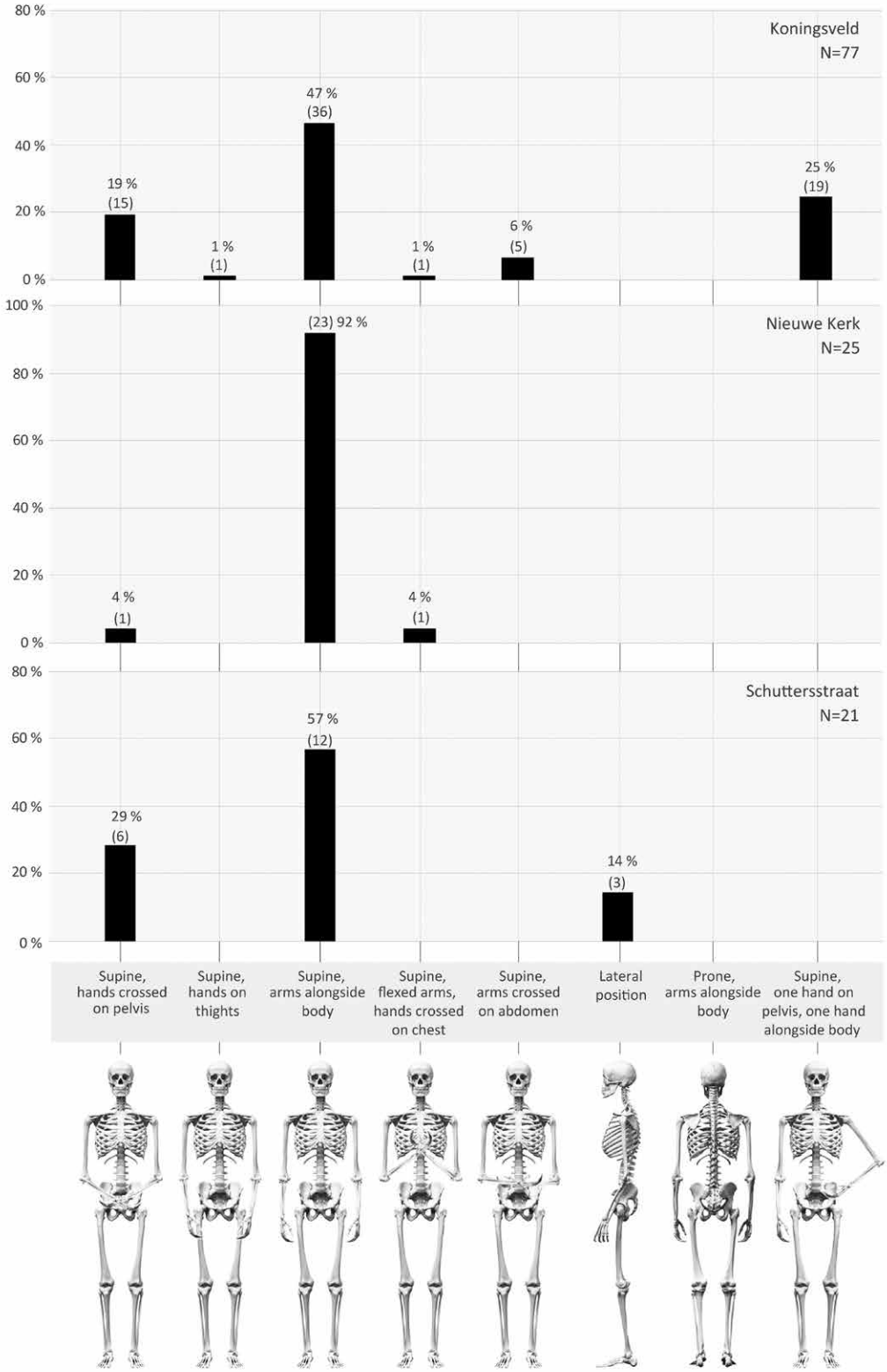


Fig. 22: Position of the hands and arms of the deceased in the cemeteries of Delft.


Koningsveld
N=77
19 % (15)
1 % (1)
47 % (36)
1 % (1)
6 % (5)
25 % (19)
Nieuwe Kerk
N=25
4 % (1)
(23) 92 %
4 % (1)
Schuttersstraat
N=21
29 % (6)
57 % (12)
14 % (3)
80 %
60 %
40 %
20 %
0 %
100 %
Supine, hands crossed on pelvis
Supine, hands on thights
Supine, arms alongside body
Supine, flexed arms, hands crossed on chest
Supine, arms crossed on abdomen
Lateral position
Prone, arms alongside body
Supine, one hand on pelvis, one hand alongside body

Another deviation of grave orientation was seen along the northern wall of the chapel of the Oude en Nieuwe Gasthuis dating to the late period. The historical records indicate that the altar consecrated by Bishop Gillys of Utrecht in 1433 was situated in front of the choir against the north wall.[82] The location of the graves situated along the northern wall matches the location where the altar is thought to be have been. It is hypothesised that graves belonging to priests were situated opposite the altar. As they were expected to guide the people on resurrection day, they had to face them. One of the deceased was determinated as a young man, the sex of the other dead still have to be determinated.

At least 45% of all deceased in each cemetery were buried with both arms laid alongside their bodies. At the parish graveyard of the Nieuwe Kerk more than 90% were buried in this way (Fig. 22). But other arm positions were also used. Except for the graves in the cemeteries of the Nieuwe Kerk and the Schutterstraat, which both contained mostly graves dating from after the Alteration, burials with one arm laid alongside the body while the hand of the other arm was positioned on the pelvis occurred quite frequently. Both hands on the pelvis was also found rather frequently in all the graveyards. Arms crossed on the chest was evident only in the cemetery of the Koningsveld Priory.

One should keep in mind that as a result of postdepositional processes,[83] for example, the loss of rigor mortis, arms could have been fallen off the pelvis or from the thighs after the burial took place.

Another exception was the burial of the nuns at the Maria Magdalena Convent. Their hands were joined on their abdomen, holding a bundle of twigs, and a brick pillow had been placed under the heads of some. It is unknown whether this practice was typical for the third order of Franciscus, to which they belonged. Fig. 23 shows the three different shapes of coffins found in the cemeteries.

As can be seen in Fig. 23, the shape of the coffins changed over time from more or less rectangular to trapezoid. Rectangular coffins were dominant in the graveyard of the early phase of the Oude en Nieuwe Gasthuis and in the Koningsveld Priory, while trapezoid coffins where more dominant in the graveyard of the late phase of the Oude en Nieuwe Gasthuis and of the Nieuwe Kerk.

Recent observations south of the Nieuwe Kerk showed rectangular and trapezoid coffins that could be dated with dendrochronology. It turned out that in the second half of the 15th century, coffins were increasingly trapezoid in shape.[84]

There are a few exceptions to the general custom. One has to do with the social status of the deceased, another with the religious order the deceased belonged to. In the Koningsveld Priory, seven vaulted tombs were present in the nave of the chapel. The people buried in these tombs most certainly belonged to the nobility and upper classes in society because they could afford expensive burials in the chapel.

82 Oosterbaan 1954, 110.
83 Schiffer 1987.
84 Van Horssen 2017a, 38.

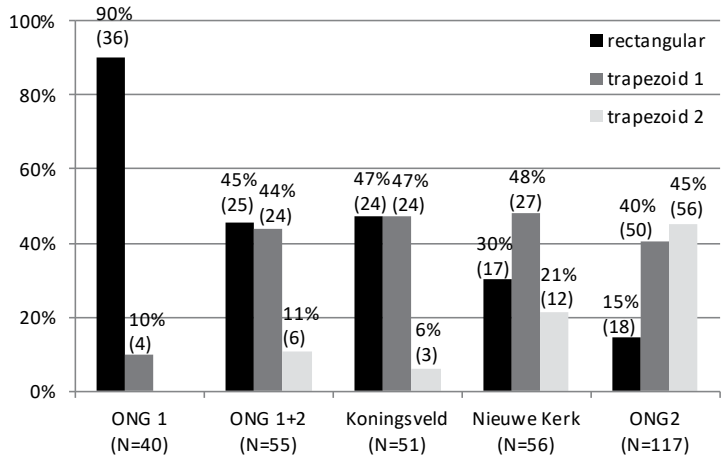


Fig. 23: Percentages of the three different types of coffins found in the Delft cemeteries. Trapezoid 1=slightly trapezoid; trapezoid 2=true trapezoid (the width at the foot end of the coffin is ≤0.5 of the maximum width). NB: The cemeteries are ordered chronologically according to the earliest date that they were in use. However, this does not mean that all individual burials necessarily adhered to this chronology, for example, the graveyard at the Nieuwe Kerk is dated from 1420, but most of the graves, at least those west of the church, probably date from the last quarter of the 16th century onward.

The second exception were people not buried in a coffin at all. A few of those were found at the lowest level of the graveyard of the Oude en Nieuwe Gasthuis. They probably belonged to the poorer classes in society. In other cases where no coffin was present, it is most likely that the wood has decomposed. At the graveyard of the Schutterstraat, there was probably not enough time to bury the many people who died of the plague, nor enough available lumber to construct coffins.

Not only were different kinds of wood used in the coffins of the cemeteries of Koningsveld and the Nieuwe Kerk, but also the number of species used differed by graveyard (Fig. 24). In the Koningsveld Priory cemetery, oak (*quercus*) was the most frequently used wood, followed by silver fir (*abies alba*). The Fig. differ significantly for the parish church of the Nieuwe Kerk. There the number of coffins made of oak was much lower and no coffins were made of silver fir. Instead, the use of beech (*fagus*) dominated in the graveyard north of the church and pine (*pinus sylvestris*) west of the church. The difference between the wood used for coffins buried on the west side of the Nieuwe Kerk and those on the north side might be because most of the coffins north of the church were older than those west of the parish church. Also, the coffins recently excavated in the cemetery south of the Nieuwe Kerk, which were mostly dated to the 15th century, were made of beech.[85]

85 Van Horssen 2017a, 22.

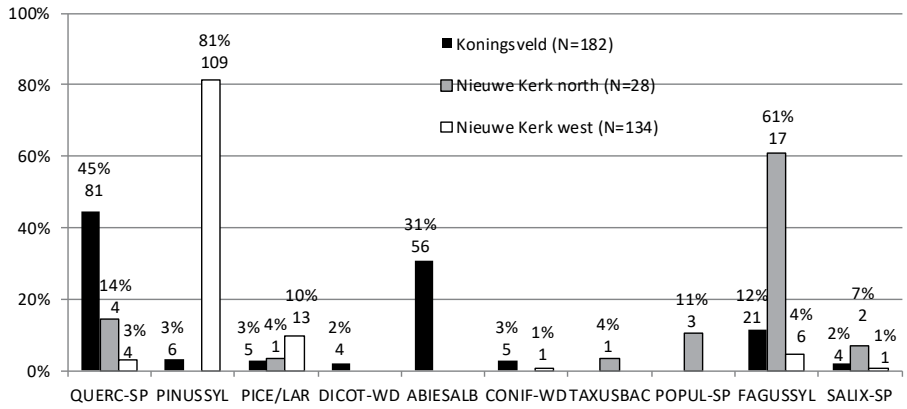


Fig. 24: Wood species used in coffins of the cemeteries of the Koningsveld Priory and the Nieuwe Kerk.

Of the different species of wood used in coffin construction, oak was the most durable, lasting in general from 10 to 25 years. Larch (*picea/lar*) and pine, for example, lasted between five and 15 years, while beech, willow (*salix sp.*), and poplar (*populus*) lasted less than five years.

Wood that lasted longer was more expensive. The thickness of the boards used was also an important factor in the price of a coffin. A pricelist of coffins from 1777 from the city of Alkmaar indicates that the cheapest coffins were made of pine and cost seven guilders. The boards of these coffins were about three centimetres thick. A coffin of pine made of boards about 3.7 cm thick cost 11 guilders, while an oak coffin with boards of the same thickness was twice as expensive. The most expensive coffin was made of oak with boards 7.5 cm thick; it cost 60 guilders.[86]

This indicates that more valuable coffins were used in the Koningsveld Priory than in the graveyard of the parish church of the Nieuwe Kerk. It also shows that on the north side of the parish church less durable wood was used than on the west side. The north side of the church may have been a less preferable location, since the sun did not shine on that spot. So the types of wood used for coffins seems to indicate the social class of the deceased buried in the coffin.

Disease patterns

Not all the diseases people suffered from can be detected by physical anthropological investigations. Apart from trauma caused by fights or accidents, it takes a long time before features of some diseases are visible on bones. In most cases, only the soft tissue is affected and the disease does not affect any bone tissue. Therefore, it is likely that people with a 'healthy' skeleton had less resistance against diseases and died soon after they became ill, while people with a strong resistance and good health survived, but their bones indicate disease. An osteological paradox[87] is that many lethal and nonlethal diseases are not visible at all! Sometimes epidemic

86 Bitter 2002, 229.
87 Wood *et al.* 1992.

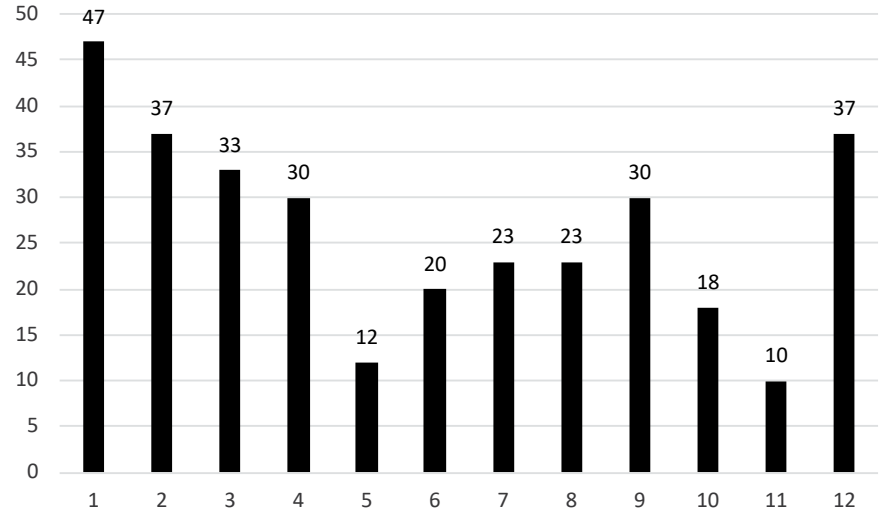


Fig. 25: Maladies miraculously healed mentioned in the four miracle books, 1327-1519. Legend: 1. lameness; 2. ulcers and tumours; 3. mental illness; 4. umbilical hernias; 5. blindness; 6. fever; 7. plague and smallpox; 8. kidney stones; 9. drowning; 10. trauma; 11. pregnancy; 12. miscellaneous (after Verhoeven 1992, 120, table 6.3).

diseases are shown in a demographic graph of the age-at-death distribution of a population in a graveyard. The graph will then represent the population 'on the street' at a certain point in time, while a normal demographic graph of a graveyard mostly represents people who died in old age or at an age that carries with it more health risks.

Historical sources can also provide information on the illnesses people suffered from. For instance, medieval books of miracles that chronicle healings upon invoking Christ or Mary give an indication of the maladies that occurred at that time. For Delft, there are four medieval books of miracles granted by four saints in the two parish churches of Delft.[88] These books contain 339 stories, which are dated between 1327[89] and 1519.[90] Fig. 25 shows the number of maladies for which a miraculous cure was attributed. The most frequently occurring maladies were lameness, ulcers and tumours, mental illness, and intestinal ruptures. It is noteworthy that of these maladies, only trauma is ever visible in the osteoarchaeological record, and then only partially.

It is not likely that the maladies mentioned in the miracle books are representative of the maladies suffered by Delft's population, because miracles that parallel those mentioned in the Bible are more likely to be recorded in a miracle book than other healings.[91] Nevertheless, the books broaden our knowledge of illnesses people in Delft suffered from.

88 Verhoeven 1992, 67.
89 Verhoeven 1992, 53.
90 Verhoeven 1992, 58.
91 Verhoeven 1992, 121.

The general health condition of a population is often explained in the context of socioeconomic, demographic, and nutritional factors. There are several factors that can provide insight into the health conditions of a past population. The first factor is adult stature. It has been known for a long time that apart from genetic determination, an important relationship exists between the health of the public and the contemporary standing living height of the people.[92] Height can be calculated from the maximum length of various long bones,[93] for example, the maximum length of the femur.[94]

The average living heights of the different Delft cemeteries were compared with each other (Table 1). The mean height of the people investigated in the Delft cemeteries in general decreased over time, if the cemeteries are chronologically arranged by their beginning date. This is in accordance with the general trend in the Netherlands during the post-medieval period.[95] This trend started during the late-medieval period and reached its lowest level during the 17th and 18th centuries.[96] It is likely to be the result of deteriorating living conditions, especially at a time when populations were increasing and living space decreasing, resulting in worsening hygienic conditions and less available food.

The average stature of the women matches perfectly this trend, but there is a major deviation for the males who were buried in the cloister garth of Koningsveld (generally considered to be wealthy and/or noble). Their stature nearly matches the

Site	Date	Male[1]	Male[2]	Female[3]	References
ONG early period	1265 – *c.*1433	171.8 cm (n=24)	170.5 cm (n=25)	164.4 cm (n=14)	Onisto *et al.* 1998, 10-11
Niewe Kerk	1387 – *c.* 1650	173.0 cm (n=20)	172.0 cm (n=18)	160.0 cm (n= 6)	Tomas-Sannen in press
ONG late period	*c.*1433 – *c.*1620	170.8 cm (n=19)	168.9 cm (n=19)	162.2 cm (n=20)	Onisto *et al.* 1998, 11
Koningsveld	*c.*1450-1573	175.9 cm (n=11)	173.6 cm (n=11)	161.7 cm (n=13)	Westen *et al.* 2012, 14
Schutterstraat	1624 – *c.*1657	169.1 cm (n=16)	n/a	159.2 cm (n=18)	Meijer 1992; Wiltens 1994; De Waal 1995; Boulonois 1996; De Vries 1996; Fermin 1996; Van Mousch 1996

Table 1. Average stature of males and females in or near Delft.
[1] Body height determined using Trotter 1970.
[2] Body height determined using Breitinger 1937. It is assumed that Breitinger's method is a more useful method for a male population in northwestern Europe, but since not all the data of the long bones of males needed for Breittinger are present, Trotter's method is also used to compare the different cemeteries.
[3] Body height determined using Trotter and Gleser 1958.

92 Maat 2003, 58-59; Maat 2003, 69.
93 Knussmann 1988; Hermann *et al.* 1990; Onisto *et al.* 1998, 8; Westen *et al.* 2012, 25.
94 Breitinger 1937; Trotter & Gleser 1952, 1958; Trotter 1970; Maat 2003, 65.
95 Maat 2003, 62.
96 Maat 2003, 68; Hendriks 2012, 17, fig. 2.

height of the canons (176 cm)[97] in the Stiftskapel of St. Servaaskerk in Maastricht.[98] The positive deviation in their height can best be explained by their socioeconomic position.

In contrast, the females buried in the cloister garth had a much lower average height. From historical records, we know that they were from noble families so why does their height not match their supposed socioeconomic status? Are the women buried at the cloister garth from another strata of society?[99]

There are other factors that can tell us something about the living conditions of the deceased. A sign of good health is the occurrence of DISH. DISH is a progressive metabolic disorder that is characterized by the ossification of connective tissue,[100] which increases with age. The age of onset is usually 50+ years.[101] The disease is more common in males than females.[102] DISH is an indication of a diet of rich food, obesity, and lack of exercise.[103] Given the diet required to acquire DISH, its prevalence correlates with increasing status,[104] so it is identified most frequently in monastic and high status burials.[105]

Table 2 shows the occurrences of DISH in the Delft cemeteries.[106] Information on the prevalence of DISH is inconsistent or not available for all the cemeteries. Only a few of the theses about the Cemetery of the Plague at the Schutterstraat paid attention to this disease, while for the graveyard of the Nieuwe Kerk, the focus on paleopathology was restricted to infections and diseases related to malnutrition.[107] Information on DISH of the burials of the Nieuwe Kerk is only available for a

Site	Source	Date	Occurrence of DISH		
			Na[1]	%	No[2]
ONG early period	Onisto *et al.* 1998, 12.	1265 – *c.*1433	4	8.0	50
Nieuwe Kerk	Scheeres 2007.	1387 – *c.* 1625	6	19.3	31
ONG late period	Onisto *et al.* 1998, 13.	*c.*1433 – *c.* 1620	9	20.0	46
Koningsveld	Westen *et al.* 2012, 52, table 4.	*c.* 1450-1573	6	17.1	35
Schutterstraat	Meijer 1992; Wiltens 1994; De Waal 1995; Boulonois 1996; De Vries 1996; Fermin 1996; Van Mousch 1996.	1624 – *c.* 1657	≥7	n/a	n/a

Table 2. The Delft cemeteries and the percentage of occurrence of DISH.
[1] Na=number of individuals affected; [2] No=number of individuals observed.

97 According to Trotter & Gleser (1958), after correction of shrinkage after the age of 30 years.
98 Janssen & Maat 1998, 9.
99 Westen *et al.* 2013, 27.
100 Westen *et al.* 2012, 19.
101 Resnick & Niwayama 1988, 1563.
102 Onisto *et al.* 1998, 19.
103 Maat *et al.* 1998, 22-23; Roberts & Manchester 2010, 161.
104 Panhuysen 2005, 195-96. Westen *et al.* 2012, 19.
105 Waldron 1985; Janssen & Maat 1999; Rogers & Waldron 2001; Jankauskas 2003.
106 Several methods are known to determine a diagnosis of DISH, but in this chapter Barge's Anthropologica's diagnostic criteria are used, like, for example, Onisto *et al.* 1998; Janssen & Maat 1999; Maat *et al.* 2002; Rijpma & Maat 2005; Westen *et al.* 2013.
107 Tomas-Sannen in press.

sample of 31 individuals.[108] No information is available for the cemetery at the Maria Magdalena Convent.

DISH was noticeably present in the second phase of the graveyard of the ONG infirmary, in the cloister garth of Koningsveld, and in the graveyard of the Nieuwe Kerk. The percentages in these cemeteries are high in comparison to the other Delft graveyards. In comparison to the graveyard of the canons in the St. Servaas Basilica in Maastricht (1070-1521) where every individual showed signs of the disease,[109] it is still low. A sample of the graves at the Nieuwe Kerk showed five individuals with early indications of DISH on the north side of the church and only one person with early indications of DISH on the west side, where the burials are assumed to be newer than the burials on the north side.[110]

An explanation for the high percentage in the graveyard of the infirmary during the late period might be that during this period elderly wealthy people were housed by the infirmary if they could pay for their pension. The presence of wealthy persons in the infirmary in the late period eating a more refined diet is also indicated by the very high frequency of carious teeth (12.3%), which is substantially higher than in the early period (7.6%).[111]

The high percentage of DISH in the cloister garth of Koningsveld also seems logical. As might be expected, the males buried in the garth not only had a high score on DISH but also a taller stature. On the other hand, it is surprising that at the same time they also showed a high score on improved hygiene and malnutrition markers (malnutrition may have been present during childhood, but their diet improved over the course of their lifetimes).[112] This can be explained by the osteological paradox mentioned earlier.

In addition, six females from the cloister garth of Koningsveld who met the Barge's Anthropologica diagnostic criteria for DISH had an average stature height of 158.7 cm, which is three centimetres below the average female stature in the sample of the cloister garth.[113] Overall, the 17% who had DISH is not as high as can be expected when compared to other monastic sites.[114] This is probably caused by the fact that most of the deceased investigated had no monastic background or were noble and/or wealthy. Both examples from the Koningsveld cloister garth show that there is good reason to continue the debate on the connection between DISH and stature and welfare and status. The presence of DISH in the Cemetery of the Plague at the Schutterstraat can be explained by the fact that the Black Death affected people regardless sex, age, or status.

The presence of linear enamel hypoplasia can also be used as a negative health indicator. This disease is noted by the prevalence of horizontal growth arrest lines, pits, or grooves visible on the enamel surface of the incisors and canines on the buccal surface of the teeth. These defects occur only during the development of the

108 Scheeres 2007.
109 Janssen & Maat 1998, 17.
110 Scheeres 2007, 29, 33.
111 Onisto *et al.* 1998, 16-17.
112 Westen *et al.* 2012, 26.
113 Westen *et al.* 2012, 26.
114 Janssen & Maat 1998, 17; Westen *et al.* 2012, 19.

teeth in childhood, but remain permanent into adulthood.[115] They are the result of serious malnutrition or chronic illness and can be seen as a skeletal indicator of systemic stress in society during childhood.

Its prevalence in the Delft cemeteries is only mentioned in the study of the cloister garth of Koningsveld, where only 3% of the deceased showed enamel hypoplasia[116] and in the graveyard of the Nieuwe Kerk, where 38% of the investigated skeletons had this disease[117] (Table 3). Enamel hypoplasia was also noted among the skeletons of the Schutterstraat (n=7),[118] but no percentage of the prevalence can be provided. The presence of hypoplasia was not studied in the population of the Oude en Nieuwe Gasthuis infirmary.[119] This indicates that the people buried in the cloister garth of Koningsveld did not suffer as much from stress during their youth as the people buried in front of the Nieuwe Kerk. The high percentage of enamel hypoplasia in the graveyard of the Nieuwe Kerk is in line with the average percentage in late-medieval Britain,[120] but low in comparison to the late-medieval urban cemetery of Alkmaar (65.3%).[121]

Another disease related to malnutrition is rickets. This disease is caused by a deficiency of vitamin D, resulting especially in the deformation of long bones. These deformities usually occur during a person's growth period, but may also occur at a later age (osteomalacia) as a result of serious medical conditions[122] (Table 3).

At the cemeteries of the Oude en Nieuwe Gasthuis infirmary, the percentage of rickets was low or altogether absent. The high percentage of rickets in the cloister garth of the Koningsveld Priory (Table 3) is conspicuous. Skeletons showed healed

Site	Source	Date	Linear enamel hypoplasia			Bilateral bending of tibias		
			Na[1]	%	No[2]	Na[1]	%	No[2]
ONG early period	Onisto *et al.* 1998, 40, table 12.	1265 – *c.* 1433	0	n/a	n/a	1	2	50
Nieuwe Kerk	Tomas-Sannen in press.	1387 – *c.* 1625	31	36.4	88	7	4.5	156
ONG late period	Onisto *et al.* 1998, 41, table14.	*c.* 1433 – *c.* 1620	0	n/a	n/a	0	0.0	32
Koningsveld	Westen *et al.* 2012, 52, table 4.	*c.* 1450-1573	1	3	33	6	17.0	35
Schutterstraat	Meijer 1992; Wiltens 1994; De Waal 1995; Boulonois 1996; De Vries 1996; Fermin 1996; Van Mousch 1996.	1624 – *c.* 1657	≥ 7	n/a	n/a	≥4	n/a	n/a

Table 3. The Delft cemeteries and the percentage of occurrences of linear enamel hypoplasia and rickets.
[1] Na=number of individuals affected; [2] No=number of individuals observed.

115 Roberts & Manchester 2010, 75.
116 Westen *et al.* 2001, 18.
117 Tomas-Sannen forthcoming.
118 Meijer 1992, 13-14; De Vries 1996, 14.
119 Personal communication Prof. Dr. G.J.R. Maat.
120 Roberts & Manchester 2010, 76.
121 Schats 2016, 141.
122 Holick 2005.

Site	Source	Date	Bilateral periostis of tibias		
			Na[1]	%	No[2]
ONG early period	Onisto *et al.* 1998, 40, table 12.	1265 – *c.* 1433	1	2.0	47
Nieuwe Kerk	Tomas-Sannen in press.	1387 – *c.* 1625	26	44.8	58
ONG late period	Onisto *et al.* 1998, 41, table 14.	*c.* 1433 – *c.* 1620	0	0.0	32
Koningsveld	Westen *et al.* 2012, 52, table 4.	*c.* 1450-1573	0	0.0	35
Schutterstraat	Meijer 1992; Wiltens 1994; De Waal 1995; Boulonois 1996; De Vries 1996; Fermin 1996; Van Mousch 1996.	1624 – *c.* 1657	≥1	n/a	n/a

Table 4. The percentage of the occurrence of bilateral osteoperiostitis.
[1] Na=number of individuals affected; [2] No=number of individuals observed.

rickets, so the health condition in these individuals in youth was worse than in later stages of life.[123] Later they developed DISH, which would indicate that their condition in life improved.

In the past, infectious diseases caused the greatest number of deaths. Variation in nutrition, climate, sanitation, and population density were some of the factors that influenced a person's immunity.[124]

If an infection is longstanding, it can be seen on the bone material. The skeletal sign which is used here as an indicator is bilateral periostitis of the tibia and is usually associated with malnutrition. Table 4 shows the provenance of bilateral periostitis in the Delft cemeteries. It was not present in the individuals investigated in the graveyards of the late period of the Oude and Nieuwe Gasthuis and in the cloister garth of Koningsveld. This is in sharp contrast to the very high incidences of bilateral periostitis in the cemetery of the Nieuwe Kerk. There is no explanation for this high prevalence. Even if the number of healed cases of bilateral periostitis is taken into account (eight individuals), the percentage of people suffering from this remains 31%!

Skeletal indicators of non-specific stress are, for example, cribra orbitalia and cribra femora. These are visible as porosity in the orbital roofs of the cranium and on the neck of the femur respectively. They are caused by anaemia, which is not a disease, but a pathological symptom and can be related to many causal factors.[125]

Cribra orbitalia and cribra femora were formerly seen as indicators of chronic iron-deficiency and anaemia caused by vitamin deficiencies like B12 and folic acid. Nowadays, cribra orbitalia is also seen as the result of malaria.[126] Malaria is widespread in an environment with numerous brackish water masses which are excellent breeding grounds for mosquitos. There is a high correlation and statistically significant relationship with areas known as malarial and the presence of cribra orbitalia, which makes it most likely that malaria was the significant cause of cribra orbitalia.[127] Malarial conditions occur in the western Netherlands,

123 Westen *et al.* 2012, 26.
124 Roberts & Manchester 2010, 167.
125 Walker *et al.* 2009, 110.
126 Roberts & Manchester 2010, 219; Westen *et al.* 2012, 16.
127 Schats 2015, 137.

Site	Source	Date	cribra orbitalia			cribra femora		
			Na[1]	%	No[2]	Na[1]	%	No[2]
ONG early period	Onisto *et al.* 1998, 40, table 12.	1265 – *c.* 1433	0	n/a	n/a	0	n/a	n/a
Nieuwe Kerk	Tomas-Sannen forthcoming.	1387 – *c.* 1625	32	31.6	104	43	52.4	84
ONG late period	Onisto *et al.* 1998, 41, table 14.	*c.* 1433 – *c.* 1620	1	3.0	30	0	0.0	n/a
Konigsveld	Westen *et al.* 2012.	*c.* 1450-1573	1	2.8	36	3	8.3	36
Schutterstraat		1624 – *c.* 1657	≥1	n/a	n/a	≥1	n/a	n/a

Table 5. The occurrence of cribia orbitalia and cribra femora.
[1] Na=number of individuals affected; [2] No=number of individuals observed.

especially in peat and clay areas.[128] The pathological changes that are associated with cribra orbitalia and cribra femora may also be associated with infection, such as scurvy, rickets, and chronic cranial infections.[129]

The presence of cribra orbitalia and cribra femora in the Delft cemeteries (Table 5) is not a surprise, since the town lay in an area of canals and ditches, some with standing water that could not flow freely because of dams. A windmill was built in 1450 at the edge of the town to stimulate the flow of water through the primary canal to provide the breweries with better quality water for making beer, since the canals almost dried up in the summer and the standing water was putrid.[130]

There is no explanation why the percentage of cribra orbitalia is so high in the graveyard of the parish church Nieuwe Kerk. Since most of the graves of this cemetery are dated to the 16th and early 17th centuries, it would be reasonable to suggest that during this period malaria was more widespread than in the earlier phase of the town. On the other hand, most of the graves in this cemetery are likely to date from a period marked by famine and food shortage, so malnutrition and vitamin deficiency could also be the cause of the high prevalence of criba orbitalia. The percentage of criba orbitalia in the Nieuwe Kerk is even higher than in the late-medieval urban graveyard of Alkmaar (18.1%) and the rural late medieval site of Klaaskinderkerke (25.9%).[131]

Impact of the local government on the general health situation

At the moment, we cannot ascertain in what way local governments affected general health. The investigation of the Cemetery of the Plague is in progress and the research on the skeletons of the Nieuwe Kerk was only limited to a few pathological bone changes. Also the skeletons from the Koningsveld Priory do not provide the necessary data because they belonged to the rich and noble who came from all over the county of Holland and sometimes from even further away.

128 Schats 2015, 134; Schats 2016, 161.
129 Westen *et al.* 2012, 16.
130 Bult 1992, 50.
131 Schats 2016, 149.

The origins of Delft's inhabitants

At present, DNA and isotopic research is used to answer the question of people's origins. For Delft, such information was not available when the research questions were formulated in the early 1990s when the archaeological project at Delft first began. Only the 1960s research is available for Delft. Salomé, in his dissertation, stated that anthropological differences correlated with historical evidence.[132] People from northwestern Netherlands in general had a long skull (dolichocranial), while people from the south (Zeeland) had a broader skull (brachycranial).[133] In the neighbourhood of Delft, many place and field names from the period of the reclamation were Frisian names.[134] It is also known that at the beginning of the eleventh century Frisian colonists were involved in reclaiming and farming the new land north of the Meuse River at Vlaardingen.[135] Given the preponderance of Frisians around Delft and if Salomé's assessment of the relation of skull shape and origin of the population is correct, the majority of people buried in the early Delft cemeteries should have a skull of the dolichocranial type.

The dimensions of skulls from three cemeteries were examined to see if they changed over time and if so, in what way they changed. Klaassen, who performed this research, used skulls from the Oude and Nieuwe Gasthuis, the Maria Magdalena Convent, and of the Cemetery of the Plague.[136] The results of his investigation were that a broad skull of the brachycephalic type was the most common in the streets of Delft until the 15th century. From the second half of the 15th century till the end of the 16th, the outward appearance became more mesocranic. By the beginning of the 17th century, the skull had lengthened further and the width decreased so the skull became almost dolichocranic.[137]

The shape of a skull can transform within a couple of decades and even within one generation.[138] A brief inspection of the available literature shows that in many northwest European towns at the end of the Middle Ages, a brachycephalic type of skull was dominant.[139]

Although the shape of the early Delft skulls is not adequate for providing information on the origins of the Delft population, an interesting point of research in the future will be to find out what triggered the change of their shape. It seems to be more a matter of alterations in the environment than a result of genetic inheritance. Before the formation of towns, a dolichocranial type of skull seems to have been the general type of skull in northwest Europe,[140] but following the rise of medieval towns brachycephalization took place. At the end of the medieval period debrachycephalization occurred. Did a change in consumption patterns cause this debrachycephalization? Or did the changing housing in the towns contribute to

132 Salomé 1969, 96.
133 Van der Feen 1965, 10-11; Bork-Feltkamp 1965, 45; Salomé 1969, 95.
134 Bult 2014b, 29.
135 Alpertus Mettensis, *de diversitate temporum*: II, 21.
136 Klaassen 1998.
137 Klaassen 1998, 40, table 15.
138 Hulse 1957.
139 Cross & Bruce 1983; Maat *et al.* 1998, 16; Stroud & Kemp 1993.
140 Compare *e.g.* Bork-Feltkamp 1965.

this change? Or was it the result of more exogamous contacts? Other data indicate a correlation between brachycephalization and families with a numerous offspring[141] and a higher birth rate of brachycephals.[142] Did family size decrease at the end of the 16th century? Only the comparison of data from other medieval towns and rural areas will shed light on this problem. Therefore, more data of skull measurements are required; the dating of the transition of skull types needs to be fine-tuned and a connection has to be made with demographic data, the composition of food, and changes in housing, topics to which archaeologists can make a major contribution.

Conclusions

In and around Delft, five different graveyards were investigated, dating from the Late Middle Ages and post-medieval period. They include cemeteries of monasteries, an infirmary, a parish church, and a graveyard of plague victims. Not all the excavated burials have been investigated completely. Nevertheless, some important provisional observations on the Delft population and their burial practices during post-medieval times can be made.

Almost everyone was buried in a coffin. At the beginning of the period, these coffins were more or less rectangular, but from the 15th century onward, coffin shape became trapezoid in form. The usual orientation of the deceased was to be buried with the head to the west and the feet to the east. This was the usual way people were buried in late-medieval times, since they believed that on resurrection day Christ would come from the east. Priests in the Oude en Nieuwe Gasthuis were buried near the altar facing the opposite direction in order to, it is believed, face the people when they arose on resurrection day so as to to guide them.

After the Alteration, the east-west orientation was no longer the only way in which people were buried. For example, in order to maximize space, trapezoid coffins were placed with the direction of the head alternating, in long rows in cemeteries. Also people buried in a hurry during an epidemic of the plague were often buried haphazardly.

Differences in the socioeconomic status of the deceased is noticeable in the places where they were buried (in or outside the church, near the altar or at a distance) and in the type of wood that was used for the coffin. Oak, the most expensive, was the wood type most preferred by the rich. Beech and fir were much cheaper and were the wood of choice for burials outside the parish church.

During the Middle Ages, the general health situation in Delft was fairly good in comparison to other medieval towns. Nevertheless, there were differences in the state of the health of the buried individuals between cemeteries when it came to the social status of the deceased. This was visible in the different statures and the prevalence of several diseases, some of which were associated with a higher social status. These were found more often in the graveyards of the Koningsveld Priory and in the late period of the Oude en Nieuwe Gasthuis. They indicate that at least the males buried in the Koningsveld Priory cemetery were of higher status than the

141 Bielicki & Welon 1964.
142 Henneberg 1976, 3.

deceased of other graveyards. Burials in other graveyards, particularly from outside the parish church, indicated the presence of malnutrition and infection.

When comparing the results of the anthropological investigations of the infirmary, it turns out that the differences in the health status of the Delft population during the early and late periods of the infirmary were minimal. During the early period (1265 – *c.* 1433), the population of Delft was growing, but when the city became overcrowded, extending the built up area brought relief. Also, city regulations addressing water pollution in the canals and the construction of cesspits, although meant to facilitate the breweries in Delft, resulted in a healthier environment. This improved situation continued until the late period (*c.* 1433 – *c.* 1620). In the middle of the 16th century, living conditions in Delft became worse due to famine and the plague. Probably the skeletons in the infirmary cemetery that were investigated were not from mid-16th-century graves, but the victims of the plague buried in the Schutterstraat cemetery and probably also those in the cemetery of the Nieuwe Kerk were.

To conclude, on the basis of stature, incidence of infectious diseases, diseases resulting from malnutrition and vitamin deficiency, and joint degenerations, it is clear that the overall health of Delft's inhabitants was very reasonable up to the 16th century,[143] but there are indications that life circumstances in the second half of the 16th and early 17th centuries worsened for Delft's population.

Unfortunately, the investigation of these graveyards is still in progress, and not all the aspects of the pathologies have been investigated. A uniform approach in describing all the pathologies is necessary to make a thorough comparison within or between the cemeteries. More exact dating of the graves is also needed to ascribe changes in the health situation to historical events.

What is missing is insight into the prevalence of tuberculosis in Delft. Tuberculosis was supposed to be widespread in late medieval towns and may be a good indicator of poverty, malnutrition, and overcrowding in a town. Unfortunately, tuberculosis cannot usually be seen on bone tissue. In the future, the use of pathogen DNA research may prove to be fruitful.[144]

Since the hypothesis that skull measurements can provide information on the origins of the Delft population is no longer valid, other methods of detecting this should be applied. One method would be the use of isotopes.[145] Nevertheless, the results of skull measurement shed an interesting light on the changing appearance of Delft's population during the 16th century, from people with a brachycranial to a dolichocranial cranium. This needs further attention to be more fully understood. What caused this phenomena, which seems to be a general trend in northwest European towns? Did this phenomena occur everywhere at the same time? What triggered it? It is expected that it is the result of changing circumstances in medieval towns, but the question is, what were these circumstances?

143 Onisto et. al. 1998, 20-21.
144 Anastasiou & Mitchell 2013, 33.
145 Pye 2004.

Bibliography

Abrahamse, J.E. & R. Rutte, 2016: '1500-1850 – Changes in urbanization: differentiation, expansion and contraction', in: R. Rutte & J.E. Abrahamse (eds.), *Atlas of the Dutch Urban Landscape. A Millennium of Spatial Development*, Bussum, 118-211.

Alpertus Mettensis, , z.j.: *De diversitate temporum*, vertaald en ingeleid door Hans van Rij (1980). Amsterdam.

Anastasiou, E. & P.D. Mitchell, 2013: 'Palaeopathology and Genes: Investigating the Genetics of infectious Diseases in Excavated Human Skeletal Remains and Mummies from Past Populations', *Gene* 528, 33-40. DOI:10.1016/j.gene.2013.06.017.

Annema, W., 1981: 'Ziekenhuizen', in: I.V.T. Spaander & R.-A. Leeuw (eds.), *De stad Delft, cultuur en maatschappij van 1572 tot 1667*, Delft, 58-60.

Bielicki, T. & Z. Walon, 1964: 'Operation of natural selection on the head form', *Homo* 15, 22-30.

Bitter, P., 2002*: Graven en begraven. Archeologie en geschiedenis van de Grote Kerk van Alkmaar.* Hilversum (published doctoral dissertation University of Amsterdam).

Bonenkampová, V., 2013: 'Waren 'rijke stinkerd' rijk? De sociale stratificatie van de Delftenaren en hun graven in de Oude Kerk', in: P. Bitter, V. Bonenkampová & K.Goudriaan (eds.), *Graven spreken. Perspectieven op grafcultuur in de middeleeuwse en vroegmoderne Nederlanden*. Hilversum, 193-204.

Boulonois, M., 1996: *Uitwerking van enig botmateriaal van de Schutterstraat te Delft. Verslag bijvak fysische antropologie*, Leiden (unpublished report for Physical Anthropology Course, Leiden University).

Breitinger, E., 1937: 'Zur Berechnung der Körperhöhe aus den langen Gliedmassenknochen', *Anthropologische Anzeig*er 14, 249-274.

Brouwer, H.C., 1979: 'De verdwenen kloosters uit de Delftse binnenstad', in: I.V.T. Spaander & R.-A. Leeuw (eds.), *De stad Delft, cultuur en maatschappij tot 1572,* Delft, 54-59.

Bult, E.J., 1992: *IHE Delft prospers on a cesspit. Archaeological research between Oude Delft and Westvest*, Delft.

Bult, E.J., 1993: 'Archeologische Kroniek van Delft juni 1991 augustus 1992', *Delfia Batavorum, Jaarboek 1992,* 145-162.

Bult, E.J., 1995: 'Archeologische Kroniek van Delft juni 1993 – juni 1994', *Delfia Batavorum, Jaarboek 1994,* 95-108.

Bult, E.J., 1996: 'Archeologische Kroniek van Delft juni1994 – december 1994', *Delfia Batavorum, Jaarboek 1995,* 93-109.

Bult, E.J., 1998: *Jaarverslag Archeologie Delft 1996*, Delft.

Bult, E.J., 2006: 'Opgravingen klooster Koningsveld', *Jaarboek Delfia Batavorum, 2005,* 113-120.

Bult, E.J., 2011: *Bureauonderzoek naar archeologische waarden. Archeologie binnen Spoorzone Delft deel I*, Delft (Delftse Archeologische Rapporten 21).

Bult, E.J., 2014a: 'De Hof van Delft', in: T. de Ridder, E.J. Bult & E. Beukers (eds.), *Graven in Holland. De hoven van de Hollandse graven tot het eind van de 13e eeuw in vergelijkend perspectief-Westerheem Special 3*, 126-159.

Bult, E.J., 2014b: 'Historisch-geografische bronnen', in: E.J. Bult (ed.), *'Huijse oft slot Harnasche'. Een archeologische opgraving van een middeleeuwse vindplaats (MD22-22) in de Harnaschpolder van de gemeente Midden-Delfland*, Delft (Delftse Archeologische Rapporten 121), 27-58.

Canneman, E.A., 1967: 'De bomen op het Marktveld', in: R. Meischke, J.C. Visser, E.H. ter Kuile (eds.), *Delftse Studiën: een bundel historische opstellen over de stad Delft, geschreven voor dr. E.H. ter Kuile naar aanleiding van zijn afscheid als hoogleraar in de geschiedenis van de bouwkunst*, Assen, 229-235.

Cross, J. & M.F. Bruce, 1983: 'Skull and face shape in Aberdeen in the 13th to 16th century', *Journal of Anatomy* 137, 435.

Crubézy, E., 1990: 'Diffuse Idiopathic Skeletal Hyperostosis. Diagnosis and importance in Paleopathology', *Journal of Paleopathology* 3, 107-118. http://doi.org/10.1016/j.jchb.2012.03.005

De Vries, L., 1996: *Onderzoek aan een aantal 17e eeuwse pestslachtoffers uit Delft*, Leiden (unpublished report for Physical Anthropology Course, Leiden University).

De Waal, M., 1995: *Skeletonderzoek van een pestkerkhof te Delft,* Leiden (unpublished report for Physical Anthropology Course, Leiden University).

Drossaers, S.W.A., 1917: *De archieven van de Delftsche Statenkloosters*, 's-Gravenhage.

Fermin, B., 1996: *Fysisch antropologisch onderzoek Delft Schutterstraat (1992)*, Leiden (unpublished report for Physical Anthropology Course, Leiden University).

Gouweleeuw, J.W.A., 1970: *Inventaris van het archief van het Oude en Nieuwe Gasthuis te Delft,* Delft.

Groen, J.M., 2005: 'Delft. Begraafplaats Nieuwe Kerk', in: TGV Teksten en Presentatie, 'Archeologische Kroniek over Zuid-Holland 2004', *Holland* 37, 2005, 59-60.

Harris, E.C., 1979: *Principles of Archaeological Stratigraphy*, Londen, Orlando, San Diego New York, Austin, Boston, Sydney, Tokyo and Toronto.

Hendriks, A.E.J., 2012: *Fertility in Tall Men and Women Treated with High-Dose Sex Steroids during Adolescence and Genetic Determinants of Tall Stature,* Rotterdam (doctoral dissertation Erasmus University Rotterdam).

Henneberg, M., 1976: 'The influence of natural selection on brachycephalization in Poland', *Studies in physical Anthropology* 2, 3-19.

Holick, M.F., 2005: 'The vitamin D epidemic and its health consequences', *Journal of Nutrition* 135, 2739-2748. PMID:16251641.

Hagers, J.K. & M. Teeuwisse, 1986: *Fysisch-anhropologisch onderzoeksrapport. Laat-middeleeuws skeletmateriaal opgegraven bij het Oude & Nieuwe Gasthuis-complex te Delft*, Leiden (MA thesis physical antropology, Leiden University).

Houtzager, H.L., 1981: 'De geneeskundige verzorging', in: I.V.T. Spaander & R.-A. Leeuw (eds.), *De stad Delft, cultuur en maatschappij van 1572 tot 1667*, Delft, 118-121.

Houtzager, H.L., 1996: 'Stadsheer te Delft', in: H.A.Bosman-Jelgersma (ed.), *Pieter van Foreest. De Hollandse Hippocrates,* Krommenie, 99-104.

Hulse, F.S., 1957: 'Exogamie et hétérosis', *Archives Suisse d' Anthropologie Générale* XXII, 103-125.

Jankauskas, R., 2003: 'The incidence of Diffuse Idiopathic Skeletal Hyperostosis and social correlations in Lithuanian skeletal materials', *International Journal of Osteoarchaeology* 13, 289-293. DOI: 10.1002/oa.697.

Janssen, H.A.M. & G.J.R. Maat, 1999: *Canons buried in the "Stiftskapel" of the Saint Servaas Basilica at Maastricht, 1070-1521 AD. A palaeopathological study*, Leiden (Barge's Anthropologica 5).

Julkunen, H., O.P. Heinonen & K. Pyörälä, 1971: 'Hyperostosis of the spine in an adult population', *Ann. Rheum Dis.*, 605-612. PMC1005837.

Kistemaker, J.G.M., 1987: 'Delft, Koornmarkt', in: D.P. Hallewas (ed.), 'Archeologische kroniek van Holland over 1986', *Holland. Regionaal historisch tijdschrift,* 19-6, 330-332.

Kistemaker, J.G.M., 1990: 'Delft, een gasthuis grondig bekeken', in: H.Sarfatij (ed.), *Verborgen steden. Stadsarcheologie in Nederland*, Amsterdam, 123-127.

Kistemaker, J.G.M., G.Ph.M.Buzing & H. de Kat, 1985: *Het Gasthuis grondig bekeken. Deel een: archeologie en actie,* Delft.

Klaassen, C.J.F., 1998: *Metingen van schedels van Delftse opgravingen uit de 13e tot de 17e eeuw,* Rotterdam (MA thesis physical antropology, Leiden University).

Klemperer, W.D., 1992: 'The study of burials at Hutton Abbey', in: T. Dickinson & E. James (eds.), *Medieval Europe 1992: Death and burial. Preprinted papers of a conference on mediaeval archaeology in Europe, 21st – 24th September 1992 at the University of York*, York. 86-91.

Knussmann, R. (ed.), 1988: *Anthropology: Handbuch der vergleichenden Biologie des Menschen*, Stuttgart, New York.

Koch, A.C.F., 1970: *Oorkondenboek van Holland en Zeeland tot 1299,* 's-Gravenhage.

Larsen, C.S.,1997: *Bioarchaeologie: Interpreting behaviour from the human skeleton,* Cambridge (Cambridge Studies in Biological Anthropology).

Maat, G.J.R., 2003: Male stature. 'A parameter of health and wealth in the Low Countries, 50 – 1997 AD', in: W.H. Metz (ed.), *Wealth, Health and human remains in Archaeology*. *Symposium in het kader van de vijfentwintigste Kroon-voordracht gehouden voor de Stichting Nederlands Museum voor Anthropologie en Praehistorie te Amsterdam op 27 maart 2003*, Amsterdam, 57-88.

Maat, G.J.R., R.W. Mastwijk & H. Sarfatij, 1998: *Een fysisch anthropologisch onderzoek van begravenen bij het Minderbroedersklooster te Dordrecht, circa 1275-1572*, Amersfoort (Rapportage Archeologische Monumentenzorg 67).

Maat, G.J.R. & R.W. Mastwijk, 2000: 'Avulsion injuries of vertebral endplates', *International Journal of Osteoarchaeology* 10, 142-152. DOI:10.1002/(SICI)1099-1212(200003/04)10:2<142::AID-OA519>3.0.CO;2-L.

Maat, G.J.R., R.W. Mastwijk & M.A. Jonker, 2002: *Citizens buried in the 'Sint Janskerkhof' of the 'Sint Jans' cathedral of 's-Hertogenbosch in The Netherlands, ca. 1450 and 1830-1858 AD*, Leiden (Barge's Anthropologica 8).

Manchester, K., 1984: 'Tuberculosis and Leprosy in antiquity: an interpretation', *Medical History* 28, 162-173.

Mata, S., P.R. Fortin, M-A. Fitzcharles, M.R. Starr, L. Joseph, C.S. Watts, B. Gore, E. Rosenberg, R.K. Chem & J.M. Esdaile, 1997: 'A controlled study of diffuse idiopathic skeletal hyperostosis: clinical features and functional status', *Medicine* 76, 104-117. PMID: 9100738.

McAlindon, T.E., C. Chaisson, M. LaValley, Y. Zhang, L. Kauppila, & D.T. Felson,1996: 'Are individuals with diffuse idiopathic skeletal hyperostosis (DISH) at increased 33 risk of diabetes mellius (DM)?', *Arthritis and Rheumatism* 39 (Supplement S9), 113.

Meijer, L.G.A., 1992: Opgraving Delft Schutterstraat 1992. *Fysisch antropologisch rapport in archeologische context. Spoor 4, 8 en een gedeelte van de knekelkuil van spoor 8*, Leiden (unpublished report for Physical Anthropology Course, Leiden University).

Onisto, N., G.J.R. Maat & E.J. Bult, 1998: *Human remains from the infirmary "Oude en Nieuwe Gasthuis"of the city of Delft in the Netherlands 1265 – 1652*, Leiden (Barge's Anthropologica nr 2).

Oosterbaan, D.P., 1954: *Zeven eeuwen. Geschiedenis van het Oude en Nieuwe Gasthuis te Delft*, Delft.

Panhuysen, R.G.A.M., 2005: *Demography and Health in early medieval Maastricht. Prosopographical observations on two cemeteries,* Maasticht (doctoral dissertation Maastricht University).

Pye, K., 2004: Isotope and trace element analysis of human teeth and bones for forensic purposes. *Geological society, London, Special Publications*, 232, 215-236.

Resnick, D. & G. Niwayama 1988: Diagnosis of bone and joint disorders. Philadelphia.

Rijpma, F.E. & G.J.R. Maat, 2005: *A physical anthropological research of the beguines of Breda 1267 to 1530 AD. Leiden*, Leiden (Barge's Anthropologica 11).

Roberts, C.A., 2009: *Human remains in archaeology. A Handbook*, York.

Roberts, C.A. & K. Manchester, 2010: *The Archaeology of Disease (Third Edition)*, Gloucestershire.

Rogers, J., 2000: 'The palaeopathology of joint disease', in: M. Cox, & M. Mays (eds.), *Human Osteology: In Archaeology and Forensic Science,* London, 163-182.

Rogers, J. & T. Waldron, 2001: 'DISH and the Monastic way of life', *International Journal of Osteoarchaeology* 11, 357-365. DOI: 10.1002/oa.574.

Salomé, A.J., 1969: *Een craniologische onderzoek van de oude bevolking van Valkenburg-Z.H=A craniological investigation of the old population of Valkenburg-Z.H. the Netherlands*, Leiden (unpublished doctoral dissertation Leiden University).

Scheeres, M., 2007: *Menselijke resten nader bekeken. Sociaal-economische verschillen op de noordelijk en westelijk gelegen pre-industriële begraafplaats van de Nieuwe Kerk te Delft*, Leiden (unpublished BA thesis Leiden University).

Schats, R., 2015*:* 'Malaise and mosquitos: osteoarchaeological evidence for malaria in the medieval Netherlands', *Analecta Praehistorica Leidensia 45,* 133-140.

Schats, R., 2016: *Life in transition. An osteoarchaeological perspective of the consequences of medieval socioeconomic developments in Holland and Zeeland (AD 1000-1600)*, Leiden (unpublished doctoral dissertation Leiden University).

Schiffer, M.B. 1987: *Formation Processes of the Archaeological Record,* Salt Lake City.

Stroud, G. & R.L. Kemp, 1993: *Cemeteries of the Church and Priory of St.Andrew, Fishergate*, York (The Archaeology of York, vol. 12: The Medieval Cemeteries).

Tomas-Sannen, P., in prep.: *Graven bij de Nieuwe Kerk. Een fysisch antropologische analyse van het skeletmateriaal uit de opgravingen bij de Nieuwe Kerk te Delft in 2004 en 2005,* Delft (Delftse Archeologische Rapporten).

Trotter, M., 1970: 'Estimation of stature from intact limb bones,'.in: T.D. Stewart (ed.), *Personal identification in mass disasters*, Washington, 71-84.

Trotter, M. & G.C. Gleser, 1952: 'Estimation of stature from the long bones of American whites and Negroes', *American Journal of Physical Anthropology NS* 10, 463-514.

Trotter, M. & G.C. Gleser, 1958: A re-evaluation of estimation of stature based on measurements of stature taken during life and of long bones after death. *American Journal of Physical Anthropology* 16-1, 79-123. DOI: 10.1002/ajpa.1330160106.

Van Bork-Feltkamp, A.J., 1965: 'Anthropologica uit oude Zeeuwse begraafplaatsen', *Archief. Vroegere en latere mededelingen voornamelijk in betrekking tot Zeeland*, 21-51.

Van Horssen 2017a: *Graven voor de deur. Archeologisch onderzoek naar het Marktplein en het kerkhof op de Markt in Delft*, Delft (Delftse Archaeologische Rapporten 129).

Van Horssen 2017b: Van gebed tot gebulder.Archeologisch onderzoek in het voormalige artilleriemagazijn aan de Paardenmarkt in Delft, Delft (Delftse Archaeologische Rapporten).

Van Mousch, R., 1996: *Determinatie van* 5 *Skeletten afkomstig van de noodbegraafplaats "Schutterstraat" te Delft*, Leiden (unpublished report for Physical Anthropology Course, Leiden University).

Van der Feen, P.J., 1965: 'Twee mensenrassen in Zeeland. Een inleiding en literatuur overzicht', *Archief. Vroegere en latere mededelingen voornamelijk in betrekking tot Zeeland*, 3-20.

Van der Kloot Meijburg, L.H.H., 1941: *De Nieuwe Kerk te Delft. Haar bouw, verval en herstel*, Rotterdam.

Van der Perre, D., 1998: *De culturele horizon van het middeleeuwse kerkgebouw (12de-16de eeuw) in het bijzonder bij de premonstratenzers: vergelijkende cultuurhistorische studie van zijn intellectuele en functionele context*, Leuven.

Verhoeven, G., 1992: *Devotie en negotie. Delft als bedevaartplaats in de late middeleeuwen,* Hilversum.

Verhoeven, G., 2006: 'Koningsveld bij Delft. Theorie en praktijk van het kloosterleven', *Jaarboek Delfia Batavorum, 2005,* 99-111.

Verhoeven, G., 2015: *De derde stad van Holland. Geschiedenis van Delft tot 1795*, Zwolle.

Walker, P.L., R.R. Bathurts, R. Richman, T. Gjerdrum and V. Andrusko, 2009: 'The causes of porotic hyperostosis and cribra orbitalia: A reappraisal of the iron-deficiency-anaemia hypothesis', *American Journal of Physical Anthropology* 139-3, 109-125. DOI:10.1002/ajpa.21031.

Waldron, T., 1985: 'DISH at Merton Priory: evidence for a 'new' occupational disease?', *British Medical Journal* 291, 1762-1763. PMC1419206.

Waldron, T., 2009: Paleopathology. Cambridge Manuals in Archaeology. Cambridge.

Westen, A.A., W.J. Groen & G.J.R. Maat, 2012: *Human remains from the cloister garth of the 'Koningsveld' priory near the medieval city of Delft, ca. 1450-1572 AD*, Leiden (Barge's Anhtropologica 12).

Wiltens, A.E.M., 1994: *Paper fysische antropologie. Naar aanleiding van een klein skeletonderzoek van skeletten, opgegraven in Delft, op het z.g. "pestkerkhof"*, Leiden (unpublished report for Physical Anthropology Course, Leiden University).

Wood, J.W., G.R. Milner, H.C Harpending & K.M. Weiss, 1992: 'The osteological paradox: Problems of inferring health from skeletal samples', *Current Anthropology* 33-4, 343-370.

A thousand graves: differences and similarities between archaeologically investigated burial grounds in 's-Hertogenbosch, the Netherlands (c. 1275-1858)

Ronald van Genabeek

Introduction

The town of 's-Hertogenbosch was established in the late 12th century, on the northern border of the Duchy of Brabant. Within a short period, the town expanded to become one of the largest cities in the modern territory of the Netherlands. The sizable town also comprised a remarkably large number of burial grounds within its walls. There have been 19 in total in the period up to 1858, six of which have been archaeologically investigated.[1] The village churchyard of Engelen was investigated as well and human skeletons were also recovered from two locations outside regular burial grounds.[2]

The excavation results have been partly published but no comprehensive study of the approximately one thousand excavated skeletons yet exists. This overview will briefly discuss the layout of four burial grounds, the burial rituals and, to the extent it was possible to determine, the health of the buried individuals. The four burial grounds are: the cemetery of the medieval Minderbroeders friary

1 More specifically, the northern section of St John's churchyard (see Pot 1988; Portegies 1999; Maat, Mastwijk & Jonker 2002 and Cleijne 2007); the southern part of the same (see unpublished excavation report DBPA); the Minderbroeders friary (see unpublished excavation reports DBMK and HTMK); the Predikheren monastery (see unpublished excavation report DBPR); St James' church and churchyard (see partly unpublished excavation reports HTWB and HTRA, and in part also Cleijne & Van Genabeek 2008); the Bethanie convent (see Janssen 1983a); the Protestant cemetery (see Pronk & Scoop 2005).

2 The Engelen village churchyard (see Janssen 1983b); French soldiers' mass grave (see Van Genabeek, Van der Linde, Kootker & Buiks 2015; burials Heetmanplein (studied by Constance van de Linde).

(*c.* 1275-1641); the churchyard of St John Cathedral (1419-1858), the Protestant cemetery (1833-1858), and a mass grave of French soldiers, dating to 1794-1795. The majority of the burials date roughly from the same period, which is late 18th century to 1858. In the conclusion we will discuss similarities and differences as well as address the question to what extent these relate to differences in context (civilian/military, Catholic/Protestant). We will conclude by indicating which topics remain unexplored and which hypotheses regarding 'death and burial in 's-Hertogenbosch' are still waiting to be tested.

Life and death in 's-Hertogenbosch

Thanks to ducal privileges and its own favourable location 's-Hertogenbosch flourished, especially in the 14th and 15th century. Its economy was mainly based on trade and crafts. Around 1438, the town had approximately 13,000 residents, a number which a century later had increased to *c.* 20,000 souls.[3] Starting in the second half of the 16th century, however, the town went into decline, mainly as a result of war, the 1629 conquest by troops of the Dutch Republic being the most serious blow. In the 17th and 18th centuries, 's-Hertogenbosch with *c.* 15,000 to 16,000 residents was still a sizable town.[4] At that time, its economy was mainly oriented on the Brabant countryside instead of long-distance trade as it had been before. Nonetheless, it retained its strategic importance as well as being a garrison town; until the mid-18th century, large numbers of soldiers were billeted on the local population. The economy first started to recover – and the population to grow – in the early 19th century, the latter reaching over 23,000 souls in 1859.[5]

In the Middle Ages, 's-Hertogenbosch was an important religious centre with dozens of churches and monastic institutions (Fig. 1). In fact, there were so many that by the 16th century the town had acquired the nickname '*Cleijn Rome*', 'little Rome'. At the start of the 16th century, almost 6% of its residents were either priests or members of a religious order.[6] The main church is St John's, which probably already in the early 13th century was surrounded by a burial ground where citizens of 's-Hertogenbosch were buried. For a long time, this was the only public cemetery. Burial also took place in many of the monastic institutions but this privilege was reserved for members of the religious orders, priests, or citizens who through donations had secured for themselves the privilege to be buried in a monastic church. There, they would be assured of the monastic community's regular prayers for their souls. Scattered throughout the town are various chapels established by religious brotherhoods or by guilds. Two of these, St Barbara's and St George', have been archaeologically investigated but no burials were found on that occasion.[7] It seems likely that no burials took place at the other smaller chapels, either.

---

3 Kuijer, 2000, 133.
4 Hanus 2011, 123.
5 According to that year's census as published in Vos *et al.* (eds.) 1997, 421.
6 Kuijer 2000, 344.
7 Archaeological research was carried out at two of the six guild chapels, those of St George and St Barbara. No burials were discovered; see Janssen & Zoetbrood 1983 (St George) and Cleijne 2011 (St Barbara).

Fig. 1: Street plan of the centre of 's-Hertogenbosch; indicated are churches, monastic houses and burial grounds (drawing by the author).

In 1569, three new parishes were created, an existing chapel in each case being elevated to the status of a parish church, which added three new burial grounds to the number of places where citizens could be buried. After the conquest of 's-Hertogenbosch in 1629, all public expressions of the Roman Catholic faith were banned and the monastic burial grounds were no longer available but the three around former parish churches remained in use, as did the burial ground associated with a hospital, *Groot Ziekengasthuis*.[8] After a fourth parish church, St Peter's, was demolished in 1645 its cemetery, was moved to the site of the St Gertrude convent, creating a total number of four public burial grounds in the town, three of them around churches which no longer functioned as such. It is likely that the limited space around St John's made these extra cemeteries indispensable. Since

8 The burial ground of the Groot Ziekengasthuis remained in use until 1810, the churchyard of the former St Catherine's church until 1822 and that around the former St James' church until 1827 (Portegies 1999, 176).

1629, 's-Hertogenbosch was formally a Protestant town although the exact ratio between Catholics and Protestants is difficult to establish since Catholics could no longer publicly profess their faith. Around 1650, the number of baptisms in the Protestant churches roughly equalled that in the Catholic clandestine chapels but around 1700, the number of Protestant baptisms had dropped to a third.[9] A large military garrison was billeted within the town walls. In the second half of the 17th century, these soldiers comprised about 20% of the total urban population, which means that the proportion of Catholics among the 'real' 's-Hertogenbosch residents probably exceeded two-thirds.[10] The first official figures with respect to religious affiliation date from 1795, when 78% of the population was Roman Catholic and 19% Dutch Reformed. In 1859, the percentage of Catholics had climbed to 84%.[11] Until 1833, both Protestants and Catholics were buried in the same four common burial grounds. There are no indications that separate Catholic and Protestant sections existed; it seems they were buried side by side. Occasionally, however, Catholic funerals and in particular the funeral Mass might contain elements frowned upon by Protestant church councils.[12] The first exclusively Protestant cemetery was laid out in 1833, oddly enough within the town walls. Its arrival coincided with an intense debate whether or not cemeteries should be relocated to non-urban areas.[13] For reasons of public health the State was very much in favour of such a move, but church councils strongly opposed the measure since it would rob them of revenues. Burial inside churches had been banned since 1810, but it took a severe cholera epidemic in 1849 to force the matter. In 1858, a new cemetery was laid out outside 's-Hertogenbosch, near the village of Orthen.[14]

The Minderbroeders friary (*c.* 1275-1641)

The oldest of the burial grounds discussed in this paper was originally part of the Minderbroeders friary. The friary was established in 1228, making it the oldest Franciscan friary in the Netherlands. It is situated within the earliest town walls in an area made available to the friars by the Duke of Brabant. There is virtually no archaeological or historical information on the first 50 years of the friary's existence. In the final quarter of the 13th century, a large church and a monastic complex were built which in their layout remained essentially unchanged as long as the friary existed: to the south a large church with three-aisled ship and aisleless choir, and to the north a cloister garth and cloisters around which the main monastic buildings were arranged. Beyond this core were other buildings such as a guest house and utilitarian structures. The friary was suppressed in 1629, after which the buildings were demolished in 1641.

9 Hanus 2011, 122-123.
10 Hanus 2011, 122.
11 Vos *et al.* (eds.) 1997, 422.
12 Portegies 1999, 126-129.
13 Portegies 1999, 193-196.
14 Portegies 1999, 193-196.

Layout of the burial ground

Between 1985 and 2008, a large section of the former monastic complex was investigated in a series of archaeological excavations. A total of 172 graves were discovered, 112 inside the church, 46 in the cloisters, six in a small cloister garth and eight inside the monastic buildings (Fig. 2). Overall, dating the excavated skeletons was difficult; in many cases, later modifications and demolitions had made it impossible to determine from which level a grave had been dug. Some burials were superimposed but whether this was a coincidence or the result of successive burials having been placed in one and the same grave is uncertain. (Fig 3). In some cases it was possible to link certain skeletons to others, but assigning a more precise date or stratigraphic relation proved to be very difficult. As a result, most of the skeletons can only be assigned to the period 1275-1629, too wide a margin to be able to draw statistically valid conclusions with regard to trends in funerary practices, health, or palaeodemography. There are indications that burials continued to take place in the area after the friary's 1629 suppression and even after the demolition of the church in 1641; at one location, skeletons were discovered on top of the demolished foundations of the church.

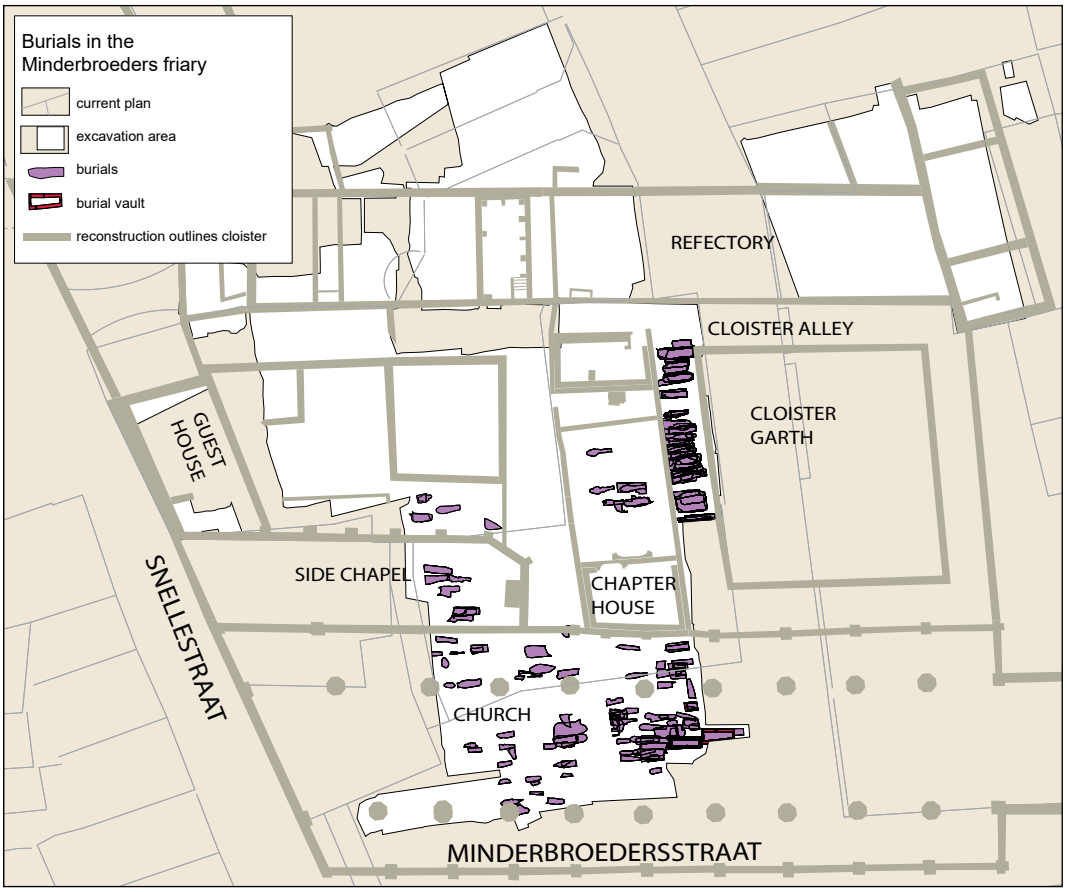


Fig. 2: Layout of a section of the Minderbroeders friary with the location of excavated graves marked (drawing by the author).

We know from historical sources and from inscriptions on the discovered tombstones that some of those buried inside the church were not members of the monastic community. Some of the tombstone fragments, for example, contain texts like 'his wife' and refer to a private house on Colperstraat,[15] while historical sources inform us that the leading local family Van Broeckhoven owned a family tomb inside the church.[16] On the other hand, it seems that only members of the monastic community were buried in the cloisters and the monastic buildings.[17] Interestingly, only one of the bodies had been buried facing west and may therefore be considered to have been a priest (Fig. 4).

Funerary ritual

In most cases it was impossible to determine whether the grave had contained a coffin. All wood had completely decayed; only in some of the deepest graves could some traces of a coffin be identified in the relatively clean sand. Sometimes the presence of a coffin could be inferred from the remaining nails. Even the earliest, 13th or 14th-century burials produced indications for coffins. Some of these traces suggest tapering coffins or a roof-shaped lid. Roof-shaped lids are regarded as remnants of an earlier idea that the coffin is the deceased individual's final dwelling.[18] The legs of a few of the 14th and 15th-century skeletons found in the cloisters were slightly splayed which may indicate that they were buried without a coffin. Three burials stood out because they contained a brick sarcophagus, which based on the size of the bricks could be dated to the late 13th or early 14th century. The deceased individuals in these sarcophagi were facing east, an indication that they probably were not priests and therefore not high-ranking members of the monastic community. They may have been important burghers instead. In one of these sarcophagi, or vaults, a simple cross had been painted on the east wall (Fig. 6). It resembles a Templars' cross with its characteristic short flaring arms of equal length, but in this case narrow rectangular strips were added to each arm. Painted motifs on the walls of burial vaults are fairly common in Flanders and to a lesser extent also in the Dutch Holland and Zeeland regions.[19] Further inland they are scarce and this is the only known example from 's-Hertogenbosch. Inside one of the monastic buildings eight graves were discovered, a highly unusual find. They were situated quite high up in the stratigraphy, just above the 15th-century floor. These individuals were therefore buried there at a later stage, in the 16th or 17th century, possibly even after the suppression of the friary.

---

15 Collection 's-Hertogenbosch Municipality, *SO/Erfgoed*, inventory numbers 5654 and 5658

16 I will return to this grave below. Schuttelaars 2010, 76.

17 In the Maastricht Minderbroeders Friary, too, the large cloisters and surrounding monastic buildings contained only male burials, which suggests that these sections were reserved for members of the monastic community (see Van Genabeek 1994, 90-91). Whether this was also the case in 's-Hertogenbosch has not yet been established; the processing of the skeletal material was still ongoing when this paper was written. The analysis is being carried out by Leiden University's Osteolab in collaboration with the faculty of medicine.

18 Kok 1990, 169.

19 Lempke 2009, 77-78.

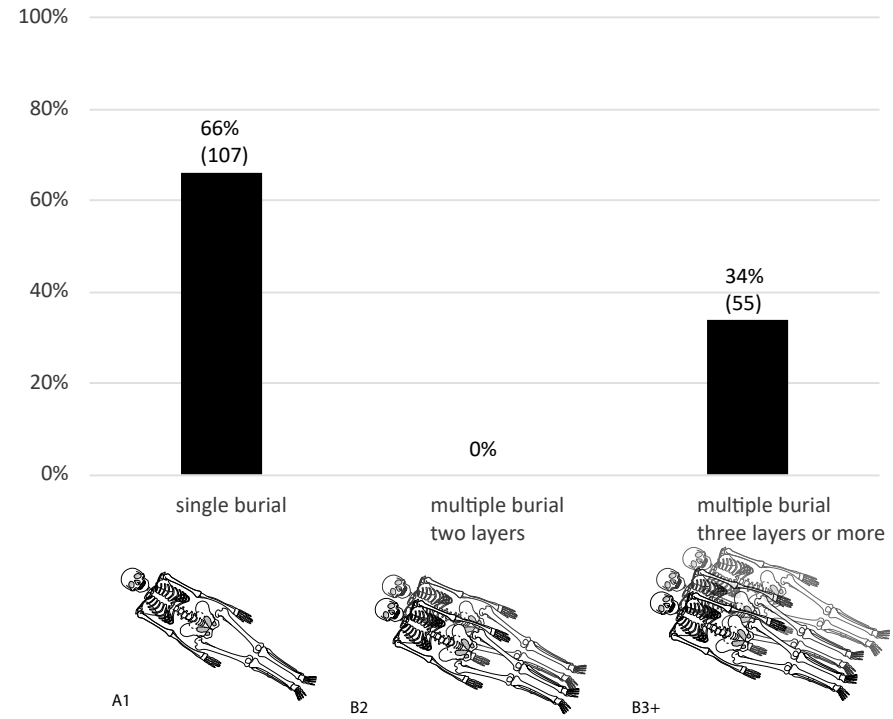


Fig. 3: Grave types. N-known 162, N-unknown 11. In cases of multiple bodies in one grave the topmost ones may have been removed during later digging activities, in which case the grave would be classified as Category A.

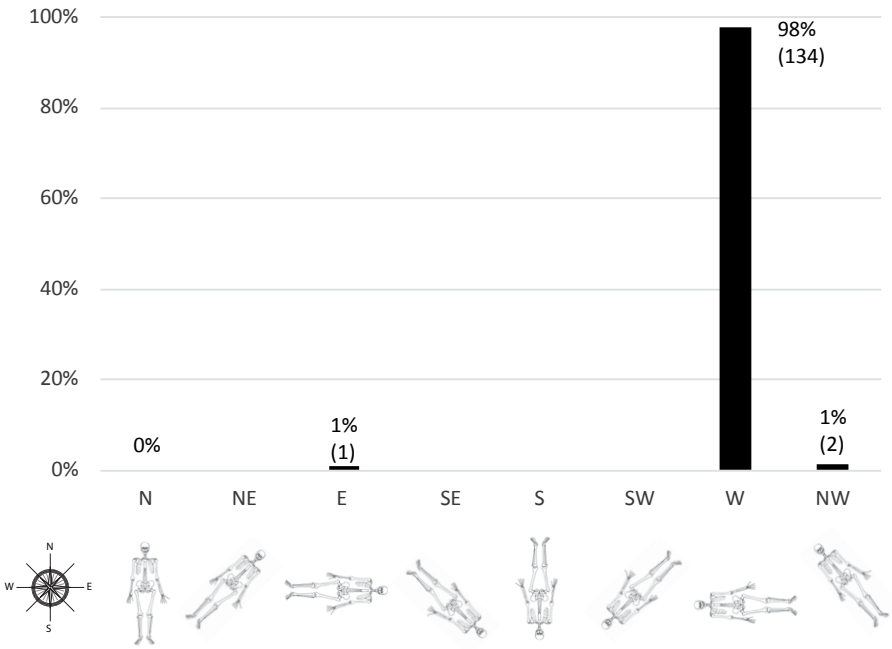


Fig. 4: Orientation. N-known 137, N-unknown 36.

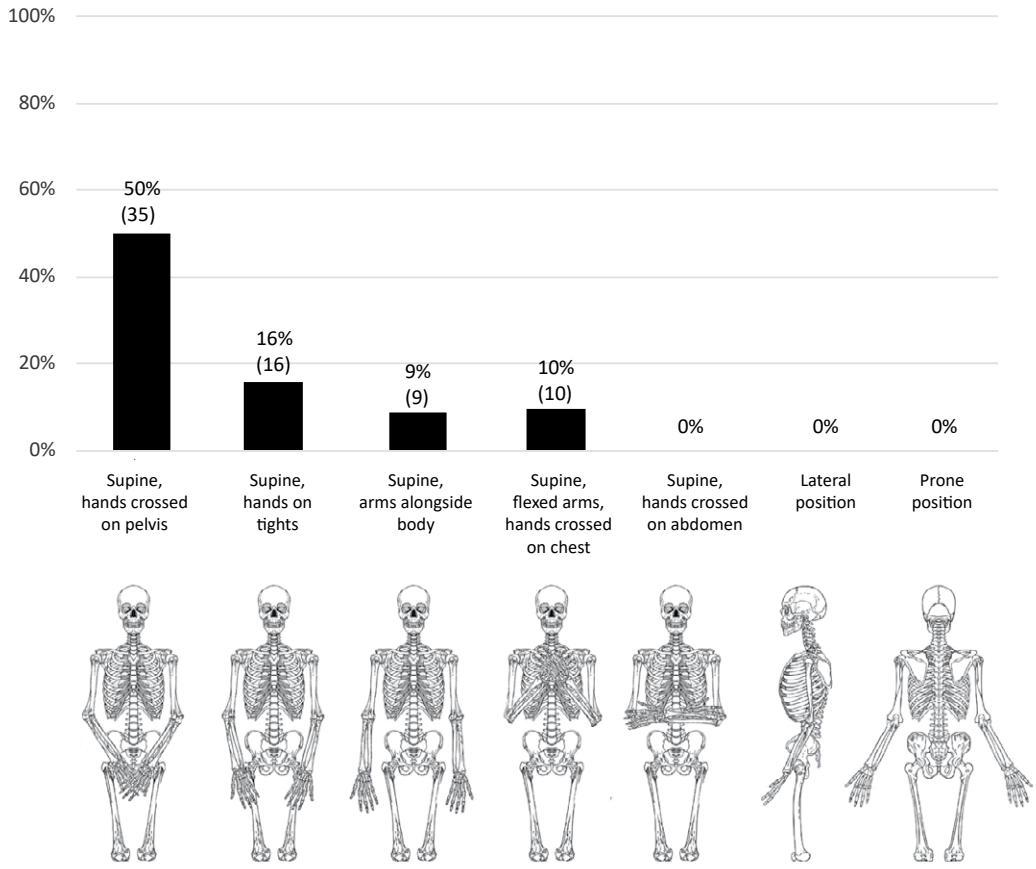


Fig. 5: Arm positions. N-known 70, N-unknown 103.

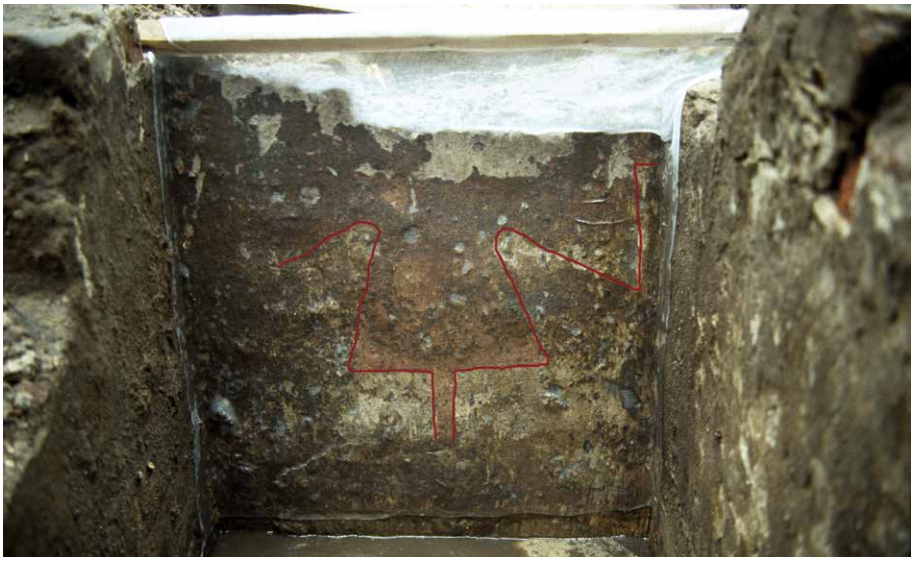


Fig. 6: Burial vault inside the Minderbroeders friary's church with a cross painted on one of the walls. The contours have been highlighted (photo 's-Hertogenbosch Municipality, SO/ Erfgoed).

St John's churchyard (*c.* 1225-1858)[20]

Until 1858, St John's and its churchyard remained the town's most important burial ground. Whoever could afford it opted for a burial inside the cathedral itself. The cathedral's burial registers do not extend further back than the second quarter of the 17th century. They reveal that, between 1631 and 1635, approximately 40% of the dead were buried inside the cathedral and the remainder outside, in the surrounding churchyard. By the period 1790-1799, the proportion of those buried inside the cathedral had dropped to about 20%. Clearly, the significance of a church burial gradually diminished in the course of the 17th and 18th centuries.[21] Many of the graves inside the cathedral received a tombstone recording the deceased's name and, occasionally, a family crest. Old tombstones were frequently recycled. St John's still contains over 500 tombstones carrying a total of 1158 names. Among the buried individuals are priests and town administrators as well as tradesmen and merchants. The other parish churches as well as a few of the larger monastic churches also contain tombstones with the names of the deceased. Occasionally, a grave received an elaborate funerary monument but only in the case of very high status individuals, as for example the grave of bishop Masius in St John's. Most of the tombstones date from the 16th or 17th century.[22] Some of them were family plots and sometimes remained in use for several generations. Families owning a private grave plot had to pay for its maintenance, a responsibility which was frequently neglected. When a church was demolished the family could claim the contents of the grave. When the Minderbroeders church was taken down, for example, Rogier van Broeckhoven ordered his parents' grave in that church to be cleared and the bones reburied in the new family tomb in Rumst (Belgium). The original tombstone was lifted and transported to Rogier's house. After his death, the stone was brought to St John's where it covered Rogier's own grave, with a new inscription.[23]

The rest of the graves were so-called 'church graves', property of the church. The proportion of church graves increased significantly in the course of the 18th century. At the start of the 19th century, only 20% of the graves in the church were still privately owned.[24] Parallel to this trend, the custom to provide a family grave inside a church with elaborate inscriptions and family crests also faded in the course of the 18th century. At most, a new name was added to an existing tombstone. As a result, St John's contains relatively few 18th-century tombstones.[25]

---

20 In 1999, a comprehensive historical study of the churchyard of St John's was published, with an emphasis on the period 1629-1858. The present paper has made extensive use of the information contained in that publication. For more context information and figures with regard to the churchyard, see Portegies 1999.

21 Portegies 1999, 23. Portegies also addresses the causes of this trend.

22 Smits 1912, Schuttelaars 2010, 66.

23 Schuttelaars 2010, 76.

24 Schuttelaars 2010, 59. Schuttelaars discusses in detail the history of burial practices in St John's.

25 Schuttelaars 2010, 66.

Layout of the burial ground

Initially, the churchyard occupied only a fairly narrow strip of land around the church. After a town fire in 1419 had destroyed a block of houses to the north of the church, the collegiate chapter used the opportunity to extend the churchyard in that direction.[26] Henceforth the burial grounds of St John's comprised four parts: the church itself, a section north of the church – by far the greatest part – another section east of the church and a narrow strip to the south. We know from historical sources that one of the factors deciding where in these burial grounds a person would be buried was social status.[27] After the church itself, the south section of the churchyard was the most expensive, followed by a strip immediately north of the nave. Also in great demand was a spot below the path leading to the north porch.[28] In 1783, the southern section was particularly favoured by Roman Catholics, according to the church wardens.[29] In the 17th century, the section to the south-east of the church was used to inter people who had died of contagious diseases. Afterwards it was planted with trees to prevent any of those potentially contagious corpses to be dug up.[30] The poorest members of the population were buried in the northern part, relatively far from the church.

In 1984, the planned construction of the cathedral's new maintenance building provided an opportunity to investigate a small section of that northern, i.e. poorer, part of the churchyard. (Fig. 7). Due to time constraints a sample[31] of 450 burials were excavated.[32] In the lowest level, eight skeletons could be dated to the 15th century. They were situated amidst the foundations of houses that had been destroyed during the town fire and are among the earliest burials at this location.[33] All other burials were significantly later. In many cases it was possible to establish a fairly precise date on the basis of religious medals and small crosses/crucifixes which accompanied the dead (see e.g. Fig 15a). These indicate that the skeletons date from the first half of the 19th century and perhaps the late 18th century.[34]

The excavated part of the churchyard was too small to be able to draw reliable conclusions regarding the graves' spatial distribution. Of some interest is a grave cluster in the north, containing the bodies of children below the age of five (Fig. 7). This cluster appeared in the highest level; deeper levels at the same

---

26 De Vrie & Janssen 1997, 130.

27 Portegies 1999, 93-102; 117-121; 176-186 and Schuttelaars 2010, 67-72.

28 Portegies 1999, 180.

29 Portegies 1999, 183.

30 Portegies 1999, 178.

31 Within the section of the churchyard that was available for research, three trenches were excavated (at 5.4m asl, 5.1m asl, and 4.5 asl, on average) and any skeletons in them systematically recorded and retrieved. Outside these excavation trenches, skeletons were mechanically removed and bones displaying unusual features (pathologies etc.) were retrieved. Pot 1988, 128-129.

32 See Janssen 1988, 72-74; Pot 1988; De Vrie & Janssen 1997, 130 and Maat, Mastwijk & Jonker 2002, among others. Of the 448 graves, 394 could be retrieved. The most complete skeletons, representing 320 individuals, were subjected to physical-anthropological analysis. Skeletons retrieved in 2005 during the installation of a fire hydrant in the churchyard's northern section (Cleijne 2007) and in 1983, when trees were planted in the southern section (unpublished excavation report DBPA), have not been included in this paper.

33 De Vrie & Janssen 1997, 130.

34 Portegies 1999, 200-201.

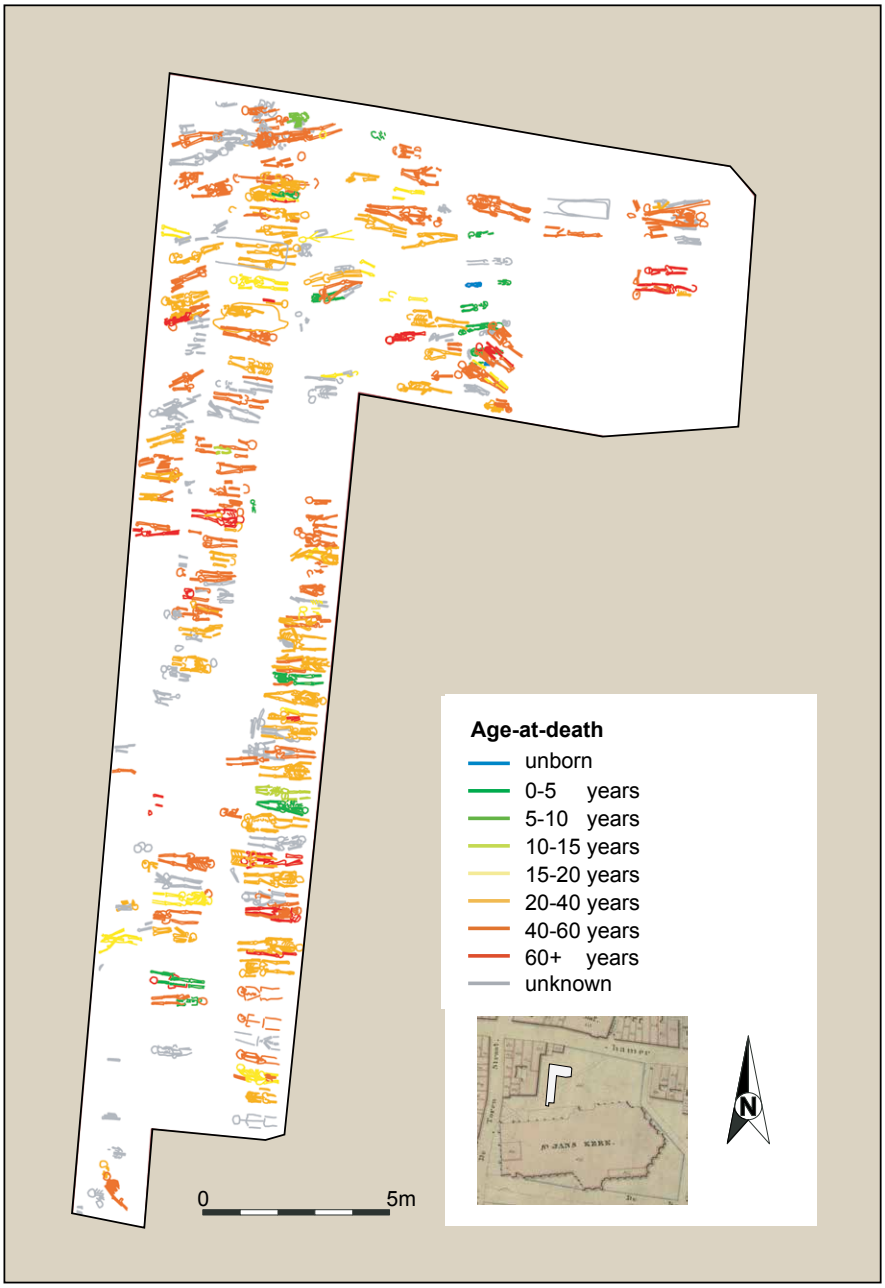


Fig. 7: Overview of the excavated part of St John's churchyard with the projection of the excavated area onto a section of the 1823 cadastral minute map. The north-eastern part of the excavation trench contains a cluster of children's graves (drawing R. Emaus, 's-Hertogenbosch Municipality SO/Erfgoed).

location contained only adult skeletons. Apparently, this section was reserved for children, but only during the final stage of the churchyard's functional use. Elsewhere in the churchyard, children's graves were encountered among adult

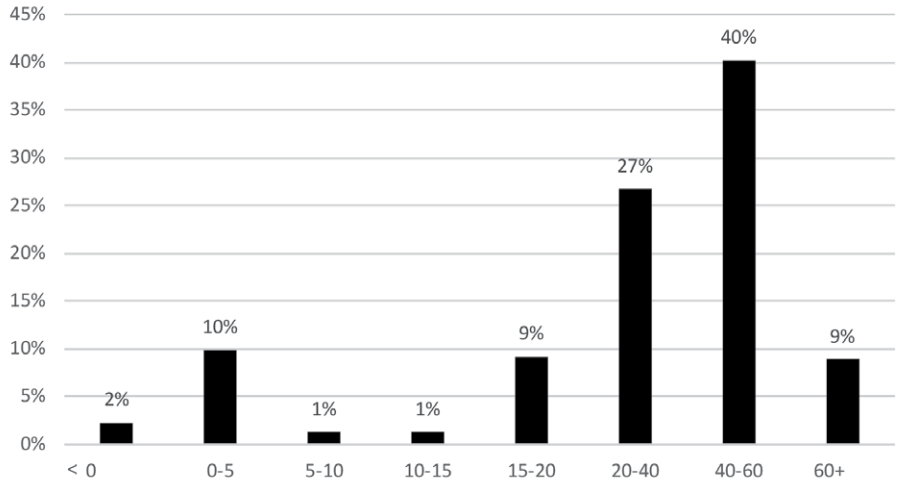


Fig. 8: Population bar chart based on analysed graves (N=303) at St John's churchyard (source: Maat, Mastwijk & Jonker 2002). See also appendix.

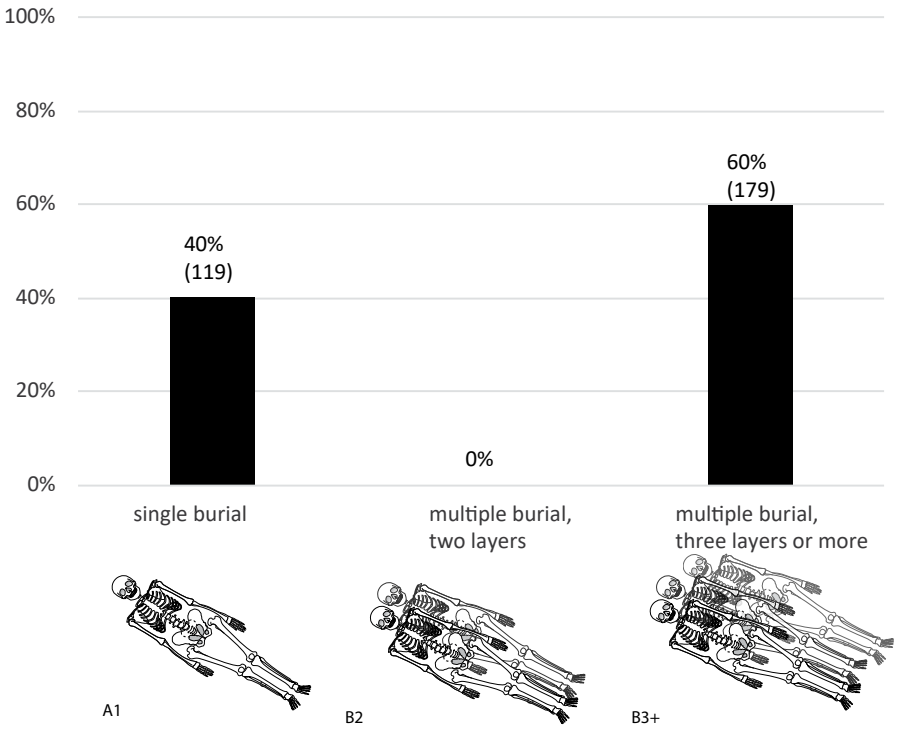


Fig. 9: Grave types. N-known 298. N-unknown 133.

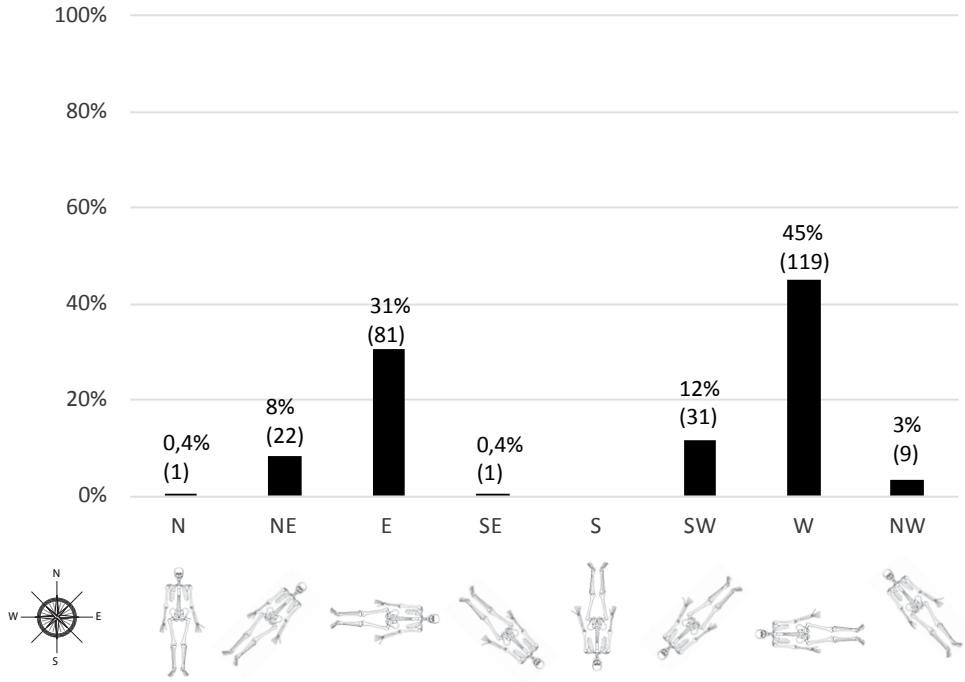


Fig. 10: Orientation. Total N-known 265. N-unknown 166.

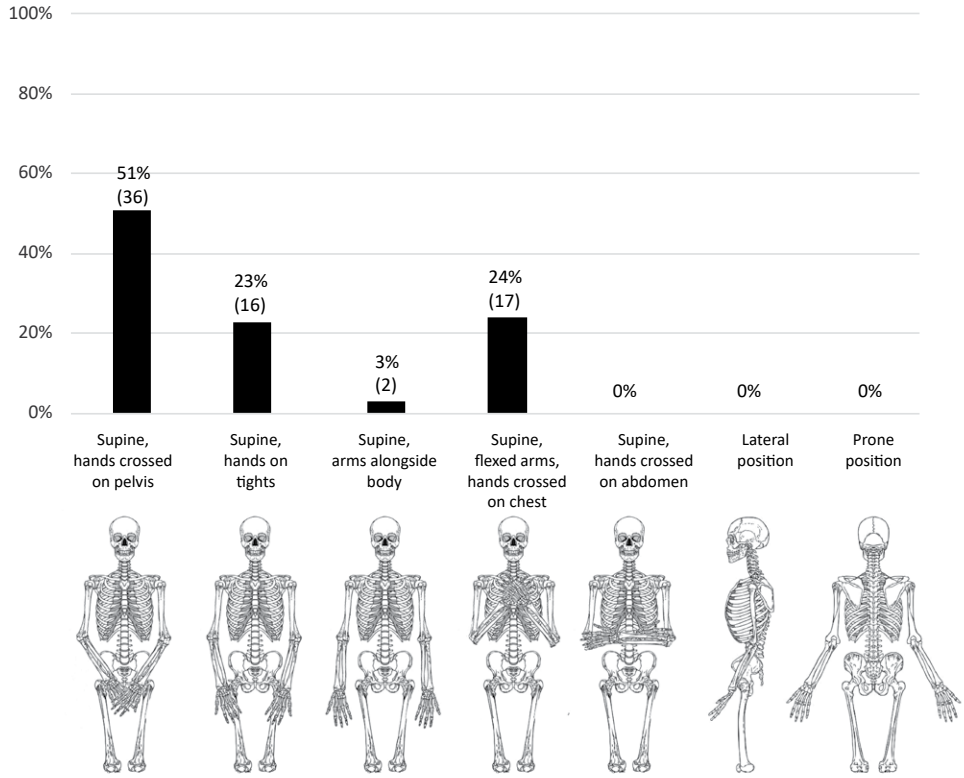


Fig. 11: Arm positions. Total N-known 72. N-unknown 359.

burials. Not all children were therefore buried at a separate location. Due to the high child mortality rates the amount of money spent on a child's funeral tended to be somewhat less than what was spent on an adult.[35] Incidentally, the number of excavated children's graves was relatively small. Historical sources indicate that, in the period 1632-1858, 40 to 60% of the burials in St John's churchyard concerned children up to the age of 12. Of the excavated individuals, on the other hand, only 15% was found to be younger than 12 (Fig. 8). It seems likely, therefore, that most children were indeed buried at a separate location from adults and that the excavation may have revealed only a small part of the children's section that was in use during the churchyard's final phase.

Most of the burials were in long rows separated by narrow paths to provide access to the graves. Although a 1635 bylaw stated that no more than two bodies could be stacked, some of the graves in St John's churchyard contained five bodies, one above the other (Fig. 9), the neatness with which they were stacked suggesting that they probably represented one single grave plot.[36] Unlike the burials inside the church, up until the early 19th century, those outside rarely received a funerary monument[37] but apparently the individual plots were marked in some other way. One section of the churchyard was reserved for burials where maximum efficiency was aimed for; no individual grave plots but large pits in which coffins were pressed together in alternating orientation (Fig. 10 and 12). This was probably the final resting place of the poorest of the poor.

Traditionally, the dead were buried with their heads to the west,[38] but in St John's churchyard this was not consistently carried through (Fig. 10). An orientation with the head to the west indeed prevailed but efficiency constraints led to some of the dead in the large grave pits being placed with their head to the east. Interestingly, 20% of the burials were oriented NE-SW or NW-SE. These were encountered mainly in the higher levels, which suggests that by that time the layout of the churchyard had been altered compared to the earlier situation. This may be related to a major overhaul of the churchyard in 1825-1826.[39] The above mentioned cluster of children's grave may also have been laid out after that event.

Clearance and reburial

Skeletons were encountered at multiple levels but it was possible to establish that even the deepest burials were 18th or 19th-century, with the exception of eight 15th-century graves.[40] This leads to the conclusion that virtually all older burials were removed at that time in order to create more space for new interments. Historical sources confirm this. In the period 1766-1810, an average of 270 dead each year were buried in or around St John's.[41] This asserted an enormous pressure on the available space. In 1781, the municipal authorities decreed that a burial had to be

35 Portegies 1999, 165-166.
36 Cleijne 2007, 23-24.
37 Portegies 1999, 32.
38 Compare, for example, the burials in the above mentioned Minderbroeders friary.
39 Portegies 1999, 143.
40 Portegies 1999, 199-201.
41 Portegies 1999, 25.

Fig. 12: Investigation of the burials in St John's churchyard, 1984. The coffins had been placed side by side in a large pit in an alternating orientation with the narrow end east or west (photo 's-Hertogenbosch Municipality, SO/Erfgoed).

left in peace for at least ten years, but out of necessity this decree was often ignored. In 1833, the period of 'eternal rest' was shortened to five years.[42] Although data on the frequency of grave clearances are lacking for the period before 1781, it is safe to assume that, even then, burial was hardly for all eternity. Between 1631 and 1749, the annual number of burials in and around St John's was 324 on average, an even greater number than in the period 1766-1810. At the churchyard, burials therefore occurred virtually non-stop, leading to a rapid clearance of older graves. In 1784, in an attempt to better coordinate the process of burial and clearance, the churchyard was divided into sections. Only when one section was completely full could a new one be cleared and subsequently made available for new burials.[43] The bones retrieved from the cleared graves could not be destroyed but had to be stored in charnel houses in sure and certain expectation of their resurrection. By the late 18th century, the churchyard of St John's comprised six charnel houses.[44] Sometimes dug-up bones were reburied, as became apparent when a few charnel pits were discovered during the excavation. However, these pits were comparatively small and few in number (16 or more), making it likely that they were used to dispose of loose bones lying about in the churchyard or dug up by undertakers, rather than systematic reburials of cleared graves. All things considering it is not surprising that very few of the discovered graves pre-date the mid-18th century, and it is even likely that most of the excavated skeletons are no older than the second quarter of the 19th century.

Coffins

To the extent that there was any information, it appears that all dead were interred in a coffin. These were tapering and had a flat lid. Roof-shaped lids were banned in the 17th century due to a shortage of space.[45] Since 1675, the Dutch-Reformed orphanage (*Gereformeerde Weeshuis*) held a monopoly on coffin production in 's-Hertogenbosch. Detailed regulations determined coffin types, specifications and prices. Between 1782 and 1804, careful records were kept for all burials of the type of coffin that was used. In virtually all burials in St John's churchyard after 1782 the coffins were made of either deal or pinewood, with pine being cheaper than deal. Pine therefore dominates in the churchyard' poorer, northern section while deal prevails in the slightly wealthier, southern part. There were virtually no oak coffins (Fig. 13).[46] Analysis of the few wood fragments retrieved during the excavation confirmed this.[47] Metal fittings were also rare; at St John's, only one decorative screw of a lid was found in the soil between the graves.[48]

---

42 Portegies 1999, 144-145.
43 Portegies 1999, 143.
44 Portegies 1999, 142.
45 Kok 1990, 169 and Portegies 1999, 87.
46 Portegies 1999, 93-97.
47 Of the wood fragments analysed by B. Meewis, nine were fir and three either Norway spruce or larch; Janssen 1988, 73.
48 Inventory No. 17697, DBKJ.

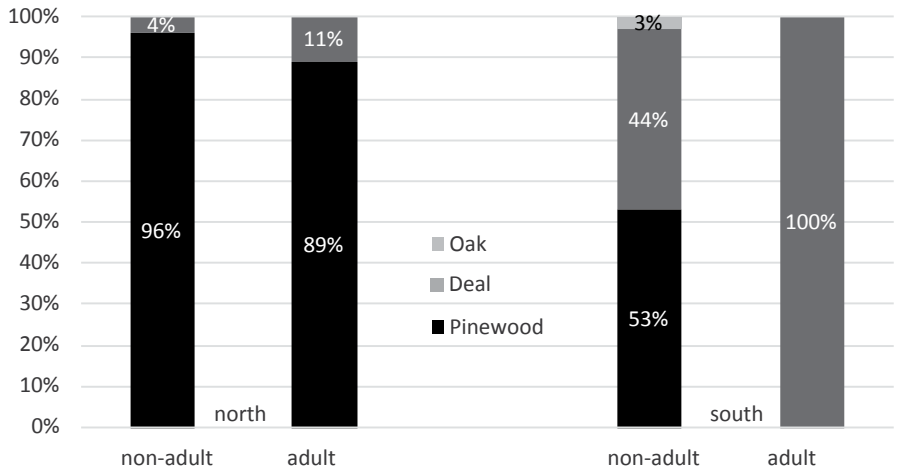


Fig. 13: Wood types used for coffins in St John's churchyard in 1785 on the basis of historical data; in percentages (source: Portegies 1999, p. 94, Table 5).

Grave goods

A large number of objects were found with the burials in St John's churchyard (Fig. 14), some of which had been deliberately placed with the deceased person – an unusual act in the Christian tradition. Objects are exceptionally rare in medieval graves elsewhere in 's-Hertogenbosch.[49] Only one grave, in the churchyard around the village church at Engelen, produced three bronze finger-rings dating from the 11th – 13th century.[50] The objects retrieved from the churchyard at St John's fall into a number of categories: religious objects (rosaries, crosses/crucifixes, medals); objects associated with funerary rituals (glass splinters); dress accessories (buckles, pins, buttons); personal ornaments (finger-rings, earrings, a necklace) and other objects which, perhaps accidentally, ended up in the grave (coins,[51] a marble, a pipe-bowl). Of the 312 more or less complete burials, 79 (25%) contained a rosary, cross/crucifix or medal or a combination thereof (Fig. 15).[52] They appear to have accompanied males and females in equal numbers but they are mainly found in burials of older adults and far less often with children. Rosaries were often found between the fingers of the skeleton's folded hands. The rise of this practice was probably linked to the Catholic emancipation during the period of the French occupation of the Netherlands shortly after 1800. In 9% of the burials (28 cases) dress accessories (pins, buttons, buckles) were present in the grave. Again, these were mostly burial of mature adults, although pins were found in some of the children's graves. Pins are often associated with shrouds but in this case

49 No gravegoods accompanied the skeletons at the Minderbroeders friary, with the exception of one grave where several buttons suggest the presence of clothing. However, the fact that some of the individuals buried there were friars may have influenced the results.

50 Janssen 1983c, 252.

51 All graves together produced two coins and one jeton. It was impossible to determine whether these had been deliberately placed in the grave or had ended up in the soil by accident. Giving coins to the dead was certainly not common practice.

52 The crosses/crucifixes, medals and rosaries were identified by G.J. Peters. See Peters 1993.

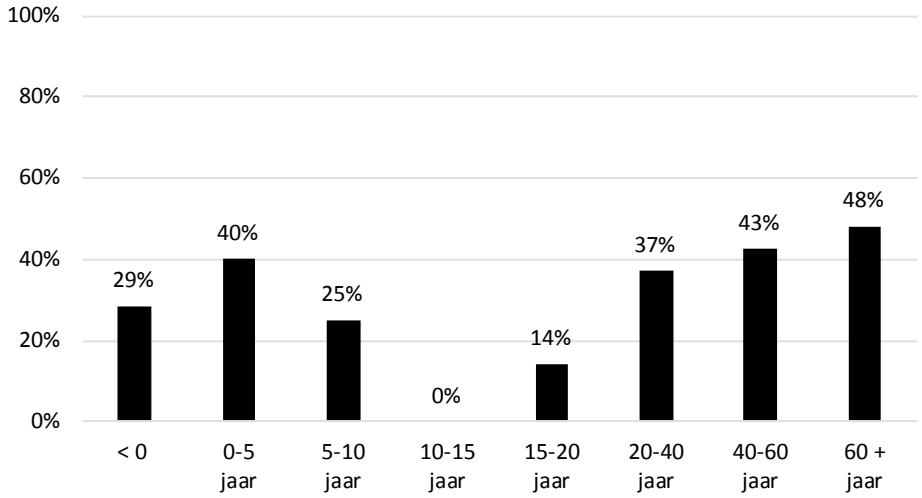


Fig. 14: Overview of gravegoods and their distribution between the various age categories: N=303 (see also appendix).

Fig. 15 (opposite page): Some of the excavated rosaries, crosses/crucifixes and medals (photos G. de Graaf, 's-Hertogenbosch).

a. Small crucifix, on the back the text 'SOUVENIR DE LA MISSION', probably acquired after the 1843 popular mission; a so-called 'miraculous medal' (struck after 1832); a medal from Trier, probably issued in 1844; a medal of Our Lady of the Rosary. All found with skeleton G247. Inventory No. 5272.

b. Rosary of beads of blue, purple and white glass or natural stone and a few bone ex-votos. Found in 2005 during excavations on St John's churchyard in grave HTJK F20/21. Inventory No. 16166.

c. Rosary(?) of blue and white glass beads, bronze links and a small bone disk. Found between the fingers of skeleton G135. Inventory No. 5132.

d. Rosary of wooden beads with bronze links, a connecting piece in the shape of a heart and a small crucifix. Found with skeleton G249. Inventory No. 5276.

e. Rosary of wooden beads with bronze links, a small cross and a medal of Maria Immaculata. Found with skeleton G200. Inventory Nos. 5214 and 5215

f. Medal bearing the text 'LOS DOLORES'. Found with skeleton G250. Inventory No. 4722.

g. Crucifix with encrusted textile remains. Found with skeleton G249. Inventory No. 4731.

h. Small cross with an image of Our Lady of the Immaculate Conception and the text 'VIR IMM VITAM PURAM PRAESTA'. Found in grave G18. Inventory No. 4719.

a 2 cm

b 2 cm

c 2 cm

d 4 cm

e 4 cm

f 1 cm

g 2 cm

h 2 cm

their number is too small to be able to draw any conclusions. Pins are very easily overlooked during excavation, or they have completely decayed. The few pins that were retrieved, historical references, and the fact that other indications for clothing are scarce may suggest that burial in a shroud remained customary until well into the 19th century.[53] Nonetheless, the presence of buttons and buckles indicates that some at least of the deceased were clothed when buried. Personal ornaments were found in 16 graves (5%), mainly of adult women. One infant of three months and one 4-year-old child wore earrings and so, surprisingly, did one male. Finger-rings were also more common with adult women. In all cases these were simple bronze rings.

Of the children below the age of five, 40% were accompanied by gravegoods in the form of a rosary or earrings. Splinters of coloured glass were found around the skull of a few children (Fig.16).[54] This was probably a variation on the custom to place a small wreath of flowers or pieces of tinfoil around the head.[55] We know from historical sources that this custom was not limited to children but was also practiced if the deceased was an unmarried adult. Despite their age, such individuals were classified socially as 'juveniles'. In one instance, glass splinters were found around the skull of a foetus. Apparently, even their funeral was accompanied by certain rites. Three of the unborn infants were encountered in the cluster of children's skeletons in the north of the churchyard; the others had been placed among the adults. At this period, the burial of unbaptized children in a churchyard was apparently not an issue.[56]

Fig. 16: Small splinters of coloured glass found around a child's skull (photo: W. Hartman, 's-Hertogenbosch Municipality SO/Erfgoed).

53 Portegies 1999, 59-61.
54 This was also observed in the case of two adult skeletons.
55 Portegies 1999, 98.
56 Four of the seven foetusses were born after a gestation period of only about five months, which means they were born dead and therefore could not be baptized.

Health

Of the excavated late-18th to mid-19th-century skeletons, 312 could be subjected to physical-anthropological analysis. The state of health of this population confirmed their relatively low status which had already been established on the basis of historical information.[57] The average age at death of the individuals above the age of 20 was 42. Overall, the teeth were in poor condition; 21% had been affected by caries. This high percentage may perhaps be related to the introduction of beet sugar, which also the lower classes could afford. *c.* 20% of the skeletons showed signs of healed fractures, suggestive of heavy or dangerous labour. 7% suffered from rickets, a bone defect caused by a lack of sunlight that was very common among labourers living in dark houses and working in factories during the hours of daylight. Illnesses typically linked to a higher social status, such as DISH,[58] are relatively rare.

A so-called hernia truss was found in the pelvis region of two skeletons (Fig. 17). An inguinal hernia is a weak point in the abdominal wall directly above the hip through which the contents of the abdomen can protrude; it can be extremely painful. Although the application of a truss was already known by the Romans, the device was greatly improved and probably more widely used in the 18th century. The excavated trusses consisted of small iron plates covered in leather which could be kept in place around the loins by a series of straps and buckles.

Fig. 17: Hernia truss found with one of the skeletons (photo G. de Graaf, 's-Hertogenbosch).

57 The data regarding age, sex and state of health derive from Maat, Mastwijk & Jonker 2002, 10-19. Historical information can be found in Portegies 1999, 201-203.

58 Diffuse Idiopathic Skeletal Hyperostosis.

Fig. 18: One of the sawn-through skulls during the excavation. This individual was probably a patient at the psychiatric institute Reinier van Arkel (photo: 's-Hertogenbosch Municipality SO/Erfgoed).

The churchyard was also used as a burial ground for patients of a hospital, the Groot Ziekengasthuis, and after 1827 also for patients of a psychiatric institution, Reinier van Arkel.[59] The churchyard produced nine cases where the top of the skull had been removed as part of an autopsy (Fig. 18). Presumably, these individuals were deceased patients of the Reinier van Arkel institution. A German medical doctor, H. Rapmund, who was employed there from 1846 onwards, studied the brains of most of the deceased patients for the purpose of establishing a link between mental illness and physical manifestations.[60]

The Protestant cemetery (1833-1858)

Because its final stage can be dated rather precisely and also because of the many objects found in the graves as well as information contained in historical sources, the churchyard of St-Jan's has provided some interesting information with regard to the poorer segment of the population in the first half of the 19th century. Until 1833, both Protestants and Roman Catholics were buried there. In that year, however, a separate Protestant burial ground was laid out on Tweede Nieuwstraat (today Sint Josephstraat) which remained in use until 1858. Although a mere 13% of the population was Protestant,[61] they nonetheless constituted the urban elite. In the 17th and 18th centuries, town administrators were often drawn from members of Protestant families from the Holland region in the north.[62] In addition, the

59 Portegies 1999, 63.
60 Portegies 1999, 77-83.
61 Coppens 1841, 7
62 Hoekx, Jacobs & Looper 1997, 98.

cemetery probably served Protestant members of the garrison billeted on the town. In 1993, a small section of the Protestant cemetery was excavated and 57 burials were retrieved. Despite this relatively small sample it is possible to point out a few interesting differences compared to St John's churchyard.[63]

Layout of the cemetery

All that could be investigated of the Protestant cemetery was an east-west oriented strip of 3m wide and 12m long. Nonetheless, the encountered graves seem to reflect two distinct burial practices. In the north, the burials were spaced closely together with only a few centimetres between each grave. Although all graves adhered to an east-west or west-east orientation they were not neatly aligned. Stratigraphically, these are the oldest graves. The more recent graves were also oriented east-west or west-east but they were spaced 60 to 80cm apart. In each grave, three or four skeletons were superimposed (Fig. 19). Within the short time the cemetery was in use a change seems to have occurred from closely packed graves to more spacious grave plots. The small size of the excavated area made it impossible to identify well-defined rows with paths in-between, as at St John's.

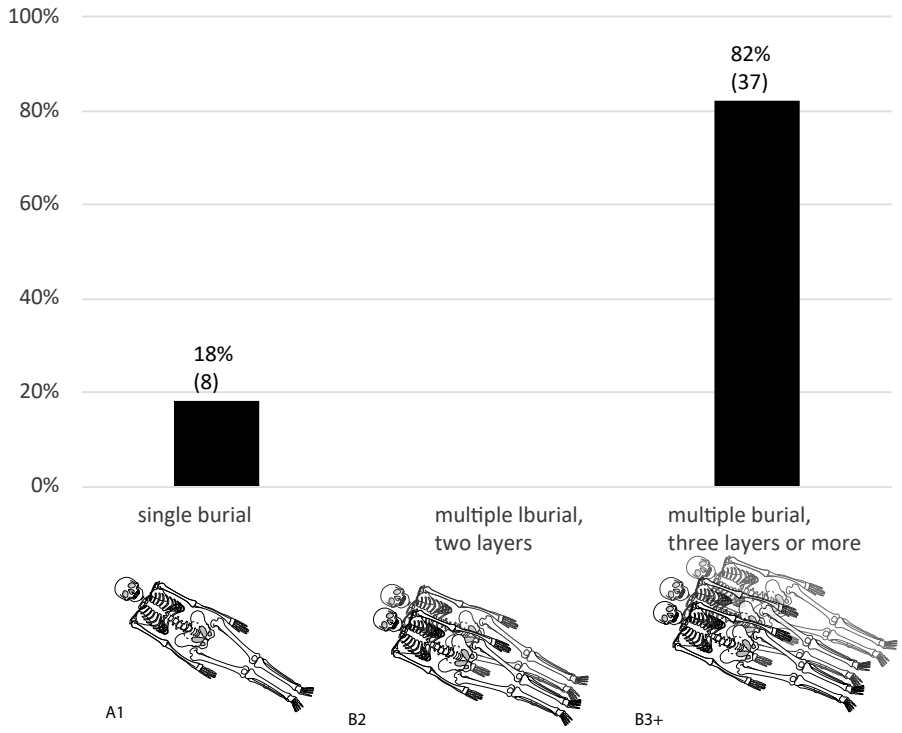


Fig. 19: Grave type. N-known 45, N-unknown 12.

63 The physical-anthropological data derive from Pronk & Scoop 2005.

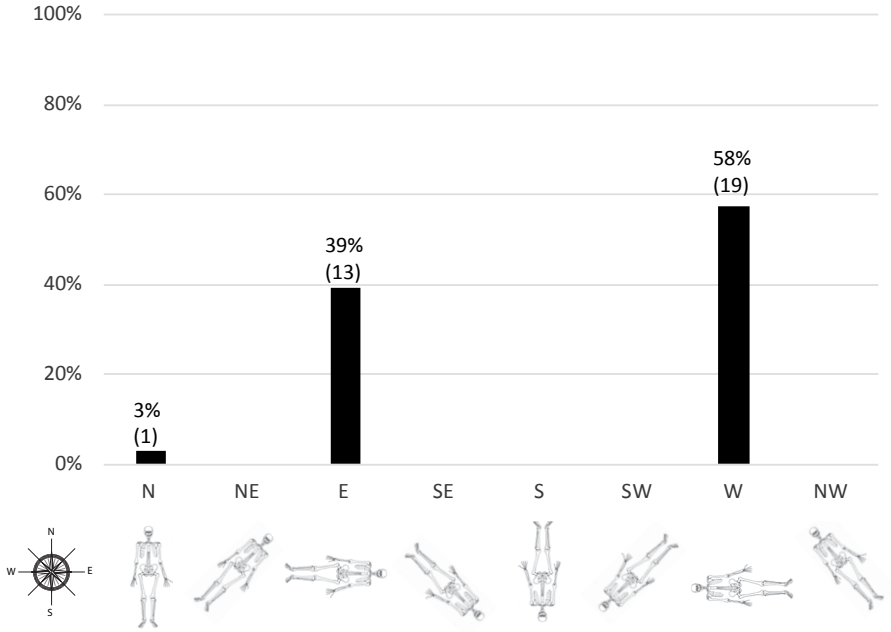


Fig. 20: Orientation. N-known 33, N-unknown 24.

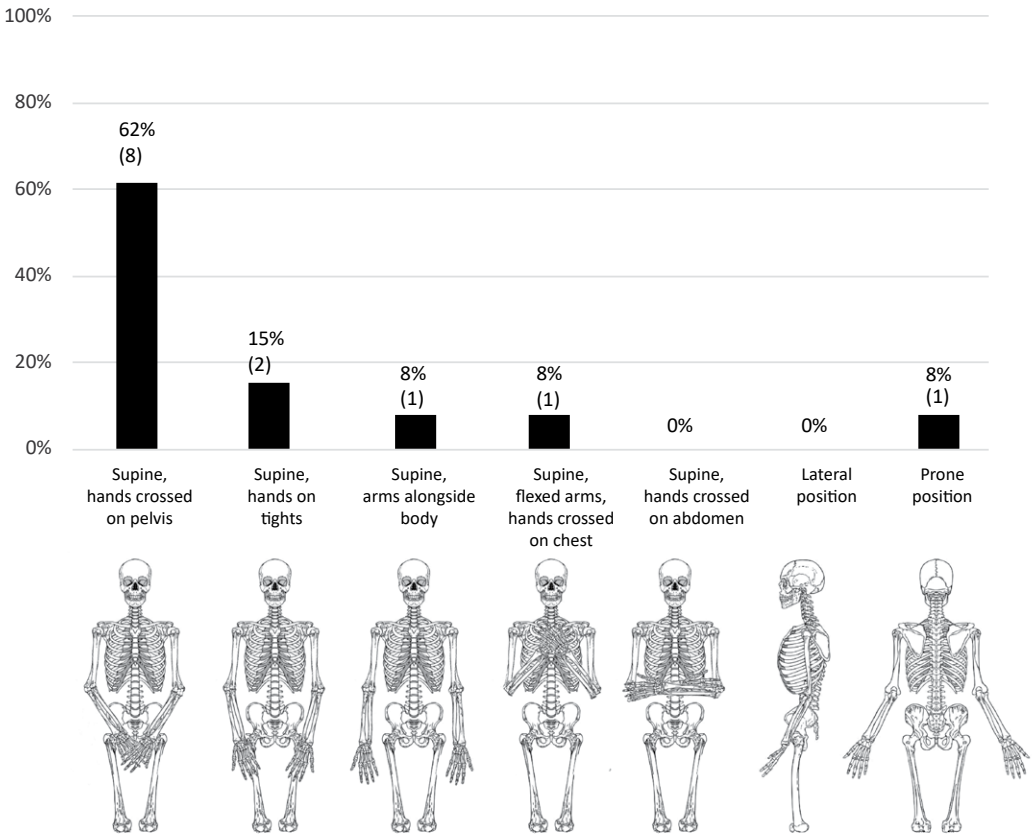


Fig. 21: Arm positions. N-known 13, N-unknown 45.

Funerary rituals

Just as at St John's, orientation was ignored when the graves were being dug. East-west and west-east both occur (Fig. 20) and appear to have been determined mostly by a need to use the available space efficiently. To the extent that the few vague coffin traces allow any conclusions, it appears that all the dead here were buried in coffins, which seem to have been rectangular rather than tapering. Rosaries and similar objects were obviously absent but a few graves nonetheless produced interesting finds. One of them contained an earthenware flowerpot, suggesting that the deceased had been buried with a potted plant (Fig. 22). Another unusual find, more difficult to explain, was small hoard of one golden 5-guilder coin, one silver ducat and five silver 3-guilder coins. Possibly the coins were originally contained in a purse. Whether this was a deliberate deposition or whether the purse had been accidentally overlooked inside a pocket of the deceased's cloths is unknown. (Fig. 23).

Fig. 22: Flowerpot on a skeleton at the Protestant cemetery. It is likely that the pot originally stood on top of the coffin when it was buried (photo: 's-Hertogenbosch Municipality SO/ Erfgoed).

Fig. 23: Silver and gold coins found with a skeleton in the Protestant cemetery (photo: 's-Hertogenbosch Municipality SO/Erfgoed).

Population structure and state of health

Of the individuals whose sex could be determined, 19 skeletons were male and 10 female, which despite the small sample size is an unusual ratio. There were also comparatively many juveniles (ten individuals between 15 and 20 years of age) while children under the age of 15 were not encountered in this part of the cemetery. Both phenomena may be related to the burial of soldiers of the local garrison. An autopsy had been performed on two of the excavated individuals: in one case the skull cap had been lifted and in the other both the upper and the lower legs had been sawn through.[64] Although no Protestant patients of the Reinier van Arkel mental institution are known to have been buried at the Protestant cemetery, this is a possibility with regard to the first skeleton. Alternatively, the individual may have been a soldier. An interesting difference to the skeletons at St John's churchyard is the significantly higher prevalence of DISH at the Protestant cemetery, a syndrome associated with diabetes and obesity.[65]

Mass grave of French soldiers (1794-1795)[66]

In 2011, a mass grave of 68 skeletons was accidentally discovered at the Baselaar bastion when a tree was being relocated. Historical and physical-anthropological research led to the conclusion that it is likely that French soldiers were buried here in the winter of 1794-1795. At that time, 's-Hertogenbosch had just been taken by French troops. The winter was severe and the townlands were inundated. The town was hit by a famine and many people succumbed to contagious illnesses including dysentery. The French soldiers nursed in a military hospital on Verwerstraat were equally affected. There are no indications that any French soldiers were buried at the regular cemeteries; the reason is unknown. Starting in February, 1795, deceased soldiers were buried outside the town walls, first in an area called Hoogveld outside the Hinthamer gate and later at Pettelaarse Schans. It seems that between October, 1794 and February, 1795, French soldiers who died in the hospital were buried at the Baselaar bastion. Whether other parts of the fortifications were simultaneously in use as burial grounds is unknown, as is the question whether there were more mass graves on Baselaar bastion. During archaeological research at the bastion prior to the construction of the entrance to a new parking garage much of the bastion's terreplein was investigated but no other mass graves were encountered. There may still be some outside the research area, however.

The excavated mass grave consisted of a pit, measuring *c.* 2.85 x 2.80m, inside which the skeletons were stacked at least six layers deep (Fig. 24). The lowest levels were separated by thin layers of sand, suggesting that those bodies had at least been covered. This had not been done with the upper bodies, nor had the corpses been placed with particular care. Twenty-one skeletons were lying face downwards, sometimes with spread arms. In some levels, the bodies had been placed so as to make optimal use of the available space. The orientation of the bodies varied in

64 The sawn-through legs may be a case of amputation, but the fact that the legs were cut in two different places rather suggests an autopsy.

65 Pronk & Scoop 2005, 13-14.

66 The information in this section derives from Van Genabeek, Van der Linde, Kootker & Buiks 2015.

Fig. 24: One of the lowest levels in the mass grave. The skeletons have been placed in the pit with maximum efficiency (photo: 's-Hertogenbosch Municipality SO/Erfgoed).

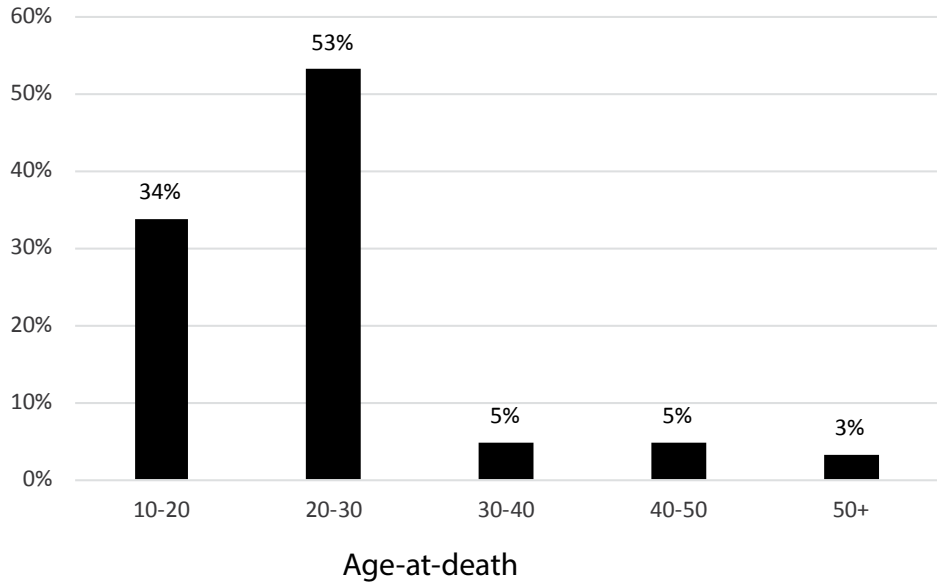


Fig. 25: Age distribution of the individuals buried in the mass grave (source: Van der Linde 2015, Appendix 2). See alo appendix.

each layer. Some had been placed east-west, others north-south. Most of the dead were probably buried naked or in a shift or shroud; a few pins may have been used to fasten a shroud. One of the buried individuals wore a bronze finger ring but no other personal possessions were found. Seven musket balls were encountered, two of them between the ribs of a body. Five other skeletons showed stab wounds in the thigh and ankle bones, caused by a sharp object like a sabre or sword. Eight individuals had undergone amputations – probably necessary after a bullet or stab wound had become infected – which subsequently had not had time to heal. A few of the amputated limbs were retrieved from other locations in the grave. With the exception of these direct casualties of war it was usually impossible to establish the cause of death. Historical sources suggest that most of these individuals fell victim to contagious diseases. Of the dead, 42 were male and 7 female while the sex of 19 individuals could not (yet) be ascertained. Not only these sex ratios but also the age distribution strongly suggests a military population. (Fig. 25). The number of young individuals stands out. Out of a total of 68 persons, only 8 were definitely older than 30. The youngest was between the 12 and 14 years of age. Many of the deceased showed symptoms of prolonged physical stress,[67] perhaps caused by a military lifestyle which demanded long marches whilst carrying heavy gear. The mass grave thus illustrates an unpleasant aspect of our history. A soldier's live was harsh. They were recruited at a young age, were overburdened and often died young, in many instances not of injuries but of hunger, exhaustion or contagious diseases. Their subsequent funeral was slipshod. Perhaps the soldiers of their own regiments, who otherwise might have provided some token of respect, were no longer stationed in the town.

Conclusion

In the course of the many archaeological investigations carried out in the past few decades in 's-Hertogenbosch, *c.* 1,000 human skeletons were retrieved, most of them in the context of four excavation projects. Dating them on the basis of stratigraphy or associated objects proved to be difficult; only approximate dates could be assigned and even then only by relying on historical information. A mere quarter of the skeletons date from the period between *c.* 1275 and 1629, a very wide range which could be narrowed down in only a few cases. Moreover, most of these earlier skeletons derive from a monastic context and therefore provide little information on secular forms of medieval funerary ritual. The reason for this overall lack of medieval burials is not only that few medieval burial grounds have been excavated but also that many of them were used intensively for a long period so that most of the earlier graves were disturbed by later ones. Over 600 skeletons date roughly from the period 1750-1858, which allows us to at least draw some general conclusions with regard to burial grounds and funerary rituals during this period. In addition, many historical studies have addressed the funerary customs of this period, the results of which may supplement the archaeological data. The pressure on space allocated to burial was intense and the deceased's 'eternal' rest

67 These include *sulcus costoclaviculair*, *osteochondritis dissecans*, enthesopathies and Schmorl's nodes. See Van der Linde 2015., 88.

was in fact of short duration. Burial grounds were crowded and in constant use. This influenced the orientation of the graves. Although east-west and west-east orientations seem to have prevailed at this time, factors such as the layout of a churchyard and the location of paths appear to have been decisive. The former distinction between graves of priests (the head in the east) and those of laypersons (the head in the west) no longer existed. Although children were occasionally buried among the adults, a specific children's section probably existed along the northern edge of St John's churchyard. This may also have been the case at the Protestant cemetery, where no children were encountered in the excavated area despite the known high childhood mortality. In addition to 'normal' citizens, the burial grounds were also the final resting place for soldiers and for patients of the Reinier van Arkel mental institution. These individuals were buried among the other dead. Historical sources indicate that the northern part of St John's churchyard was largely reserved for the poorer segment of the population. This is confirmed by the results of archaeological research in that area. Until 1833, Catholics and Protestants were buried at the same churchyard, with little in their respective burial rituals to distinguish them. In the 19th century, the main difference was that Catholics regularly received rosaries, crosses and religious medals in their coffins. Although these objects cannot always be precisely dated, there is nothing to suggest that the practice already existed in the 18th century. It probably emerged after 1795, when public profession of the Roman Catholic faith was again permitted. Unlike billeted Dutch soldiers, deceased French soldiers were not allowed to be buried in existing burial grounds. Instead, they received a newly dug mass grave on the edge of the town centre.

To summarize, we may state that a combination of historical and archaeological research has produced some fairly detailed information on the funerary practices of the poorer section of the population of 's-Hertogenbosch between *c.* 1750 and 1858. Such data are lacking for the wealthier social classes, although some of the individuals buried at the Protestant cemetery probably were members of that elite. With regard to the period before 1750 and in particular that before 1629, our data are still scarce. It is hardly possible to draw conclusions on either funerary rituals or health conditions during the town's heyday in the 15th and early 16th century. We can only hope that these gaps in our knowledge may be remedied in the future.

English translation by Gerre van der Kleij (Vertaalbureau GrondTaal).

Bibliography

Boekwijt, H.W. & H.L. Janssen (eds.), 1988: *Kroniek van bouwhistorisch en archeologisch onderzoek. 's-Hertogenbosch,*'s-Hertogenbosch.

Boekwijt, H.W. & H.L. Janssen (eds.), 1997: *Bouwen en wonen in de schaduw van de Sint Jan.*, 's-Hertogenbosch (Kroniek bouwhistorisch en archeologisch onderzoek 's-Hertogenbosch 2).

Cleijne, I.J., 2007: *'s-Hertogenbosch. Sint Janskerkhof. Definitief archeologisch onderzoek en archeologische begeleiding,* 's-Hertogenbosch (BAAC-rapport 05.170).

Cleijne, I.J., 2011: *'s-Hertogenbosch. Beurdsestraat. Opgraving,*'s-Hertogenbosch (BAAC-rapport A-08.0213).

Cleijne, I.J. & R.J.M. van Genabeek, 2008: Archeologisch onderzoek, in: I.J. Cleijne, H. van Dijk, R.J.M. van Genabeek, A.G. Oldenmenger & J.M.J. Willems, *'s-Hertogenbosch Sint Jacobskerk. Bouwhistorisch onderzoek, 's-Hertogenbosch*, 's-Hertogenbosch (BAAC-rapport 05.204), 187-223.

Coppens, J.A., 1841: *Nieuwe Beschrijving van het Bisdom van 's-Hertogenbosch naar aanleiding van het Katholijk Memorieboek van A. van Gils,* 's-Hertogenbosch.

Genabeek, R.J.M. van, 1994: *Menselijk skeletmateriaal van het Minderbroedersklooster in Maastricht.* 's-Hertogenbosch (thesis University of Amsterdam).

Genabeek, R.J.M. van, C. van der Linde, L.M. Kootker & J. Buiks, 2015: *'s-Hertogenbosch Bastion Baselaar. Opgraving van een massagraf van Franse soldaten uit 1794-1795,*' s-Hertogenbosch.

Hanus, J., 2011: 'Demografische neergang in Den Bosch? Bevolkingstrends in de 16e en 17e eeuw', *Bossche Bladen* 13-4, 118-125.

Hoekx, J., B. Jacobs & B. Looper, 1997: 'De 'stadstaat'. Politiek, bestuur en rechtspraak', in: A. Vos, J. Bosmans, M. Prak, A. van de Sande & G. van de Ven (eds.), *'s-Hertogenbosch. De geschiedenis van een Brabantse stad 1629-1999*, Zwolle, 95-122.

Janssen, H.L., 1983a: 'Bethaniekerk en -klooster', in: H.L. Janssen (ed.): *Van Bos tot Stad. Opgravingen in 's-Hertogenbosch,*'s-Hertogenbosch, 105-108.

Janssen, H.L., 1983b: 'De kerk en het kerkhof van Engelen', in: H.L. Janssen (eds.), *Van Bos tot Stad. Opgravingen in 's-Hertogenbosch,* 's-Hertogenbosch, 109-126.

Janssen, H.L., 1983c: 'Metaal', in: H.L. Janssen (eds.), *Van Bos tot Stad. Opgravingen in 's-Hertogenbosch,* 's-Hertogenbosch, 249-270.

Janssen, H.L., 1988: 'Inleiding: Het specialistische onderzoek in het kader van het uitwerkingsbeleid in 's-Hertogenbosch', in: H.W. Boekwijt & H.L. Janssen (eds.), *Kroniek van bouwhistorisch en archeologisch onderzoek. 's-Hertogenbosch,* 's-Hertogenbosch, 68-74.

Janssen, H.L. & P.A.M. Zoetbrood, 1983: 'De Sint Joriskapel', in: H.L. Janssen (eds.), *Van Bos tot Stad. Opgravingen in 's-Hertogenbosch,* 's-Hertogenbosch, 101-104.

Kok, H.L., 1990: *De geschiedenis van de laatste eer in Nederland*, Lochem.

Kuijer, P.Th.J., 2000: *'s-Hertogenbosch, stad in het hertogdom Brabant ca. 1185-1629*, Zwolle/'s-Hertogenbosch.

Lempke, I., 2009: *Voorspraak in Dordtse Grafkelders. (Beschilderde) grafkelders in het Minderbroedersklooster in Dordrecht ca 1248-1572*, Amsterdam (Master thesis University of Amsterdam).

Linde, C., van der, 2015: Het fysisch antropologisch onderzoek, in: R.J.M. van Genabeek, C. van der Linde, L.M. Kootker en J. Buiks: *'s-Hertogenbosch Bastion Baselaar. Opgraving van en massagraf van Franse soldaten uit 1794-1795.*'s-Hertogenbosch, 50-89.

Maat, G.J.R., R.W. Mastwijk & M.A. Jonker 2002: *Citizens buried in the 'Sint Janskerkhof' of the 'Sint Jans' Cathedral of 's-Hertogenbosch in the Netherlands ca. 1450 and 1830-1858 AD* Leiden (Barge's Anthropologica 8).

Oudheusden, J. van & H. Tummers (eds.), 2010: *De grafzerken van de Sint Jan te 's-Hertogenbosch,* 's-Hertogenbosch.

Peters, G.J., 1993: *Devoot tot na de dood. Devotionalia gevonden bij de opgraving van het St.-Janskerkhof in 's-Hertogenbosch,* Nijmegen (thesis Radboud University).

Portegies, M., 1999: *Dood en begraven in 's-Hertogenbosch. Het Sint-Janskerkhof 1629-1858*, Utrecht.

Pot, Tj., 1988: 'Een gebitsonderzoek van het 18e-eeuwse grafveld St. Janskerkhof 1984', in: H.W. Boekwijt & H.L. Janssen (eds.), *Kroniek van bouwhistorisch en archeologisch onderzoek. 's-Hertogenbosch,* 's-Hertogenbosch, 125-149.

Pronk, A.M.C. & D.W.L. Scoop 2005: *Demografie en paleopathologie van skeletmateriaal afkomstig van de protestantse St. Josephstraatbegraafplaats te 's-Hertogenbosch ca. 1833-1858 A.D. In vergelijking met het skeletmateriaal afkomstig van het katholieke Sint Janskerkhof te 's-Hertogenbosch ca. 1830-1858 A.D,* Leiden.

Schuttelaars, A., 2010: "Hier leijt begraven…' Begraven, begravenen en grafzerken in de Sint-Jan van de middeleeuwen tot de negentiende eeuw', in: J. van Oudheusden & H. Tummers (eds.), *De grafzerken van de Sint Jan te 's-Hertogenbosch,* 's-Hertogenbosch, 21-93.

Smits, C.F.X., 1912: *De Grafzerken in de Kathedrale Sint Janskerk van 's-Hertogenbosch*, 's-Gravenhage.

Vos, A., J. Bosmans, M. Prak, A van de Sande & G. van de Ven (eds.), 1997: *'s-Hertogenbosch. De geschiedenis van een Brabantse stad 1629-1990*, Zwolle.

Vrie, D.M. de & H.L. Janssen, 1997: 'Het archeologisch onderzoek van de middeleeuwse bebouwing op het Sint Janskerkhof', in: H.W. Boekwijt & H.L. Janssen (eds.), *Bouwen en wonen in de schaduw van de Sint Jan,* 's-Hertogenbosch (Kroniek bouwhistorisch en archeologisch onderzoek 's-Hertogenbosch 2), 48-139.

Appendix

Saint Johns' graveyard	< 0	0-5 years	5-10 years	10-15 years	15-20 years	20-40 years	40-60 years	60 + years	Total	Age-at-death unknown	Total
female					7	38	53	15	113	5	118
male					8	39	59	12	118	2	120
Total known sex					**15**	**77**	**112**	**27**	**231**	**7**	238
sex unknown (non-adult)	7	30	4	4	13	4	10	0	72	2	74
Total sex known and unknown	**7**	**30**	**4**	**4**	**28**	**81**	**122**	**27**	**303**	**9**	**312**

Saint Johns' graveyard	< 0	0-5 years	5-10 years	10-15 years	15-20 years	20-40 years	40-60 years	60 + years
female					47%	49%	47%	56%
male					53%	51%	53%	44%

Saint Johns' graveyard	< 0	0-5 years	5-10 years	10-15 years	15-20 years	20-40 years	40-60 years	60 + years	Total	Age-at-death unknown	Total
without gravegoods	5	18	3	4	24	51	70	14	189	5	194
with gravegoods	2	12	1	0	4	30	52	13	114	4	118
Total	**7**	**30**	**4**	**4**	**28**	**81**	**122**	**27**	**303**	**9**	**312**

Mass grave	10-20 years	20-30 years	30-40 years	40-50 years	50+ years	Total	Age-at-death unknown	Total
female	3	4				7		**7**
male	10	24	2	3	2	41	1	**1**
Total sex known	13	28	2	3	2	48	1	1
sex unknown (non-adult)	8	5	1			14	5	**5**
Total sex known and unknown	**21**	**33**	**3**	**3**	**2**	**62**	**6**	**68**

Mass grave	10-20 years	20-30 years	30-40 years	40-50 years	50+ years	Total	Age-at-death unknown
female	23%	14%	0%	0%	0%	15%	0%
male	77%	86%	100%	100%	100%	85%	100%

In the shadow of St. Plechelmus: A thousand years of burials

Gavin L. Williams

Introduction

In the period between September 2011 and March 2013, ADC Archeoprojecten in combination with RAAP carried out an excavation on and around the St. Plechelmusplein in Oldenzaal (Overijssel). The excavations were necessary due to the plans of the city council to redevelop the square and replace the aging sewer system under the square itself. This paper will present a brief overview of the results of the excavation. For more detailed information about the excavation and specifically the integrated physical anthropological, DNA, and isotope analysis we refer the reader to the ADC monography that has just been published.[1]

During the excavation, 5,000m² were investigated and 2,750 individuals were recovered (Fig. 1). Of these, 1,005 were sampled for DNA/isotope research (37% of the total excavated population). In addition to burials, a number of foundations relating to earlier phases of the present church were uncovered. The possible remains of the original stone church were also identified during the excavation in the form of foundations found to the north and to the south of the 13th-century church tower. To the south of the church, remains consisting of stone foundations with iron ore blocks were found that, using AMS dating, were dated as 10th to 12th century. These could also have belonged to the original church as iron ore was used up until the 12th century as a building material for churches and was used in the construction of churches in Dalfsen, Ommen, and Raalte.[2] Although the exact function of this building is unclear, it was obviously a structure of some status. Other foundations were found and have been identified as belonging either to buildings associated with the church or to the different building phases of the church itself, including the cemetery wall in the south of the excavation as well as a cellar of one of eleven houses belonging to the cannons of the basilica.

1 Altena, Kootker & Panhuysen 2016.
2 Klomp 2013, 34.

The excavation has produced burials dating from the 7th/8th centuries through to the 19th century. People from the villages around Oldenzaal as well as people from Oldenzaal itself were buried in the cemetery. Through church documents we know that in the 17th century the villages around Oldenzaal were responsible for the upkeep of specific areas of the cemetery wall, making it plausible that each village had its own allotted area for burials within the cemetery.[3] In the period between 1597 and 1633, the St. Plechelmus church and its cemetery, which had been Catholic, became a Protestant jurisdiction, but after the Eighty Years' War (1568-1648), the cemetery was used by both. In 1810, the church again became Catholic.

Fig. 1: Overview of the excavated burials and zones (A to E) designated for post-excavation analysis.

3 Calendarium-necrologium St.-Plechelmuskapittel te Oldenzaal.

Field methods

During the post-excavation analysis, five zones (A to E) at the periphery of the cemetery were selected for analysis (Fig. 1). Two hundred individuals from these zones underwent a complete physical anthropological, DNA, and isotope analysis (the first time that such analysis has been carried out on such a scale in the Netherlands). The individuals were selected based on the extent of the conservation of their remains, and an effort was made to select individuals who represented the entire period of time the cemetery was in use. The aim of the analysis of these 200 individuals was to discover more information about the population's general health and diet, mobility, and migration patterns, as well as demographics and social characteristics. The five zones that were selected for post-excavation analysis were chosen to show the longest period of activity within the excavated area of the cemetery. 14C dates combined with Harris matrices were used to date (absolutely and relatively) as many individuals as possible within the selected zones. The individuals analysed were divided into two periods, before and after 1500. Using these two periods meant that it was possible to compare and contrast the DNA and isotope data from Oldenzaal with excavations in Vlissingen and Eindhoven.[4]It became obvious during the excavation that the cemetery was much bigger than was first thought. Due to the sheer size of the excavation and the wealth of information that was produced (6,918 find numbers were used, 503 finds boxes, 3,169 photo forms for a total of 13,832 photographs taken), we faced a number of unique challenges during the excavation. To cope with the data produced by excavating and recording the details of 2,750 individuals, we decided early on in the excavation to record all the data associated with the individuals in a database instead of using the old fashioned analogue forms. This database was developed in cooperation with Raphael Panhuysen (physical anthropologist, Skeletloket) and was further developed during the fieldwork. We hope to present a definitive version of it in the near future.

To help understand the complex stratigraphy of the site and after advice from Natasha Powers and Carlos Lemmers from Museum of London Archaeology (MOLA), we employed the 3D-software system Sketch Up to analyse the spatial distribution of the burials and enable the creation of two- and three-dimensional graphics for use in the final publication (Fig. 2). These graphics proved a great help in the production of the Harris matrices for the zones that were selected for post-excavation analysis.

As per the brief, only primary burials were recorded and excavated. Secondary burials were not recorded, and only the position and dimensions of charnel pits were documented. When a primary burial was identified, the individual received a unique find number. The graves were excavated by hand and the skeletons exposed, cleaned, and registered in the database. The usual anthropological measurements were also recorded. It was also possible to record in the database whether DNA, isotope, or parasite samples were taken as well as finds associated with the burial.

---

4 Vlissingen: Clays 2010; Eindhoven: Arts 2013. The preliminary DNA results from Eindhoven: Altena, Smeding & De Knijff 2014.The extensive DNA results from both Eindhoven and Vlissingen will be published by Eveline Altena (Leiden).

The individual was recorded photometrically, and the outlines of the individual and coffin (if present) were recorded using a robotic Total Station. Levels were taken of the cranium, pelvis, and feet, or depending on the properties of the context, of other locations. Age and sex were determined by the junior physical anthropologist on site. These determinations were made on unwashed remains in the field in sometimes less than ideal circumstances (i.e., rain, snow, hail) and should, therefore, be regarded as preliminary indications (200 individuals have been selected for post-excavation analyse and it will be interesting to compare these definitive results with the determinations from the field). Any stratigraphical relations observed were also noted.

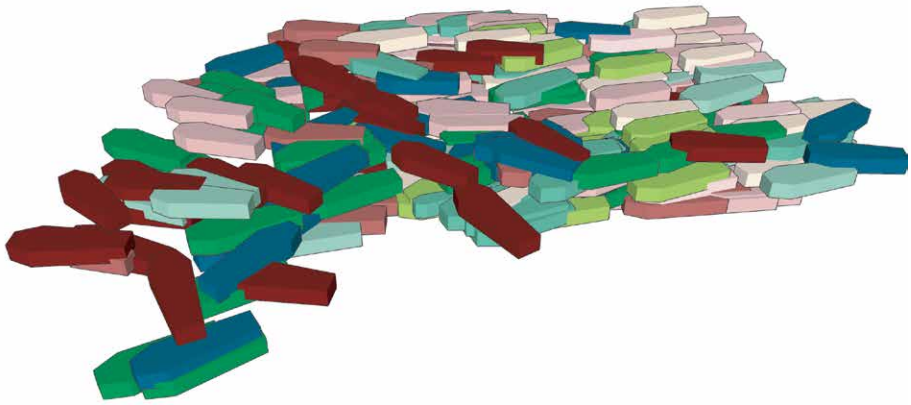


Fig. 2: 3D representation of burials in zone A.

Fig. 3: DNA samples being taken in the field.

Where possible, DNA samples were taken in situ (Fig. 3). However, in a number of zones this was not possible because the soil in these zones had been polluted with heavy metals, and the field work had to be carried out within specific health and safety guidelines, which made it impossible to take the samples in the field. In these zones, craniums were lifted while the jaws and teeth were still partially covered with soil, and the samples taken were processed using the same protocol had they been taken in the field. The DNA samples were always taken by the same archaeologists, all of whom had received training at the beginning of the project from Eveline Altena (Skeletloket), the project's DNA specialist. From the 1,005 individuals that were sampled, a total of 2,938 samples were taken. Once recorded and photographed, the remains were lifted. The skeletons were washed and slowly dried on site. Apart from coffin nails there were very few finds in the graves or associated with the skeletons (and those that were found were with the most recent burials dating to the 18th and 19th centuries).

Results

Of the 2,750 individuals excavated, 2,229 were identified as being adult, 189 as juvenile, and 291 as children (41 individuals have yet to be aged). When looking at the results of the excavation, one has to be aware of the fact that we only excavated a small part of the cemetery (only the areas that would be damaged by the redevelopment of the square were excavated, and these were generally the outlying areas of the cemetery close to the boundary wall). However, even with this in mind the low number of infants (11%) identified during the excavation is noteworthy. The reasons for this low number are unclear; it is possible that infants were buried in a specific area of the cemetery, and this area was not excavated.

There is evidence of a variety of burial traditions. During the excavation, one tree trunk burial was found (Fig. 4) as well as a number of ladder coffins (Fig. 5). There is also evidence for shroud burials with and without a coffin. Nails were found in apparent association with some skeletons but are unreliable criteria for estimating the number of coffined burials. Wooden remains of 31 coffins were recovered during the excavation. Coffins made of oak and pine were identified, but the wood from nine coffins was so poorly preserved that it was impossible to identify it. As so few coffins were recovered, it is not possible to form any conclusions about the use of wood relating to the status of the deceased.

No evidence was found of grave markers in the cemetery, either in the form of inscribed stones or settings for wooden posts, although the latter would have been difficult to detect in the disturbed conditions. Although almost all the individuals were buried with a west-east orientation, there is a clear variation within this orientation, which seems linked to the position of the individual grave within the cemetery itself. This suggests that internments took place with some degree of planning within the context of the cemetery as a whole. No rows could be identified during the excavation, no doubt because of the long period of time the cemetery was in use; there were too many phases of the cemetery, with burials on top of each other, to be able to identify specific rows. Two sandstone sarcophagus lids were recovered during the excavation but unfortunately both were found ex situ.

A number of noteworthy graves and rituals were identified during the excavation, which are discussed below.

Fig. 4: Tree trunk burial.

Fig. 5: Ladder coffin.

Clay burials

A number of burials located throughout the cemetery had a thin layer of clay smeared on the inside of the coffin (Fig. 6 and Fig. 7). This clay layer was only identified after the bones of the individual had been completely exposed and the burial was being registered by a physical anthropologist. This means that it is possible that more clay burials existed in the cemetery but that they were not recognized in the field. Burials with an ash, chalk/lime/mortar, crushed stone, or vegetation (e.g., moss) lining are well documented within the archaeological record, and in the post-medieval period, coffins were also sometimes filled with a layer of sawdust, wood shavings, bran, or straw to soak up body fluids during early putrefaction. However, burials with a clay lining are less known. Two sites in England (St. Peter's Church, Barton-upon-Humber in Lincolnshire and St. James Priory in Bristol) have produced burials where the bodies were completely encapsulated in liquid clay, a process that could only have taken place after the coffin was placed in the grave because the sheer weight of the coffin after it had been filled with liquid clay would have made it too heavy to move. In St. Peter's, two groups of burials were identified exhibiting this feature, one to the north of the church tower and the other within the south aisle of the church.[5] The burials in Bristol were grouped in the northwest corner of the cemetery.[6] The burials in St Peter's were dated to the late Anglo Saxon-Norman period (950-1150) and those in Bristol to the 13th to late 15th centuries. The excavators of the two sites have suggested that clay may well have been used to protect the rest of the community against an infectious disease. However, in Oldenzaal only a thin layer of clay was identified at the bottom of the coffin.

Warwick Rodwell, who excavated the site of Burton-upon-Humber, noted that a thin layer of pale grey silt/clay was visible in the ground, running alongside the boards of the oak coffins and that when a timber coffin had largely or totally rotted away, the lines of its sides were normally marked by a clearly defined streak of pale clay in the ground, up to about 2 cm in width. He has suggested that as the planks rotted they were 'replaced' by clay/fine silt which, over the course of many centuries, washed into the fissures created alongside the boards as they rotted and gradually became thinner and thinner. During the excavation, the archaeologists recovered a number of coffins with their lids intact, and with no soil inside. In no case was there any evidence of a deliberate lining of clay on the inner sides of the boards. But there was often a thin layer of clay in the bottom of the coffin, which was probably silt that had washed in via gaps between the boards.[7] Another possibility is that the clay was use to seal the joints of the side panels and base of the coffin, thereby preventing the escape of bodily fluids at inopportune moments when the body was laid out for the funeral.

To return to the Oldenzaal excavation. During the excavation, one mortar filled burial was found (in the southern part of the cemetery). The dating of this burial is at this time unknown and unfortunately there was so little remaining of

5 Waldron 2007, 26.
6 Jackson 2006, 98.
7 Warwick Rodwell, University of Reading 2013, email.

Fig. 6: Example of a clay burial.

Fig. 7: Overview of clay burials in the field.

the individual that it has not been possible to determine its age or sex. The fact that only one burial out of 2,750 had a mortar filling fits well with the results of the southern cemetery of St. Mary Spital in London where only one example of this was found out of the 10,000 individuals that were recovered. Gilchrist and Sloane suggest that an element of display is the reason behind this practice; a white lining in the grave could suggest purity and the burial rite can be associated with a religious individual.[8]

Maiden crowns

During the excavation, green stains were noticed on a number of skeletons from throughout the entire site. At first we thought that these stains could be linked to copper alloy pins, possibly used to secure shrouds wrapped around bodies, found throughout the site. However, it soon became clear that there was no relation between the individuals with green stains and shroud burials (Fig. 8 and Fig. 9). Also, the green stains seemed to be concentrated around the cranium, which suggests a different reason for the staining than shroud burials.

We also found a small number of individuals with copper wire, combined with organic matter, wrapped around the skull (Fig. 10). Some of the organic remains have been identified as buxus leaves. Other examples of this kind of headdress are known from a number of sites within the Netherlands. At St. John's Basilisk in Oosterhout, fragments of copper wire were found in combination with buxus leaves in graves dating from the 17th to the 19th centuries.[9] Recently, at the Maria church in Didam, a well preserved sample was found in the grave of a young woman.[10] The burial is dated to the 18th/19th or possibly even the early 20th century. In Antwerp during excavations at the Cathedral of our Lady and St. Paul's Church, a number of individuals were found with traces of green oxidation and fragments of metal around the cranium. A number of crowns made from flowers and leaves mounted on a metal frame were found on the sites of both churches.[11]

In Belgium, *witte lijken* or 'white bodies' had the right to be buried with such a garland, or maiden crown. Veeckman points out that not only females were afforded a maiden crown but that everyone who died unmarried (and therefore a virgin), be it man, women, or child, had the right to wear one. Indeed, there is evidence that the custom continued in Germany until the early 20th century and that during World War I soldiers who died unmarried were given a maiden crown which was exhibited either in church or in their parent's living room.[12]

The results in Oldenzaal seem to support the idea that maiden crowns were not exclusively associated with women. Fifty-five per cent of the individuals identified with cooper staining on the skull have been provisionally estimated as female, 25 per cent juvenile/child, and 20 per cent male.

---

8 Gilchrist & Sloane 2005, 143.
9 Sam *et al.* 2005, 74.
10 Schabbink 2013, 34-37.
11 Veeckman 1997, 73.
12 Claudia Melisch, Berlin 2013, email.

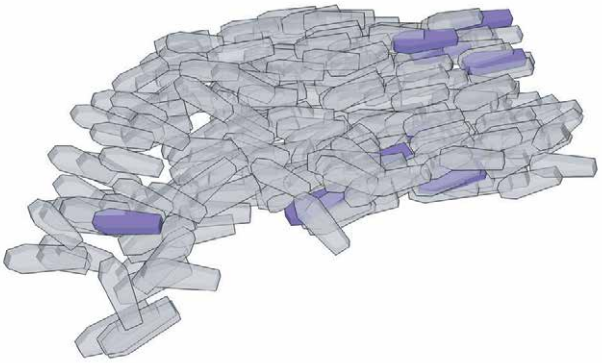


Fig. 8: 3D representation of the location of burials with green stains in zone A.

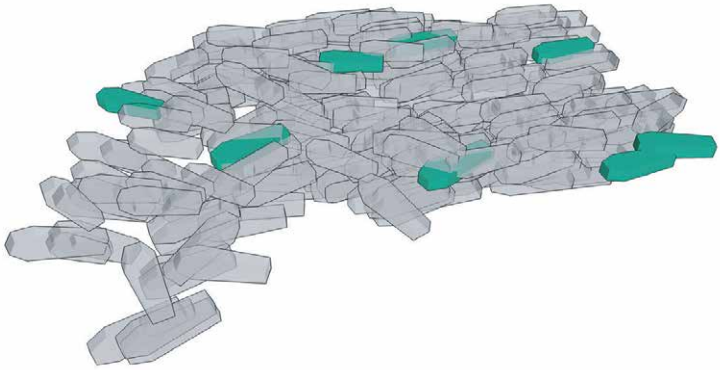


Fig. 9: 3D representation of the location of shroud burials in zone A.

Fig. 10: Organic remnants of a maiden crown around the cranium.

Most maiden garlands from Germany, where more than 600 examples are known, belong to children aged 0-6 years. Among the adults it seems that more women than men were buried with maiden garlands. The first indications of maiden garlands appear in the 16th century, but the custom peaked in the 17th and 18th centuries.[13] The individuals with garlands in Oldenzaal date from the 17th century.

The preliminary XRF results from the wire collected in Oldenzaal indicate that a number of the fragments of wire were coated with gold and a number with silver. Leonic wires (German: *leonische Drähte*) is an umbrella term for copper wire coated with other metals (gold, silver, and later zinc) to imitate high-quality gold and silver wire. According to written sources, these wires were produced at the beginning of the 16th century in Lyon, hence the name. They were often associated with maiden crowns.[14]

A similar tradition of decorating the deceased with a crown of flowers made of paper called *peelen* can often be associated with the funerals of young Catholic children. During the excavation of the St. Jans Church in 's-Hertogenbosch, glass splinters were found in the graves of nine children, including two babies. Portegies suggests that these splinters were used to create a shimmering effect around the head while the child was laid out.[15] During the St. Plechelmus excavation, nine children were found with fragments of glass, all of which date to the 17th century or later.

North-south burials

As mentioned earlier, almost all the individuals were buried according to the classic Christian tradition with a west-east orientation (with a slight variation depending on the location of the grave within the cemetery). However, in the south-east corner of the cemetery near the cemetery wall, a cluster of nine burials were found with a north-south orientation (Fig. 11 and Fig. 12). One of the individuals was sampled and produced an AMS date of 1619-1681. These nine individuals were buried in three groups of three near the outer edge of the cemetery; newer burials with a traditional west-east orientation were present above them. All of the individuals were adults, and both men and women were found. The reason for this grouping is still unclear. However, it is clear that these nine individuals were deliberately buried in a non-traditional manner. One can assume that this took place with the permission of the church as well as with the wishes of the individuals themselves.

North-south burials are known from other medieval and post-medieval sites within the Netherlands and Belgium such as Antwerp, Breda, Mechelen, and Venlo. In Antwerp the burials are dated to the 16th and 17th centuries, and it has been suggested that the burials can be associated with plague victims or possibly soldiers who died in battle (this explanation has also been used for the north-south burials found in Venlo Q4, Bergstraat, and Maaskade-zuid).[16] However, I fail to

13 Claudia Melisch, Berlin 2013, email.
14 Juliana Lippok 2015, email.
15 Portegies 1999, 99.
16 Loopik 2015.

see the connection between a military context and the relationship with so-called 'deviant' burial orientations.

North-south graves of the Reformation period have been interpreted as recognisable symbolism suggesting that the buried individuals were outcasts of the Christian church.[17] However, if this was the reason for the burials in Oldenzaal, then it is unclear why the individuals were buried within the cemetery bounds.

Fig. 11: North-south burials from the south-east corner of the cemetery in workzone 4 (see Fig. 17).

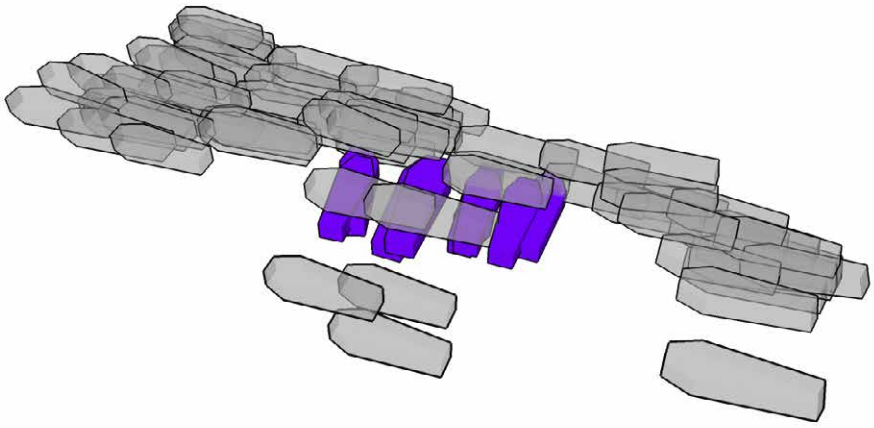


Fig. 12: 3D representation of the north-south burials in workzone 4 (see Fig. 17).

17 Fay 2006, 197.

Examples of this north-south burial tradition are also known from non-conformist cemeteries. In Kingston upon Thames in London, a Quaker cemetery has been investigated where around 55 per cent of the population was buried in a north-south orientation.[18] At the cemetery of Abingdon Vineyard in Abingdon, Oxfordshire dated to the English Civil War (1642-1651), all the burials were north-south. Abingdon was a strongly Protestant town with a Parliamentarian garrison during the war, which may explain the orientation.[19] There was a second burial ground of a similar date in the town on West St Helen's Street that had mostly west-east burials. But on the edge of the burial ground were several north-south orientated burials, and it is assumed that those burials were non-conformist.[20] It seems that the north-south burial tradition in the United Kingdom at least was used as a way for individuals (and groups) to distinguish themselves from the Roman Catholic Church.

The reasons for the deviant burials in Oldenzaal are (and probably always will be) unclear. What is clear is that these graves would have been visible within the cemetery, as the mounds covering them would be at odds with almost all the other graves within the cemetery. Because the graves are within the boundary of the cemetery, the burials must have taken place with the permission of the church elders. Traditional west-east burials are found above this group, and these are the only ones with a north-south orientation found during the excavation, suggesting that these represent one specific moment of time. It is tempting to suggest that this cluster of burials represent the transition of the church in Oldenzaal from Catholic to Protestant (around 1633), and as in the United Kingdom, the community in Oldenzaal would have used these burials as a way of symbolising their break from Rome.

East-west burials

During the excavation, a small number of burials (11) with an east-west orientation were also recovered. It is commonly assumed that east-west burials were those of priest who were placed with their heads in the east so that on the Day of Judgement they would rise to meet their congregants. However, of the 11 individuals in Oldenzaal, five have been preliminary identified as female and one as a child, which suggests that there is another reason for this phenomenon. The traces of these coffins found at the site show us that they were rectangular in shape, and it may well be the case that the coffins were simply buried the wrong way round.

Four prone burials, located throughout the site, were identified during the excavation. It has been suggested that prone burials may have been perceived as deviant in some respect, but the examples in Oldenzaal show no other evidence that would support this theory.

18 Bashford & Sibun, 2007.
19 Allen 1996, 51-55.
20 Brady *et al.* 2007, 131.

Stone pillows

In the northern part of the cemetery and near the church, the remains of an individual were found with two stones set on either side of, and partially under, the skull. One of the two stones is a fragment of a Bentheimer sandstone block that had been used as a whet stone, the other stone is an undressed fragment of stone (Fig. 13). While the date of this individual is unknown, the use of Bentheimer sandstone dates the burial to the late medieval period.

Unfortunately, this individual was recovered in one of the small trenches that were excavated for the new electricity cables that were laid at a number of locations around the church. Due to the nature of the excavation brief, we were limited to excavating only those areas that would be disturbed by the redevelopment of the square. This meant that it was not possible to excavate this individual completely and only the skull and upper torso were recovered (see Fig. 13 for an overview of the recovered remains of this individual).

These so-called 'earmuffs' are known from other sites. The standard explanation for these stones is that they secured the head so that on Judgement Day the resurrected body would be facing Christ as he descended in the east. Gilchrist and Sloane suggest that the stones may have helped form a visual frame for the head of the deceased during a wake.[21]

Fig. 13: Stone pillow burial.

21 Gilchrist & Sloane 2005, 126.

Two mass graves

Two mass graves were identified during the excavation, one in the north-west area of the excavation and one in the south. The grave found in the southern part of the cemetery consisted of a large square pit in which six individuals were found. The individuals were buried in two neat stacks of three with a west-east orientation. The grave consisted of five children aged between two and nine and an adult woman. The position of the female is striking; she lies on top of one of the stacks and her right arm lies on the hip of one of the children in the second stack (Fig. 14). During the excavation, two of the individuals were sampled and produced a 14th-century date. Interestingly, the first Black Death epidemic in Oldenzaal dates to this period (1352), and it is possible that the mass grave can be linked to this epidemic. Samples have been sent to the Max Planck Institute for the Science of Human History in Jena, Germany, but at the time of writing of this article, the samples have not yet been analysed.

The second mass grave was found in the north-west corner of the site. The grave contains four individuals; a young boy aged two, a young girl aged six, a girl aged between 11 and 15, and an adult woman. The youngest of the three children was placed between the feet of the woman with its head in the east instead of the west (Fig. 15). This grave also dates from the 14th century. DNA analysis of the samples from the two graves provide surprising results. In both graves, the adult females are not the mothers of the children buried alongside them. The DNA results also prove that the children are not full brothers or sisters with each other and that there is no relation on the mother's side between the individuals buried in each of the mass graves. However, there is a mother-daughter relation between the adult female in the southern burial and one of the young girls buried in the northern grave.[22] Isotope analysis carried out on the individuals shows that the adult female in the north-western burial as well as the 11-15-year-old girl are not local to Oldenzaal and originate in an area north-east of Oldenzaal.[23]

Since mass graves are in no way uncommon in late- and post-medieval cemeteries, it is striking that only two mass graves were identified during the excavation. It is noteworthy that both mass graves consisted of a number of children in combination with an adult female. Indeed, the fact that multiple children were found together with a female adult illustrates the position of children within the burial ritual. It was possibly believed that children were afforded some kind of protection in the afterlife by the presence of an adult. Gilchrist, however, makes a valid point by asking whether the presence of a child's corpse in the grave was beneficial for the adult rather than the other way round.[24]

22 Williams *et al.* 2016.
23 Williams *et al.* 2016.
24 Gilchrist 2012, 209.

Fig. 14: Southern mass grave.

Fig. 15: North-western mass grave.

Pot burials

Near the southern boundary of the cemetery, 13th-century globular pot (Dutch: *kogelpot*) shards were identified. The pot seems to have been deliberately placed within the cemetery and then disturbed by a newer grave. The fill of the pot was wet sieved over 2 mm but no finds were present in the pot. It was at first unclear why this pot had been buried within the boundary of the cemetery. However, there are examples of this phenomenon known from other cemeteries within the Netherlands and Belgium. The best-known and documented are pots found in 1962 in Sint Anna ter Muiden in Zeeland. In the winter of 1962 while clearing the graveyard, workmen found two whole pots containing the remains of newborn babies. During the excavation that followed this discovery, another pot was recovered at the foundations of the original 14th-century church. The pots were all found in the north-east area of the cemetery and were dated to the 15th century. Other examples are known in Zeeland and Belgium, such as Zottegem in south-east Vlaanderen and Boudelo in north-west Vlaanderen. The largest number of pots has been found in Friesland. Most of these examples were found at the edge of cemetery sites while the find from Zottegem was located outside the cemetery.[25]

The examples from the north date from the 12th to 15th centuries and those in the south date from the 15th and 16thcenturies. The examples in the north were all kogelpots while those found in the south were three-legged cooking pots (Dutch: *grape*). The example found in Oldenzaal was also a kogelpot which seems to fit in the northern tradition. Although no foetal remains were recovered from the pot in Oldenzaal, when one takes into account the fact that the pot was clearly disturbed by a newer burial combined with the dry sandy soil the pot was found in, it is not surprising that foetal remains, if there were any, did not survive.

Infants who died unbaptised or stillborn were not granted burial in consecrated ground, and this special 'potting' of infant remains may suggest that these individuals were buried illicitly in the cemetery. The concept of *limbus infanticum,* a place for unbaptised children, was well-known at this time, and it seems that parents, possibly in cooperation with the clergy, choose a location on the boundary of the cemetery to bury their children, the edge of the cemetery symbolising the limbo in which their children would spend eternity. This tradition astonishingly enough carried on well into the 20th century. Kok writes of evidence that until 1955 stillborn infants in Tubbergen (Overijssel) were buried at night under the boundary hedge of the cemetery and that in Urk they were buried under the cemetery wall itself.[26]

Another ritual associated with the burial of babies and young children was the clustering of these burials close to the church building, so called 'eaves drip burials'. The most common explanation for this phenomenon is that rain would be sanctified through its contact with the church roof and then by falling onto the burials would symbolise a sort of second baptism of the infants. In the UK this practice seems to have died out in about the 13th century, but examples are known in France, Italy, and Austria dating into the post-medieval period. In addition to

25 Deschieter & De Wandelt, 2009.
26 Kok 1970, 77.

Fig. 16: Possible deviant burial.

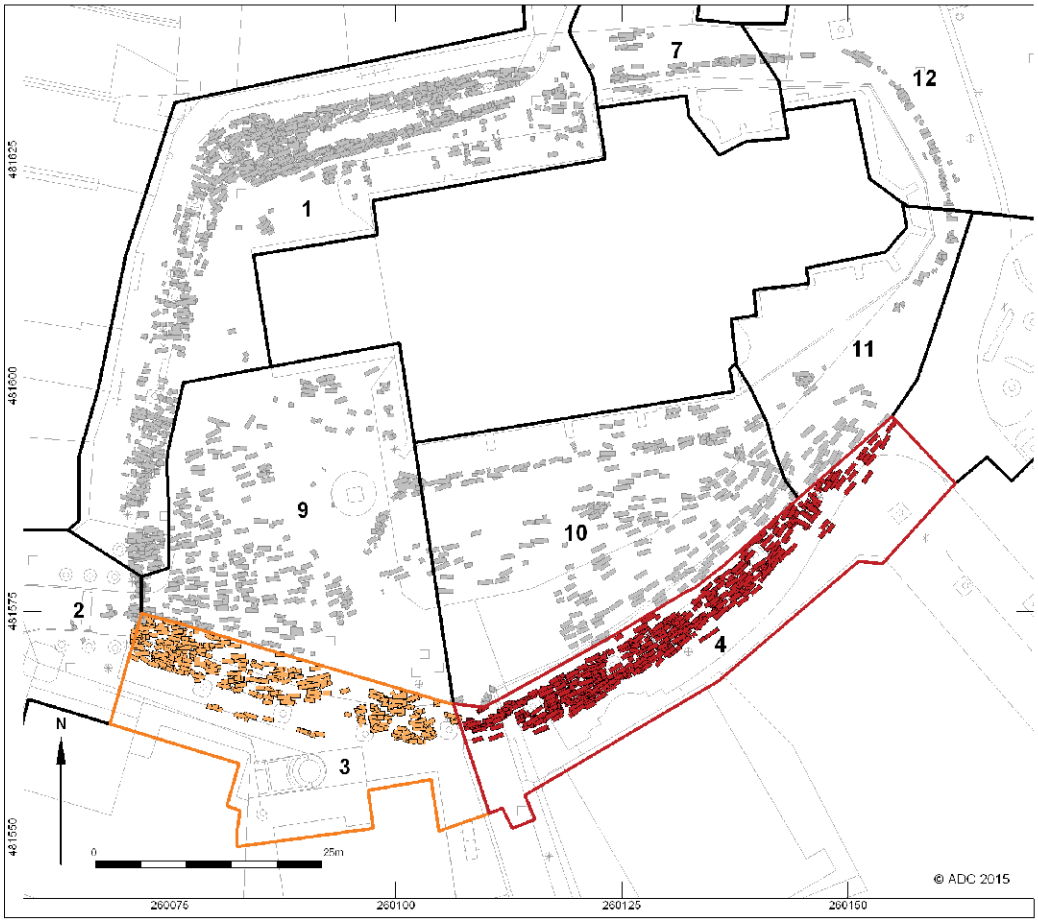


Fig. 17: Overview of all the excavated burials, in yellow and red zones 3 and 4 whereby the west-east orientation of the burials runs parallel with the cemetery boundary.

these clusters of noteworthy burials, a number of deviant single burials were also identified, including one individual that was found with a large stone placed on his chest (Fig. 16).

The cemetery produced a relatively uniform picture of burial traditions through the centuries with little variation. Almost all burials were oriented west-east (as one would expect in a Christian cemetery), and although there was occasionally a small deviation to this west-east orientation this was due to lack of space within the cemetery as the graves had been clearly laid out parallel to the cemetery wall (Fig. 17).

During the post-excavation analysis of the cemetery, we tried unsuccessfully to identify patterns in the arrangement of the burial, but it was very difficult to infer much from the arm positions because of post-mortem disturbances.[27] Melisch suggests that even without post-mortem events the position of the arms within a burial cannot be linked with specific forms of prayer or specific periods of time and that arm positions are more likely influenced by whether the individual had been placed in a coffin or wrapped in a shroud.[28]

Differences between graves from the Catholic and Protestant periods were also difficult to identify. The presence of rosary beads in a small number of 19th-century burials was the exception to the rule. Objects relating to the preparation of the body, such as wash bowls, combs, and razors have been found in 18th- and 19th-century Protestant cemeteries in Germany but were not present in Oldenzaal.[29] Obviously there were marked differences between Protestant and Catholic funerals. Hollewand has shown that in the 18th century the most money for a Catholic funeral was spent on the funeral service itself while for a Protestant funeral, the most money was spent on food and drink for a post-funeral meal as well as clothes for the funeral.[30]

Isotope and DNA analysis

The integrated approach to the analysis of the 200 individuals has produced a wealth of information. Compared to other cemetery sites, such as Eindhoven and Deventer, the average age of death of the individuals analysed in Oldenzaal was relatively low (38 years for males and 36 years for females).[31] However, as mentioned earlier, the areas of the cemetery that were excavated (zones A to E) were located at the periphery of the cemetery, where one would expect people of a lower social class and status to be buried and, hence, with a shorter life expectancy. There was also little difference between the average age of death between the periods before and after 1500.[32]

The number of children found is less than one would expect (especially in the period after 1500), and it would seem unlikely that our results were truly representative of the actual number of child burials present within the cemetery as

27 Gilchrist & Sloane 2005, 152.
28 Claudia Melisch, Berlin 2013, email.
29 Kenzler 2015, 166.
30 Hollewand 2011, 9.
31 Altena, Kootker, Panhuysen 2016, 251.
32 Altena, Kootker, Panhuysen 2016, 295.

a whole. It is possible that this underrepresentation was due to the selection criteria applied or that children were simply buried at locations that fell outside the scope of this excavation.

The isotope analysis (stable isotopes nitrogen and carbon) showed that fish (both fresh and salt water) was a minor component of the diet in both periods of the population analysed; in the pre-1500 period, saltwater fish seems to have played a very small part in the diet of the male population.

The results of the strontium and oxygen isotope analysis have also shown that 15 per cent of the individuals analysed were not native to the Oldenzaal region, with individuals possibly from Germany and the United Kingdom being identified. This figure is lower than the results of the excavation in Vlissingen, as one would expect, Vlissingen being a thriving international port.[33]

The DNA analysis produced a picture of a relatively high and constant genetic diversity within the population in both periods. Evidence of parent-child and brother-sister relationships has also been established through the DNA analysis. These individuals were almost all grouped close together.

In the south-west zone, two individuals buried close to each other were both not native to the Oldenzaal region yet were buried at least 75 years apart. This suggests that a shared cultural background could be the reason why these individuals were buried close to each other. The fact that most of the analysed individuals were recovered from the periphery of the cemetery suggests, as mentioned earlier, that the excavated population consisted of individuals of lower status within the community. This seems to be supported by the relative low age at death as well as the relatively high number of bone fractures among and evidence of arthritis and periostitis found on the selected individuals.

Conclusions

When one looks at the results of the investigation, one has to keep in mind that we only excavated a small area of the cemetery. Almost all of the excavated individuals were recovered from the periphery of the cemetery, and the question has to be asked whether these individuals were representative of the entire cemetery.

The results of the excavation were at first view surprisingly uniform, with little difference between the burials, burial traditions, as well as the physical anthropological, DNA, and isotope research. Although slight variations of the traditional west-east orientation were noted, this was in almost all cases due to the fact that the burials had almost always been placed parallel to the cemetery boundary. The largest variation was noted in the north-west corner of the cemetery (and again, these burials were west-east in orientation). The presence of rosary beads was the only way in the field to determine whether individuals were buried according to Protestant or Catholic tradition, although there are obviously many differences between a Catholic and Protestant burial. The archaeological record can ever only represent certain aspects of the funerary culture and traditions

33 For the period before 1500, 14.8% of the individuals were not local and for the period after 1500 13.4% were not (Altena, Kootker, Panhuysen 2016, 285). The extensive isotope analysis from the cemetery from Vlissingen (16th – 19th centuries) will be published by Lisette Kootker (Amsterdam).

practised at any one time. As Kenzler notes, 'graves were used as means of symbolic communication between this world and the hereafter. Changes in burial custom therefore always express changes in living culture as well'.[34] He also points out that medieval burials were homogenous and that there was no difference between burials from the 8th century and those of the 15th century.

In conclusion, the excavation of St. Plechelmus produced a wealth of data, of which only a small amount has been analysed. As is often the case, the excavation produced more questions than answers; further research of the individuals with copper stains is at this moment being carried out, and samples taken from the individuals from the mass graves are being analysed to determine whether or not they were victims of the Black Death. We hope that this paper and the monography are not the end of this excavation but rather the start of further research at an international level.

Bibliography

Allen, T, 1996: 'Abingdon Vineyard Area 6', *South Midlands Archaeology* 26, 51-55.

Altena, E., L. Kootker & R. Panhuysen, 2016: 'Populatieonderzoek', in: B. Williams (ed), *Memento Mori. Een archeologische opgraving rondom de St. Plechelmuskerk, Oldenzaal*, Amersfoort (ADC-Monografie 21), 11-301.

Altena, E., R. Smeding & P. de Knijff, 2014: 'Het DNA-onderzoek: de eerste resultaten', in: N. Arts, *Een knekelveld maakt geschiedenis. Het archeologisch onderzoek van het koor en het grafveld van de middeleeuwse Catharinakerk in Eindhoven, 1200-1850*, Eindhoven, 213-227.

Arts, N., 2013: *Een knekelveld maakt geschiedenis. Het archeologisch onderzoek van het koor en het grafveld van de middeleeuwse Catharinakerk in Eindhoven, 1200-*1850, Eindhoven.

Bashford, L. & L. Sibun, 2007: 'Excavations at the Quaker Burial Ground, Kingston-upon-Thames, London', *Post-Medieval Archaeology* 41-1, 100-154. http://dx.doi.org/10.1179/174581307X236210.

Brady, K., A. Smith & G. Laws (eds.), 2007: 'Excavations at Abingdon West Central Redevelopment: Iron Age, Roman, Medieval, and Post-medieval Activity in Abingdon', *Oxoniensia. A refereed journal dealing with the archaeology, history, and architecture of Oxford and Oxfordshire* 72, 107-202. http://dx.doi.org/10.1179/174581307X236210.

Claeys, J., N.L. Jaspers & S. Ostkamp, 2010: *Vier eeuwen leven en sterven aan de Dokkershaven in Vlissingen*, Amersfoort (ADC-Monografie 9). https://doi.org/10.17026/dans-xpy-76pu.

Deschieter, J. & T. de Wandelt, 2009: 'Over een baby in een kookpot onderweg naar de limbo. Een neotale bijzetting uit de late middeleeuwen in de Hoogstraat te Zottegem', *Handelingen van het Zottegems Genootschap voor Geschiedenis en Oudheidkunde* 14, 453-468 (73-88).

Fay, I., 2006: 'Text, space and the evidence of human remains in late medieval and Tudor disease culture', in: R Gowland & C Knüsel, *The Social Archaeology of Funerary Remains*, Oxford, 190-208.

34 Kenzler 2015, 148.

Gilchrist, R., 2012: *Medieval Life Archaeology and the Life Course*, Woodbridge.
Gilchrist, R., & B. Sloane, 2005: *Requiem*, *The Medieval monastic cemetery in Britain*, London.
Ginst, V. Vander, & M. Smeets (eds.), 2012: *Het archeologische onderzoek aan de Minderbroedersgang te Mechelen*, Kessel-Lo (Archeo-rapport 110).
Hollewand, K.E., 2011: *Funeral consumption and social distinction in the early modern Netherlands*, Utrecht (unpublished master's thesis University of Utrecht).
Jackson, R., 2006: *Excavations at St James's Priory Bristol*, Oxford.
Kenzler, H., 2015: 'Religion, Status and Taboo. Changing Funeral Rites in Catholic and Protestant Germany', in: Sarah Tarlow (ed.), *The Archaeology of Death in Post-medieval Europe Berlin*, Berlijn, 148-169.
Klomp, M., 2013: *Opgravingen in vroege Overijsselse NH kerken,* Zwolle (Publicaties Archeologisch Depot Overijssel 1).
Kok, H. L., 1970: *De geschiedenis van de laatste eer in Nederland*. Lochem.
Loopik, J., 2015: *Venlo Q4 – Locaties Bergstraat-west & Maaskade-zuid, Leven en dood aan het Schriksel. Een archeologische opgraving*, Amersfoort (ADC-monografie 20). https://doi.org/10.17026/dans-x5b-rp4y.
Portegies, M., 1999: *Dood en begraven in 's-Hertogenbosch*, Utrecht.
Sam, L.A., M. Parlevliet, M. d'Hollosy & J.P. Flamman, 2005: *Graven op de markt, een middeleeuwse nederzetting en begraafplaats op de Markt in Oosterhout*, Amsterdam (AAC-rapport 320).
Schabbink, M., 2013: *Oude besjes en 'schone' bruiden begraven onder de 'Diemse' toren. Archeologische inspectie rond de Mariakerk te Didam*, *gemeente Montferland,* Weesp (RAAP-rapport 2749). https://doi.org/10.17026/dans-xtv-az95.
Veeckman, J., 1997: 'Post-medieval mortuary practices in Antwerp (Belgium)', in: G. de Boe & F. Verhaeghe (eds.), *Death and Burial in Medieval Europe, Papers of the 'Medieval Brugge 1997' Conference*. Vol 2, 71-75.
Waldron, T., 2007: *St Peter's Barton upon Humber, Lincolnshire. A Parish Church and its Community. Volume 2: The Human Remains*, Oxford.
Williams, G. (ed.), 2016: *Memento Mori. Een archeologische opgraving rondom de St. Plechelmuskerk, Oldenzaal,* Amersfoort (ADC-Monografie 21).

The Carmelite monastery in Aalst (Belgium, province of East Flanders) (1497-1797)

An urban burial ground in a monastic environment

Koen De Groote, Jan Moens & Kim Quintelier

Introduction

Between 15 March 2004 and the end of December 2005, archaeological excavations were carried out at the Hopmarkt in Aalst, the site of a former Carmelite monastery (Fig. 1), as a result of the planned construction of an underground car park. The project was a collaboration between the former Flemish Heritage Institute (now Flanders Heritage Agency) and the town council of Aalst. The study area, which measured ca 3200 m², was fully excavated. In 2011, in preparation for the construction, additional areas adjacent to the 2004-2005 excavations were unearthed by Solva, the intercommunal archaeological service in this region.

The study of the data regarding the construction history of this monastery as well as the burials was published in full in Dutch in 2011.[1] This contribution to the proceedings of the Urban Graveyard Workshop is a summary of that article, completed with additional data from the stable isotope research, published in 2014,[2] and the first results from the Solva excavation project of 2011.[3] For further details on the research data and for the literature and sources consulted, we refer to the publications mentioned in the bibliography.

The Hopmarkt excavation project revealed the remains of the Carmelite monastery of Aalst, also known as Brothers of the Blessed Virgin Mary (*Onze-Lieve-Vrouwebroeders*), founded in 1497 and dissoluted in 1797 during the French

1 De Groote *et al.* 2011.
2 Quintelier *et al.* 2014.
3 De Maeyer *et al.* 2014.

Fig. 1: View of the monastery remains during excavation, seen from the west.

Revolution. Three main zones were investigated: the church, the cloisters with the adjacent buildings, and the gardens. Probably already since its founding, this friary had the right to bury laity. Without doubt, the Carmelites had several juridical disputes over funeral rights with the Saint-Martin church, the only parish church of Aalst, in the first half of the 16th century, which were resolved in 1543. We know from 18th-century written sources that four burial zones were designated by the Carmelites, each costing a different amount: the choir (most expensive), elsewhere in the monastic church, the cloister garth, and the general cemetery (cheapest). The general cemetery was situated outside the excavation area. The three other areas revealed 398 primary burials of which only 238 skeletons found during the 2004-2005 excavation project were fully studied.

Overview of the history of the Carmelite monastery

The Hopmarkt of Aalst, formerly known as the Veemarkt, was originally much smaller than it is today.[4] During the medieval period, the southern, excavated section of the present-day square was built up. The western side included a large watering place for livestock in the 14th and 15th centuries. The establishment, in the late 15th century, of a monastery to the south of the Veemarkt meant the end of civic occupation there. In 1497, the Carmelites of Liedekerke were granted permission to move their monastery within the town walls of Aalst (Fig. 2). All the

4 De Groote *et al.* 2011, 90-125.

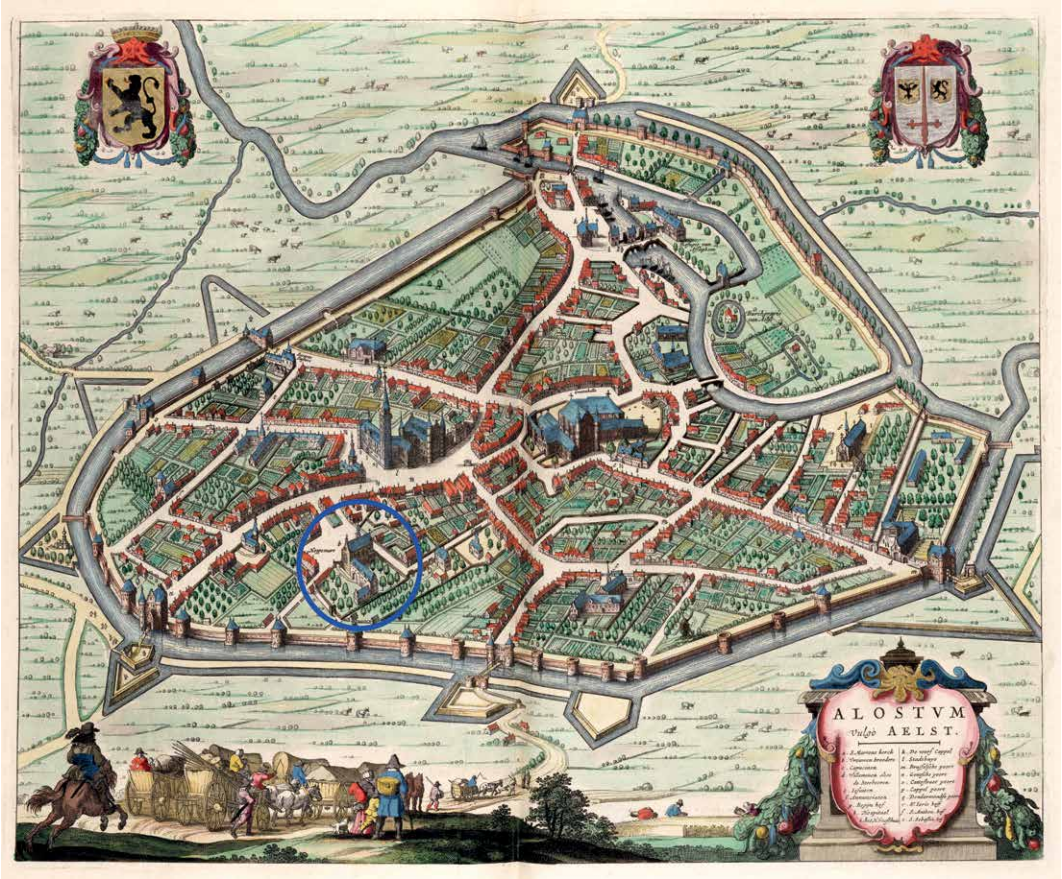


Fig. 2: Plan of Aalst from Sanderus' Flandria Illustrata (1641-1644), with the location of the Carmelite monastery, founded in 1497.

data regarding the construction history of this monastery, as well as the burials, were studied. Where possible, the results of the archaeological investigations were compared with the available historical data. On the basis of written and cartographic source material, the construction history of the monastery buildings has been divided into four main phases, three of which three took place during the years the monastery was active. Besides some exceptions, it was impossible to connect the burials with these main phases.

From the historical sources it can be deduced that during the first phase (1497-1582), the Carmelites built their first monastery on some plots they already owned prior to 1497. The heart of the monastery was formed by the area of the *engienhuus*, the urban weaponry building or armoury that was built only ten years before (1484-1487) and that was transformed into the first monastery church.[5] The fairly small floor plan of the original residential building can be explained by the fact that when construction began, much of the land to the south and west was not yet in possession of the Carmelites. When they obtained a large moated site in

5 General State Archives, Stadsrekeningen Aalst, n° 31478, f 122 – f 132.

1503, a substantial amount of land west of the monastery, up to the late medieval town walls, came into their possession. This zone became their general cemetery, which was not a part of the excavated area.

Because the earliest monastery church was in fact the transformed and reshaped *engienhuus*, it had a diverging tripartite rectangular floor plan. The main, northern, entrance led to a smaller central space, connected on both sides to larger square spaces (Fig. 3a). The eastern square space was the choir, in which the monastery community prayed. The wider community met in the western space for the preaching of sermons. Besides the hall-shaped church, the monastery consisted of a detached residential building oriented north-south. A town council financial statement from 1512 mentions the fitting out of a refectory and dormitory. The presence of several rubbish pits are an indication that by the middle of the 16th century nearly the entire area between the northern monastery wall and the later west wing was in use as a garden (including an orchard and a kitchen garden).

The second phase of construction (1582-1605) commenced near the end of the religious troubles. In 1576, Spanish troops plundered and routed the monastery and in 1582, Calvinist troops again caused much damage to the Carmelite monastery. The written sources mention the rebuilding of the church, completed by 1591, and repairs to the residential building, which would take at least another ten years. The archaeological data clearly show that the church was rebuilt from the foundations up and on the same footprint. When exactly the residential building was repaired and extended cannot be ascertained on the basis of the manuscripts. However, the excavated remains of the building clearly indicate that a hall was the first to be added to the living quarters, half of which initially had a basement. On the south-western side, a third building was erected, perpendicular to the new residential buildings. These new buildings were first depicted in the 1628 town plan by De Dijn, although they had probably been completed by the early 17th century. The spread of the various buildings indicates that by then the monastery had reached its maximum spatial expansion.

Phase three (1605-1797) was the final and longest phase delineated during the time when the monastery was active (Fig. 3b). It is impossible to distinguish any further major building phases within this period. Between 1608 and 1628, an entirely new church was built, a long, single-nave church in the Gothic style and with a choir apse. The raised choir with its monumental altar was probably separated by a rood loft between the third and fourth bays. On the west side, a platform was created on which the organ probably sat. The new church floor plan made it possible to connect the west wing with the church, creating a closed space. The slightly altered orientation of the church also necessitated the building of a new cloister alley abutting the church, which was probably constructed as early as 1610. The western cloister alley was not built until 1643, whereas the southern and eastern cloister alleys were probably built as late as the second half of the 17thcentury or even later. The written sources indicate that during the 17th century, the west wing was undergoing constant remodelling. Yet it is hard to connect the historical and archaeological data, and the further extension of the southern wing in the 17th century can only partly be traced. It is unknown when the earliest part, abutting the west wing and the probable location of the monastery's brewery, was

extended. What we do know is that the infirmary postdates 1649 and that it was situated in the building located at the end of the south wing, against the old moat. In 1664, a new gate was built, probably coinciding with the infilling of the moat. A new monastery wall was erected, against which on the north-western side, new outbuildings were constructed.

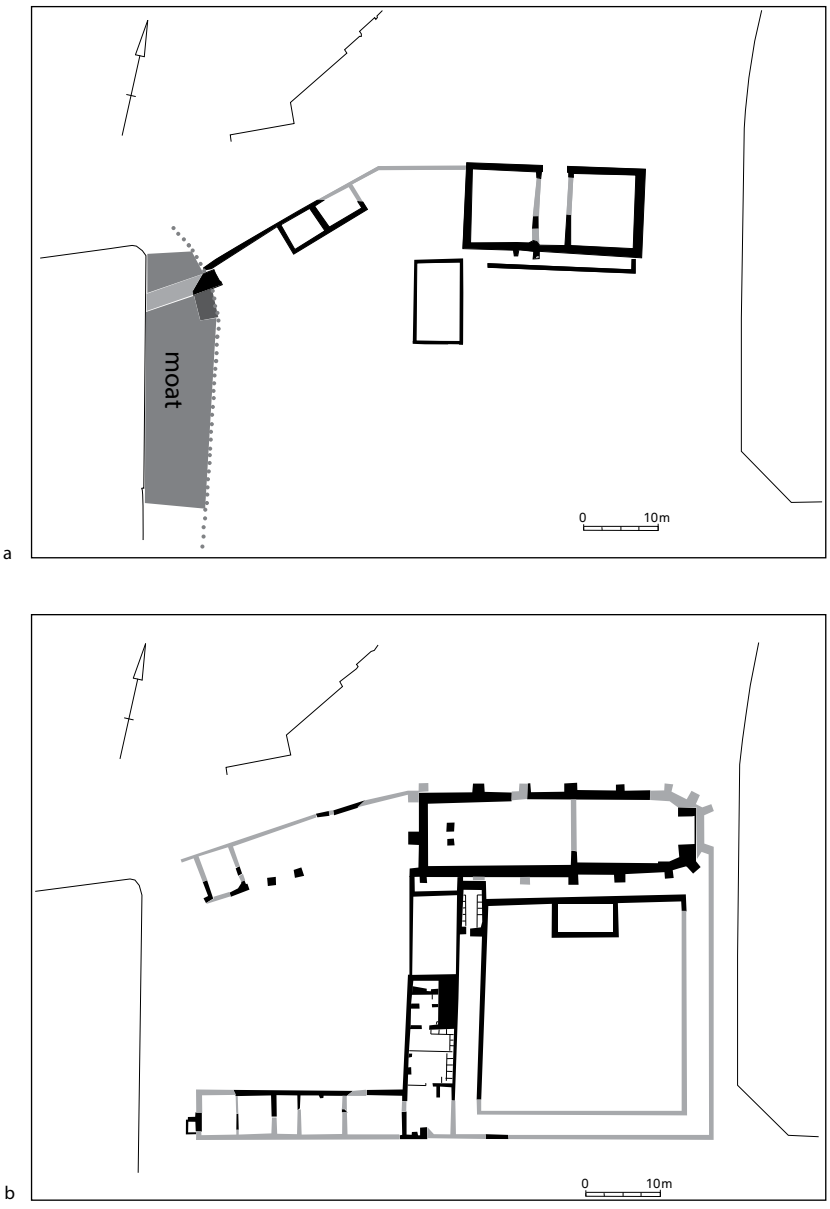


Fig. 3: a) The first construction phase (1497-1582) and b) the 18th-century plan of the monastery. Legend: black: excavated walls; grey: disappeared/unexcavated walls; dark grey: excavated part of the moat.

The fourth and final phase began in 1797 with the dissolution of the monastery by the French authorities and the confiscation of its property. In 1798, the buildings were bought by a group of civilians from Aalst; the former monastery church was sold to the town of Aalst in 1808. Thereafter, the church fulfilled a variety of functions, such as a clothworkers' hall, a meat market, a place where spinning took place, a Sunday school (1818) and a music school (1858); eventually, around 1864, it was transformed into the town theatre, a function it fulfilled until its demolition in 1936. In 1941, an underground air defence command post was constructed on the site of the former church. The monastery buildings were divided into approximately ten houses, which were not removed until after World War II. In 1808, part of the western area, where the gardens and orchard had been located, was transformed into a square, the Botermarkt. In 1872, the town council decided to turn this into a covered market, but dismantled it in 1953. In other words, the Hopmarkt did not obtain its current form until after World War II.

The burials and the physical anthropological analysis

As part of the archaeological investigations of 2004-2005, a total of 238 primary burials were discovered, either partly or fully intact (Fig. 4).[6] The Solva excavation of 2011 in the south-eastern part of the cloister revealed another 160 primary burials.[7] All excavated skeletons were situated in three main zones: the church, the cloister alleys, and the cloister garth (Fig. 5). Only a few skeletons could be chronologically related to the cloister's construction history. The cemetery proper of the monastery was situated outside the archaeological zone investigated. In addition, archival research yielded historical information on the burial practices at the Carmelite monastery. The records consisted of burial registers for the period 1726-1790 and the *Diarum Carmeli Alostani* (1643-1796). According to the registers, the Carmelites carried out 5,727 burials between 1726 and 1790, mainly in their general cemetery. So it is clear that the 398 excavated skeletons were only a portion of the total number of individuals originally buried in the zones investigated. Several graves had disappeared in the course of the monastery's history due to the various building activities, most notably the construction of a cellar under the northern part of the western cloister alley (Fig. 5: A). Many skeletons had been partly or entirely disturbed by the intensive burial activity itself, while many graves disappeared following the dissolution of the monastery. The construction, in 1941, of the underground command post destroyed no less than a third of the area of the newest monastery church and the burials located there (Fig. 5: C). The building of houses with basements on the site of the eastern and southern cloister alleys and part of the cloister garth also resulted in the destruction of graves (fig. 5: B).

The church burials revealed 96 preserved skeletons found within the walls of the 17th-century Gothic church building (Table 1). With regard to the distribution of the graves in this monastery church, it was established that burial took place within a set spatial layout, probably determined by the use of tombstones. A total of

6 De Groote *et al.* 2011, 125-164.
7 De Maeyer *et al.* 2014, 78-81.

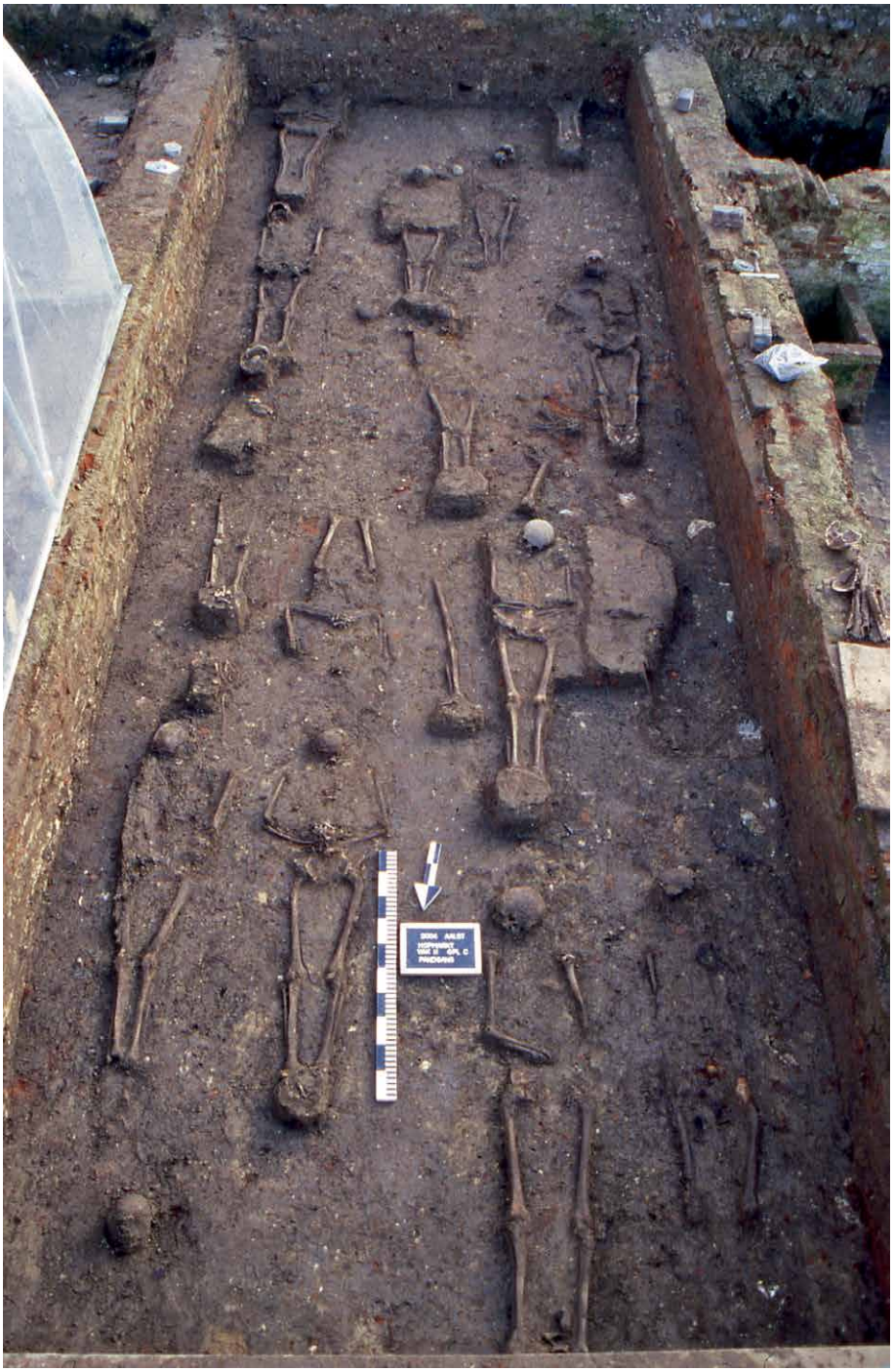


Fig. 4: The north-south and south-north oriented burials in the western cloister alley.

96 plots could be distinguished, some of which containing multiple superimposed burials (Fig. 6). These observations can be linked with some information from the 18th-century burial registers, which, in order to establish a burial location, used the location indicators '*graefen*' (12 east-west rows) and '*seercken*' (8 north-south rows) (Fig. 5). The registers make frequent mention of multiple superimposed burials. In the choir area, several partially preserved brick vaults were located. This included the tomb of Sir Pierre de Lannoy, which was situated within the choir, but truncated in 1941 when the underground command post was constructed. Seventy-three burials were located in the cloister alleys, more specifically 33 in the western and 42 in the northern part (Table 1). Because of the different layout of the 17th-century church, 5 of the burials found in the northern cloister alley were originally situated inside the walls of the oldest church phases. In the cloister garth, the third burial zone, 60 graves were recovered. Most of these burials was concentrated near the wall of the northern cloister alley. However, some more isolated graves were also situated in the south-eastern and south-western part of the cloister garth.

Individuals were buried extended and supine, predominantly on a west-east alignment (Fig. 5). A west-east orientation is the general Christian burial practice. However, several individuals in the northern cloister alley had been placed in the grave with their heads to the east. Written sources and archaeological data from other sites indicate that the latter position was reserved for the burial of clergy. All east-west facing skeletons except one were adults, while all except two were male. The burials in the western cloister alley, which was probably only built in 1643, have a south-north or north-south orientation. Here the graves follow the line of the cloister alley. The clear preponderance of men, the fact that we are dealing with adults only, the presence of three north-south facing male burials, and the occurrence of textile remains with metal wire in several of the graves are all indications that the western cloister too was reserved mainly for the burial of clergymen and friars.

With regard to the arm position of the skeletons, 90 per cent of the individuals were positioned with their arms either resting on the pelvis or alongside the body; in the case of the women, a slight preference for the former position could be detected. Children under five were buried with their arms alongside their bodies. A small group of mainly men was buried with the arms folded across the chest in a 90 degree angle, or with hands in the prayer position at the top of the breastbone. These rather specific arm positions suggest that these may have been clergymen.

For 139 of the 238 burials from the 2004-2005 excavation project, there is strong evidence for the use of wooden coffins. Several coffins were vaguely trapezoidal, while others were rectangular. In the church and the cloister garth, ossuary pits were encountered, containing the collected remains of cleared graves.

The excavation yielded a number of artefacts that can be associated with the burials. However, the number of artefacts that can be linked with specific skeletons is very limited. One individual had a finger ring, and a burial in the western cloister contained plant remains (*Buxus sempervirens*). In the same area, five burials contained clothing remains with metal wire, probably from the decorated chasubles

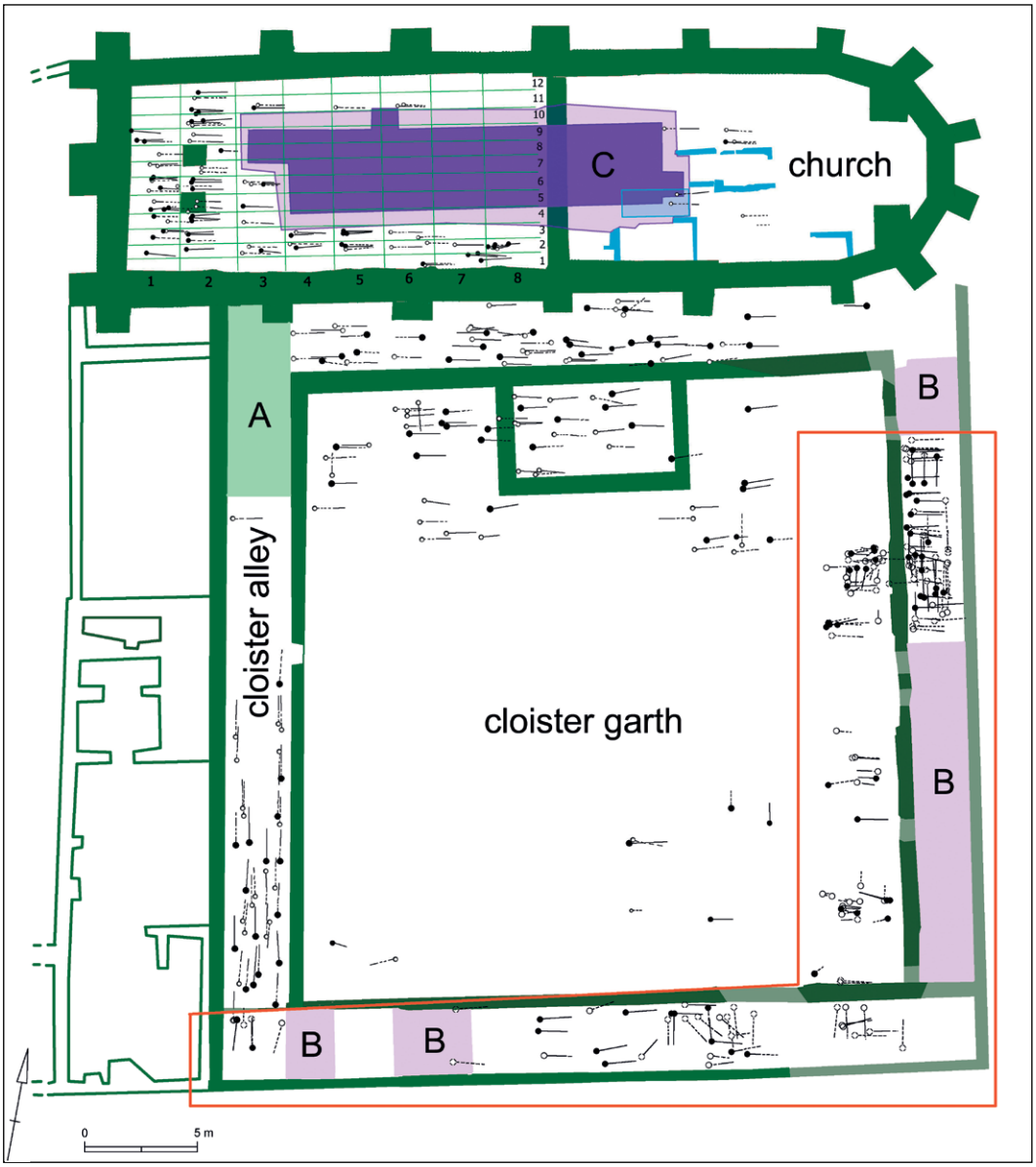


Fig. 5: Location of the excavated burials. Combined plan of the 2004-2005 excavations by the Flemish Heritage Institute and the 2011 excavations by Solva (red frame). Legend: excavated walls (dark green) and vaults (blue); destructed burial zones: A: 18^{w}-c. cellar of monastery (light green); B: 19th-c. cellars of houses (light purple); C: air defense bunker from World War II (purple). Burial icons: head in black: skull present; head in white: skull absent; full line: part of skeleton present; dotted line: part of skeleton absent.

Fig. 6: Two superimposed burials in the monastery church.

in which clerics were buried. Finally, a skeleton found in the southern cloister alley carried a copper alloy medical plate on the left upper arm.[8]

In addition to these finds, several types of objects were encountered that could also be associated with the burials. The most important among these were pins, probably used to secure the shrouds in which the deceased were wrapped. The many hooks and eyes found probably served the same purpose. Several of the clothing accessories may suggest that some dead were buried fully clothed, but none of the clothing accessories were found on the skeletons themselves so this interpretation remains uncertain. Other finds can be interpreted as personal possessions of the deceased, several among which clearly had a symbolic or religious meaning. Some *devotionalia* and a ring depicting the Virgin Mary with child, directly linked with the Carmelites, were the most striking examples in this group. One of the two seal matrices found in the northern cloister alley was the prior's seal; priors tended to

8 De Maeyer *et al.* 2014, 89, afb. 71.

Fig. 7: The grave of a three- to four-year-old child in the church.

be buried in this part of the monastery. A third one, found in the southern cloister alley, was probably the personal seal of one of the friars.[9]

A physical anthropological analysis was carried out for the 238 burials of the 2004-2005 campaign (Table 1).[10] On average, the skeletons tended to be incomplete with moderate preservation of surface detail and moderate to severe fragmentation of the bones. The sex could be determined for 204 of the skeletons: 69 females and 135 males (34% and 66%, respectively) (Table 2). The fact that the anthropological analysis demonstrates a preponderance of men over women when the reverse can be seen in the burial registers may be the result of the nature of the excavated area. Since the monastery's cemetery proper was not excavated, all graves derived from the church, the cloister alleys, and the cloister garth. Within the monastery church, 46 per cent of the burials were female and 54% were male. The archives and archaeological artefacts indicate that the inhabitants of the

9 De Maeyer *et al.* 2014, 89, afb. 72.
10 De Groote *et al.* 2011, 164-191.

Burial location	<5	>5	20+	20-40	40+	40-60	60+	Total
Church	1	7	4	56	3	22	3	96
Church or N. cloister alley				2		1	2	5
N. cloister alley	1	4	3	17	3	14		42
W. cloister alley			6	14	3	10		33
Cloister garth	6	10	5	24		13	2	60
?			1	1				2
Total	**8**	**21**	**19**	**114**	**9**	**60**	**7**	**238**

Table 1: Distribution of the anthropological age classes by burial location.

	Male		Female		Total	ratio M:F
Burial location	**n**	**%**	**n**	**%**	**n**	
Church	45	54	39	46	84	1:0.9
Church or N. cloister alley	4	80	1	20	5	1:0.25
N. Cloister alley	30	81	7	19	37	1:0.2
W. Cloister alley	25	86	4	14	29	1:0.2
Cloister garth	31	65	17	35	48	1:0.5
?	-	-	1		1	-
Total	**135**		**69**		**204**	**1:0.5**

Table 2: Sex distribution by burial location.

Age	Male		Female		Total	
(years)	n	%	n	%	n	%
0-10	3	3	2	3	5	3
10-20	7	6	4	7	11	7
20-30	17	16	16	27	33	20
30-40	38	35	21	36	59	35
40-50	28	26	11	19	39	23
50-60	9	8	4	7	13	8
> 60	6	6	1	2	7	4
Total	**108**	**65**	**59**	**35**	**167**	**100**

Table 3: Age distribution in ten-year intervals by sex.

monastery were preferentially buried in the cloister alley, which is consistent with a concentration of male skeletons in this part of the site (83% males versus 17% women). Within the cloister garth, the ratio was 65 per cent men/35 per cent women.

Of the total sample (238 individuals), 29 (12%) skeletons were non-adults and 209 (88%) were adults. They were divided into a number of age categories:<5 years and >5 years for non-adults, and 20-40 years, 40-60 years, 40+ years, 60+ years and 20+ years (individuals whose age could not be determined more accurately than that they were

20 or over) for adults. The youngest age groups (neonates, children, and teenagers) were underrepresented. While all age groups were represented, the proportion between the different groups varied depending on the burial location within the monastery. For the monastery church, 92 per cent of the adults (<20 years of age) and 8 per cent of non-adults (>20 years of age) could be determined. In the cloister alleys, nearly all skeletons were those of adult individuals, which underlines the fact that it was mainly monks who were buried there. Non-adults were more likely to be buried in the cloister garth (Fig. 7). This observation seems to be confirmed by the results of the 2011 Solva excavation. More than half of the 59 burials found in 2011 in the cloister garth near the eastern cloister alley were non-adults. No precise figure can be given because so far no anthropological data is published on these burials.

The distribution of the mortality figures differs per sex (Table 3). Most women died between the ages of 20 and 40 years, while men tended to die between 30 and 50 years, that is, the women in the group investigated died at a younger age, on average, than the men. A possible explanation for this is the fact that during this period, pregnancy, giving birth and gynaecological conditions constituted substantial health risks. In order to widen the interpretive frame of reference for the data from the physical anthropological research, the data were compared to those from two reference populations from the Netherlands (Dordrecht and 's Hertogenbosch), for which specific data were available.[11] The Aalst population appears to have died younger, on average, than the Dutch groups–most died in the prime of life.

Wherever the state of preservation of the skeletons allowed, the height and cranial and postcranial indices were calculated. The men were on average 10 centimetres taller than the women. Average height is seen as an indication of the state of health of an individual as well as of the socio-economic context within which the person reached adulthood. The average length of the thighbone of the Aalst males was not significantly different from that of selected reference populations for the period. As status can be associated with place of burial, the connection between average height and average thighbone length was investigated for the burial locations. However, this exercise did not yield any significant differences.

The dental condition, observed pathologies and anatomical variations of the skeletons were investigated in relation to age and sex. Besides demographic and metric characteristics, the physical anthropological research also utilised the occurrence of pathological conditions in order to gain insight into the state of health of the population. As with many skeletal assemblages from archaeological sites, joint diseases formed the largest group of pathologies in adults. The percentage of degenerative disc disease (DDD) (42% of those skeletons of which the spinal column had been preserved) was lower than in the selected reference populations. Peripheral osteoarthritis (pOA) was observed in just over half of the adults (56%). The frequent occurrence of both conditions in young adults (20 to 40 years) was

11 De Groote *et al.* 2011, 172-173 and its bibliography.

notable. Most of those suffering from these joint conditions were buried in the cloister garth.

Other diagnosed conditions, albeit to a lesser extent, are rheumatoid arthritis (RA) and gout. Besides joint diseases, infectious diseases formed a major part of the palaeopathological conditions observed. In a small number of individuals, periosteal reactions or inflammation of the periosteum were observed (in 3% of the cases it concerned bilateral lesions to the lower limbs), as well as osteomyelitis or bone marrow infection. One skeleton displayed lesions caused by tuberculosis. Some evidence for metabolic disease (rickets in 3% of the adults, and enamel hypoplasia in 46%) and haematological disorders (cribra orbitalia in 2% and hyperplasia of the diploe in 4%) on the bone material was attested. The twelve skeletons in which Diffuse Idiopathic Skeletal Hyperostosis (DISH) was noticed were all men who were buried throughout the church and the cloister (Fig. 8). In clinical literature, this condition of the vertebral column is of uncertain aetiology, but has been linked to high animal protein and/or high calorie diets and obesity. Within osteoarchaeological literature, this condition has often been noted in past monastic populations. Yet the current state of research necessitates a degree of caution in the interpretation of these facts. In order to gain more insight into this issue, a research project was set up for the Aalst skeletons to explore the relationship

Fig. 8: DISH is characterised by the ossification of the anterior longitudinal ligament of the vertebral column (04/1413).

between diet and DISH employing carbon and nitrogen stable isotopes (see below). Additionally, 9 per cent of the adults showed macroscopical evidence of trauma in the form of healed fractures. Considering what it could tell us about social status, we investigated whether the various pathologies could be correlated with the burial place, but this exercise did not yield much significant information. In many cases, the number of samples to which this could be applied was simply too small.

Seventy-seven of the adult population had teeth and/or jaws surviving, enabling us to record dental disease. Dental health was poor, with high levels of tooth decay (10%) and ante-mortem tooth loss (19%). Here too, attempts to correlate dental condition with place of burial yielded few results. Generally speaking, it could be established that most individuals with ante-mortem loss of teeth and caries were buried in the cloister garth. Most the individuals with enamel hypoplasia were buried in the cloister alley. For the epigenetic characteristics, of which some could indicate genetic relationships, it was not possible to make any determinations in relation to the burial location.

This study of a small fraction of the Aalst population suggests fairly favourable living conditions, compared with Dutch contexts. However, our picture of the Aalst population in a wider context remains superficial as the current state of skeletal research in Flanders does not provide sufficient data with which this new data can be usefully compared.

The combined data from the physical anthropological analysis carried out for the 238 burials of the 2004-2005-campaign, the study of historical sources, and the archaeological evidence provide a picture of burial practices in the Carmelite monastery in Aalst.[12] The anthropological study shows that the excavated skeleton population was dominated by male individuals, while the burial registers pictures the opposite. This is above all the result of the fact that that the churchyard proper was situated outside the excavated area and that the friars were buried inside the cloisters. This picture is confirmed by the anthropological data that demonstrate that there was a clear dominance of male burials in the cloisters. Eleven of the male burials in the cloister alleys were buried following the rules of the *Rituale Romanum*, the official ritual of the Roman rite of the Catholic Church, first published in 1614 under Pope Paul V. It describes the burial position of clergymen; their head is to be pointed east, and their bodies positioned towards the altar or the choir. It may also explain the deviations in arm positions of some of the skeletons buried in that area. But finds such as the seal of the prior and the remains of at least 5 chasubles also show that the northern and western cloister alleys were privileged places to bury clergymen and important friars. Both the anthropological data and the burial registers show that in the church mainly lay adults, more or less half of them men and half of them women, were buried. All the vaults were situated in the eastern part of the church, mainly in or just in front of the choir. Unfortunately, no skeletons were preserved in the excavated vault remains. If buried in the monastery itself, non-adults (neonates, children and teenagers) usually were laid in their final resting place in the cloister garth. The striking dominance of the number of child inhumations in relation to adults shown in the burial registers is not visible in

12 De Groote *et al.* 2011, 191-207.

the anthropological study. Probably children were mainly buried in the general cemetery situated outside the excavated area.

Monasteries formed a special habitat with unique living conditions and dietary rules. Friars had a privileged lifestyle, with limited physical work and a ready supply of food. Most monasteries had their own infirmary where both knowledge and means were present for the treatment of illnesses. Although in one way or another this lifestyle was expected to be reflected in a higher life expectancy and/or the presence of diet-related diseases, for several reasons this could not be derived from the anthropological data of Aalst. The main reason being the mixed burial population, consisting of both religious and lay, which resulted in the number of skeletons identified as friars or clergymen being too low to produce useful data.

Assessing human diet, social variability and DISH using stable isotope ratio analysis

Stable isotope ratios ($\delta^{13}C$ and $\delta^{15}N$) were measured from 39 adult individuals buried in three different locations at the monastery, that is, the church, cloister alley, and cloister garth, representing a mixed monastic and lay population and most likely reflecting groups with differing social status. [13] The main goal of this study was to investigate possible dietary variations by comparing the isotopic results by social class, sex and age. Additionally, isotopic analysis was performed on skeletons that displayed DISH. The focus here was to discover if the stable isotope ratios of individuals afflicted by DISH could be linked to unique or different diets compared to the other members of the population.

Samples for stable isotope ratio analysis were collected from the ribs or, if no ribs were available, from diaphyseal long bone fragments. For individuals with DISH, two samples were taken, one from the ribs (non-pathological bone tissue), the other from newly formed bone in the vertebral spine (pathologically altered bone tissue). The aim of this sampling strategy was to compare normal and pathological bone as a methodological test.

In order to understand the trophic context for the human isotope data, 15 contemporaneous terrestrial animal samples (including cattle, sheep and pig bones) from consumption refuse excavated at the site were analysed. Published isotopic data from fish bone from the nearby Scheldt River basin and the North Sea were further used for comparison. The bone collagen from these 15 animals and 39 human bone samples was extracted and measured at the Department of Human Evolution, Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany.

Distinct and statistically significant differences between the diets of the males and females were observed (Fig. 9). The males displayed a wide variation in their isotopic results, but, on average, exhibited higher $\delta^{13}C$ and $\delta^{15}N$ values than the females, reflecting a greater component of terrestrial and marine animal protein in the male diet. The isotopic results of the females were more tightly clustered than those of the males, indicating that their diet was less varied and included fewer animal products and marine foods. This result represents a remarkable continuity

13 Quintelier *et al.* 2014.

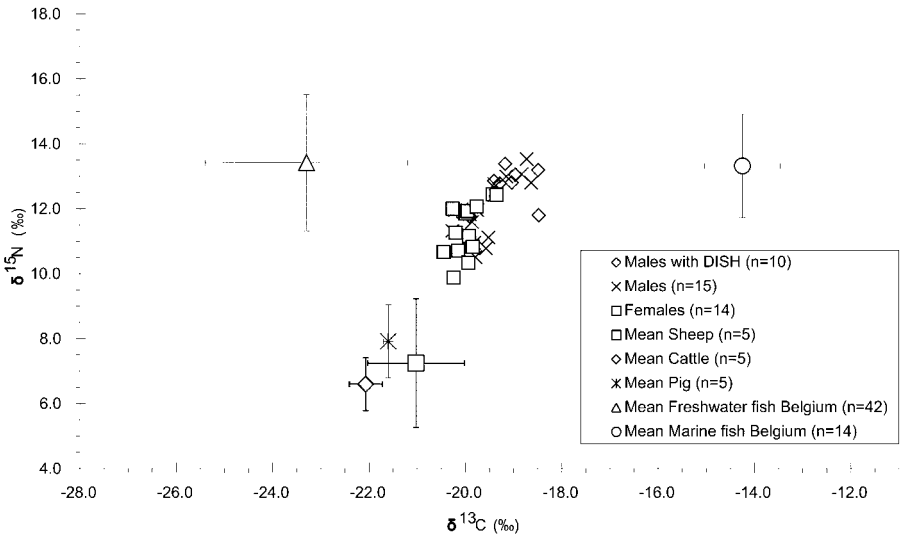


Fig. 9: Stable isotope data ($\delta^{13}C$ and $\delta^{15}N$) from human skeletons (n=39) from the post-medieval Carmelite monastery at Aalst (with a distinction made between females, males without, and males with DISH). Data from three domestic mammal species (n=15), sampled from consumption refuse from the site, represent the terrestrial animal protein in the former humans' diet. The fish data are derived from a general study for Flanders: Fuller et al. 2012.

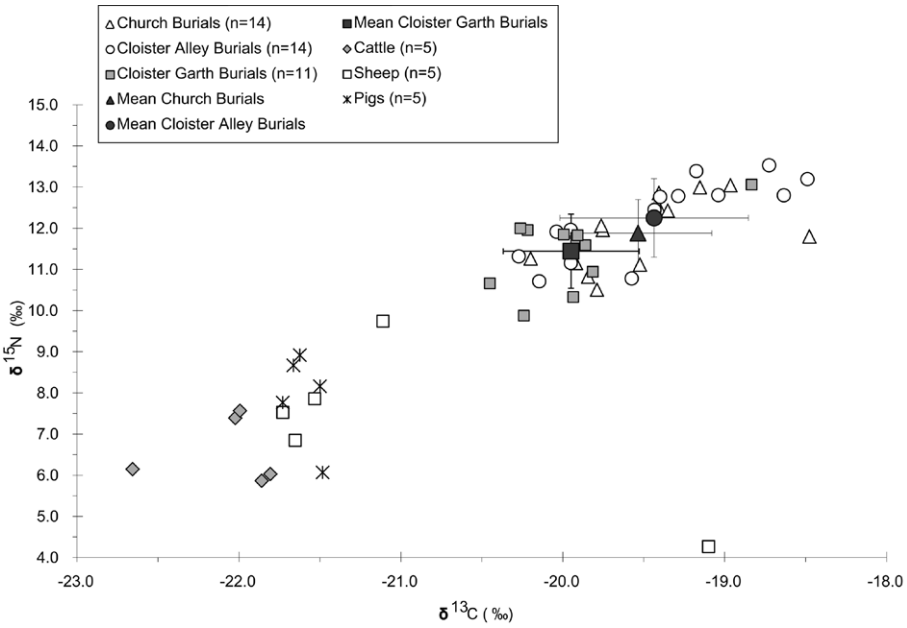


Fig. 10: Stable isotope data ($\delta^{13}C$ and $\delta^{15}N$) from human skeletons (n=39) from the post-medieval Carmelite monastery at Aalst, with distinction made between burial location (raw data, mean values, and error ranges representing 1 standard deviation).

with medieval dietary patterns, with different consumption patterns for men and women. This suggests that the social and economic changes of the early modern period had a limited effect on everyday life. Nevertheless, it must be remembered that the male skeletal population from the Aalst monastery consisted of both lay and monastic individuals, which cannot be entirely distinguished on the basis of their burial context. It is therefore possible that specific characteristics of the diet of the friars contributed to the differences observed between the male and female dataset.

Comparing the sexes separately by burial location revealed no significant differences, which is probably due to the small sample size and/or unequal distribution of males and females among the burial locations. When both sexes were examined together, variation was noticed between individuals buried in 'higher' and 'lower' status locations. Statistical significant differences in carbon values were demonstrated between the cloister garth, which represents the 'lower status' lay burials, and the more prestigious burial area, the church, suggesting that individuals buried in the cloister garth consumed significantly less marine protein compared to people buried in the church. The isotopic data from the cloister alley and the church show a large overlap, suggesting that a similarly rich diet was enjoyed by the friars, who were usually buried in the cloister alley, and the wealthy lay males who paid a substantial price to be buried inside the monastery (Fig. 10).

Finally, the hypothesis that DISH is linked to a diet rich in animal protein was tested. No systematic or statistically significant differences between pathological and non-pathological bones from the same individuals affected with DISH were observed, and no statistical differences were found between individuals with DISH and individuals without DISH. It could not be proven, but, at the same time, nothing in this isotope study contradicted a possible link between a protein rich diet and the development of DISH. Further research using sulphur stable isotope ratios or single amino acids in this area is recommended.

Conclusions

The archaeological investigations of the Hopmarkt have contributed significantly to a fuller and more accurate insight into the evolution of this part of the centre of Aalst. The written sources provide very little information regarding the construction history of the Carmelite monastery, and what they do tell us is rather anecdotal in nature. Thanks to the data produced by the archaeological research we now have a fairly clear picture of the various building phases of the monastery. The physical anthropological research, combined with the archaeological and archival sources, improves our insight into burial practices. The stable isotope research has shed new light on human diet and social variation within the monastery. Furthermore, it contributed to a better understanding of a disease–DISH–attested in many archaeological populations, but still poorly understood. In anticipation of processed data from Belgian/Flemish contexts, the results from the investigations on the Hopmarkt in Aalst can serve as a first step towards the anthropological reconstruction of population and society.

This contribution presents the initial findings of the study of the data from the Hopmarkt excavation of 2004-2005. Much work remains to be done, particularly on the monastery's material culture. Such investigations will contribute, among other things, to an improved understanding of nutrition within the monastery, and will yield information that can feed into physical anthropological research.

The research presented here demonstrates the enormous potential of the archaeology of post-medieval monasteries. The comparative research has clearly shown that this is an under-investigated area of archaeological research, for which written sources are often insufficiently informative. However, not only the potential has become clear, but also the problems and limitations associated with such research. Many methodological problems could not be solved because the archaeological sources were insufficient. This became particularly clear in the physical anthropological investigations, which demonstrated that the opportunities and results were highly dependent on the approach to the fieldwork and the decisions made on site. In addition, preservation conditions influenced the attainability of certain research objectives and the interpretability of the results.

Bibliography

Sources

General State Archives, Rekenkamers. Delen en banden (registers), Stadsrekeningen Aalst 1395-1786, Algemene Rekeningen, n° 31478, f 122-f 132.

Literature

De Groote K., W. De Maeyer, J. Moens, K. Quintelier, F. Van Cleven, I. Vanden Berghe & W. Vernaeve 2011: 'Het karmelietenklooster van Aalst (prov. Oost-Vlaanderen) (1497-1797): het gebouwenbestand, de begravingen en het fysisch-antropologische onderzoek', *Relicta* 8, 83-250.

De Maeyer W., S. Van Cauwenbergh, S. Klinkenborg, E. Taelman & B. Cherretté, 2014: *Aalst Hopmarkt – fase 2. Onderzoek van de pandgangen en de poel*, Erpe-Mere (Solva archeologie rapport 25).

Fuller B.T., G. Müldner, W. Van Neer, A. Ervynck & M.P Richards, 2012: 'Carbon and nitrogen stable isotope ratio analysis of freshwater, brackish and marine fish from Belgian archaeological sites (1st and 2nd millennium AD)', *Journal of Analytical Atomic Spectrometry* 27, 807-820. DOI: 10.1039/C2JA10366D.

Quintelier K., A. Ervynck, G. Müldner, W. Van Neer, M.P. Richards & B. T. Fuller, 2014: 'Isotopic Examination of Links Between Diet, Social Differentiation, and DISH at the Post-medieval Carmelite Friary of Aalst, Belgium', *American Journal of Physical Anthropology* 153-2, 203-213. DOI: 10.1002/ajpa.22420.

St. Rombout's cemetery in Mechelen, Belgium (10th – 18th century AD)

A typical urban churchyard?

Katrien Van de Vijver, Frank Kinnaer & Silvia Depuydt

Introduction

Excavations of the former churchyard of St. Rombout's parish in the city centre of Mechelen between 2009 and 2011 revealed 3,617 graves with 4,158 articulated depositions dated between the 10th and 18th centuries.[1] The large number of burials offers an unusual opportunity to study variations and changes in the parish's population and funerary traditions over a time period spanning over 800 years. The graves and associated human remains were carefully recorded during the excavation and sampled for ancient DNA and soil from the abdominal cavities. Historical sources offer additional information on the background of the living and the buried population of St. Rombout's parish.

The common Christian mode of burial in medieval and post-medieval northwestern Europe was inhumation with the body supine, wrapped or placed in a coffin, with the head oriented towards the west. Such burials have long been considered of little interest to researchers due to their perceived uniformity and lack of grave goods. In reality, however, medieval and post-medieval cemeteries can be rich sources of information because they are extensive and reflect varied burial customs.[2] While the interior of a church was considered a more desirable location for burial, the majority of the population in this period was buried in open-air graveyards, associated with the parish church. Burial in the churchyard was cheaper and hence included mostly individuals from the lower and middle classes.

1 All dates are AD unless indicated otherwise.

2 Rahtz 1981, 117; Gilchrist & Sloane 2005, 1-6; Roberts 2009, 50-51; Gilchrist 2012, 200-201.

Fig. 1: Map of Mechelen (Braun and Hogenberg. 1574. Civitates Orbis Terrarum) with St. Rombout's cemetery in the centre (© Stadsarchief Mechelen).

A further distinction can be made between the churchyard and possible subsidiary cemeteries, usually considered least desirable. Spatial distinctions depended on the local situation and period, size and background of the population.[3] Circumstances of death and socio-economic background could also influence location, as well as mode of burial and treatment of remains. This could result in deviant or unusual burial for example for criminals, unbaptised infants and suicides although many were apparently accorded 'normal' burial.[4] A differentiation was sometimes made between the south and north churchyards. Superstition resulted in the north churchyard being associated with suicides, the poor and the unbaptised, although practical concerns were probably more important considerations for spatial organisation.[5] At St. Rombout's, for example, the north churchyard was simply the larger of the two because the space available for the south churchyard was limited by the location of the town's marketplace (Fig. 1).

3 Harding 1992, 120-122, 125-127; 1998, 55-57; 2002, 46-48, 55-59, 61-62; Daniell 1997, 87-101; Gilchrist & Sloane 2005, 56, 62.

4 Gittings 1984, 69-79; Daniell 1997, 103-106; Cox 1998, 119-121; Harding 1998, 60-61; 2000, 174; Gilchrist & Sloane 2005, 71; Cherryson, Crossland & Tarlow 2012, 119-120, 199.

5 Gittings 1984, 69-79, 139; Daniell 1997, 99; Harding 1998, 56; Cherryson, Crossland & Tarlow 2012, 119-121.

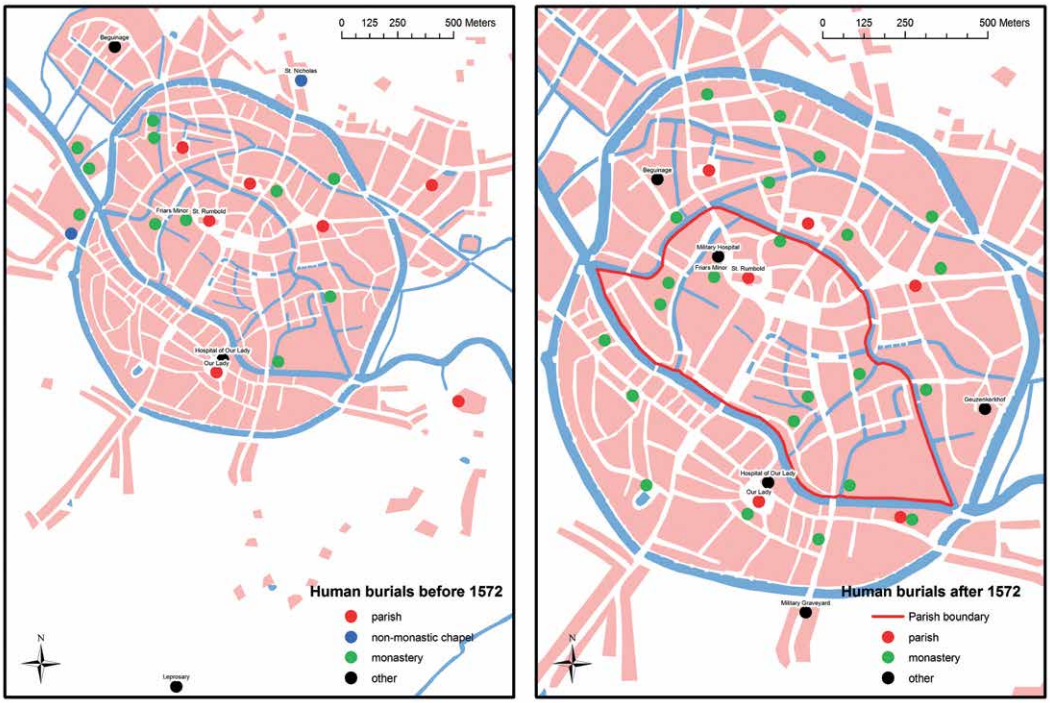


Fig. 2: Map of Mechelen, indicating the different burial grounds and St. Rombout's parish, based on excavations and historical references.

Mechelen is a small city in central Flanders. To date, excavations have been carried out in the north churchyard, a few inhumations have been excavated in the south churchyard and inside St. Rombout's Church,[6] at St. Pieter's cemetery[7] and excavations have also taken place at the Minderbroedersklooster (the Monastery of the Friars Minor) in 2005 and 2011 (Fig. 2).[8] St. Rombout's parish was one of seven parishes in Mechelen, each with its own burial ground. In 1572 one parish was abolished. Before 1572, there were also 11 monasteries in Mechelen, again, each with its own burial ground. Their number grew to 23 by the 17th century.

Burial grounds could be identified based on historical references to cemeteries or parish rights, records of the burial of important persons in a church or monastery, lists of funerary inscriptions or tomb markers, and historical or recent discoveries. There are also references to burials at the Onze-lieve-Vrouw Gasthuis (the Hospital of Our Lady). There are references to burials outside the city at the leprosarium from c. 1200, a hospital for plague victims, and the Kwade Kerkhof (malevolent churchyard). Records from 1315-16, during the Great Famine, indicate that existing cemeteries were elevated and expanded and new cemeteries established outside the city.[9] Elevations were not

6 Kinnaer *et al.* 2004, 6-7; Kinnaer *et al.* 2013, 7.

7 Vandenbruaene & Watzeels 2003

8 Burials were excavated during excavations in the cloister (Troubleyn *et al.* 2006) and adjacent to the choir (Vander Ginst & Smeets 2012).

9 Delafaille 1874, 17-18; Steurs & Uytterhoeven 1942, 12, 135, 142; Steurs & Uytterhoeven 1949, 80; Stadsarchief Mechelen, Verzameling Berlemont, map 182, 101-102.

recorded for St. Rombout's cemetery, but a new cemetery at the St. Nikolaas Chapel may have functioned as a subsidiary cemetery.

St. Rombout's cemetery–where more than 4,000 burials have been excavated–is the largest churchyard assemblage in Flanders. It shows considerable variation in the construction of graves and treatment of the bodies, as well as an evolution in the use of the graveyard. The results of the preliminary assessment of the skeletal remains and of their burial environment have been associated to detect patterns related to age, sex or socio-economic subgroups. Because many of the Flemish burials that have been studied and published were recovered from monastic or rural sites or from within churches,[10] it is difficult to find comparable sites within Flanders. Examples of published urban parish churchyards in the wider region include those pertaining to the Catharinakerk (Church of St. Catharine) in Eindhoven,[11] as well as a number of British sites.[12]

Historical background

Based on toponymy, it is suggested that the history of Mechelen may go as far back as the Merovingian period.[13] The oldest recorded feature–an urn found to the northeast of the city–dates from 575-625, the early Middle Ages.[14] Although there are no material indications, it is likely that the core of the settlement was situated to the southwest of the current city, near the river Dijle and the Onze-Lieve-Vrouw-over-de-Dijlekerk (Church of Our-Lady-across-the-Dijle), which may be Mechelen's original church (Fig. 2). The patron saint of Mechelen, St. Rombout, would have settled nearby during the Merovingian period. After his death, St. Rombout was revered as a martyr at least as early as 800-825,[15] since he is mentioned as 'rumolde' in a *Litania Sanctorum* from the Dom of Cologne, which dates to around 810.[16] His *Vita*, written around 1100, describes him as an Irish missionary. His relics were radiocarbon dated to the early 7th century and are still kept in the current church of St. Rombout.[17] The earliest historical record of Mechelen is in the Treaty of Meerssen from 870, which refers to a series of abbeys assigned to West Francia.[18] The religious community probably originated around the relics of the saint. While no traces have been discovered of this community to date, it was probably located near the current Church of St. Rombout, in the direct vicinity of the settlement, since it is referred to as 'Maalinas'. Carolingian finds from the cemetery also suggest occupation of this area and possibly burial during this period.

---

10 Flanders Heritage Agency, *Onderzoeksbalans*, chapter 9.4, *Fysisch-antropologisch onderzoek*.
11 Arts 2013.
12 Gilchrist & Sloane 2005; Cherryson, Crossland & Tarlow 2012.
13 Claes 1991, 16.
14 Vandenberghe 1984.
15 Jans 1990.
16 Köln, Dombibliothek, Codex 106, Sammelhandschrift, ca. 810, Darmst. 2106, f. 74r. Available through: Codices Electronici Ecclesia Coloniensis (CEEC) www.ceec.uni-koeln.de.
17 Van Strydonck *et al.* 2006, 81-89.
18 Waitz 1883, 110.

Between 971 and 1008, a Chapter of secular canons, likely a transformation of the abbey, was instituted by Bishop Notger of Liège, and between 971/1008 and 1134 the area of the excavation was presumably used as a burial ground for canons and lay servants.[19] A burial in the lowest layer in St. Rombout's cemetery was radiocarbon dated to 1057±28 BP (RICH-20791),[20] which makes it possible to attribute it to the Chapter and confirm the use of the cemetery possibly as early as the late ninth to early 11th century. The presence of the relics in the religious community and later in the Chapter may also have attracted burial as inhumation *ad sanctos*.[21]

In 1134 the Chapter acquired the parish rights to Mechelen, including burial rights.[22] The centre of Mechelen subsequently shifted to the area around St. Rombout's cemetery, and in the early 13th century the first signs of urbanisation appeared around the Chapter, in the form of a cloth hall,[23] the monastery of Friars Minors[24] and the central market.[25] Between 1134 and 1255, St. Rombout's churchyard was probably the only cemetery in Mechelen, although some inhabitants chose to be buried in monastic institutions[26] and leprous individuals were buried by the leprosarium outside the city.[27] Due to urban expansion and population growth, the parish of Mechelen was divided into three different parishes in 1255. It was divided again in 1309, resulting in seven parishes,[28] with their own burial ground. The other six parishes comprised areas within and outside the city walls; St. Rombout's parish was the only entirely urban parish.

St. Rombout's parish lies in the centre of Mechelen and includes the central marketplace, many of the central guild halls, the Alderman's house, the prison, the school and the Exchange. From the 14th century, the parish shows clear urban characteristics, with a dense occupation and a concentration of central functions. This in contrast to the parish of Onze-Lieve-Vrouw-over-de-Dijle which had a more rural character.[29] The area was a centre of the textile industry, evident from the cloth hall and wool market,[30] although weaving, fulling and dying activities were limited.[31] The food trade was prominent as well, and the meat guild was particularly important; documentary evidence shows that all butchers were located and buried here from the 13th century onwards.[32] Based on records related to donations for a reliquary[33] the presence of rich guilds and trades and only few of the poorer crafts, the parish is considered to be one of the wealthier areas of Mechelen.[34]

---

19 Van den Wijngaert 1974, 69-70.
20 95.4% probability: 890-930 AD (10.9%); 940-1030 AD (84.5%).
21 Alexandre-Bidon 1998, 155; Tardieu 1993, 227; Lauwers 2005, 27.
22 Van den Wijngaert 1974, 48; Van Mingroot 1978, 40; Verbesselt 1950, 156-157.
23 Bormans & Schoolmeesters 1893, 171.
24 Laenen 1926, 357-358.
25 Beterams 1956, 311.
26 Installé 1996a, 86-87; Croenen 2003, 310.
27 Installé 1996b, 126-127.
28 Foppens 1734, 116-117; Verbesselt 1950, 156-157.
29 Installé 1991, 185.
30 De Munck 1777, Oo, xliv – liii; Doehaerd 1947, 83-222.
31 Joosen 1935, 448-550; De Munck 1777, Oo, xliv-liii.
32 Olbrechts 2008, 11.
33 Van Uytven 1991b, 54.
34 Blockmans 1976, 145.

Fig. 3: Illustration of the excavated area within the current development.

The city itself achieved its definitive shape with the construction of the second city wall, 1264-1268, when the area *intra muros* contained 154.6 hectares. The population in 1370 is estimated to have numbered 12,000-13,000, which is likely an underrepresentation. By 1544, it numbered 19,000-23,000.[35] Mechelen was an independent lordship owned by the Bishop of Liège, who, in the 14th century, sold it to the Count of Flanders. It later passed to the dukes of Burgundy under laws of succession, and between 1473 and 1530 they made Mechelen the capital of the Burgundian territories in the Low Countries. Mechelen was a prominent town due to the cloth industry, and particularly flourished in the 15th and 16th centuries.

The smaller, southern cemetery of St. Rombout is believed to have been abandoned in 1717.[36] The northern cemetery continued in use until 1785, when Emperor Joseph II abolished inner city cemeteries. Burial was reinstituted in 1789-1790 during the Brabant Revolution, a revolt of the Southern Netherlands against Austrian rule.[37] The final burial was the mass grave of 41 brigands who were executed during the Peasants' war, in 1798.[38] The area was later transformed into a park and then, in the second half of the 20th century, into a car park.

35 Verbeemen 1953.
36 Berlemont 1975, 218.
37 Meutermans 2011.
38 Van de Vijver & Kinnaer 2014. The mass grave from the Peasant's War is not included in the following study of the parish cemetery because this would skew results.

The excavations at the northern cemetery revealed 3,617 graves, containing a total of 4,158 articulated individuals. The excavation covered approximately 2,000 m² and included only part of the original cemetery (Fig. 3). The original soil surface was 1.7-2.4 m below street level. Three main anthropogenic layers were recognized, dated to the 17th – 18th, 15th – 16th and 12th – 14th century (although this layer contained some older burials as well).[39] The oldest layer also contained burials that predated the parish cemetery, when the area was used as the Chapter's burial ground. One burial from this phase was identified; it was radiocarbon dated to the late 9th/early 11th century. The burials in both of the more recent layers are exclusively part of the parish cemetery.

Organization of the cemetery

The area is designated as 'atrium S. Rumoldi in Machlinia' in 1235 and as 'cimiterium Machliniense' in 1238,[40] indicating that the cemetery was in use as a demarcated, sacred space at least by the 13th century.

The spatial distribution in St. Rombout's cemetery shows the oldest burials concentrated to the west and south, with a minority distributed more widely (Fig. 4). The more recent burials of that period fan out further north, while still concentrated in the southwest. The 15th – 16th century burials are distributed more evenly across the excavated area. In the most recent period, the burials are again concentrated in the southern part of the excavated area and are densely packed. There are no major differences in frequency of inhumation in the area over time. A total of 1,341 inhumations were recorded in the 17th – 18th-century layer, not including the mass grave of executed brigands, another 1,576 in the 15th – 16th-century layer and a further 1,195 in the 12th – 14th-century layer. Although the number of deaths recorded in the registers (infra) increased over time, the area for burial was reduced over time. No clusters of burials are obvious, although they may be obscured by the long time span in which the cemetery was in use.

A 1530 source mentions '*stichhele vanden kerckhove van Ste Rombouts*', which indicates that the cemetery was enclosed by a low stone wall (a *stichel*),[41] and historical illustrations from 1574 show a wall on the east and west extent of the churchyard and houses on the north and northeast extent (Fig. 1).[42] The excavated area revealed no evidence of a cemetery wall. The oldest layer revealed the outlines of a ditch in the western area, running north – south but turning east near the southwest corner of the excavated area (Fig. 5). The fill is dated in the late 13th-early 14th century. The ditch may represent an early boundary of the parish cemetery, which was later filled in due to an expansion of the cemetery. The burials to the west and south of the ditch are oriented more uniformly WSW – ENE, whereas those to the north and east are more randomly distributed, with a higher proportion aligned WNW – ESE, indicating chronological differentiation. One grave was cut by the ditch and dated to the late 9th/early 11th century, suggesting that the earlier

39 Depuydt, Kinnaer & Van de Vijver 2013.
40 Foppens 1734, 97; Goetstouwers 1956, 17.
41 Behets 2005.
42 Braun & Hogenberg 1574.

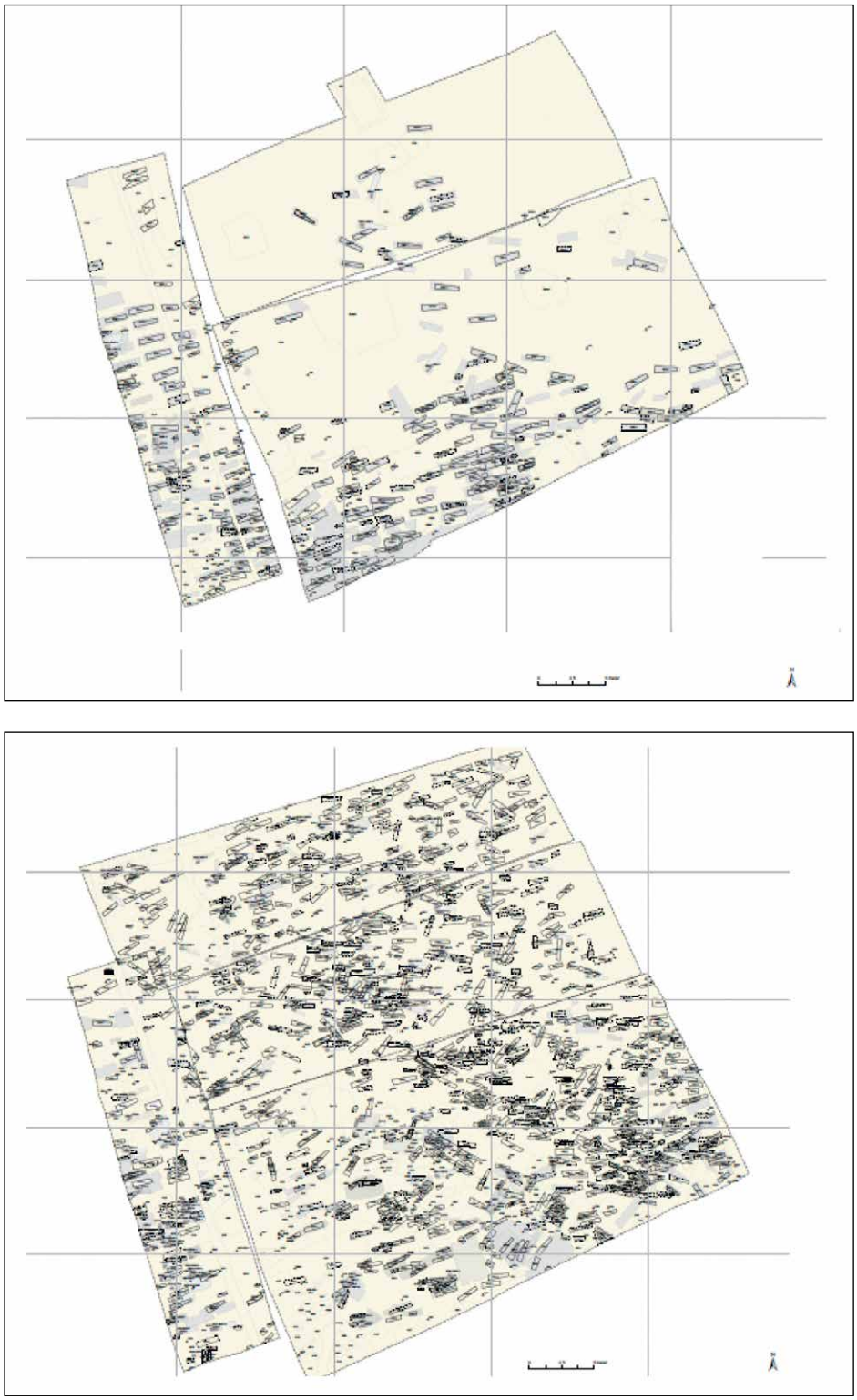
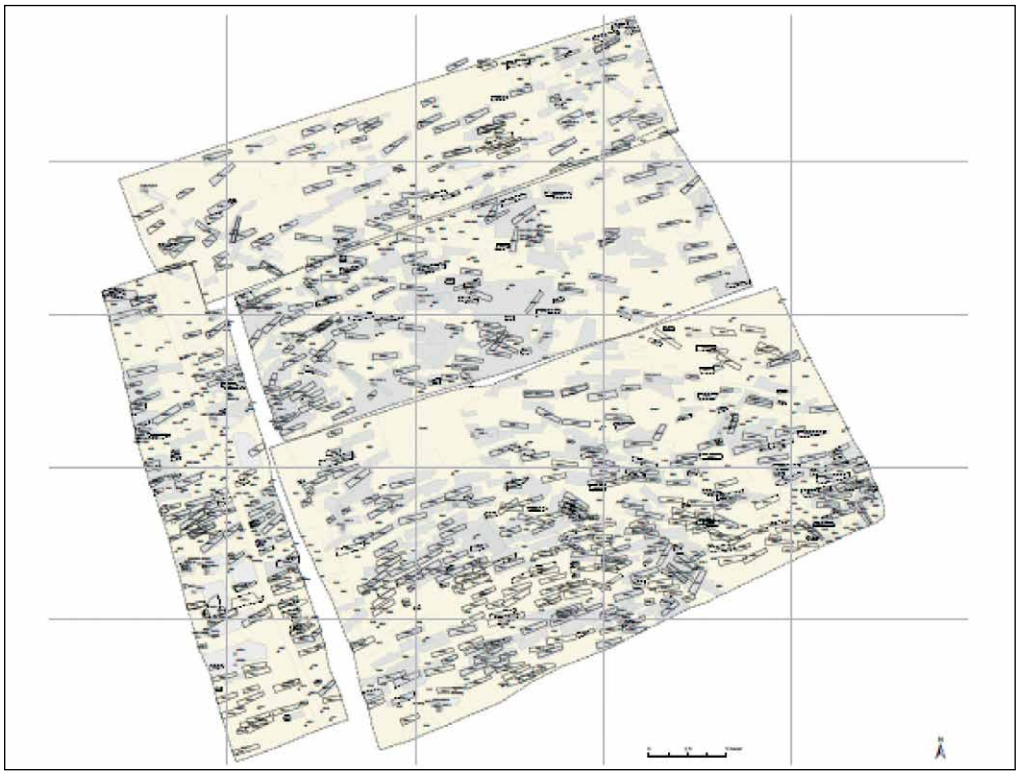
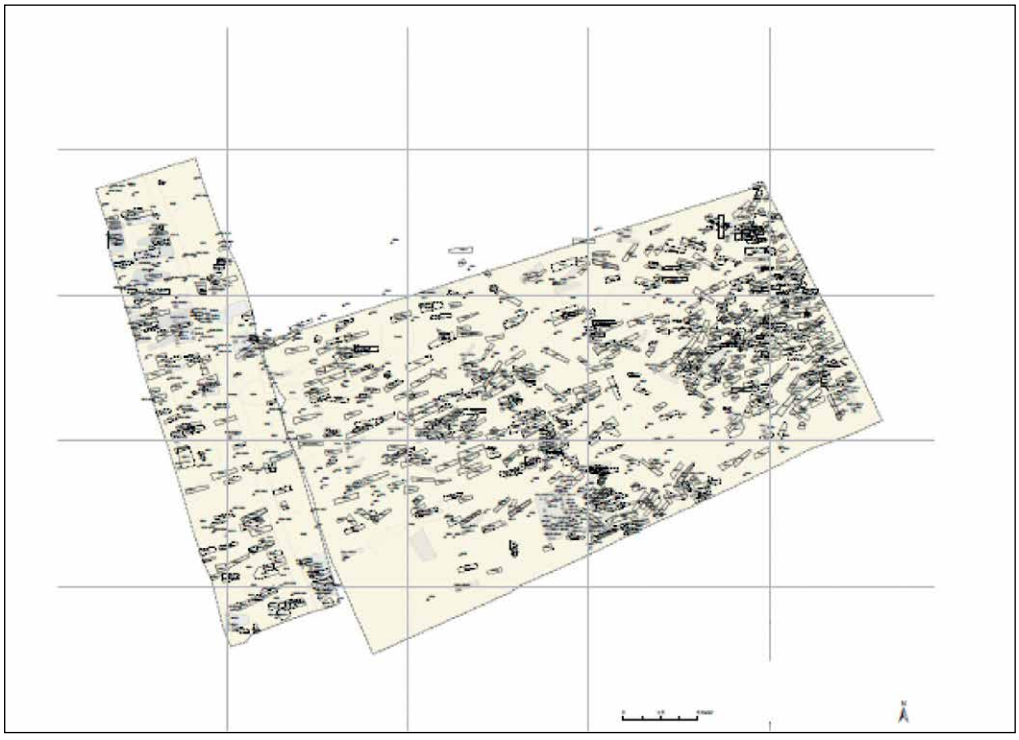


Fig. 4: Distribution of the burials within the excavated area. Early 12th – 14th-century layer (top left), late 12th – 14th-century layer (top right), 15th – 16th-century layer (bottom left) and 17th – 18th-century layer (bottom right) (Copyright Stad Mechelen, Dienst Archeologie).





Chapter cemetery extended further north. Some later graves were constructed over the ditch. In the 12th – 14th-century layer, a band with fewer burials runs east – west, and in the more recent layers, a similar band runs southeast – northwest. These bands may coincide with pathways.

Around the time of the transition to the late Middle Ages (12th – 13th centuries), two rectangular structures were recorded in the southern part of the excavated area, of which the outlines consisted of charcoal and possibly lime. A rectangular cemented structure, destroyed in the late 13th – early 14th century, was excavated in the northern part of the excavation. The structures may possibly be the remains of cells, since anchoresses were living in the cemetery in the 13th century or they may be related to the use of the cemetery.[43] A round cemented sandstone structure, possibly the base of a small monument, was uncovered in the upper layer, located in the centre of the original cemetery. There was no evidence of grave markers.

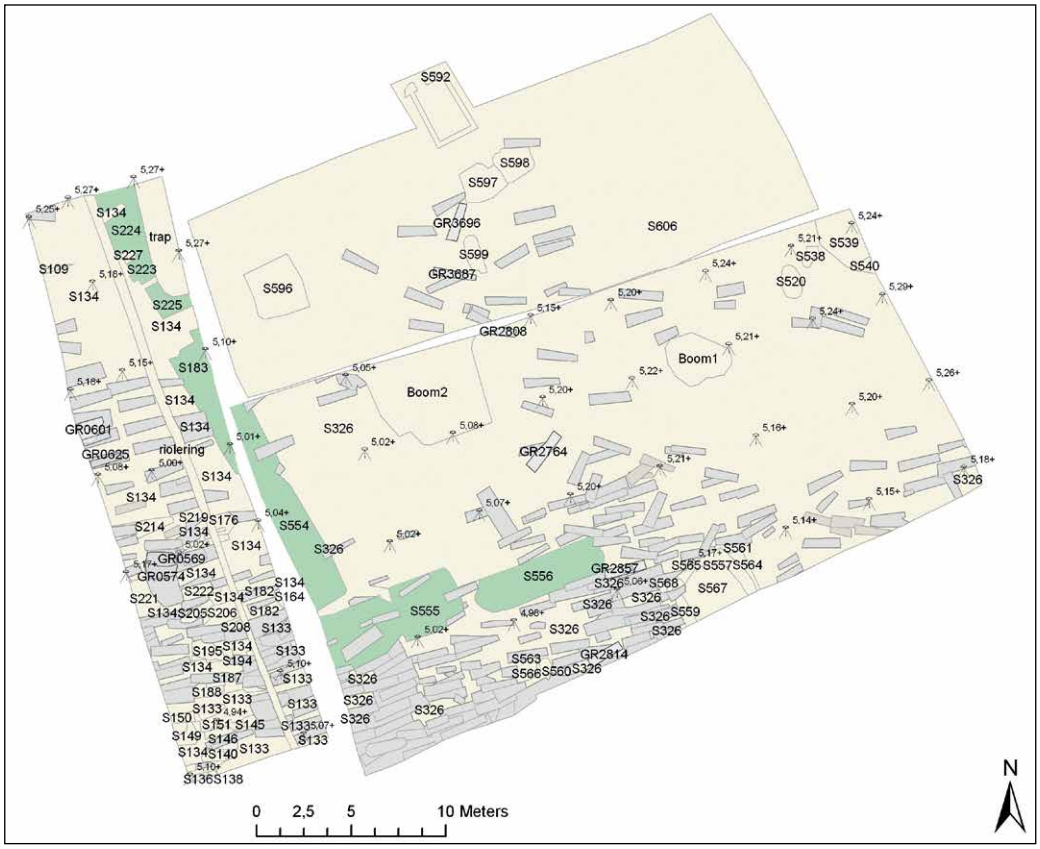


Fig. 5: Excavation plan, with the ditch shown in green, from the early 12th – 14th-century period (Copyright Stad Mechelen, Dienst Archeologie).

43 Beterams 1956, 311; Goetstouwers 1956, 71-72.

The cemetery was also a social meeting place. The aldermen of Mechelen held sessions in it in 1254,[44] and regulations of the brotherhood of Sint-Elooi, before 1254, state that members were prohibited from selling wares in the cemetery, suggesting that commercial activity within it was not unusual.[45] Statutes from 1270 indicate weavers were to offer their services in the cemetery.[46] Although the records are rare and mainly from the Middle Ages, the large number of coins and other items found outside the graves suggests the cemetery was probably continually used as a meeting place. Records from Britain and France indicate that churchyards were used for secular activities, such as markets, games and judicial activities, or as thoroughfares. Archaeological and historical evidence also points to cemeteries being used for rubbish disposal and artisanal activities.[47]

Reconstructing the population of the living and the dead

The population of St. Rombout's parish in the period in question can be partially reconstructed using historical and archaeological data. The living population can be studied using historical documents, including a 1798 census, parish registers and other archival records. The parish death registers provide information on those who were originally buried in St. Rombout's parish, while the excavated skeletal assemblage provides information on that part of population which was buried in the churchyard. These sources can be used to study the background of the parish and its population, while the information they provide can also be compared to offer interpretations for differences.

The inhabitants of St. Rombout's parish

The population of Mechelen in 1370 has been estimated by Verbeemen (1953) to have been between 11,813 and 13,332, based on donor lists for a new reliquary for St. Rombout. However, the results are debatable and likely an underrepresentation. For 1544, the population of Mechelen *intra muros* has been estimated to have been between 19,000 and 23,000.[48] This has been extrapolated to 5,499-7,332 for St. Rombout's parish,[49] which, after Onze-Lieve-Vrouw-over-de-Dijle, was the largest parish in Mechelen. For 1646, the number of inhabitants has been estimated to have been 19,450-21,582,[50] of which 6,790-7,534 belonged to St. Rombout's

44 Goetstouwers 1956, 47-48.

45 Gysseling & Pijneburg 1977, 60-62.

46 Joosen 1935, 464.

47 Alexandre-Bidon & Treffort 1993, 270-273; Daniell 1997, 109-115; Alexandre-Bidon 1998, 245-257; Harding 2002, 52-53, 73-74; Gilchrist & Sloane 2005, 45.

48 Population numbers for 1544 are based on the number of houses in tax rolls and house registers. Verbeemen (1953) listed 3860 houses *intra muros* multiplied by a coefficient of between 4.5 and 5.4 as an estimation of family size, with an added 10% for the clergy, who were not subject to taxation.

49 For St. Rombout's parish, an upper limit of 6.0 has been used as a coefficient for estimation of family size, based on a comparison with Ieper for 1506, since St. Rombout's was likely the wealthiest parish with a focus on trade and industry, making it likely that family size (including servants) was higher (Depuydt *et al.* 2013, 310).

50 Population numbers for 1646 are based on the number of houses in tax rolls and house registers. For 1646, the number of houses was multiplied by a coefficient of 5.93, based on a comparison with Ieper and with St. Pieter's parish in Mechelen in this period (Verbeemen 1953).

parish.[51] Mechelen's growth can be partially accounted for by immigration, mostly from nearby regions such as Brabant and Flanders and a minority from the Prince-Bishopric of Liège, the Netherlands, Germany, France and Italy.[52] The Lombards, who were first mentioned in 1280, were all located in St. Rombout's parish.[53]

According to the 1796 census of the French regime, which recorded the age, sex and occupation of Mechelen's inhabitants, the city had a population of 18,330 *intra muros*. The population between the ages of 12 and 98 numbered 6,429 men and 9,468 women, a sex ratio of 0.67. St. Rombout's parish had 5,617 inhabitants, 1,298 were under 12 years old; 2596 were women (60.1 per cent) and 1724 men. The sex ratio in St. Rombout's parish was evenly balanced for 12- to 14-year-olds, but the percentage of women increased among older inhabitants, with the greatest difference among 20- to 29-year-olds, and remains imbalanced in favour of women.[54] Population numbers rose sharply from the 15- to 19-year-old category, peaked for the category 25- to 29-year-olds and then declined. Children under 12 years old constituted 23.1 per cent of the population.[55] Immigrants from outside Mechelen, of which 64.2 per cent were women, constituted 32.8 per cent of the adult population. This imbalance between sexes among immigrants was present in all age categories starting with 15- to 19-year-olds. The proportion of immigrants was high in all age categories, except for 12- to 14-year-olds. There is no information on the age people migrated.[56]

Rural to urban migration was an important phenomenon in the medieval and post-medieval periods. It was often motivated by a search for employment and comprised many young individuals. This age group would have affected the demographic profile of urban populations.[57] Many medieval and post-medieval urban populations in northwest Europe also show an imbalance in favour of women. This phenomenon is often interpreted as being due to a largely female migration into urban centres for employment.[58] The high number of immigrants in the census, and the high proportion of women among them, suggests these were also important factors for Mechelen. However, young men may be under-recorded due to a fear of conscription into the French army.[59]

At the close of the 18th century, textile was the main industry in St. Rombout's parish. Many inhabitants, mostly immigrants and women, were also employed in domestic service. Trade was important, as were clerical institutions.[60] The parish is also characterised by a strong presence of tanners and butchers.[61] Sources indicate

51 Verbeemen 1953, 69, 72.
52 Van Uytven 1991a, 41.
53 Bormans & Schoolmeesters 1895, 318-324; Beterams 1956, 15, 75, 843; Jamees 1993, 154-155, 167-168, 207-208; Berlemont 1975, 69.
54 Piessens 2014, 15.
55 Piessens 2014, 13-15, 25.
56 Piessens 2014, 13-15, 25.
57 Dyer 1998, 192; Connel *et al.* 2012, 10-11, 177.
58 Mays 1997, 124; Simons 2001, 9; Piessens 2014, 14.
59 Piessens 2014, 17.
60 Piessens 2014, 26-28.
61 Piessens 2014, 29-30.

that around one-quarter of the population between the ages of 12 and 14 years were employed.[62]

Parish registers

Between 1506 and 1796, 37,671 funerals were recorded in the preserved parish registers for St. Rombout's parish. The registers are incomplete and showed large temporal gaps (Fig. 6). The number of deaths per year averaged around 75-80 for the 16th century, with peaks of 200 to 300 that may have been related to epidemics, the Wars of Religion, or the Spanish and English Fury in the second half of the century. In the first half of the 17th century, the number of deaths per year averaged around 125; it rose to 200 in the first half of the 18th century, after which it decreased to about 160.[63]

For the 17th – 18th centuries, the parish death records list more women than men, with a sex ratio between 0.87 and 0.91. Percentages of children's deaths were very low, at 2.1 to 2.9 per cent, which probably reflects inconsistent recording of age (Fig. 6). Childhood mortality is considered to have been high in preindustrial societies, with an estimated 30-70 per cent of the population dying before the age of 14 or 15.[64] While the registers give an indication of who received a funeral at St. Rombout's parish, there are no consistent indications for the location of the interments, which could include the church, the northern or southern churchyard, monasteries and perhaps also the subsidiary cemetery.

While the estimated living population remained relatively constant, the number of recorded deaths gradually increased over time. Perhaps a higher mortality rate was offset by immigration or by the burial of more non-parishioners. The sex

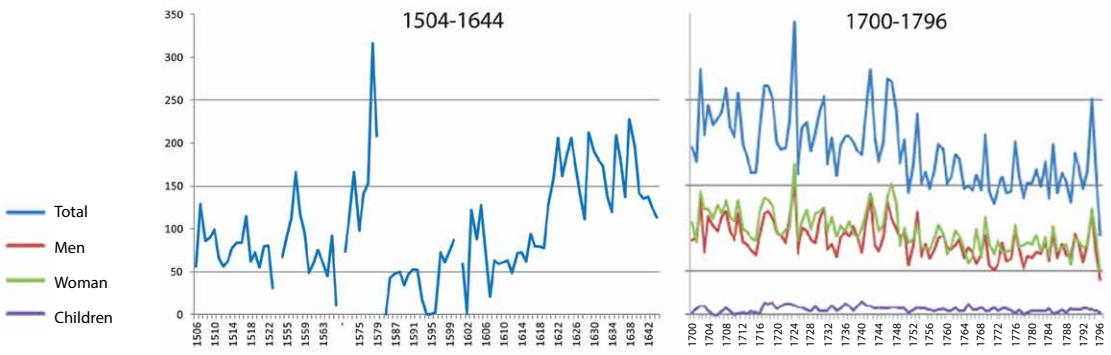


Fig. 6: Representation of the number of deaths recorded in parish registers for 1504-1644 and 1700-1796, including demographic composition for the period 1700-1796. (Depuydt et al. 2013).

62 Piessens 2014, 13-15, 25.
63 Depuydt *et al.* 2013.
64 Saunders & Barran 1999, 183; Harding 2005, 95; Lewis 2007, 22.

ratio in the parish registers differs from that in the 1796 census, with a higher proportion of men's deaths registered, although the imbalance in favour of women remained.

The population of Mechelen was Catholic, except for the presence of a Protestant minority for a brief period in the 16th century. St. Rombout's Church was used by the Calvinist community between 1580 and 1585. In 1572, Protestant funerals were recorded in the registers, although there are no entries for the years 1580-1585,[65] and Protestants and Catholics could not be differentiated in the burials. Sources also mention a small Jewish community in the 13th century, but there is no information on their burials.[66]

The excavated population

The bones from Mechelen were generally well preserved, with only limited surface erosion. A preliminary estimation of age and sex was made during the excavation (Fig. 7 and Fig. 8). Individuals were divided into adults, adolescents (12 – c. 20 years old), children (1-12 years old) and infants (less than 1 year old), based on skeletal growth.[67] The proportions of the age categories across all excavated burials showed an increase from infants, which were least represented, to adults (75% of the assemblage), with no large differences between periods. At less than 10 per cent, the number of infants and children among the excavated burials is low, considering the high childhood mortality in preindustrial societies, although higher than indicated by the registers. Remains of children and infants are frequently underrepresented in medieval and post-medieval cemeteries, possibly due to spatial concentrations or their fragile bones and small, shallow graves.[68] Adolescents, however, constituted 13.6 per cent of the excavated population. The migration of young people into towns may be reflected in mortality profiles of excavated cemeteries, and some medieval urban sites, such as St. Peter's in Barton-upon-Humber and St. Mary Spital in London, also showed a high ratio of adolescents and young adults.[69] The youngest individuals from St. Rombout's cemetery were aged 30-32 weeks post-gestation. Although the literature often refers to the exclusion of unbaptised infants, it appears they were regularly included in cemeteries.[70] The registers refer to infants baptised by midwives and at home, suggesting they died around birth.

Sex was determined for adults based on morphological characteristics of cranium and pelvis.[71] Of the 1,810 individuals for whom sex could be estimated, 32.8 per cent were male and 24.9 per cent female. In the 15th – 18th-century layer, males constituted approximately 60 per cent of the biologically sexed individuals (Fig. 8), while in the 12th – 14th-century layer, males and females were equally represented (Fig. 8), which contrasts with the documentary sources. No clusters

65 Marnef 1985, 49-63.
66 Laenen 1905.
67 Schwartz 1995; Buikstra & Ubelaker 1994.
68 Daniell 1997, 125; Bello & Andrews 2006; Lewis 2007, 22-25.
69 Connel *et al.* 2012, 177; Gilchrist 2012, 53.
70 Alexandre-Bidon 1998, 153, 261-262; Cox 1998, 213; Lauwers 2005, 169; Cherryson, Crossland & Tarlow 2012, 122-123.
71 Schwartz 1995; Buikstra & Ubelaker 1994.

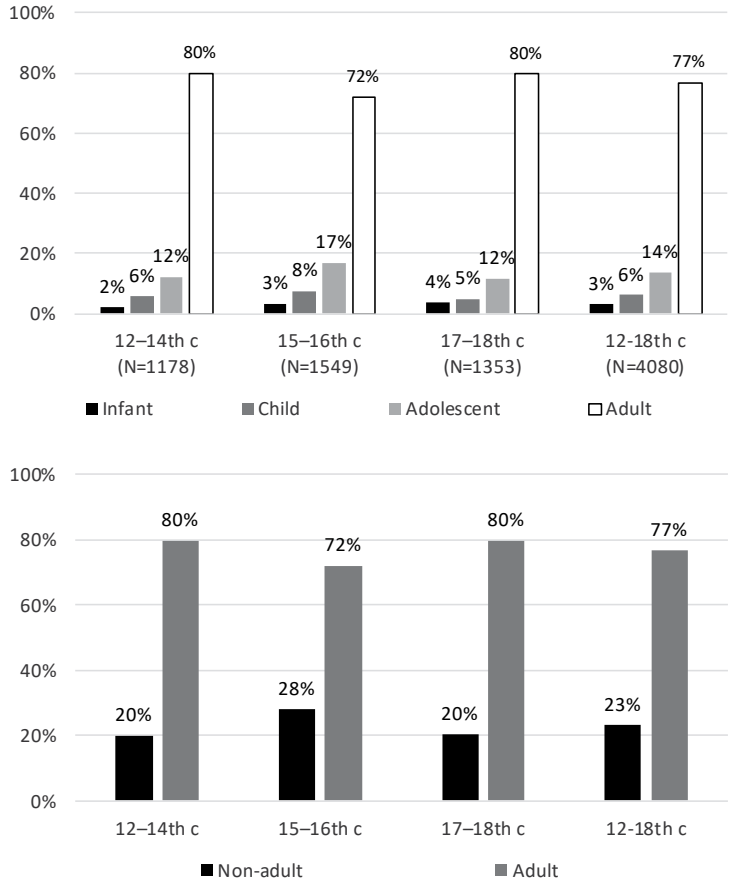


Fig. 7: Demographic composition of the excavated skeletal remains. Age is divided in categories of infant (less than one year), child (1-12 years old), adolescent (12-c. 20 years old) and adult. For the data, see the appendix.

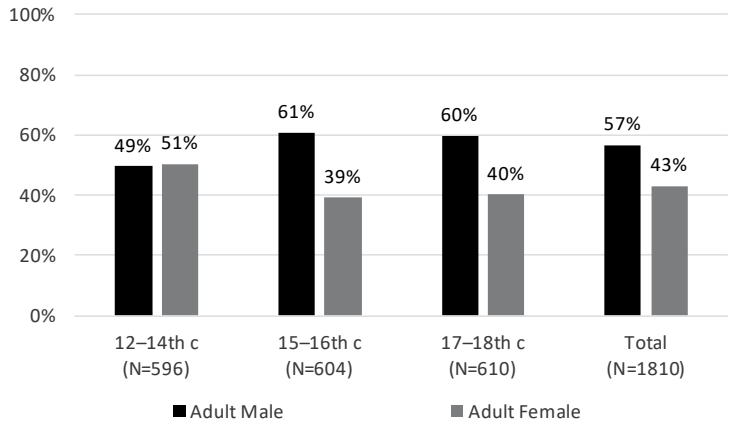


Fig. 8: Frequency for sex divided by period (these do not include individuals where sex could not be determined; indeterminate individuals for the 12-14th c layer: 345; 15-16th c: 511; 17-18th c: 469; total: 1325).

based on age or sex were found at St. Rombout's cemetery, although it is possible they exist outside the excavated area.

The number of deaths per year given in the registers, with several peaks and an overall increase over time, cannot be associated with patterns in the burials because these could only be attributed to three broad periods. In the 17th – 18th-century layer, 1,341 inhumations were recorded; in the 15th – 16th-century layer, 1,576; and in the 12th – 14th-century layer, 1,195. Despite an increase in recorded deaths between the 15th and 18th centuries, the number of burials in the area decreased. Since the cemetery was only partially excavated and its limits could not be determined, it is impossible to calculate the total number of burials. The decrease in the number of articulated depositions may be partly due to the increased disturbance of older burials in more recent layers (see below). The use of a subsidiary cemetery also hinders comparisons. The higher percentage of excavated children compared to the numbers in the registers also indicates inconsistent recording in the documentary sources.

When comparing the information from the different sources on the population of St. Rombout's parish, it is important to take into account that they are not all referring to the same population. The census recorded the living population whose composition differs from that of the dead population, and there are indications of inconsistent recording. Due to a differential risk of death the composition of the dead population consists of higher numbers of young and older individuals.[72] In contrast to the census, the parish death registers concern the dead and their burials in the parish, without differentiating the location of the graves. The background of the population, spatial organisation, and funerary customs related to social organization may have affected who was buried in the north churchyard, as opposed to the south churchyard, and in the church, which were more desirable locations, or the subsidiary cemetery by the St. Nikolaas Chapel, which may have been less desirable.

Part of the population was probably not buried in the parish, which has a bearing on the composition of the buried population and skews the comparison with the historical data. Immigrants could have returned to their place of origin later in life, widows may have entered beguinages, and wealthier personages were sometimes buried in monasteries. Criminals or prisoners were likely buried outside the city, while the sick may have been buried at the Hospital of Our Lady or the leprosery or plague house outside the walls. Numerous epidemics and famines were recorded, and peaks in the burial rates can also be observed in the registers. It is possible that during mortality crises not everybody could be accommodated in the churchyards. Records from 1315-1316, during the Great Famine, indicate the establishment of new cemeteries outside the city.[73]

Conversely, it is possible that St. Rombout's cemetery did not serve solely as a parish cemetery but also included burials of other groups, such as patients from the Spanish military hospital. It was first founded in 1567 in the Hof van Saksen to the

72 Wood *et al.* 1992; Jackes 2011, 108.

73 Delafaille 1874, 17-18; Steurs & Uytterhoeven 1942; Stadsarchief Mechelen, Fonds Berlemont, map 182.

northwest of the churchyard. This first attempt was abandoned, but the hospital was re-instituted in 1585 by Alexander Farnese and remained in use until 1715. It was the first permanent military hospital in early modern Europe and served as a medical institution for the Spanish army in the Low Countries.[74] The archives were mostly destroyed by troops who occupied the hospital in 1713.[75] Surviving documents are dispersed, but include an inventory from 1637 and regulations from 1685. Historical studies have unfortunately focused mostly on the organisation and buildings of the hospital, rather than the patients. The volume of people attended to varied, depending on need, but staff could number around 50 at certain times. Based on the 1637 inventory, which mentions 330 beds, more than 2,000 soldiers could have been treated that year. In 1637, the hospital consisted of five buildings, including a chapel.[76] Patients were soldiers from the Italian and Spanish troops, which could include other nationalities such as Scottish and Irish.[77] They were treated for injuries sustained in conflict, as well as infections and psychological disorders, described by the doctors as *mal de corazón*.[78] Studies have suggested infections such as dysentery, typhus, malaria, smallpox, and plague were a greater danger to early modern soldiers than violence.[79] Venereal disease, particularly syphilis, was also a problem, and the hospital offered special treatment.[80]

There are unfortunately no indications of where patients were buried, and only a few references to those who died. According to the inventory, one depot contained tools for digging graves and a wooden box for corpses, suggesting this was also a morgue.[81] Parilla Hermida[82] suggests that a passage in the *Ordenanze de hospitales militares de 1739*, which states that surgeons were required to practice on cadavers of people who died in the hospitals, could also have applied to Mechelen. An illustration of the hospital that dates however from 1755 does not show any burial grounds[83] nor are there are any references to burials in the parish registers. But the hospital had its own chapel with priest, and the adjacent cemetery of St. Rombout could have been used to bury patients, although this cannot be confirmed. Neither do we know how many patients were buried there.

British records indicate that parishes were responsible for the burial of foundlings, the poor, and pensioners, who were likely accorded cheaper plots and funerals.[84] The presence of wealthy charitable institutions and records of unknown dead in the registers suggests similar practices for St. Rombout's parish, although a few references also indicate that strangers were buried at the Kwade Kerkhof and that their burials were paid for by the council. Parish registers from the 17th

74 Van Meerbeeck 1950; Parilla Hermida 1964; Installe 1996c, 203; Parker 2004, 141.
75 Van Meerbeeck 1950, 82.
76 Van Meerbeeck 1950; Parilla Hermida 1964; Installe 1996c, 203.
77 Van Meerbeeck 1950, 86.
78 Van Meerbeeck 1950; Parilla Hermida 1964; Installé 1996, 203; Parker 1996.
79 Cunningham & Grell 2000.
80 Van Meerbeeck 1950, 99; Parilla Hermida 1964, 39.
81 Van Meerbeeck 1950, 101.
82 Parilla Hermida 1964, 36-37.
83 Plan of the hospital from 1755 by Ferdinand Hancko, lieutenant of the Artillery, Algemeen Rijksarchief Brussel, Kaarten en plannen, nrs. 1920 en 1921.
84 Daniell 1997, 90; Harding & Ruggiu 2005, 98.

century also refer to soldiers who were billeted with inhabitants, although these concern only a few individuals per year.

The excavated assemblage, finally, concerns only that part of the population buried in the northern churchyard. Only part of the churchyard could be excavated, and the burials showed extensive disturbance, resulting in the recovery of only a fraction of the original graves.

Although the different sources cannot be directly compared, since they refer to different populations and demonstrate issues with completeness and representativeness, noting the discrepancies between them is nevertheless informative. The imbalances in the age categories, the proportion of females, and the number of burials suggest there may have been spatial patterns of where people were buried related to their social backgrounds and changes over time, which could have influenced who was buried in the northern churchyard. The deviations in sex ratio, with an overrepresentation of females in the parish registers as opposed to a strong overrepresentation of males in the 15th – 18th century layers in the excavated assemblage, also indicate that other groups, such as patients from the hospital, may have been buried in the northern cemetery of St. Rombout. The excavated assemblage is thus not a direct representation of the original population of the parish, but rather consists of certain social sub-groups, possibly of both parishioners and non-parishioners.

The burials

It should be stressed that burials represent only part of the original gestures accorded to the deceased.[85] Unfortunately, we rarely find traces of preparation, transport, perishable objects or commemoration, which could have included important distinctions. We also recover only part of the original buried population. Nevertheless, the treatment of the body, characteristics of the grave and spatial organisation show variation that may be associated with the organisation of society, funerary practices, and the manner in which people dealt with death. Since funerals were for the dead and the living, they reflect preoccupations of the living and their social background, as well as religious and spiritual considerations,[86] although they cannot be considered a direct reflection.

Non-normative burial is a term used for burials that deviate from the norm of that period or area in the location or construction of the grave or in the position and treatment of the body. The term is often taken to indicate individuals whose social background or circumstances of death warrant special treatment. However, non-normative burials do not necessarily indicate marginalized groups, as even 'normal' burials show extensive variation.[87] Practical considerations, local traditions or personal preferences should not be forgotten.

85 Blaizot 2014b, 93.
86 Harding 2005, 104.
87 Holloway 2008, 132; Murphy 2008, xiii; Cherryson, Crossland & Tarlow 2012, 105.

Disturbance of older burials

Burial in St. Rombout's parish cemetery consisted mainly of primary inhumations, with 3,616 graves containing articulated remains. A further 56 graves were identified as disturbed burials and 53 as secondary deposits, or charnels, in pits. Selective inclusion and ordering of the skeletal remains was observed in 34 charnels, while 19 showed a random deposition. Anatomical connections were generally lost, indicating that the bodies had fully decomposed when they were disturbed, which likely happened as a result of accidental disturbance during the construction of new graves. Most were relatively small pits, which could include only crania, a selection of crania and long bones or a large number of smaller and larger bones; one ossuary from the upper layer also contained a cranium with saw marks, suggesting dissection or autopsy.

Secondary contexts occurred in all layers but were least frequent in the 15th – 16th-century layer. Disturbed burials were most common in the youngest layer and charnels in the oldest layer.

Disarticulated bones were also scattered in the soil between the graves and in the backfill of graves. Disturbance of older depositions increased over time: in the oldest layers, 70.8 per cent of burials were more than 50 per cent preserved, compared with only 45.3 per cent of the burials in the 17th – 18th-century layer. This may be due to a decreased concern for the integrity of burials, increased pressures on space, or the use of grave markers. There were no indications of a common practice or organised clearing. The reduction of a burial to make room for a new deposition was recognized in one case, where the remains of an infant were pushed together, by the feet of an adult.

Disturbance of older burials was common in crowded medieval and post-medieval urban graveyards, and similar strategies of dealing with disturbed bones are seen in most cemeteries. The frequent presence of burials from the oldest period suggests that, if possible, burials were left in peace.[88]

Single or multiple burials

Although single inhumation is often considered normal funerary practice for medieval and post-medieval churchyards, excavations have shown that multiple and collective burial, which include the deposition of two or more individuals, was not uncommon.[89] In St. Rombout's cemetery, single graves were used for 80.7 per cent (3,311) of burials. The other 19.3 per cent were buried in collective superimposed or multiple graves, one large context was unclear.

Multiple and collective graves are distinguished by the chronology of the deposition of the bodies in the grave. In multiple graves, individuals are buried simultaneously or within a short period, which can be recognized archaeologically by contact between bones and general preservation of anatomical connections despite some movement due to simultaneous decomposition. In collective graves,

88 Daniell 1997, 123, 147, 146; Harding 1992, 128; 2002, 64-65; Gilchrist & Sloane 2005, 194-195; De Groote 2011, 143; Cherryson, Crossland & Tarlow 2012, 91-93; Nollen 2013, 145-146; Delattre 2014; Guillon 2014.

89 Harding 2002, 63; Gilchrist & Sloane 2005, 156.

individuals are buried in successive, separate phases, identified archaeologically by disturbance of earlier burials during later depositions or by the presence of an intermediate layer of soil. Since the first anatomical connections only decompose after a few weeks, phases within a short period may not be recognized.[90]

Superimposed burials are graves where the same location was used for the successive deposition of two or three individuals, which suggests collective burial. This was the case for 239 out of 3,616 graves in all layers, based on the same location and orientation of individuals in close association with an intermediate layer of soil, which suggests different phases in the funerary gestures. Older depositions were occasionally disturbed. Superimposed burial was used for 12.3 per cent of individuals. This type of burial was least common in the 12th – 14th-century layer and most common in the 15th – 16th-century layer (Fig. 10). The superimposed burials consisted mainly of plain earth burial, although 32.5 per cent showed evidence of a coffin. Adults constituted 74 per cent, with twice as many men (20.8%) as women (11.5%). Superimposed burials are known from numerous cemeteries. They are thought to indicate a desire to be buried in the same grave and suggest the presence of a grave marker, although concerns about space and money may also have been important.[91] It is not possible to ascertain whether the superimposed graves were associated with married couples or other relationships. The higher frequency in the later layers at St. Rombout's cemetery could be due to a higher number of deaths as well as changing attitudes about death.

In total, 65 multiple, or simultaneous, burials were recognized in all layers, and these contained seven per cent of all individuals. Of these, 47 showed only a single phase of deposition; with up to 12 individuals in one grave, mostly packed close together, in contact and without disturbance (Fig. 9). Burials with several phases were recognized in 18 graves; up to 14 bodies were placed in two to six layers of three to four individuals (Fig. 9). They were distinguished by a layer of soil in between phases.

The orientation of the bodies within the graves varied: some had the same orientation, some were head to toe, others deviated. Most were deposited with care, although a few smaller graves showed careless positioning. Adults (56.2%), mostly males, were most common in the multiple burials, followed by adolescents (35.7%). However, 18.1 per cent of all adolescents were buried in a multiple grave, as opposed to only 5.1 per cent of adults. This mortality profile deviates from that of the excavated population, and these unusual burials may suggest particular circumstances. Infants in multiple graves were usually buried with an adult. Such burials are often interpreted as death in childbirth or the practice of interring an infant with the next adult burial. One female was recorded with foetal remains in utero.

Variation exists between time periods: multiple burial was most common in the 15th – 16th-century layer, when almost 10 per cent of individuals were buried in multiple graves. Multiple burials with a single phase were most common in the

90 Duday *et al.* 1990, 46; Duday 2009, 98-104.

91 Harding 2002, 65; Gilchrist & Sloane 2005, 158; Brickley *et al.* 2006, 26-27; De Groote *et al.* 2011, 133; Cherryson, Crossland & Tarlow 2012, 97.

Fig. 9: Illustration of a collective superimposed burial (15th – 16th century layer) (left), a multiple burial with several phases (17th – 18th century layer) (middle) and a multiple burial with one phase containing 12 individuals (15th – 16th century layer) (right).

15th – 16th-century layer. Burials with different phases were more evenly distributed across time. Neither type showed spatial clusters.

Simultaneous burial in the same grave indicates that the individuals died around the same time. The use of multiple burials, while not rare, was not the norm for medieval and post-medieval cemeteries and suggests particular circumstances or an unusual mortality which caused a deviation from normal burial. They could relate to the death of patients from a hospital or attempts to save space and money. The presence of an isolated multiple burial could be an indication of the accidental, coincidental death of several people.[92]

The presence of several multiple burials in the same period and area suggests a mortality crisis, with multiple burials serving as a way to accommodate the higher number of dead. In addition to expediency, poverty or a person's social situation may have affected inclusion in multiple burials, such as burial in hospitals, or for the poor. While an elevated mortality can only be only recognized by the presence of multiple burials, all intermediate forms–from traditional single to mass graves–were used, and it seems that parishes avoided abandoning normal funerary practice if possible. Most medieval and post-medieval communities incorporated multiple burials in existing cemeteries, although sometimes new cemeteries were established.[93]

92 Harding 2002, 65-66; Margerison & Knüsel 2002, 140; Gilchrist & Sloane 2005, 156-159; Castex 2008; Cherryson, Crossland & Tarlow 2012, 112-113.

93 Harding 2002, 65-66; Margerison & Knüsel 2002, 140; Gilchrist & Sloane 2005, 156-159; Castex 2008; Cherryson, Crossland & Tarlow 2012, 112-113.

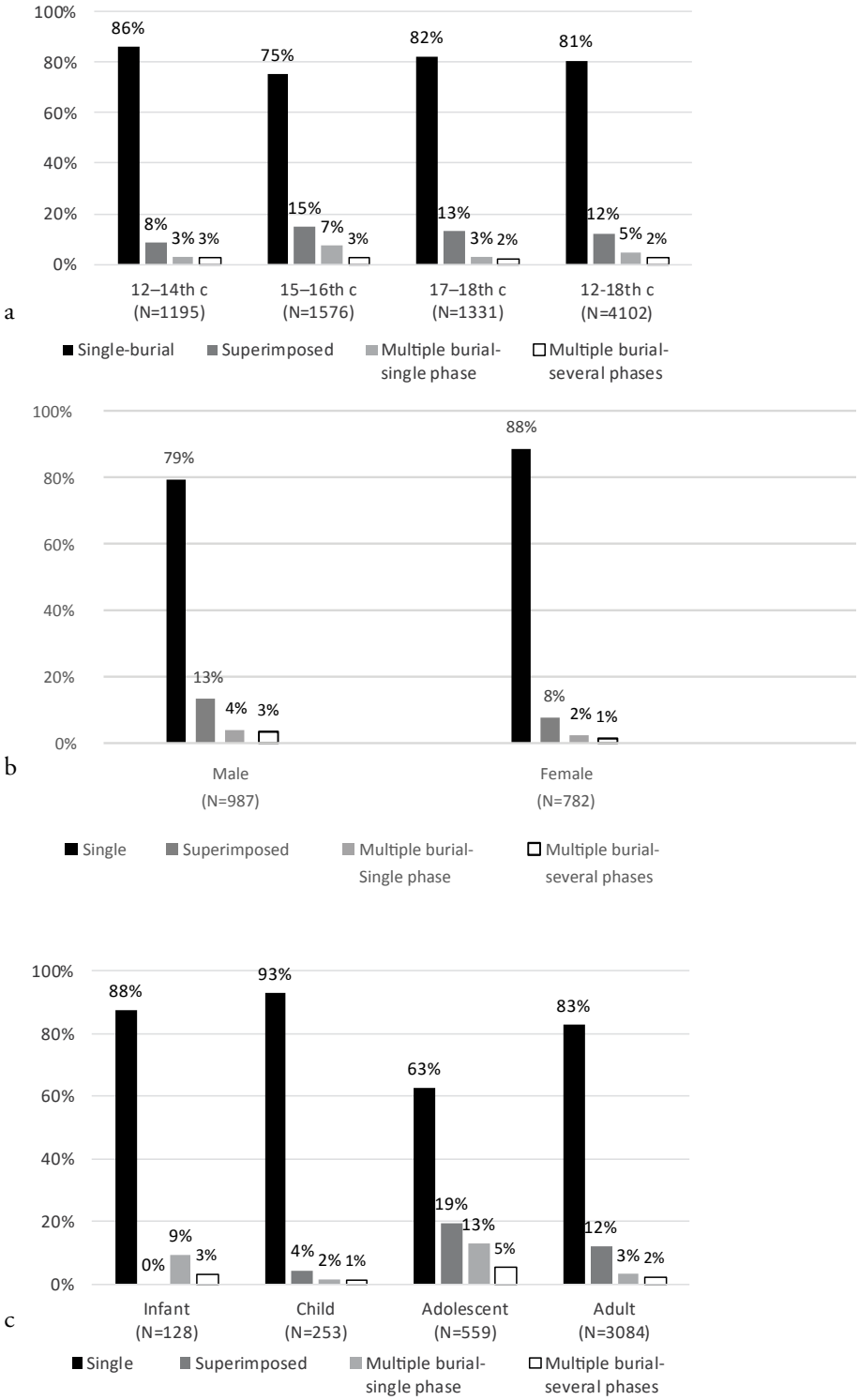


Fig. 10a-b-c: Frequency of single and multiple depositions recorded on-site for the different layers (a), sexes (b) and age categories (c). See the appendix for the data.

Anomalies in the demographic composition within multiple burials and palaeopathological lesions may provide information on circumstances of death and burial, to determine how they may be related to mortality crises, social background or other motives. A 'normal' attritional mortality profile usually consists of higher numbers of very young and older individuals, representing the accumulation of deaths during the use of a cemetery. Mortality crises, for example as a result of epidemics, war, natural catastrophes or famine, tend to affect either the entire population or target certain age and sex categories.[94]

In St. Rombout's cemetery, multiple burials of varying types were found throughout the different layers, suggesting there was no uniform or common practice and that they likely represent recurrent episodes of unusual mortality. The number of deaths per year calculated from the registers is not so high as to suggest multiple burials may have been a common way to deal with a large number of normal deaths. The high frequency of adolescents in all multiple burials, which deviates from the mortality profile of the entire excavated population, also suggests unusual circumstances or motives, which could be related to mortality crises, such as epidemics or famine, but also to the socio-economic background of individuals.

More detailed archaeothanatological study of the plural burials will allow a better evaluation of the occurrence of collective and multiple burials and the association with skeletal studies will allow a better understanding of why they were used.

The burial environment

At St. Rombout's cemetery, the dark soil in the more recent layers obscured archaeological features.[95] Here archaeothanatology may provide additional information to reconstruct funerary practices. Archaeothanatology, developed in France over the past 30 years and not commonly used outside that country, uses knowledge of the decomposition process and detailed observation of the burial environment to reconstruct the original situation. The preservation or loss of anatomical connections between bones (which indicates whether or not the bones had potential for movement), together with their spatial configuration, are related to the type and shape of the grave, the soil type, the original position and treatment of the body, and taphonomic processes.[96]

When sediment directly covers the body, bodily spaces are filled in progressively as decomposition takes place, inhibiting the movement of bones.[97] Such plain earth burials in St. Rombout's cemetery were distinguished by a lack of coffin delineation (a linear discoloration in the soil due to decomposition of wood) and conservation of anatomical relations. In some cases this was very clear, with preservation of articulations and thoracic volume and a lack of obstruction along the sides of the body (Fig. 11). Lateral constraint, which could be extreme, may be

94 Margerison & Knüsel 2002; Castex 2008; Duday 2009, 98-102.

95 Van de Vijver 2012, 175.

96 Boddington 1987, 40-42; Brothwell 1987, 22-26; Duday *et al.* 1990, 31-33; Duday 2009, 25-30; Maureille & Sellier 1996, 313-315; Willis & Tayles 2009, 548-549; Blaizot 2014a; Crevecoeur *et al.* 2015, 285.

97 Duday *et al.* 1990, 36-37; Duday 2009, 32, 52-57.

a sign of wrapping (Fig. 11). However, because shrouds could be loosely wrapped and coffins narrow, lateral pressure is not unambiguous.

Scholars generally agree that most bodies in the late Middle Ages to the 16th century were shrouded or wrapped in textile, although this did not preclude a coffin.[98] Shrouds could be sewn, tied with laces, or pinned together. They could be tightly or loosely wrapped, and not all body parts were necessarily covered or bound to the same extent. Small copper pins in a grave may indicate wrapping because they were used as fasteners or left accidentally when closing the shroud, and they are often found in burials from the 12th century onwards.[99] Shrouds continued to be used during the late medieval and post-medieval period, although clothing became more common.[100] Copper pins were recorded for 366 of the 4,112 burials in St. Rombout's cemetery, with and without a coffin delineation. Up to six pins could be associated with a single body, and they were found in different locations across the body. The presence of pins increased over time, from 1.7 per cent of burials in the 12th – 14th-century layer to 7.3 per cent in the 15th – 16th-century layer and 17.2 per cent in the 17th – 18th-century layer (Fig. 12a). Lace chapes, which may have been attached to laces used to bind shrouds, were recovered from 30 burials.[101] Pins were associated with dress items in ten of the burials, dated to the 15th – 18th centuries. In British post-medieval examples, some bodies were also clothed as well as wrapped.[102] While the presence of copper pins and possibly lace chapes offer clear indications for shrouds in St. Rombout's cemetery, shrouds could also be sewn closed or closed with perishable materials, making it difficult to estimate the actual frequency of shroud use. The increase in copper pins, thus, does not necessarily indicate an increase in the use of shrouds but rather an increase in the use of copper pins.

Because of the empty spaces in coffins, gravity can cause unstable bones to move, which offers a means of distinguishing coffin burials when the coffin or a delineation can no longer be recognised (Fig. 11).[103] Coffin delineations were observed in 39.1 per cent (1,609) of all burials (Fig. 12a), mostly in single graves but occasionally in multiple graves. They were more common in the oldest layer, where almost 60 per cent showed a delineation, possibly related to the better visibility of features in the soil. In the few instances where wood was preserved and construction could be observed, the coffins consisted of two sides and two ends, a lid and a full plank bottom. Wood samples from 219 coffins could be analysed.[104] Of these samples, 90.5 per cent consisted of softwood, mainly pine, but also some spruce and fir, possibly imported. Only 3.6 per cent consisted of hardwoods, including tilia, poplar, alder and walnut, likely local or derived from waste lumber. This contrasts with two oak samples from a 17th-century vault within

98 Daniell 1997, 156; Gilchrist & Sloane 2005, 106-110; Cherryson, Crossland & Tarlow 2012, 23.
99 Daniell 1997, 156; Gilchrist & Tarlow 2012, 23.
100 Janaway 1998, 24-26; Cherryson, Crossland and Tarlow 2012, 23.
101 Cherryson, Crossland & Tarlow 2012, 28; Gilchrist 2012, 210.
102 Cherryson, Crossland & Tarlow 2012, 28.
103 Duday *et al.* 1990, 34-36, 39-42.
104 Van Daalen 2013.

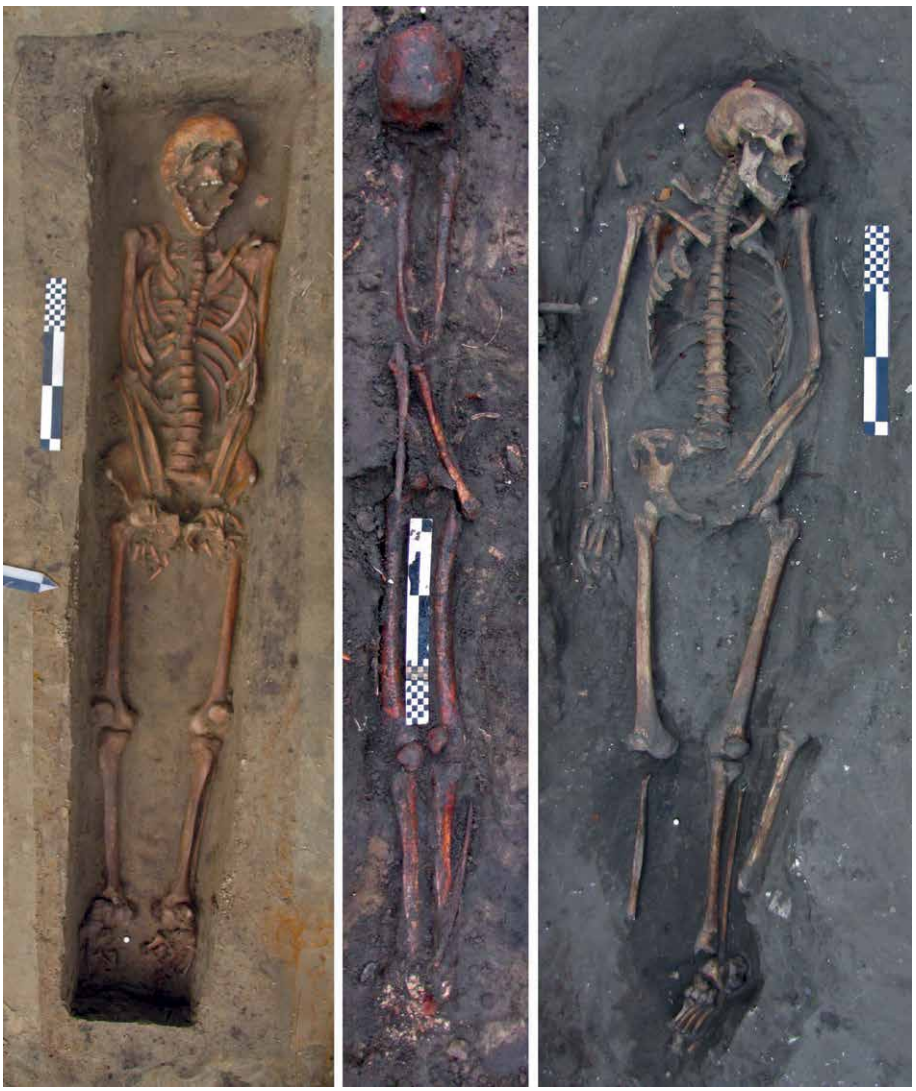
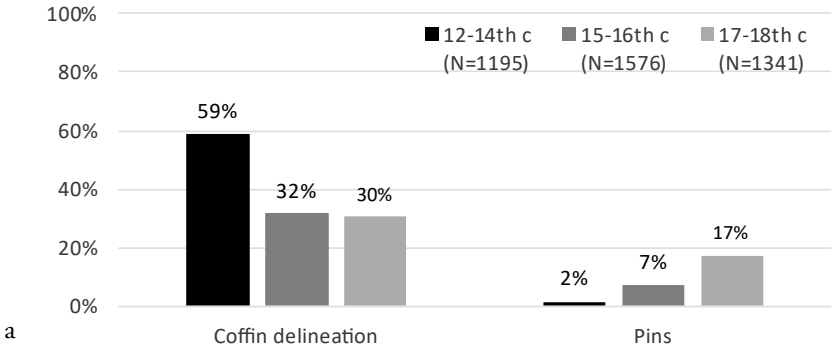


Fig. 11: Modes of burial. 12th – 14th-century layer coffin burial (left), 12th – 14th-century layer burial with extreme lateral pressure (middle) and a 17th– 18th-century layer plain earth burial (right).

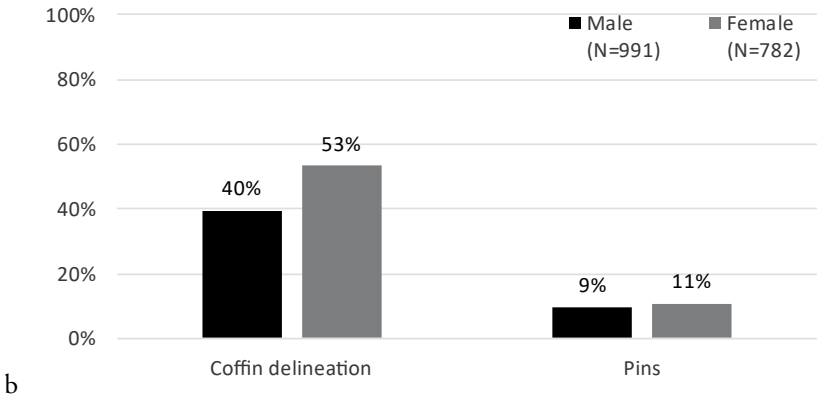
the church.[105] Studies of coffin wood in Britain reveal that elm, in addition to oak, was the traditional choice, with oak being more expensive. Pine, spruce and larch were cheaper.[106]

The only evidence of grave containers found were wooden coffins or perishable containers; no other materials or wall linings were found. Coffin delineations were most common with infants and adults and less common with children and adolescents. They were recorded with 53.1 per cent of women as opposed

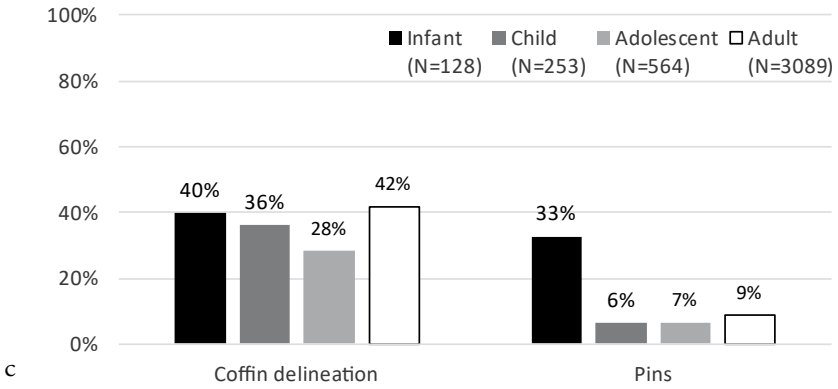
105 Kinnaer *et al.* 2013, 7.
106 Gilchrist & Sloane 2005, 112; Cherryson, Crossland & Tarlow 2012, 54-57.



a



b



c

Fig. 12a-b-c: Frequency of the presence of coffin delineation and pins divided by period (a) and according to, sex (b) and age (c). For the data, see the appendix.

to 39.5 per cent of men. While the lack of a coffin delineation may indicate a plain earth or shrouded burial, a preliminary archaeothanatological study shows that several burials without a delineation showed the likelihood of a container evinced through the loss of articulations in hands and feet and through linearity and constraint in the bones.[107] In other words, the rate of coffin use based solely on the presence of a delineation are underestimated. The cranium falling backwards, observed for several individuals, suggests a perishable structure, such as a head support. Other anomalies in bone displacements were observed. While in many cases displacements may have been caused by a local collapse due to decomposition of lower bodies and coffins or other taphonomic processes, future archaeothanatological studies may reveal added variation in the organisation of the graves.

Coffin fittings were found in all layers, most often in adult burials. Copper fittings were found more often with women and iron fittings more often with men. Iron coffin fittings, handles and plates were found with 56 burials. Copper fittings, which were most common in the 15th – 16th-century layer and were possibly from coffins, were found in 25 burials. They consisted of small plates, rivets and nails, some of them decorated. Post-medieval coffins from Britain were additionally decorated with small pieces of embellished metal,[108] and some of the copper fittings from St. Rombout's cemetery may be interpreted as such.

Historical sources indicate that while coffins were often used during the funeral service, many people were buried in a shroud, although coffins are regularly found.[109] Most were rectangular or trapezoid boxes, fastened with iron nails or wooden dowels. The ratio of coffin burials in British medieval cemeteries varied greatly, and women and children were often buried more regularly in coffins than were others. Coffin burial became the norm after the Reformation in England, although many people continued to be interred in shrouds.[110] French sources also indicate the increased use of coffins after the Middle Ages.[111] In St. Rombout's cemetery, on the other hand, coffin delineations were common in medieval layers, with ample evidence for plain earth burial into the 17th and 18th centuries. The higher frequency of coffin delineations in female burials is consistent with the British evidence. The presence of pins as well as a delineation in 155 burials, from all layers, shows bodies could be shrouded inside a coffin. It is difficult to discern the use of a shroud based solely on the position of bones, although the extreme lateral pressure observed in some burials suggests shrouding. Neither coffin delineations, fittings, wood species, nor pins showed a spatial concentration.

Since visibility of features in the upper layers was low, shape could only be recorded in 736 of the 3,311 single burials. The most common shape of grave was trapezoid. Coffin delineation was present for 429 of the 476 trapezoid burials. Rectangular shapes accounted for 241 burials, 173 of which had a delineation.

---

107 Blaizot 2014a, 264.

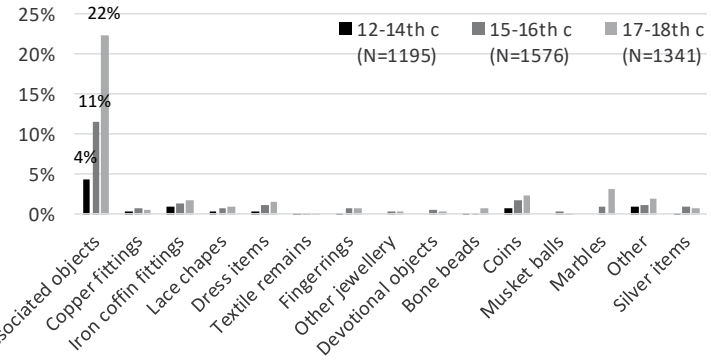
108 Cherryson, Crossland & Tarlow 2012, 66-67.

109 Gilchrist & Sloane 2005, 111.

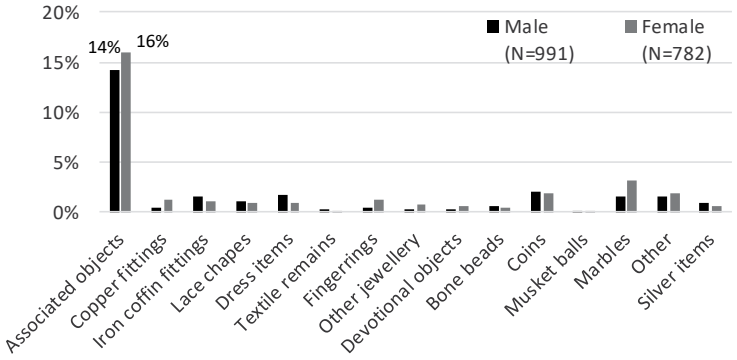
110 Harding 2002, 59-60; Gilchrist & Sloane 2005, 111-116; Cherryson, Crossland & Tarlow, 45-46, 57-58.

111 Alexandre-Bidon 1998, 136.

a



b



c

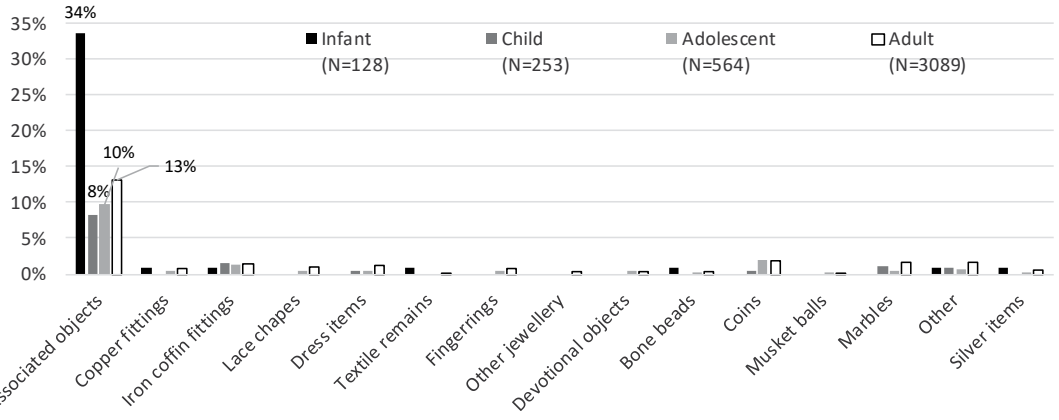


Fig. 13a-b-c: Frequency of the presence of associated objects divided per period (a), according to gender (b), according to age (c). For the data, see the appendix.

More females were found in trapezoid shapes, possibly due to their association with coffins. An anthropomorphic shape, with a recess for the head, was observed in six single plain earth burials in the oldest layer, including the oldest dated burial, and they were concentrated in the south of the excavated area. These burials contained only adults and, where sex could be estimated, male individuals. In British cemeteries anthropomorphic graves are dated to the late 11th – 14th centuries and are mostly associated with monastic graveyards and adult males, resembling the trends from St. Rombout's cemetery.[112] The multiple burials generally had an irregular or rectangular shape.

Objects

The inclusion of grave goods as part of the funerary ritual was uncommon in Christian tradition. Objects found in burials were usually related to the grave context or the preparation, dress and adornment of the body. Such objects were found with 535 individuals (12.9%) from St. Rombout's cemetery. Objects were most common in the 17th – 18th-century layer, where they were included in 22.4 per cent of burials. Their inclusion, both in general and for the different categories, became progressively more frequent over time (Fig. 13). In 77.3 per cent of the burials with objects, the individual was an adult. Objects were found with 13.2 per cent of adult burials and with 33.5 per cent of infants, but were less common with children and adolescents.

By far the most common objects were pins. Most were copper alloy, but the excavation also yielded five silver pins. In all likelihood, the majority were associated with shrouds, although some may relate to clothing. Other objects found include dress items, textile fragments, lace chapes, jewellery, marbles, devotional objects, bone beads, coins, musket balls and other items. Jewellery, devotional objects, musket balls and marbles only appear in the 15th – 18th-century layer. The low numbers make it difficult to determine patterns.

The high frequency of associated objects with infants is due to pins, found with 32.8 per cent of infants (Fig. 14). It has been suggested many were swaddled for burial.[113] Most pins (73.2 per cent) were found with adult burials. Lace chapes, which may be related to dress or shrouds, were found in 30 burials. In most burials only one was recovered, and they were found in varied areas of the body.

Objects related to dress were found more often with men. They consisted mainly of bone and copper alloy buttons, but also included copper alloy buckles, rings, wire, dress pins, a headband, eyelets and hooks. Textile fragments were found with five individuals. Dress items consisted mostly of one or two objects. In a 16th-century male burial, 24 copper alloy buttons were discovered along the thorax and wrists (Fig. 14).

Jewellery was found with 33 of the 4,112 individuals. Finger rings, possibly wedding rings, were found in 24 burials. Most were a plain, copper alloy band. Other jewellery consisted of copper alloy earrings and a medallion. While finger

112 Gilchrist & Sloane 2005, 132-133.
113 Gilchrist 2012, 79, 81.

Fig. 14: Grave objects. A candle stick with a 15-16th-century layer female burial (left), buttons with a 15-16th-century layer male burial (middle) and pins along the spine of a 15-16th-century layer infant burial (right).

rings and jewellery were found with men, they were more common with women. No jewellery was found with children or infants.

Evidence for clothed burials or personal adornment was generally limited. It is assumed, based on archaeological evidence, that clothed burials postdate the mid-13th century and followed the fashion in ecclesiastical burials.[114] In St. Rombout's cemetery it was not possible to determine when dress objects appeared. Dress items were rare (about 1 per cent of burials) and more frequent from the 15th century onwards.

Devotional objects were found with 13 individuals and bone beads with 14. One male burial (17th – 18th centuries) contained three insignia, possibly pilgrim badges. Other objects were religious pendants and one small crucifix. They were only found with adolescents and adults, and such devotional objects were more common for women. Bone beads were found mainly with male adults and are

114 Gilchrist & Sloane 2005, 80-81; Cherryson, Crossland & Tarlow 2012, 24-30; Gilchrist 2012, 70.

thought to be associated with rosaries. They were usually recorded positioned at the middle and lower body. Multiple beads were found with three individuals. Both bone beads and devotional objects were mostly associated with crossed arms, but due to the low frequency of such finds this association is not necessarily meaningful. Devotional items and rosaries in burials are generally rare, and pilgrim badges are usually dated to the 13th – 14th centuries.[115]

Coins, some of which may be accidental inclusions, were found with 68 individuals. They were found across the body. With two individuals a small hoard of similar coins was found. No coins were associated with infants. Burials with coins were uncommon in medieval and post-medieval cemeteries. The reason for their inclusion is mostly unclear; it is thought some may have had a symbolic or protective function.[116]

Lead musket balls were found in seven burials; six of these balls were found within the grave fill. They were not found with infants and children. None could be associated with peri-mortem trauma.

Ceramic marbles were found with 56 individuals, mostly women. It was not always clear whether the marbles were part of the burial or what purpose they played. In the Broerenkerk in Zwolle, a marble was found in a coffin, suggesting they could be part of the burial.[117]

Items classified as 'other' are objects that were recorded only a few times. They include spindle whorls, game discs, needles, a fishhook, a thimble, a bone pen, a coin scale, a whetting stone, a fragment of grinding stone, knives, a seal imprint, a bell, two pipe-clay statuettes, a book fitting, a fragment of roman tegula, dice and a candlestick (Fig. 14). It is unclear whether they were deposited deliberately and/or were present on the body before burial or represent disturbed objects.

Silver items, coins, pins and adornments were found with 26 burials, mainly adults and more often with males than females.

Objects were found predominantly with adults, but do not show spatial clustering. Musket balls, jewellery and coins were rarely associated with infants and children. Dress items, bone beads and silver objects were more common with men, whereas jewellery and marbles were more common with women. Objects, particularly pins, were more frequently associated with single depositions. Dress items, lace chapes and jewellery were not found in multiple burials. However, the low frequencies make it difficult to make assertions about their association with demographic categories or burial traditions.

Most objects were related to the grave context or preparation of the body. Some unusual objects, such as tools, statuettes, the roman tegula, the candlestick and devotional objects, may be grave goods, including items which were protective items or mementoes.[118] They were less common in post-medieval graves in Britain, while in St. Rombout's cemetery, objects were more common in the more recent layers.

---

115 Gilchrist & Sloane 2005, 93-98; Gilchrist 2012, 158, 211.
116 Alexandre-Bidon 1998, 146; Gilchrist & Sloane 2005, 100-102.
117 Aten 1992, 27.
118 Alexandre-Bidon 1998, 143; Cox 1998, 117; Gilchrist & Sloane 2005, 227; Gilchrist 2012, 211-213.

Orientation

The most common orientation in the burials was WSW – ENE (42.2%), followed by a W – E and less commonly a WNW – ESE orientation, resulting in 77.2 per cent of single burials oriented approximately W – E (Fig. 15). Orientation showed no spatial clustering. For 8.7 per cent of burials orientations deviated, mainly S – N and some E – W. These deviant orientations were, not surprisingly, more common in multiple burials. Orientation was clustered more closely around a W – E orientation in the 12th – 14th-century layer but became increasingly varied in later layers. Deviant orientations were also least common in the 12th – 14th-century layer. Variation was most common for adolescents and males.

The more varied orientations in the post-medieval period may be related to different funerary customs or above-ground organisation, although this could not be determined. Single burials in Christian tradition are usually oriented with the head towards the west, related to the belief that at the Resurrection, the body will rise towards the returning Christ in the east. Deviant orientations may be related to a particular social background, but could be accidental or related to cemetery lay-out.[119]

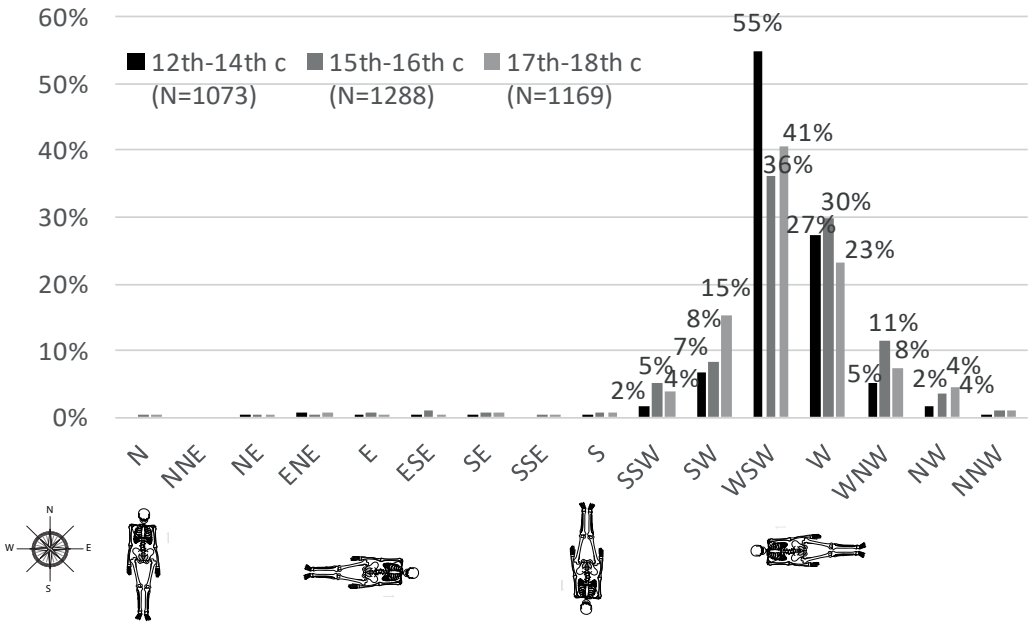


Fig. 15: Distribution of the orientations of bodies in single burials, divided by period.

119 Alexandre-Bidon 1993, 190-191; Daniell 1997, 148-149; Gilchrist & Sloane 2005, 152-153.

Body position

The majority of bodies (98.1%) were buried supine, the norm for Christian burial. Only two per cent was buried prone and one per cent on the right or left side. The position of the legs for the vast majority was extended (96.5%), followed by flexed legs, crossed legs or ankles, and different positions for either leg. The main positions for the arms were crossed over the pelvis (254) or over the abdomen (358). Rarely, they were crossed over the chest (28) or each arm was in a different position. Crossed arms were followed in frequency by arms extended at the sides or flexed. An unusual position was one or both arms hyperflexed to the respective shoulder. Deviant positions, such as abducted arms, arms crossed behind the back or in one case folded over the head, were recorded in 1.2 per cent of individuals. All positions occurred in all periods, but the vast majority in all periods, age and sex categories were buried in a supine, extended position.

Multiple burials showed more deviant positions, related to deposition dynamic. Crossed arms were the most common category in the multiple burials, but extended, crossed and different positions occurred more equally in the single graves. Deviant arm positions were more common in the most recent layers.

Unusual positions were found in all layers in the single burials, although flexed legs were more common in the 15th – 18th-century layer. Distribution of arm positions showed crossed arms were most common in the 17th – 18th-century layer, where they were found in 40.3 per cent of burials, compared with extended arms in only 21.5 per cent. The opposite pattern was true in the older period. Flexed arms were most common in the 12th – 14th century, but decreased over time. Hyperflexion was most common in the 15th – 16th-century layer. Extended arms were more common with a coffin delineation and crossed arms more common without a coffin.

Deviant positions were more common in adolescents and adults, and among adults they were more common in males. Infants showed relatively many side burials and a high frequency of flexed legs, which may be due to their natural position. Adolescents showed a much higher frequency of crossed arms. Hyperflexion did not occur in infants and children. Males also showed more crossed arms than females.

Crossed legs, hyperflexed arms and arms crossed over the chest were unusual positions, mostly associated with adults and adolescents and only found in supine burials (Fig. 17). Prone and side burials were also unusual. They were associated with varied arm and leg positions, but were not particularly related to a careless deposition. Prone and side burials and deviating arm positions were more commonly associated with plain earth burials.

Only crossed legs showed a spatial concentration, that being the northwest corner of the oldest layer.

There are no universal trends in arm position in medieval cemeteries, although deviant positions were rare. The most common positions were with the hands over the pelvis, lying along the sides or more rarely crossed over the chest, besides different positions for either arm. Some cemeteries show spatial patterns and age- or sex-related trends. Crossed arms are more frequently associated with men and

more common in later periods, while extended or flexed arms were associated more with older periods.[120] Similar patterns were seen in St. Rombout's cemetery.

The praying position, with hands crossed over the chest, was unusual. Many are male, and these burials are often found on monastic sites. Hyperflexed arms are interpreted as a gesture of supplication or a disturbed prayer position.[121] This position was observed in one burial from St. Rombout's cemetery, where the lower arms moved laterally but the hands were still on the central chest.

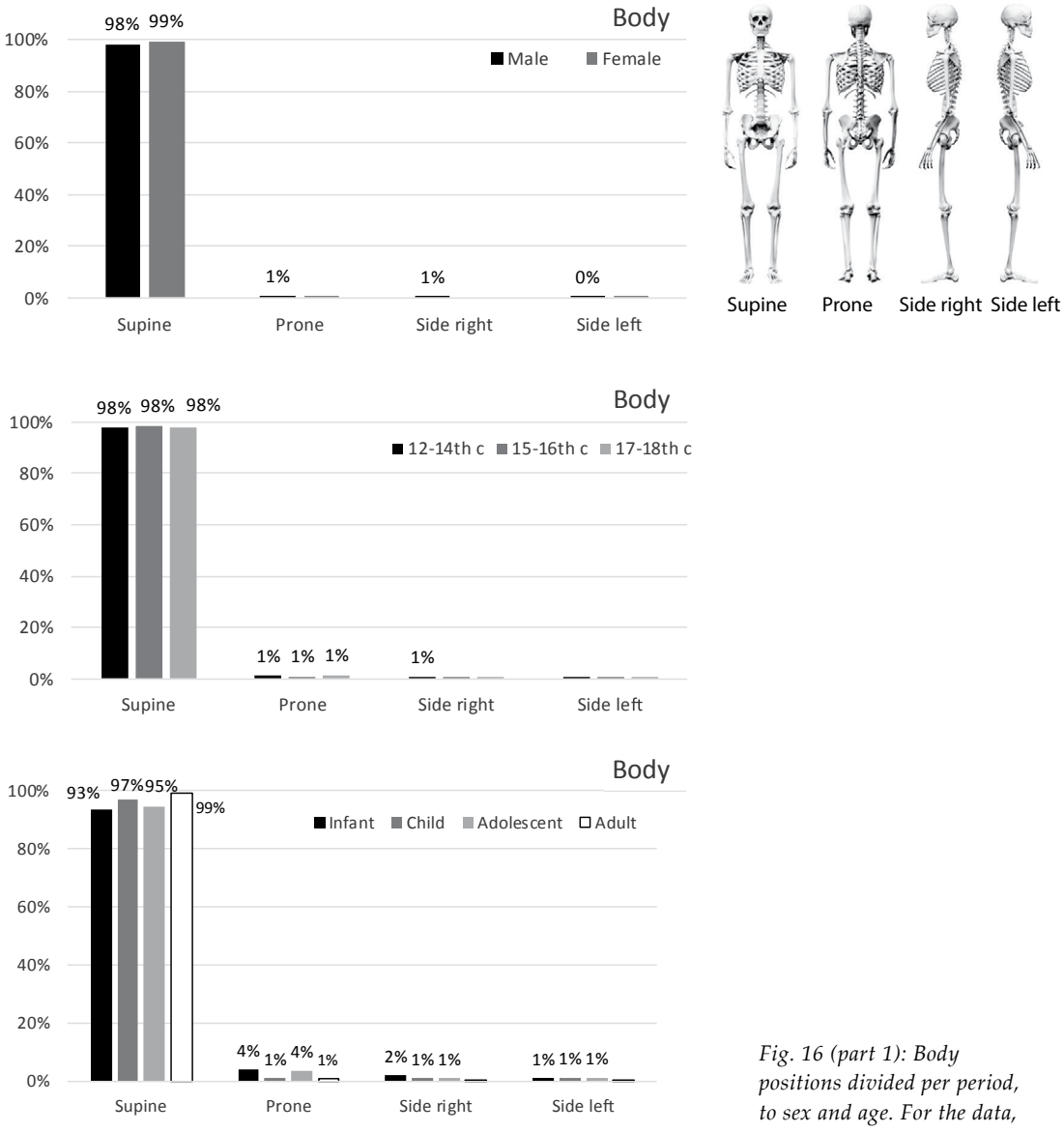
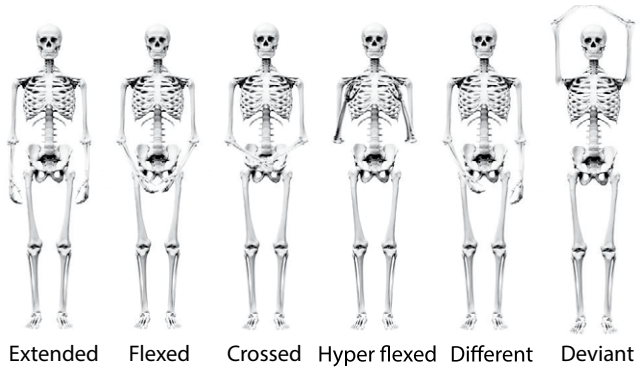
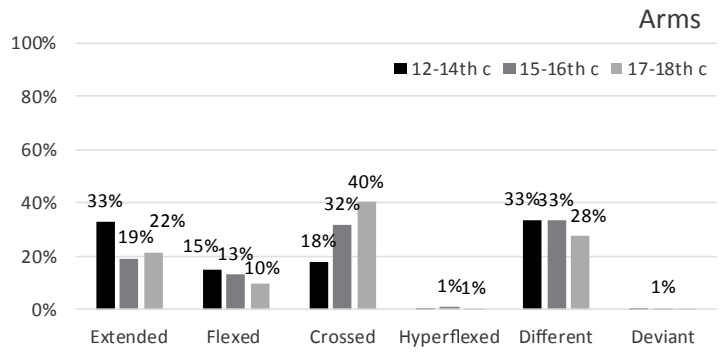
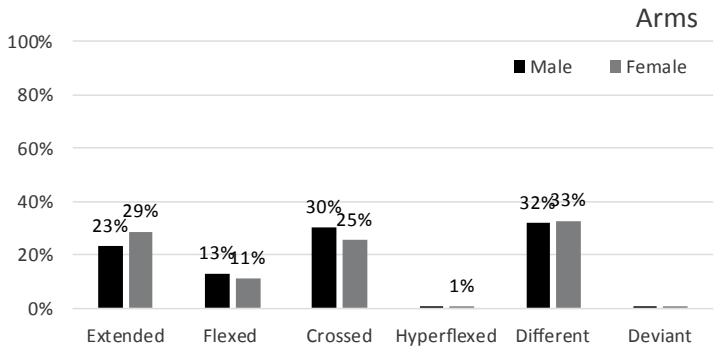


Fig. 16 (part 1): Body positions divided per period, to sex and age. For the data, see the appendix.

120 Stroud & Kemp 1993, 145; Daniell 1997; Gilchrist & Sloane 2005, 152-153.
121 Gilchrist & Sloane 2005, 156.







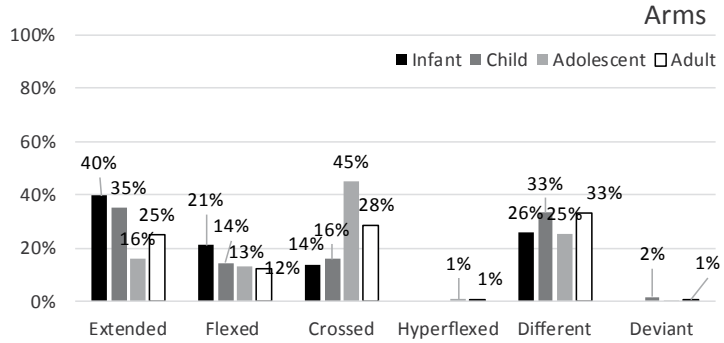
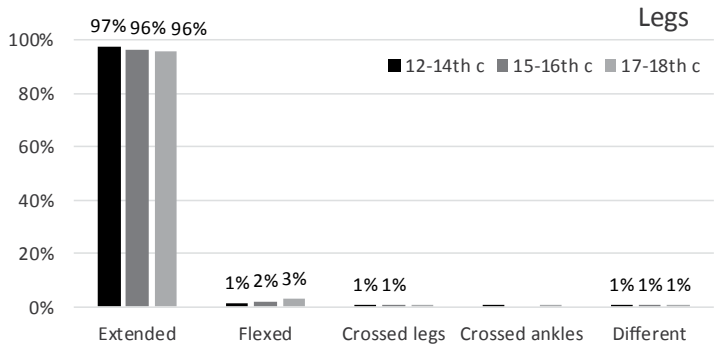
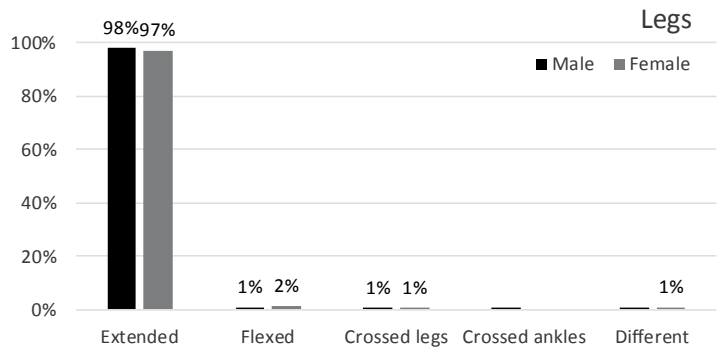


Fig. 16 (part 2): Body positions divided per period, to sex and age. For the data, see the appendix.





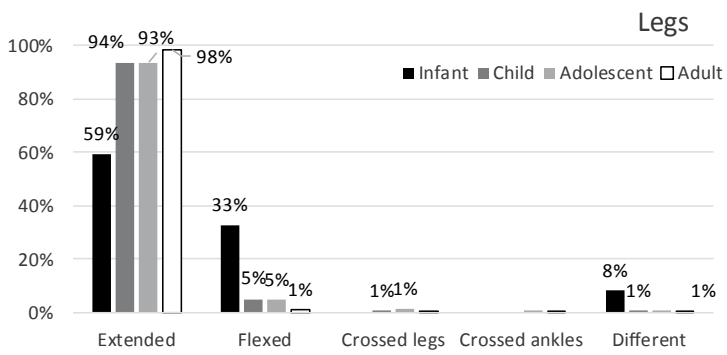


Fig. 16 (part 3): Body positions divided per period, to sex and age. For the data, see the appendix.

Fig. 17: Unusual burial positions. A prone burial of a 15-16th-century layer adult male (left), hyperflexed arms in a 17-18th-century layer adult burial (middle) and crossed legs in a 15-16th-century layer adolescent burial (right).

A prone position is often interpreted as an indication of a deviant background, a penitential act or a casual, hurried or clandestine burial. In British cemeteries, mostly adults were buried in the prone position, and these burials were often grouped at the margins of cemeteries. Side burials are also found more frequently with infants in medieval British cemeteries, and it has been suggested their bodies were arranged in a sleeping position.[122] Besides symbolism, body position can also

122 Cox 1998, 119-120; Gilchrist & Sloane 2005, 153-156.

be influenced by practical considerations during preparation, the tightness of the shroud, the liability of the corpse to shift in its coffin or while being placed into the grave, or taphonomic changes.[123] Different positions of the arms could be due to shifts in the coffin, while the more common occurrence of crossed arms in plain earth burials may be related to wrapping to keep the arms in place.[124]

Grave linings

Twenty-nine graves out of 3,616 showed evidence of a grave lining of ash, lime or loam (Fig. 18). Linings applied to burials are known from medieval and post-medieval cemeteries and mainly consisted of lime, chalk, charcoal or ash. Both practical and religious motives have been proposed for why graves were lined, although varied explanations may be appropriate for different burials.

A thin layer of loam was found in two single burials from the 17th – 18th-century layer. One was a plain earth burial of an adolescent, the other an adult coffin burial. Burials with a distinctive layer of soil have been recorded for medieval burials, but their meaning is unclear.[125]

Twenty-two burials, most of which were recovered from the 15th – 18th-century layer, contained a thin layer of ash underneath the bones, mixed with small pieces of charcoal, burnt bone and burnt earth. Two individuals were found in a superimposed burial, whereas the others were single burials. Sixteen showed a coffin delineation, with ash found in and outside the coffin. Save for one adolescent, the ash burials contained only adults. Ash burials were rare in the medieval and post-medieval periods and usually associated with coffins and churchyards, and linings consisted of ash, charcoal, animal and plant matter, pottery sherds and domestic refuse. Several explanations for these linings have been proposed: they may have functioned as a symbol of penance or humility, to absorb putrefaction fluids, or to reduce odours, or they may be the residue of burnt incense.[126]

Five burials in St. Rombout's cemetery contained a white substance identified as lime. They were recorded in all layers, in single and multiple graves, with adolescents and adults. The lime consisted of rubble remains, grains or a layer underneath the body. Although intentionality was not clear for all burials, the layers indicated a deliberate practice. Reasons for inclusion of lime are often associated with the presence of infectious disease, and it was used both to speed decomposition and preserve the body.[127] Other motives could have been to absorb putrefaction fluids or to reduce odours. Or the lime may have functioned symbolically or as a visual element. In St. Rombout's cemetery, the demographic composition and palaeopathological lesions suggest several of the burials may have been associated with disease.[128]

---

123 Alexandre-Bidon 1993, 190-191; Gilchrist & Sloane 2005, 151.
124 Alexandre-Bidon 1993, 195.
125 Gilchrist & Sloane 2005, 145.
126 Kjølbye-Biddle 1992, 231; Veeckman 1992, 74; Daniell 1997, 31; Alexandre-Bidon 1998, 143; Gilchrist & Sloane 2005, 120-123; Lauwers 2005, 161; Holloway 2008, 133, 142-143.
127 Cherryson, Crossland & Tarlow 2012, 112.
128 Schotsmans *et al.* 2015.

Fig. 18: Grave linings. Lime in a 17-18th-century layer adult male burial(left), ash in a 17-18th-century layer adult female burial (middle) and loam in a 17-18th-century layer adult male burial (right).

Conclusion

The burials excavated in the northern cemetery of St. Rombout show extensive variation in the characteristics of the burial and treatment of the body related to chronological patterns and to the age and sex of the deceased. Such demographic and diachronic patterns were observed for plural burials, the use of a coffin, presence of objects or a grave lining and the position and orientation of the body. While many of the practices are similar to patterns present in other cemeteries, differences were also observed, indicating local variations. Chronological patterns

suggest changes were gradual. Over time there was an increase in the disturbance of older burials and more differentiation in orientation, suggesting a change in religious attitudes. The more common presence of objects in the more recent layers implies increasing social differentiation and focus on the individual and burial, which is not unlike other archaeological and historical evidence of post-medieval burial.

Further in-depth archaeothanatological study of the burials and an association of burial characteristics and skeletal data, including demographic and palaeopathological studies, together with additional historical information will allow us to determine more detailed patterns in the burials. This, in turn, will allow us to interpret the differentiation between burial practices and what they can tell us about the background of the individuals in the graves, as well as added information for the interpretation of the biological characteristics of the buried population. Findings from St. Rombout's cemetery can then be placed within the context of the wider region and of Christian burial practices more generally.

Acknowledgements

Thanks are due to our colleagues of the archaeology department of the city council of Mechelen, the excavation team of St. Rombout's cemetery, the Center for Archaeological Sciences at KU Leuven, the Royal Belgian Institute of Natural Sciences in Brussels, Belgium and Wim Van Neer in particular, Brigitte Meijns from the KU Leuven, and Liesbeth Troubleyn from the Dienst archeologie of Mechelen, who all provided helpful feedback. We would also like to thank De Ware Vrienden van het Archief and Dana Piessens for providing demographic data.

Bibliography

Alexandre-Bidon, D., 1993: Le corps et son linceul, in: D. Alexandre-Bidon & C. Treffort (eds.), À réveiller les morts: La mort au quotidien dans l'Occident médiéval, Lyon: Presses Universitaires de Lyon, 183-206.

Alexandre-Bidon, D., 1998: *La mort au Moyen Âge. XIIIe-XVIe siècle*, Paris: Hachette Littératures.

Alexandre-Bidon, D. & C. Treffort, 1993: Un quartier pour les morts: Images du cimetière médiéval, in: D. Alexandre-Bidon & C. Treffort (eds), À réveiller les morts. La mort au quotidien dans l'Occident médiéval, Lyon: Presses Universitaires de Lyon, 253-273.

Arts, N., 2013: *Een knekelveld maakt geschiedenis. Het archeologisch onderzoek van het koor en het grafveld van de middeleeuwse Catharinakerk in Eindhoven, circa 1200-1850.* Utrecht: Uitgeverij Matrijs.

Aspöck, E., 2008: What actually is a 'deviant burial'? Comparing German-language and Anglophone research on 'deviant burials', in: E.M. Murphy (ed.), *Deviant burial in the archaeological record,* Oxford: Oxbow Books, 17-34.

Aten, N., 1992: 'De opgraving in de Broerenkerk', in: H. Clevis & T. Constandse-Westermann (eds.), *De doden vertellen. Opgraving in de Broerenkerk te Zwolle 1987-1988*, Kampen: Stichting Archeologie IJssel/Vechtsreek, 13-29.

Behets, P. 2005: *Cijnzen op de Koninklijke Domeinen te Mechelen Anno 1530*, Lier: Paul Behets, s.p. (Genealogisch Repertorium van het Mechelse district, 11).

Bello, S. & P. Andrews, 2006: 'The intrinsic pattern of preservation of human skeletons and its influence on the interpretation of funerary behaviours', in: R. Gowland & C. Knüsel (eds.), *Social archaeology of funerary remains*, Oxford: Oxbow Books, 1-13.

Berlemont, F.A., 1975: *Mechelse kronieken. Van het jaar 1 tot 1945,* Brussels: Kultuur en beschaving.

Beterams, F.G.C., 1956: Inventaris van het archief van de commissie van openbare onderstand van Mechelen I: Heilig-geesttafels en huisarmen. Mechelen: Commissie van Openbare Onderstand.

Blaizot, F., 2014a: 'Apporter, placer, déplacer et replacer: De l'expression individuelle à l'expression collective dans le cimetière des Ruelles, à Serris (Seine-et-Marne), du VIIe au début du XIe siècle', in: D. Boyer-Gardner & M. Vivas (eds.), *Déplacer les morts: Voyages, funérailles, manipulations, exhumations et réinhumations de corps au Moyen Âge,* Bordeaux: Maison des Sciences de l'Homme d'Aquitaine, 93-108.

Blaizot, F., 2014b: 'From the skeleton to the funerary architecture: A logic of the plausible', *Anthropologie* LII-3:263-284.

Blockmans, W.P., 1976: 'Armenzorg en levensstandaard te Mechelen vóór de hervorming van de openbare onderstand (1545)', in: A. Montballieu, G. Dogaert & R. De Smedt (eds.), *Studia Mechliniensia Bijdragen aangeboden aan Dr Henry Joosen ter gelegenheid van zijn vijfenzestigste verjaardag,* Mechelen: Koninklijke Kring voor Oudheidkunde, Letteren en Kunst van Mechelen, 141-173.

Boddington, A., 1987: 'Chaos, disturbance and decay in an Anglo-Saxon cemetery', in: A. Boddington, A.N. Garland & R.C. Janaway (eds.), *Death, decay and reconstruction: Approaches to archaeological and forensic science,* Manchester: Manchester University Press, 27-42.

Bormans, S. & E. Schoolmeesters, 1893: *Cartulaire de l'Église Saint-Lambert de Liège I.* Brussels: Hayez.

Braun, G. & F.Hogenberg, 1575: *Civitates Orbis Terrarum, Liber Primus*. Cologne.

Brickley, M., S. Buteux, J. Adams & R. Cherrington, 2006: *St. Martin's uncovered. Investigations in the churchyard of St. Martin's-in-the-Bull Ring, Birmingham 2001*. Oxford: Oxbow Books.

Brothwell, D., 1987: 'Decay and disorder in the York Jewbury skeletons', in: A. Boddington, A.N. Garland & R.C. Janaway (eds.), *Death, decay and reconstruction: Approaches to archaeological and forensic science*, Manchester: Manchester University Press, 22-26.

Buikstra, J.E. & D.H. Ubelaker, 1994: *Standards for data collection from human skeletal remains*, Arkansas: Arkansas Archaeological Survey.

Castex, D., 2008: 'Identification and interpretation of historical cemeteries linked to epidemics', in: D. Raoult & M. Drancourt (eds.) *Paleomicrobiology: Past human infections,* Berlin: Springer-Verlag, 23-48.

Castex, D., S. Kacki, H. Réveillas, I. Souquet-Leroy, G. Sachau-Carcel, F. Blaizot, P. Blanchard & H. Duday, 2014: 'Revealing archaeological features linked to mortality crises', *Anthropologie* II-3, 299-128.

Chapman, K. & R. Randsborg, 1981: 'Approaches to the archaeology of death', in: R. Chapman, I. Kinnes & K. Randsborg (eds.), *The archaeology of death,* Cambridge: Cambridge University Press, 1-24.

Cherryson, A. Z. Crossland & S. Tarlow, 2012: *A fine and private place. The archaeology of death and burial in post-medieval Britain and Ireland,* Leicester: University of Leicester.

Claes, F., 1991: 'Beknopte toponymie van stad en deelgemeenten', in: R. van Uytven (ed.), *De geschiedenis van Mechelen. Van heerlijkheid tot stadsgewest,* Tielt: Lannoo, 15-19.

Connell, B., A.G. Jones, R. Redfern & D. Walker, 2012: *A bioarchaeological study of medieval burials on the site of St. Mary Spital. Excavations at Spitalfields Market, London E1, 1991-2007,* London: Museum of London Archaeology.

Cox, M., 1998: 'Eschatology, burial practices and continuity: A retrospection from Christ Church, Spitalfields', in: M. Cox, (ed.), *Grave concerns: Death and burial in England 1700 to 1850,* York: Council for British Archaeology, 112-126.

Croenen, G., 2003: *Familie en macht. De familie Berthout en de Brabantse adel,* Leuven: Leuven University Press.

Cunningham A. & O.P.Grell, 2000: *The four horsemen of the apocalypse, religion, war, famine and death in reformation Europe*, Cambridge: Cambridge University Press.

Daniell, C., 1997: *Death and burial in medieval England 1066-1550*, London: Routledge.

De Groote, K., W. de Maeyer, J. Moens, K. Quintelier, F.V. Cleven, I.V. Berghe & W. Vernaeve, 2011: Het Karmelietenklooster van Aalst (prov. Oost-Vl.) (1497-1797): Het gebouwenbestand, de begravingen en het fysisch-anthropologisch onderzoek, *Relicta* 8, 83-250.

De Munck, I.I., 1777: *Gedenck-schriften dienende tot opheldering van het leven, lyden, wonderheden, ende duysent-iarige eer-bewysinge van den heyligen bisschop ende martelaer Rumoldus, apostel ende patron van Mechelen,* Mechelen: Van der Elst.

Delafaille, F.E., 1874: *Hongersnooden en volksziekten. Episoden uit de geschiedenis van Mechelen.* Mechelen: Ars Graphica.

Delattre, V., 2014: 'Du cadavre à l'os sec: Exhumer, trier puis ranger au Moyen Âge en Île-de-France', in: D. Boyer-Gardner & M. Vivas (eds.), *Déplacer les morts Voyages, funerailles, manipulations, exhumations, et réinhumations de corps au Moyen Âge,* Bordeaux: Maison des Sciences de l'homme d'Aquitaine, 605-620.

Depuydt, S., F. Kinnaer & K. van de Vijver, 2013: In de schaduw van de toren. Resultaten van het archeologisch onderzoek van het Sint-Romboutskerkhof in Mechelen (unpublished report), Mechelen: Dienst Archeologie Stad Mechelen.

Doehaerd, R., 1947: *Compte du tonlieu d'Anvers, 1365-1404,* Brussels: Palais des Académies.

Duday, H., 2007: 'Les preuves archéologiques d'une crise brutale de mortalité: Simultanéité du dépôt de cadavres, simultanéité des décès?', in: D. Castex & I. Cartron (eds.), Épidémies et crises de mortalité du passé Actes des séminaires (année 2005) de la Maison des Sciences de l'homme, Bordeaux: Ausonius, 15-21.

Duday, H., 2009: *The archaeology of the dead. Lectures in archaeothanatology,* Oxford: Oxbow books.

Duday, H., P. Courtaud, E. Crubézy, P. Sellier & A.M. Tillier, 1990: 'L'anthropologie "de terrain": Reconnaissance et interprétation des gestes funéraires', *Bulletins et Mémoires de la Société d'Anthropologie de Paris* 2(3-4), 29-50.

Dyer, C., 1998: *Standards of living in the later Middle Ages. Social change in England c. 1200-1520,* Revised edition, Cambridge: Cambridge University Press.

Flanders Heritage Agency: *De onderzoeksbalans, chapter 9 Fysisch-antropologisch onderzoek*, www.onderzoeksbalans.onroerenderfgoed.be.

Foppens, J.F., 1734: *Diplomatum Belgicorum nova collection sive Supplementum ad Opera Diplomatica Auberti Miraei, Tomustertius,* Brussels: Apud Petrum Foppens.

Gilchrist, R., 2012: *Medieval life. Archaeology and the life course*, Woodbridge: The Boydell Press.

Gilchrist, R. & B., Sloane, 2005: *Requiem. The medieval monastic cemetery in Britain,* London: Museum of London Archaeology.

Gittings, C., 1984: *Death, burial and the individual in early modern England*, London: Routledge.

Goetstouwers, A., 1956: *De oorkonden der Abdij Rozendaal der orde van Citeaux I,* Tongerlo: St. Norbertusdruk.

Gysseling, M. & W. Pijneburg, 1977: *Corpus van Middelnederlandse teksten, tot en met het jaar 1300, Reeks I ambtelijke bescheiden, 1, 1210-1283*, 's Gravenhage: Martinus Nijhoff.

Harding, V., 1998: Burial on the margin: Distance and discrimination in early modern London, in: M. Cox (ed.), *Grave concerns: Death and burial in England 1700-1850,* York: Council for British Archaeology, 54-64.

Harding, V., 2000: 'Whose body? A study of attitudes towards the dead body in early modern Paris', in: B. Gordon & P. Marshall (eds.), *The place of the dead. Death and remembrance in late medieval and early modern Europe,* Cambridge: Cambridge University Press, 170-187.

Harding, V., 2002: *The dead and the living in Paris and London 1500-1670,* Cambridge: Cambridge University Press.

Harding, V. & F.J. Ruggiu, 2005: 'Les vivants et les morts dans les métropoles de l'époque moderne', *Histoire, Économie et Société* 24-1, 89-107.

Holloway, J., 2008: 'Charcoal burial: a minority burial rite in Early Medieval Europe', in: E.M. Murphy (ed.), *Deviant burial in the archaeological record,* Oxford: Oxbow, 131-147.

Installé, H., 1991: Een veeleer traditionele economie en standenmaatschappij, in: R. van Uytven (ed.), *De geschiedenis van Mechelen. Van heerlijkheid tot stadsgewest,* Tielt: Lannoo, 193-191.

Installé, H., 1996a: 'De reguliere Kanunnikessen van Sint-Augustinus van de congregatie van Windesheim in hun klooster Bethanië', *Handelingen van de Koninklijke Kring voor Oudheidkunde, Letteren en Kunst van Mechelen* C-2, 86-97.

Installé, H., 1996b: 'Het klooster "Ter Siecke" of van de Ziekelieden', *Handelingen van de Koninklijke Kring voor Oudheidkunde, Letteren en Kunst van Mechelen* C-2, 124-126.

Installé, H., 1996c: 'Het Spaans Gasthuis', *Handelingen van de Koninklijke Kring voor Oudheidkunde, Letteren en Kunst van Mechelen* C-2, 203-204.

Jackes, M., 2011: 'Representativeness and bias in archaeological skeletal samples', in: S.C. Agarwal & B.A. Glencross (eds.), *Social Bioarchaeology,* Chichester: Wiley-Blackwell, 107-146.

Jamees, A., 1993: *De oorkonden van Pitzenburg. Commanderij van de Duitse ridderorde te Mechelen (1190-1794)*, volume II (23 januari 1300- 10 december 1344), Antwerpen: Provincie Antwerpen.

Janaway, R., 1998: 'An introductory guide to textiles from 18th and 19th century burials', in: M. Cox (ed.), *Grave concerns: Death and burial in England 1700 to 1850,* York: Council for British Archaeology, 17-32.

Jans, A.,1990: 'Oud en nieuw over Sint-Rombout', *Provinciale Commissie voor Geschiedenis en Volkskunde Jaarboek 1989-1990*, 77-84.

Joosen, H., 1935: 'Receuil de documents relatifs à l'histoire de l'industrie drapière à Malines (des origins à 1384)', *Bulletin de la commission Royal d'Histoire* 99, 365-572.

Kinnaer, F., L. Lettany, L. Troubleyn & W. Wouters, 2004: 'Het archeologisch onderzoek op de site "Huis van de Mechelaar" Befferstraat – Reuzenstraat – Zakstraat', *Nieuwsbrief 5, Mechelen: Dienst archeologie stad Mechelen en Instituut voor het Archeologisch Patrimonium,* 1-8.

Kinnaer, F., N. Merlier, B. Robberechts & L. Troubleyn, 2013: 'Het archeologisch onderzoek aan de Stompaertshoek', *Nieuwsbrief 20, Mechelen: Dienst archeologie stad Mechelen*, 2-5.

Kjølbye-Biddle, B., 1992: 'Dispersal or concentration: The disposal of the Winchester dead over 2000 years', in: S. Basset (ed.), *Death in towns. Urban responses to the dying and the dead.* Leicester Leicester University Press, 210-247.

Laenen, J., 1905: 'Les Lombards à Malines', *Bulletin du Cercle archéologique, littéraire & artistique de Malines* 15, 23-47.

Laenen, J., 1926: *Geschiedenis van Mechelen, tot op 't einde der Middeleeuwen,* Mechelen: Dierickx-Beke & Zonen.

Lauwers, M., 2005: *Naissance du cimetière. Lieux sacrés et terre des morts dans l'Occident médiéval,* Paris: Aubier.

Lewis, M.E., 2007: *The bioarchaeology of children. Perspectives from biological and forensic anthropology*, Cambridge: Cambridge University Press.

Margerison, B.J. & C.J. Knüsel, 2002: 'Paleodemographic comparison of a catastrophic and an attritional death assemblage', *American Journal of Physical Anthropology* 119, 134-143. DOI: 10.1002/ajpa.10082.

Marnef, G., 1985: 'Mechelen en de opstand. Van beeldenstorm (1566) tot reconciliatie (1585)', *Handelingen van de Koninklijke Kring voor Oudheidkunde, Letteren en Kunst van Mechelen* 89, 49-63.

Maureille, B. & P. Sellier, 1996: 'Dislocation en ordre paradoxal, momification et décomposition: Observations et hypothèses', *Bulletins et Mémoires de la Société d'Anthropologie de Paris* 3-4, 313-327.

Mays, S., 1997: 'Life and death in a medieval village', in: G. De Boe & F. Verhaeghe (eds.) *Death and burial in medieval Europe*, Zellik: Instituut voor het Archeologisch Patrimonium, 121-125.

Mays, S., 1998: *The archaeology of human bone,* London: Routledge.

Meutermans, J., 2011: *Begraven binnen of buiten de stad*, Mechelen: De ware vrienden van het archief.

Murphy, E.M., 2008: 'Introduction', in: E.M. Murphy (ed.), *Deviant burial in the archaeological record.* Oxford: Oxbow Books, xii-xviii.

Nollen, J., 2013: 'Het grafritueel', in: N. Arts (ed.), *Een knekelveld maakt geschiedenis. Het archeologisch onderzoek van het koor en het grafveld van de middeleeuwse Catharinakerk in Eindhoven, circa 1200-1850,* Utrecht: Uitgeverij Matrijs, 117-150.

Olbrechts, M., 2008: *Het geslacht Suetens, meer dan 600 jaar beenhouwers te Mechelen, 1*. Mechelen: De ware vrienden van het archief.

Parilla Hermida M., 1964: *El hospital militar español de Malinas en los siglos XVI y XVII*, Madrid: Servicio Geográfico del Ejército.

Parker G., 1996: *The military revolution and the rise of the West 1500-1800 (2nd edition)*, Cambridge: Cambridge University Press.

Parker G., 2004: *The army of Flanders and the Spanish road, 1567-1659. The logistics of Spanish victory and defeat in the Low Countries' wars (2nd edition)*, Cambridge: Cambridge University Press.

Piessens, D., 2014: De Sint-Romboutsparochie te Mechelen op het einde van de 18e eeuw: Een historisch-demografische studie, Brussels (Bachelor thesis, Vrije Universiteit Brussel).

Rahtz, P., 1981: 'Artefacts of Christian death', in: S.C. Humphreys & H. King (ed.), *Mortality and immortality: The anthropology and archaeology of death,* London: Academic Press, 117-136.

Roberts, C., 2009: *Human remains in archaeology. A handbook,* York: Council for Bristish Archaeology.

Saunders, S.R. & L., Barrans, 1999: 'What can be done about the infant category in skeletal samples?', in: R.D. Hoppa & C.M. Fitzgerald (eds.), *Human growth in the past: Studies from bones and teeth,* Cambridge: Cambridge University Press, 183-209.

Scheuer, L., 1998: 'Age at death and cause of death of the people buried in St. Bride's Church, Fleet Street, London', in: M. Cox (ed.), G*rave concerns. Death and burial in England 1700 to 1850,* York: Council for British Archaeology, 100-111.

Schotsmans, E.M.J., K. van de Vijver, A. Wilson & D. Castex, 2015: 'Interpreting lime burials. A discussion in light of lime burials at St. Rombout's cemetery in Mechelen, Belgium (10^{th}-18^{th} centuries)', *Journal of Archaeological Science: Reports* 3 464-479. http://dx.doi.org/10.1016/j.jasrep.2015.07.006.

Schwartz J.H., 1995: 'Skeleton keys: An introduction to human skeletal morphology, development and analysis', Oxford: Oxford University Press.

Sellier, P., 2011: 'Tous les morts? Regroupement et sélection des inhumés: Les deux pôles du "recrutement funéraire"', in: D. Castex, P. Courtaud, H. Duday, F. Le Mort & A-M. Tillier (eds.), *Le regroupement des morts: Genèse et diversité archéologique,* Bordeaux: Maison des Sciences de l'Homme d'Aquitaine, 83-94.

Simons, W., 2001: *Cities of ladies: Beguine communities in the medieval Low Countries (1200-1565),* Philadelphia: University of Pennsylvania Press.

Steurs, V. & J. Uytterhoeven, 1942: *De plaatsnamen van Mechelen binnen de oude wallen, I,* Mechelen.

Steurs, V & J. Uytterhoeven 1949: 'De plaatsnamen van Mechelen binnen de oude wallen, II', *Mechelse Bijdragen* XI-2, 76-93.

Stroud, G. & R.L. Kemp, 1993: *Cemeteries of the church and priory of St. Andrew, Fishergate*, York: Council for British Archaeology.

Tardieu, J., 1993: 'La dernière demeure: Archéologie du cimetière et des modes d'inhumation', in: D. Alexandre-Bidon & C. Treffort (eds.), Á réveiller les morts, La mort au quotidien dans l'Occident médiéval, Lyon: Presses Universitaires de Lyon, 223-252.

Troubleyn, L., R. Ribbens & B. Robberechts, 2006: 'Het archeologisch onderzoek op de sites Minderbroederskloosterand Begijnenstraat', *Nieuwsbrief 9, Mechelen: Dienst archeologie stad Mechelen*, 1-5

Van Daalen, I.S., 2013: *Mechelen, Sint-Romboutskerkhof. Houtsoortenonderzoek van 221 grafkisten,* Amersfoort: Earth Integrated Archaeology (EARTH 2013-25).

Van de Vijver, K., 2012: 'The uses of field anthropology on the excavation of the St-Rumbold cemetery, Mechelen, Belgium', in: P.D. Mitchell & J. Buckberry (eds.), *Proceedings of the twelfth annual conference of the British Association for Anthropology and Osteoarchaeology*, Oxford: Archaeopress, 175-181.

Van den Wijngaert, F.L., 1974: 'Het ontstaan van het Sint-Romboutskapittel te Mechelen', *Handelingen van de Koninklijke Kring voor Oudheidkunde, Letteren en Kunst van Mechelen* 78, 35-70.

Van Meerbeeck, L. 1950: L'hôpital royal de l'armée Espagnole à Malines en l'an 1637, *Handelingen van de Koninklijke Kring voor Oudheidkunde, Letteren en Kunst van Mechelen* 54, 81-125.

Van Mingroot, E., 1978: 'De oorkonden van bisschop Borchard van Kamerijk betreffende het altare van Mechelen (1116-1123). Twee diplomatische bronnen voor de kerkelijke geschiedenis van Mechelen', *Handelingen van de Koninklijke Kring voor Oudheidkunde, Letteren en Kunst van Mechelen* 82, 37-62.

Van Strydonck, M., A. Ervynck, M. Vandenbruane & M. Boudin, 2006: *Relieken: Echt of vals?,* Leuven: Davidsfonds.

Van Uytven, R., 1991a: 'De bevolking', in: R. Van Uytven (eds.), *De geschiedenis van Mechelen. Van heerlijkheid tot stadsgewest*, Tielt: Lannoo, 40-43.

Van Uytven, R., 1991b: 'Maatschappelijke verhoudingen', in: R. Van Uytven (eds.), *De geschiedenis van Mechelen. Van heerlijkheid tot stadsgewest*, Tielt: Lannoo, 53-56.

Vandenberghe, S., 1984: 'Inventaris van het Merovingisch, middeleeuws en post-middeleeuws aardewerk (faïence uitgezonderd) in het museum Hof van Busleyden te Mechelen', *Handelingen van de Koninklijke Kring voor Oudheidkunde, Letteren en Kunst van Mechelen* 88, 43-92.

Vandenbruaene, M. & S. Watzeels, 2003: 'Griezel of wetenschap – Of over de studie van mensenbeenderen, voorgesteld aan de hand van de Kluis in Mechelen', *Opgetekend Verleden* 2, Mechelen, 64-69.

Vander Ginst, V., M. Smeets & L. Kootker, 2012: Het archeologisch onderzoek aan de Minderbroedersgang te Mechelen Kessel-Lo, Kessel-Lo: Studiebureau archeologie (unpublished report. Archeorapport 110).

Veeckman, J., 1997: 'Post-medieval mortuary practices in Antwerp (Belgium)', in: G. De Boe & F. Verhaeghe (eds.), *Death and burial in medieval Europe. Papers from the 'Medieval Europe Brugge 1997' Conference*. Zellik: Instituut voor het Archeologisch Patrimonium, 71-75.

Verbeemen, J., 1953: 'De demografische studie van Mechelen (1370-1800)', *Handelingen van de Koninklijke Kring voor Oudheidkunde, Letteren en Kunst van Mechelen* 57, 63-97.

Verbesselt, J., 1950: *Het parochiewezen in Brabant tot het einde van de 13e eeuw, I, De wording van de parochiën*, Zoutleeuw: Peeters.

Waitz, G., 1883: *Annales Bertiniani*., Hannover: Impensis Bibliopolii Hahniani (Monumenta Germaniae Historica, Scriptores rerum Germanicarum in usum scholarum separatim 5).

Wood, J.W., G.R. Milner, H.C Harpending & K.M. Weiss, 1992: 'The osteological paradox: Problems of inferring health from skeletal samples', *Current Anthropology* 33-4, 343-370.

Appendix

	12–14th c	15–16th c	17–18th c	Total
Infant	26	53	49	**128**
Child	66	119	68	**253**
Adolescent	145	262	157	**564**
Adult	941	1115	1079	**3135**
Total determinate	1178	1549	1353	**4080**
Indeterminate	17	27	34	**78**
Total	**1195**	**1576**	**1387**	**4158**

	12–14th c	15–16th c	17–18th c	Total
Adult Male	295	368	365	**1028**
Adult Female	301	236	245	**782**
Total determinate	596	604	610	**1810**
Indeterminate	345	511	469	**1325**
Total	**941**	**1115**	**1079**	**3135**

	12–14th c		15–16th c		17–18th c		12-18th c	
	graves	individuals	graves	individuals	graves	individuals	Total graves	Total individuals
Single-burial	1030	1030	1188	1188	1093	1093	3311	3311
Superimposed	48	101	108	231	83	172	239	504
Multiple burial-single phase	12	33	25	117	10	36	47	186
Multiple burial-several phases	7	31	6	40	5	30	18	101
Total graves	1097		1327		1191		**3615**	
Indeterminate graves					1	10	1	10
Total individuals		1195		1576		1341	**3616**	**4112**

	Male	Female	Total
Single	782	692	1474
Superimposed	132	60	192
Multiple burial-single phase	39	19	58
Multiple burial-several phases	34	11	45
Total	**987**	**782**	**1769**

	Infant	Child	Adolescent	Adult	Total
Single	112	235	350	2552	3249
Superimposed	0	11	108	373	492
Multiple burial-single phase	12	4	72	95	183
Multiple burial-several phases	4	3	29	64	100
Total	**128**	**253**	**559**	**3084**	**4024**

	12-14th c	15-16th c	17-18th c	Total
Individuals	**1195**	**1576**	**1341**	**4112**
Coffin delineation	703	498	408	**1609**
Pins	20	115	231	**366**
Associated objects	53	181	301	**535**
Copper fittings	5	13	7	**25**
Iron coffin fittings	12	21	23	**56**
Lace chapes	4	13	13	**30**
Dress items	5	17	20	**42**
Textile remains	1	3	1	**5**
Fingerrings	1	12	11	**24**
Other jewellery	0	5	5	**10**
Devotional objects	0	8	5	**13**
Bone beads	2	3	9	**14**
Coins	9	28	31	**68**
Musket balls	0	4	3	**7**
Marbles	0	14	43	**57**
Other	12	17	27	**56**
Silver items	1	14	10	**25**

	Male	Female	Total
Individuals	**991**	**782**	**1773**
Coffin delineation	392	416	**808**
Pins	93	83	**176**
Associated objects	140	125	**265**
Copper fittings	4	9	**13**
Iron coffin fittings	16	8	**24**
Lace chapes	11	7	**18**
Dress items	17	7	**24**
Textile remains	2	1	**3**
Fingerrings	4	10	**14**
Other jewellery	2	6	**8**
Devotional objects	2	4	**6**
Bone beads	6	3	**9**
Coins	20	14	**34**
Musket balls	1	1	**2**
Marbles	15	25	**40**
Other	15	15	**30**
Silver items	9	4	**13**

	Infant	Child	Adolescent	Adult	Total
Individuals	**128**	**253**	**564**	**3089**	**4034**
Coffin delineation	51	92	159	1287	**1590**
Pins	42	16	37	268	**363**
Associated objects	43	21	55	407	**526**
Copper fittings	1	0	3	21	**25**
Iron coffin fittings	1	4	7	44	**56**
Lace chapes	0	0	2	27	**29**
Dress items	0	1	3	37	**41**
Textile remains	1	0	0	4	**5**
Fingerrings	0	0	2	21	**23**
Other jewellery	0	0	0	10	**10**
Devotional objects	0	0	2	11	**13**
Bone beads	1	0	1	12	**14**
Coins	0	1	11	54	**66**
Musket balls	0	0	1	5	**6**
Marbles	0	3	3	50	**56**
Other	1	2	4	47	**54**
Silver items	1	0	1	19	**21**

Body	12-14th c	15-16th c	17-18th c	Total
Supine	1105	1376	1210	**3691**
Prone	12	14	18	**44**
Side right	7	4	5	**16**
Side left	3	4	6	**13**
Total	**1127**	**1398**	**1239**	**3764**
Legs				
Extended	851	922	789	**2562**
Flexed	11	22	25	**58**
Crossed legs	5	7	2	**14**
Crossed ankles	1	0	3	**4**
Different	5	7	5	**17**
Total	**873**	**958**	**824**	**2655**
Arms				
Extended	231	144	125	**500**
Flexed	105	100	56	**261**
Crossed	126	238	234	**598**
Hyperflexed	1	9	4	**14**
Different	234	249	160	**643**
Deviant	3	6	2	**11**
Total	**700**	**746**	**581**	**2027**

Body	Male	Female	Total
Supine	891	746	**1637**
Prone	8	3	**11**
Side right	5	0	**5**
Side left	3	1	**4**
Total	**907**	**750**	**1657**
Legs			
Extended	682	581	**1263**
Flexed	6	9	**15**
Crossed legs	4	3	**7**
Crossed ankles	1	0	**1**
Different	3	5	**8**
Total	**696**	**598**	**1294**
Arms			
Extended	144	145	**289**
Flexed	82	57	**139**
Crossed	188	128	**316**
Hyperflexed	3	5	**8**
Different	197	165	**362**
Deviant	3	2	**5**
Total	**617**	**502**	**1119**

Body	Infant	Child	Adolescent	Adult	Total	Multiple burials
Supine	97	238	430	2864	**3629**	269
Prone	4	2	16	21	**43**	38
Side right	2	2	4	7	**15**	6
Side left	1	3	5	4	**13**	4
Total	**104**	**245**	**455**	**2896**	**3700**	317
Legs						
Extended	29	144	298	2065	**2536**	232
Flexed	16	8	15	19	**58**	16
Crossed legs	0	1	4	8	**13**	6
Crossed ankles	0	0	1	3	**4**	1
Different	4	1	1	11	**17**	3
Total	**49**	**154**	**319**	**2106**	**2628**	258
Arms						
Extended	17	46	42	393	**498**	14
Flexed	9	19	35	197	**260**	26
Crossed	6	21	118	450	**595**	97
Hyperflexed	0	0	2	12	**14**	4
Different	11	44	66	520	**641**	55
Deviant	0	2	1	8	**11**	25
Total	**43**	**132**	**264**	**1580**	**2019**	**221**

	12th-14th c	15th-16th c	17th-18th c
N	0	4	4
NNE	0	0	0
NE	2	4	4
ENE	7	3	9
E	2	8	6
ESE	6	12	1
ES	1	11	9
SSE	0	7	3
S	6	11	7
SSW	17	68	46
SW	73	106	179
WSW	589	465	476
W	292	383	271
WNW	56	147	88
NW	18	47	52
NNW	4	12	14
Total	**1073**	**1288**	**1169**

Taking stock of burial archaeology

An emerging discipline in Denmark

Lene Høst-Madsen

Burial archaeology in Denmark

Burials are one of the most highly regulated facets of a society. The customs and practices that regulate burials relate to religion and belief, and this makes the burial context different than other archaeological phenomena. This is also why burials are an outstanding source for investigating religious life of a society.

Protestantism has been the dominant form of Christianity in Denmark since 1536. This date also marks the end of the medieval period in Denmark. There is no strong tradition for archaeological excavation and documentation of Protestant cemeteries primarily because most of these cemeteries are still active. In this paper, I introduce the current state of burial archaeology in the post-medieval period in Denmark beginning with an examination of the guidelines and laws for working with archaeological excavations of burials in and outside existing cemeteries. I then review the studies of Protestant burials that have been carried out within the last 30 years, beginning with an investigation of the material culture of the coffins of two royal children buried in the Roskilde Cathedral excavated in the 1980s. I continue with a discussion of a series of archaeological excavations of cemeteries carried out from 2001 to 2011, including the Assistens Cemetery containing burials as recent as 1988. I conclude the introduction with a discussion of a World War II battlefield grave, which I argue is an example of a special case where the grave should be protected on site. Following the introduction, there is a general discussion of the problems and the potential regarding burial archaeology of modern graves. Post-medieval burial archaeology can provide new and important information, and the central question is what we gain from working with post-medieval burial archaeology.

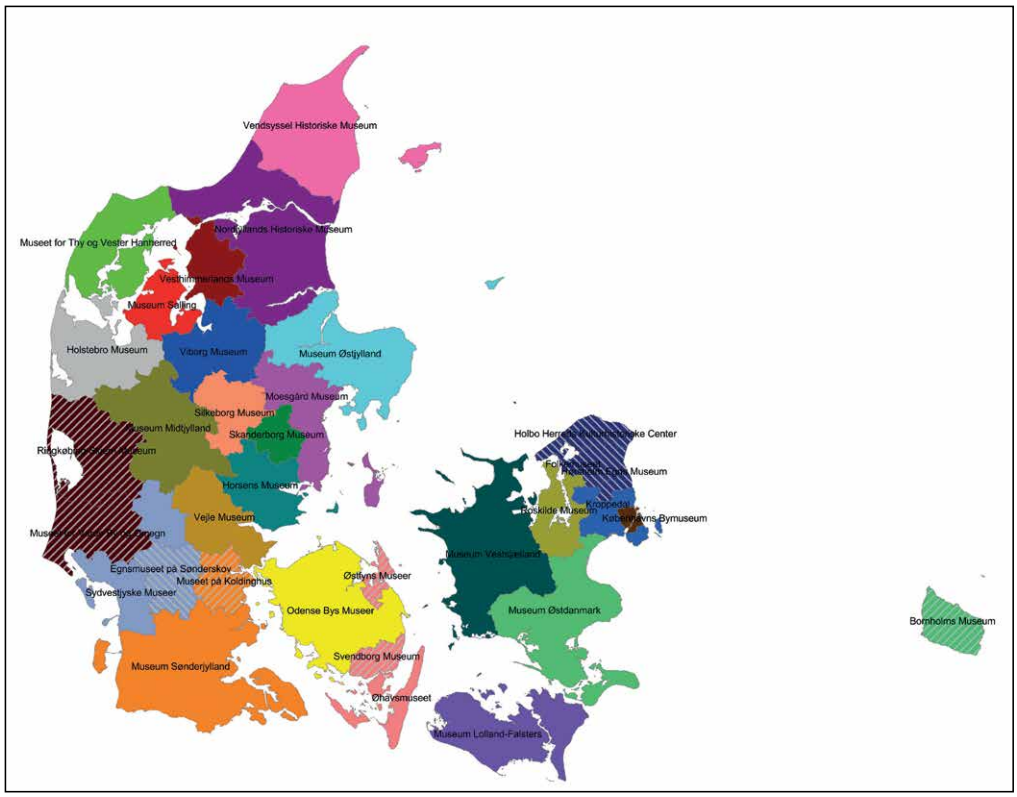


Fig. 1: Jurisdictions of archaeological responsibility in Denmark 2014 (Danish Agency for Culture).

Danish burial traditions and legislation

The post-medieval Protestant dominance in Denmark has significant implications for how the dead were perceived. Because bones themselves are not sacred in Protestantism, the normal procedure is that a grave will remain intact for 25 years and then, unless the family wishes to continue paying rent for the use of the plot, the grave is dug up, and a new burial can take place in the same plot.

In Denmark, cemeteries are connected to churches and as such, a body of laws pertaining particularly to them is in place under the Ministry of Ecclesiastical Affairs. When it comes to archaeological interests, the National Museum is responsible for historical investigations as well as archaeological studies of soil layers and burials in existing cemeteries. When it comes to graves in abandoned cemeteries and burials outside church grounds, the general Museum Act is applicable.[1]

In Denmark, as in the Netherlands, the Valetta Convention and 'the polluter pays' principle come into affect when development of archeological sites is involved.[2] As is the case in most countries, archaeological excavations are almost always connected to construction projects and rarely are they financed by research dollars.

1 Lov nr. 1247; Lov nr. 1391.
2 VALLETTA 1992.

The main difference between Danish and Dutch legislation is that in Denmark there is no tender process on 'development led' archaeology. In Denmark, local museums, divided into 40 administrative districts, are in charge of archaeological work (Fig. 1). These museums relate directly to the Danish Agency for Culture. The Agency for Culture has to approve the rationale of any archeological work, assure quality control, and approve the budgets of all archaeological excavations conducted under the aegis of the Museums Act.

The history of post-medieval osteoarcheology in Denmark

We will look at a sample of archaeological investigations of burials dating from the 17th to the 20th century in Denmark conducted during the last 30 years, and a selection of the most significant projects will be discussed.

The tradition of archaeological documentation of graves from the post-medieval period in Denmark is not well established. There are several reasons for this. First, most modern cemeteries are still actively used today. The dismantling of graves occurs as a part of the normal cycle of old graves being dug up to make room for new burials. This work is undertaken by the church and is not normally documented for archeological purposes. Second, when it comes to archaeological excavations, there has been a tendency to ignore the dismantling of post-medieval graves, that is, when more recent burials are dug up to reveal medieval graves, grave details are recorded only for the medieval graves but not for the more recent ones. Fortunately, this is changing, and we are seeing a steady increase in the excavation and investigation of post-medieval burials. However, the published material on these burials is still very limited and generally of a provisional character.

One of the earliest examples of osteoarchaeology is an investigation from 1981 of several royal graves in a chapel at Roskilde Cathedral (Fig. 2, 1). The work took place during the restoration of the coffins of two young children, Prince Frederik Christian (1625-1627) and Princess Maria Cathrine (1628), the children of Kirsten Munk and Christian IV the King of Denmark and Norway. The focus was on the textiles in the coffins and not on the bodies because the only archaeological find of 17th-century brocade-knitted waistcoats originated from these graves as both children were wearing one.[3] The bodies were very well preserved and this led to the documentation of the textiles, so it is worth asking whether this investigation can be classified as osteoarchaeology. Still, the results suggest that post-medieval burials are important sources of information.

Almost twenty years would pass before another osteoarchaeological investigation of a grave crypt was conducted. As part of the renovation of Sankt Olai Church in Elsinore (Fig. 2, 2), 60 well preserved burials in crypts from the 18th century were documented and then encased in the church's new concrete floor. The burials were documented by physical anthropologist Pia Bennike from the Panum Instituttet and curator and archaeologist Lone Hvass from the local museum in Elsinore. The work is published in Elsinore Museum's Yearbook.[4]

3 Kruse *et al.* 1988, Ringaard 2014, 75.
4 Hvass *et al.* (eds.) 2002.

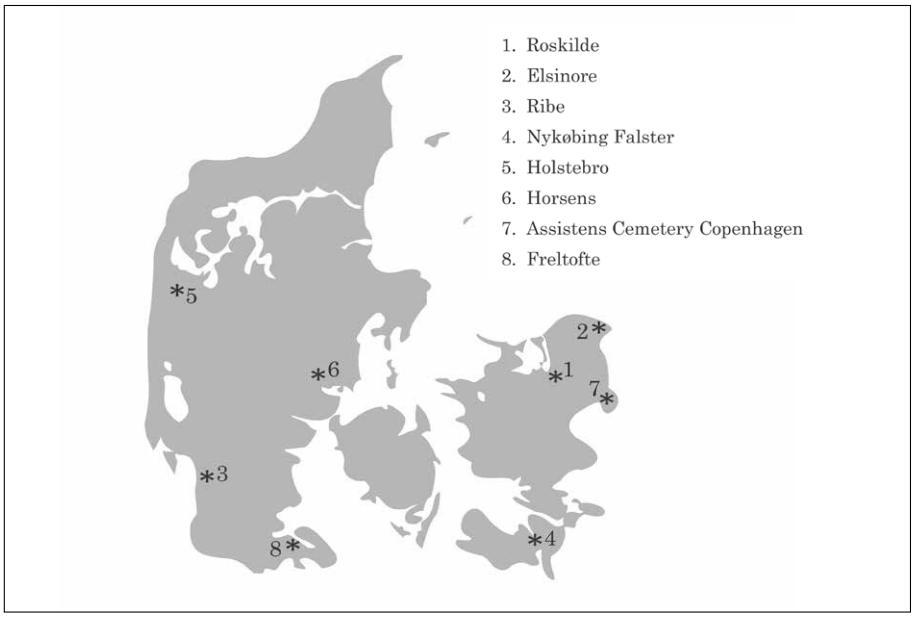


Fig. 2: The location of sites discussed in the text (Lene Høst-Madsen).

In the southwestern part of Denmark, at Ribe Cathedral, at a site called Lindegaarden, 503 individuals were excavated (Fig. 2, 3). Twenty-seven of the graves were situated in the Cathedral's ambulatory and were dated to around 1700. The excavation was of high quality with clear documentation of the outlay of the cemetery, the building structures, and the coffin assemblages, followed by a thorough physical anthropological analysis of the bone material. The results of the excavations have been published in an annual book on excavations from the area.[5]

The investigations at Roskilde Cathedral, Sankt Olai Church, and Ribe Cathedral represent burials from two crypts and one processional walkway. The practice of burial inside church buildings in Denmark was very popular from the medieval period onwards, as close proximity to the house of God was seen as closeness to God. As urbanization increased in the 18th century, the practice decreased and was finally forbidden by a Royal Resolution passed on February 22, 1805.[6]

The only exception to the Resolution was the burial of members of the royal family. They have been buried in Roskilde Cathedral since the 15th century. In 2013, preparation of a crypt for the eventual burial of Queen Margrethe II and her husband Prince Henrik began and as a result, an excavation in the Cathedral ensued, carried out by the National Museum. The results have not yet been published, but the excavation was closely monitored by the public through a number of newspaper stories that reported on its process.[7]

5 Madsen & Søvsø 2010.
6 Lovbekendtgørelse LBK nr 906.
7 Ritzau 2013; Brudvig, 2013.

The next five cases are of a more general archaeological nature; they are earthen graves outside church buildings in existing or abandoned cemeteries, and as such, are similar to the prehistoric and medieval graves that fall within the jurisdiction of the Museums Act. The only difference is their post-medieval dating.

The first example, from around 2001, is an abandoned cemetery in southern Denmark that had been in use until around 1940 (Fig 2, 4). At some point it was incorporated into a parking lot for a large supermarket chain. The extensive discussion, primarily based on the ethics of digging up graves, included representatives from the Danish Agency for Culture, museum staff, and religious leaders who favored leaving the dead alone and protecting the site.[8] In the end, the project was halted because of negative publicity, and the cemetery is still sealed by the parking lot.

On the west coast of Jutland, in the city Holstebro, an excavation at the central city church also caused a stir (Fig. 2, 5). In 2007-08, part of a cemetery that had been abandoned in 1865 was to be excavated. Some of the local priests opposed bringing the excavated bodies to the Panum Instituttet in Copenhagen for physical anthropological analysis. Newspapers covered the story extensively; again the main concern was the ethics of disturbing graves. Lutheran bishops spoke in favor of not disturbing the grave peace for 200 years, but their wish was not granted. The case was resolved by the reburial of 111 individuals out of the 293 excavated, although the remains were not reburied in the same place they had been taken from. One-hundred-and-eighty-two individuals of medical interest are still deposited at the Panum Instituttet. All the excavated bone material underwent physical anthropological analysis before reburial, and the archaeological as well as the anthropological results are published in the yearbook from Holstebro Museum.[9]

A further excavation took place at a cemetery in Horsens on the east coast of Jutland, which is slightly older than the one in Holstebro (Fig. 2, 6). Approximately 500 individuals from the 18th century were excavated and underwent physical anthropological analysis. The results are published in an anthology on historical archaeology.[10]

The excavation of Assistens Cemetery in Copenhagen is the most recent cemetery excavated in Denmark (Fig. 2, 7). Even though the Metro Company has been criticised for choosing the Assistens Cemetery as a location for a station, the public has generally accepted and been interested in the excavations and the research results. The Assistens Cemetery – a cemetery without a church–opened in 1785 and was established as an overflow for churchyards in the increasingly crowded city. The area that was excavated was originally incorporated into the cemetery in 1806 and was reserved for parishioners from Trinitatis Church in the city centre. According to cemetery records, coffin burials took place in the area until 1984 and cremation burials until 1988.

8 Sørensen, 2001; Steens 2008.
9 Thomsen 2008; Bennike 2008.
10 Grønfeldt 2012.

The excavation took place between December 2009 and February 2011 and was carried out under a separate agreement between the Museum of Copenhagen, the cemeteries of Copenhagen, the Ministry of Ecclesiastical Affairs, and the Metro Company. The work was carried out in accordance with the Danish Agency for Culture's standards and guidelines, and in many ways exceeded the work that would have been allowed under the Museum Act (Fig. 3).[11]

In all, 854 in situ inhumations and 81 cremations were excavated. Significant issues in the project were the ethical requirements inherent in the excavation of a cemetery from such a modern period. A set of ethical strategies was decided upon before the excavation began. Among other things, all the excavations of human remains were conducted under tents. All soil removed from the site was sifted for bones, and all the coffins, skeletons, and their associated artefacts were retained on site, recorded, and reburied in a new location in the cemetery during the fieldwork phase of the excavation. To ensure a high standard of documentation, a laboratory with a portable x-ray machine was set up on site and all skeletal remains, as well as other finds, were thoroughly investigated and documented before reburial.[12] As a result, the post-excavation analysis was done on site.

The last and most recent case study I would like to discuss in this short revue is the excavation of a single soldier's grave on a battlefield in the southern part of Denmark at Freltofte (Fig 2, 8). Museum Sønderjylland, the local museum, is aware that there are many unidentified soldiers buried in this particular area as this was the site of a large battle between Denmark and Germany in 1864. Based on historical sources, it is estimated that more than 100 soldiers lost their lives. Only a small number of graves have been identified. The museum monitors all development in the area to try to prevent the destruction of unidentified graves.

In 2013, a single soldier grave was found in connection with a water pipe project. The identification of the burial as a battle grave was based on a find of lead bullets in a cartridge bag typical for a Danish soldier from 1864. As soon as it was established that the skeleton belonged to a soldier, the water pipe project was halted. It was decided that the pipe would be located some distance from the grave so that it would not be disturbed. The soldier was reburied along with his belongings, including a bronze wedding ring. The grave was further protected by a stone marker erected on April 9, 2014 with the inscription: 'Here rests/An unknown Danish soldier/Died March 17, 1864/Grave discovered 2013/This stone erected in 2014' (Fig. 4).[13]

It is unfortunate that no further archeological excavation were carried out as soon as it was determined that the remains were from a soldier. Even a limited physical anthropological analysis combined with an attempt to determine whether there were more individuals in the grave would have provided important knowledge about the buried individual.

11 Anthony *et al.* 2016, 8ff.
12 Anthony *et al.* 2016, 60.
13 Ethelberg & Kristensen 2014.

Fig. 3: Assistens Cemetery during excavation (Museum of Copenhagen).

Fig. 4: The unknown soldier memorial, near Freltofte (photo: Lene Høst-Madsen).

April 9, 1940 was the date of the World War II German invasion of Denmark and 2014 was the 150th anniversary of the end of the 1864 war. To erect the commemorative stone on these two anniversaries sent out a powerful signal. Because of the proximity of this area to the German border, many families were directly affected by both World War I and II, and they still elicit a lot of emotion.

Even though the wars are long over, historical memory in the area still runs deep and many physical signs of the wars are present in the form of memorials. In light of this, it made good sense to keep the soldier in situ. In situ protection also corresponds well with the intent of the Danish Museum Act. However, in the end, the grave was not protected because the farmer who owned the field had second thoughts; the stone was moved the edge of the field and the grave itself is unmarked and unprotected. Eventually it will be destroyed through repeated cultivation.

Taking stock

We have now looked at a sample of archaeological investigations of burials in Denmark dating from the 17th to the 20th century, conducted during the last 20 years. It is clear that there have been significant developments in the field. We have focused on excavations of approximately 2,000 burials (Elsinore – 60, Ribe – 503/27, Holstebro – 293, Horsens – 500, Copenhagen – 935).[14] These archaeological investigations were supplemented with a variety of development-sponsored excavations that were undertaken in areas with modern graves. The results and documentation in these cases often remain unpublished. I would estimate that there have been about 20-30 cases in the last ten years in addition to the National Museum's church studies. Most of these contained only a small number of burials. This means that museums continuously carry out archaeological development-led excavations of more recent burials in Denmark and that the importance of doing so is no longer questioned.

In the spring of 2014, the Danish Agency for Culture and the Ministry of Ecclesiastical Affairs jointly issued guidelines on archaeological excavations of abandoned cemeteries.[15] These guidelines do not question the significance of archaeological investigations in connection with development work on abandoned cemeteries. Rather, the focus of the guidelines is on the physical anthropological and ethical aspects of investigations and to a lesser extent on the material culture (coffin handles, clothing, false teeth, beads, pins, artificial flowers, etc.).

The ethical aspects

Even though in Protestant belief human bones are not sacred, ethical questions have still dominated the discussion of excavations of post-medieval graves. The simplest solution to the ethical problem is in situ conservation, which is in line with the intent of the Museum Act. However, the majority of archaeological excavations conducted are the direct result of development, and destruction of graves is inevitable. In the case of the battlefield grave in southern Jutland, it was possible to relocate the pipeline and thus protect the tomb; the problem was that the area was not protected afterwards. This links into another key issue, that abandoned cemeteries are not protected. There is nothing to prevent development and excavation in these areas. Here ethical considerations come into play, as they always should when it comes to the excavation of cemeteries. The Ministry of

14 Hvass *et al.* 2002, Madsen & Søvsø 2010, Thomsen 2008, Petersen 2012, Anthony *et al.* 2016.
15 Vejledning nr. 9315.

Ecclesiastical Affairs/Agency for Culture guidelines, Chapter 9, regarding best practice "*Gode råd om arkæologiske undersøgelser på kirkegårdsarealer*" suggests that before any excavation begins, a clear and precise agreement between the different partners in the project (landowner, church, archaeologists) should be worked out on the following points:

- Protection of the archaeological area of interest from the public, e.g., fencing.
- Protection of specific areas within the site from excavation, e.g., protecting graves of a certain depth if the construction work will be shallow.
- Collecting all loose finds on the site and covering up skeletons every day before works halts for the day.
- The subsequent treatment and storage of bone material.
- Possible reburial of bone material.
- A joint press strategy.
- A joint strategy for dialogue with local residents.
- Restoration of the area after excavation.
- How to handle possible unexpected findings during construction work.[16]

The excavation at Assistens Cemetery is to date the only excavation where ethical considerations were taken into account; skeletal material was not shown to the public while the investigation was in progress and individuals were reburied on site. Such far reaching measures do not necessarily need to take place at every site. The key is to take a position on the issue in the initial stages of the planning of the archaeological work, and it is essential for archaeologists to be in constant dialogue with the church and the public.

It is worth noting that it is the church that has been most critical in relation to archaeological excavations of more recent burials and not the public, and its criticism focuses mainly on a desire to have the dead reburied and perhaps the grave peace extended.

My experience of working with excavations of post-medieval graves in Copenhagen for more than ten years is that the public generally thinks that it is good to have archaeologists conducting the work instead of having the dead removed by construction equipment.

Osteoarchaeology

Abandoned cemeteries provide us with information on lifestyle and living conditions of people buried there, and the study of them is deeply rooted in physical anthropological studies: What was their diet? What was the state of their health? Did they experience periods of hunger? Was there a population group that differed significantly from other residents? Which diseases did they suffer from? Are there any signs of disease treatment? How tall were they? How old? There is no doubt physical anthropological analysis is the way to obtain knowledge on these very important questions. The large-scale archaeological excavations of human remains discussed in this paper make evident that bone material can be an excellent source of information on living conditions through the centuries. Most of the studies

16 Vejledning nr. 9315.

discussed in this article were of a high calibre, and the studies were accompanied by thorough physical anthropological studies. The many burials in the major excavations discussed above (approximately 2,000) were situated primarily in towns (the only exception being the soldier from Freltofte), which means that there is a significant amount of bone material that can help us understand urban life in the 1700s and 1800s. Some of the Copenhagen material is as recent as the mid-1900s.

Peter Tarp from Antropologisk Afdeling ved Retsmedicinsk Institut, Syddansk Universitet i Odense, abbreviated as ADBOU, has compared the post-medieval bone material from Horsens with bone material from a medieval cemetery from the same city. He concludes that life expectancy increased by some four years between the medieval period and the 1700s. Leprosy disappeared and the first signs of cancer appeared. The appearance of cancer may be related to higher life expectancy and unhealthy lifestyle practices like smoking.[17] The popularity of tobacco smoking in the 17th and 18th centuries can be clearly seen on teeth that have been affected by chewing on clay pipes; this is one of the significant features that typically comes to light in studies of graves from the 1700s (Fig. 5). Another example of the effects of the modern lifestyle is carious lesions that, like tobacco, have a clear connection to the colonies, in this case the importation of sugar.

Fig. 5: Cranium from the Ribe excavation with clear tooth marks from pipe smoking (HAM/Sydvestjyske Museer).

17 Tarp 2012, 9.

Rickets and scurvy, both of which were detected in the remains of children at Horsens and Assistens Cemetery, are the result of malnutrition, and scurvy indicates limited access to sunlight. Furthermore, both diseases are considered to be affects of industrialization and urbanisation. Even though there is no comparative material from rural communities to help us understand rural living conditions, the data we do have indicates that urban life had its dark side, just as it does today.[18]

There can be no doubt that further research on human development in earlier and modern periods would be highly relevant. However, in Denmark, 'rescue' archeology does not generate research money; the developer is only obliged to pay for post-excavation analysis directly related to the excavated material and conservation but not for further research. This means that there is no money for synthetizing the data and publishing, which is probably the main reason for the lack of research done on bone material. Fortunately, but unusual, external funding has been secured for a postdoctoral thesis at the Panum Instituttet on the human osteological remains from the Assistens Cemetery. This research will focus on the impact of urbanisation and industrialization on the human body in the 19th and 20th centuries and will hopefully reveal some of the potential this material possesses.

Material culture

There is no doubt that material culture connected to cemeteries is accompanied by the same problems as the osteological analysis mentioned above. More research in classic archaeological studies such as the establishment of typology and possibly chronologies for grave outlines, coffin types, and the various ways that people have commemorated the dead throughout this particular period would increase our understanding of life in the 18th to 20th centuries.

Visible grave memorials are often well documented, and like church and cemetery records, contain a wealth of information on the function of the cemetery. New information may appear from future archaeological investigations. In studies of Assistens Cemetery, it was evident that the deaths of some individuals in the cemetery were not recorded in the church records. This was true, for example, for an area under a tree where apparently infant children were buried outside the cemetery's otherwise strict architectural lines. This also shows some of the potential in spatial analysis (Fig. 6).[19]

Emotion

All tangible material culture in the form of coffin handles, casket designs and linings, textiles, and the form of burial is an important avenue of research in which the individual story can be given a personal touch. It is interesting, for example, that the wedding ring from the soldier grave, like objects from the tombs of Assistens, remained with the dead.

Two graves from the Assistens Cemetery, that of a two-and-a-half years old child buried with a red rubber ball and a child of 15 months buried with a porcelain doll, are examples of how emotions can be uncovered through the study of grave objects

18 Petersen 2012, 293, Anthony *et al.* 2016, 261.
19 Høst-Madsen 2012, 573.

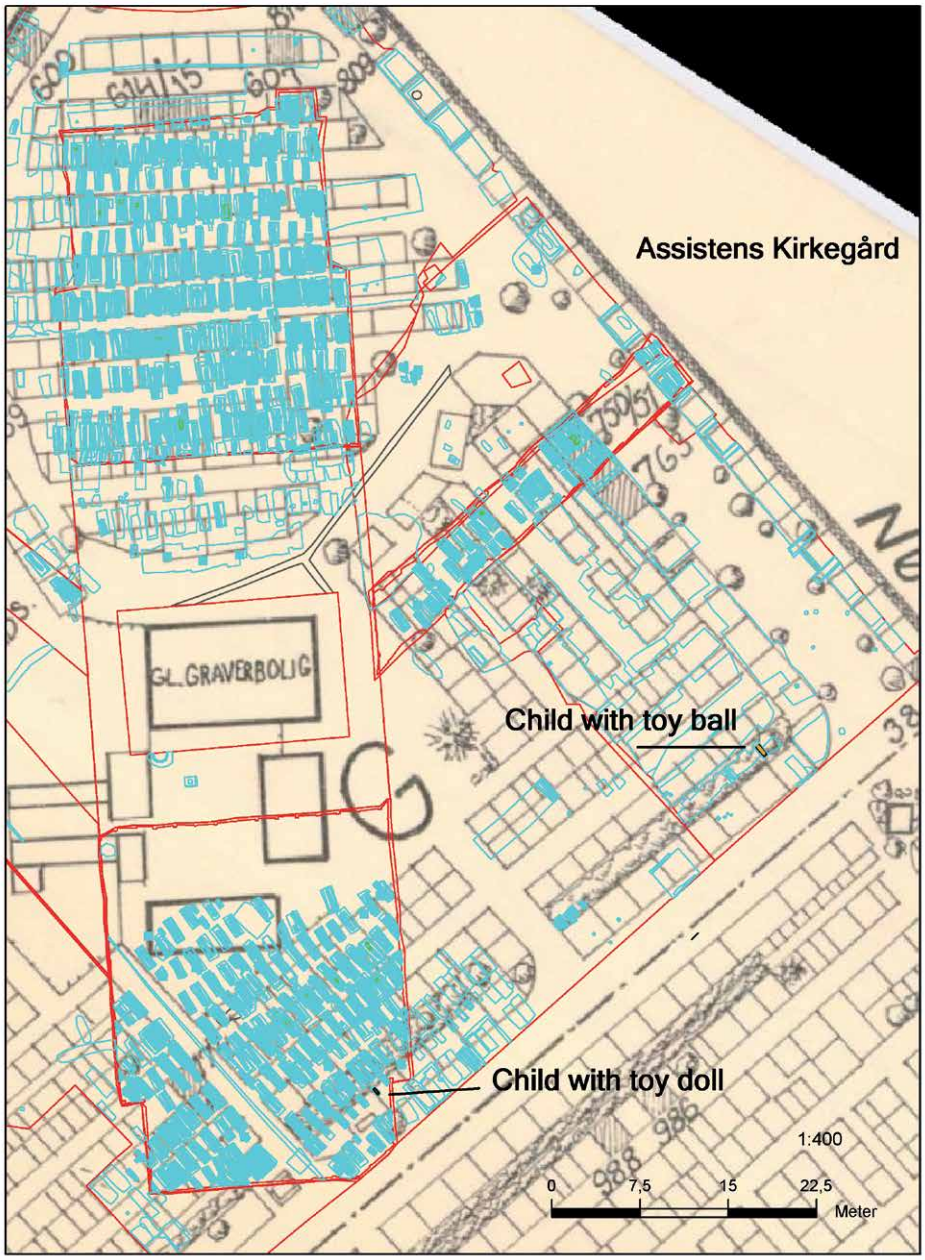


Fig. 6: Distribution of children's graves at Assistens Cemetery (Museum of Copenhagen).

(Fig. 7). When this material culture is held alongside the physical anthropological evidence that the first child had scurvy and the child with the doll suffered from rickets, we can picture poor nutrition combined with love and care.[20]

20 Høst-Madsen 2012, 575.

Fig. 7: Two graves, one with a child and a ball, one with a child and a doll (Museum of Copenhagen).

The royal children buried in the Roskilde Cathedral were of a very different social category and time period than the children from Assistens. Here research is dominantly based on historical and iconographical sources and on the textiles recovered from the coffins; no osteological analysis was performed, and in that sense this investigation can be seen as the best indicator of the potential of the historical approach. However, a sense of the emotion that is connected to child burials is still present. Charlotte Paludan describes the opening of the coffins as follows: 'Amidst the strange display of beauty and magnificence in conjunction

with discoloration and decomposition the two children's corpses in their silk garments mixed with silver and gold thread, gems and pearls formed a daunting *memento mori*'.[21] The analysis of the royal children's graves would have benefited from anthropological analysis, but they also clearly show the potential of material culture. Paludan concludes: 'After careful examination and photographing, the children and their burial clothes were once more laid to rest in their coffins and placed in the crypts of Roskilde Cathedral'.[22]

Conclusion

In this paper, I have introduced the current state of the archaeological work in post-medieval burial archaeology in Denmark, beginning with guidelines and laws. This was followed by a review of the published studies of Protestant burials carried out within the last 30 years. I end my paper by discussing the problems and the potential regarding burial archaeology of modern graves in Denmark.

There is no doubt that archaeological and osteological analysis provide important new knowledge regarding life and death, health and disease, love and belief in Danish society and that this knowledge is important for understanding the past and maybe even improving health in our society.

Archaeological and anthropological work turns bodies into archaeological objects. Therefore, it is necessary to incorporate ethical expectations into any archeological work carried out. This will ensure that while important new knowledge that has relevance for our understanding of the past as well as the present is gained, the dead will still be handled with respect. Modern detection methods can easily record the bodies and the material culture for posterity before the bodies are reburied. However, this does not mean that objects and bones should not be registered. This can be done with modern methods, and samples of physical anthropological material can be taken.

Based on the developments within this field during the last decade and the new guidelines, we have come a long way, but there is still a lot that needs to be done. When looking at archeological burial material, it is clear that it is primarily from urban sites. Future research projects would benefit from documenting rural graveyards for comparison of both material culture and osteology. Hopefully, there will be more research and publications on the material that has already been excavated. Results is the best way to justify the importance of burial archaeology.

Acknowledgements

Many people have helped during the process of writing this paper, but each and every mistake is of course mine alone. I would like to thank Jeroen Bouwmeester for inviting me to this important conference. I am grateful to Susan Dahl Mahler for her correction of my script and the colleagues at my former workplace at the Museum of Copenhagen, Marie Louise Jørkov, Jane Jark Jensen, Hanna Dahlström, and Hoda El-Sharnoby. The local museums of many of the locations have also been of great help especially Morten Søvsø from Sydvestjyske Museer, Lennart

21 Paludan 1988, 253.
22 Paludan 1988, 259.

Madsen and Tenna Kristensen from Museum Haderslev and Niels Terkildsen from Holstebro Museum.

Bibliography

Ahlefeldt-Laurvig, J., 1980: 'Clay Pipes from Denmark', in: P. Davey (ed.), *The archaeology of the clay tobacca pipe IV, Europe 1*, Oxford (BAR International series 92), 219-251.

Anthony, S., J. Johannsen, M. Jørkov & M. Keenan, S. 2016: *Assistens Kirkegård Nørrebros Runddel, Metro Cityring Project, KBM 3830, Nørrebro* (Kulturstyrelsen j.nr.: 2010-7.24.02/KBM-0015, Unpublished Excavation Report).

Brudvig, M., 2013: 'Arkæologer forbereder dronning Margrethes grav', *Politiken*, 21 June 2013. Retrieved on 12 April 2017, from: http://politiken.dk/kultur/ECE2001165/arkaeologer-forbereder-dronning-margrethes-grav/

Edelberg, P. & T. Kristensen 2014: 'Den ukendte soldat', *Arkæologisk Forum,* vol. 31, 8-15.

Gaimster, D., 2012: 'Dealing with the archaeology of the modern world in northern and central Europe: Past experience and future prospects', in: H. Harnow, D. Cranstone, P. Belford, & L. Høst-Madsen (eds.), *Across the North Sea. Later Historical Archaeology in Britain and Denmark, C. 1500-2000 AD,* Sheffield (University of Southern Denmark Studies in History and Social Sciences, 444), 51-61.

Grønfeldt, C., 2012: 'Where People tread you do not bury your dead', in: H. Harnow, D. Cranstone, P. Belford, & L. Høst-Madsen (eds.): *Across the North Sea Later Historical Archaeology in Britain and Denmark, C. 1500-2000 AD,* Sheffield (University of Southern Denmark Studies in History and Social Sciences, 444), 287-296.

Høst-Madsen, L., 2012: 'Childhood in Archaeology', in: M.F. Hurley (ed.), *Kindheit und Jugend, Ausbildung und Freizeit* (Lübecker Kolloquium zur Stadtarchäologie im Hanseraum VIII), 565-582.

Hvass L.,T. Bill-Jessen, L. Madsen, P. Jensen, Aagaard (eds.), 2002: *Helsingør Kommunes Museer 2001. Restaureringen af Helsingør Domkirke 2000 – 2001 og undersøgelse af de borgerlige begravelser.*

Jensen, J. & H. Dahlström, 2009: *Beretning for Skt. Clemens I og III. Udgravning af den nordlige del af kirkegården tilhørende den middelalderlige Skt. Clemens kirke*, Københavns Bymuseum (Unpublished Excavation Report).

Kruse, A., B. Johannesen, C. Paludan, L. Warburg, E. Østergård 1988: *Fru Kirstens børn – to kongebørns begravelser i Roskilde Domkirke*. Nationalmuseet.

Lynnerup, L. & L. Harvig, 2012: 'The Ethics of Anthropological Analysis of Human Remains', in: H. Harnow, D. Cranstone, P. Belford, & L. Høst-Madsen (eds.), *Across the North Sea. Later Historical Archaeology in Britain and Denmark, C. 1500-2000 AD,* Sheffield (University of Southern Denmark Studies in History and Social Sciences, 444), 297-303

Madsen; H & M. Søvsø, 2010: 'Liv og død i Ribe omkring år 1700 – de gravlagte i processionsgangen syd for Ribe Domkirke', *By, Marsk og Geest. Kulturhistorisk årbog for Sydvestjylland,* 56-75.

Paludan, C., 1988: 'Med guld tilredt og perlestukket, silkebredt', Kruse, A., B. Johannesen, C. Paludan, L. Warburg, E. Østergård, *Fru Kirstens børn – to kongebørns begravelser i Roskilde Domkirke, Nationalmuseet*, 65-128. English summary by D. Hohnen, 253-259.

Petersen, C., 2012: 'Where People Tread You do not bury Your Dead'. I; Harnow, H., Cranstone, D. Belford, P. and Høst-Madsen, L. (eds.), *Across the North Sea. Later Historical Archaeology in Britain and Denmark, C. 1500-2000 AD,* Odense. Sheffield (University of Southern Denmark Studies in History and Social Sciences, 444), 287-295.

Reeve, J. & M. Adams, 1993: *The Spitalfield Project, Volume 1. The archaeology across the Styx*, York (Council for British Archaeology research report 85).

Reeve, J. & M. Cox, 1999: 'Research and our recent ancestors: post-medieval burials grounds', in: J. Downes, T. Pollard (eds.), *The Loved Body's Corruption: archaeological contributions to the study of human mortality*, Glasgow, 159-170.

Ringgaard, M., 2014: 'Silk Knitted Waistcoats: A 17th-century fashion item', in T.E. Mathiassen, M.-L. Nosch, M. Ringgaard, K. Toftegaard & M.V. Pedersen (eds.), *Fashionable Encounters. Perspectives and Trends in Textiles and Dress in the Early Modern Nordic World,* Oxford and Philedelphia (Ancient Textiles Series 14), 73-103.

Ritzau, 2013: 'Dronningens grav snart klar', *TV2/Nyheder*, 19 June 2013. Retrieved on 12 April 2017, from: http://nyhederne.tv2.dk/article.php/id-69625056:dronningens-grav-snart-klar.html.

Sørensen, L.K., 2001: 'FDB vil bygge på kirkegård', *Kristeligt Dagblad*, 29 June 2001. Retrieved on 12 April 2017, from: http://www.kristeligt-dagblad.dk/kirke-tro/fdb-vil-bygge-p%C3%A5-kirkeg%C3%A5rd

Steens, J., 2008: 'Ind til benet på historien', *Kristeligt Dagblad*, 21 February 2008. Retrieved on 12 April 2017, from: http://www.kristeligt-dagblad.dk/kirke-tro/ind-til-benet-p%C3%A5-historien.

Tarp, P., 2012: 'Månedens skeletfund', *Nyhedsbrev fra ADBOU,* Nyhedsbrev nr. 4, January 2012, 6-10.

Thomsen, T., 2008: 'Udgravningen af Holstebro Kirkeplads', *Holstebro Museums Årsskrift,* 10-24.

Winther, S. 2009: *Af jord er du kommet. En analyse af Kirkegården ved Farimagsvejen set i et kulturhistorisk og tværfagligt perspektiv samt en vurdering af nyere tids arkæologi*, Copenhagen (Unpublished M.Sc. dissertation. University of Copenhagen).

Danish official publications and documents

Law no./Lov nr. 1247, Approved 18 December 2012, https://www.retsinformation.dk/Forms/R0710.aspx?id=144650.

Law no./Lov nr. 1391, Approved 23 December 2012, https://www.retsinformation.dk/forms/r0710.aspx?id=144939.

Law Order no./Lovbekendtgørelse LBK nr 906. Approved 25 June 2013, Gældende https://www.retsinformation.dk/Forms/r0710.aspx?id=152547.

Instructions/Vejledning nr. 9315 Approved 23 May 2014 Gældende Vejledning om anlægsarbejder og fortidsminder på nedlagte kirkegårde. Kulturstyrelsen og Kirkeministeriet den 26. maj 2014 https://www.retsinformation.dk/Forms/R0710.aspx?id=163248.

VALLETTA 1992: *Bekendtgørelse af konvention af 16. januar 1992 om beskyttelse af den arkæologiske arv (revideret)*. Retrieved on 12 April 2017, from: https://www.retsinformation.dk/Forms/R0710.aspx?id=23185w

A rural view of early modern mortuary practices

Context and material culture of the 18th- and 19th-century cemetery of Middenbeemster, the Netherlands

Frank J. van Spelde & Menno L.P. Hoogland

Introduction

A collection of papers devoted to the urban graveyards of pre-modern societies would not be complete without a short excursion to their rural environs. The context and material culture encountered at one of these rural graveyards, that of Middenbeemster, is the subject of this paper, and the nature and diversity of the material culture found at the site its main focus. In other words, what items of material culture have been found surrounding the skeletal remains in Middenbeemster and how do they illuminate our understanding of burial practices and changing attitudes towards death in eighteenth- and nineteenth-century Netherlands? To answer these questions, multiple elements of the cemetery are investigated: the layout and use of the cemetery, the burial sepulchres and their associated accessories, remains of the burial attire of the deceased, and other items related to the burials, such as coins and jewellery. Although the finds have been published in a Dutch excavation report, this article situates them in their context and presents them to a wider audience.

The cemetery of the Keyserkerk, Middenbeemster

The rural cemetery chosen for this study is that of the Keyserkerk in Middenbeemster, a small farming community in the north of Holland (Fig. 1). Middenbeemster was one of the first towns established in the early seventeenth century in the reclaimed Beemster polder, a former lake. The polder was designed with square plots which was unique for that time period. The preservation of the design was one of the reasons UNESCO designated the polder as a world heritage site in 1999. They described the Beemster polder as '…a masterpiece of creative planning, in

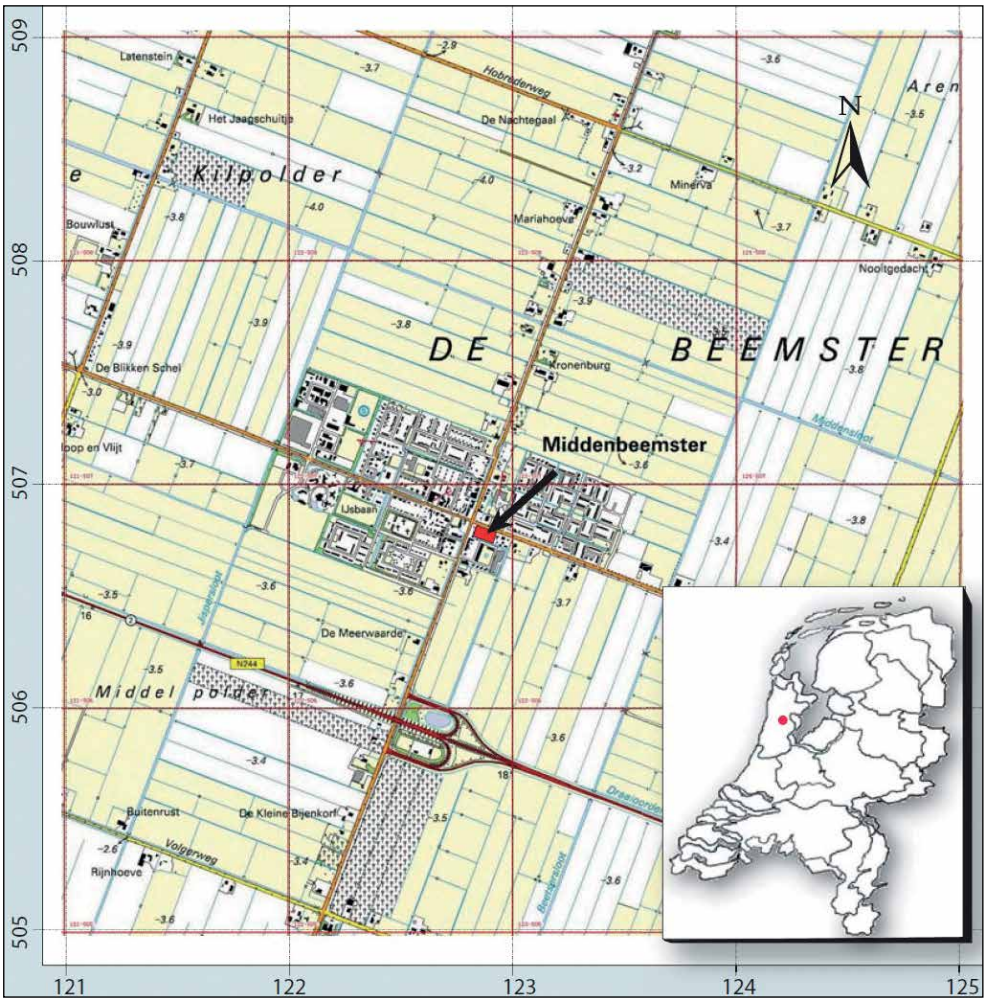


Fig. 1: The location of the excavation in the town of Middenbeemster (Reproduced with permission from Hakvoort 2013, 11).

which the ideals of antiquity and the Renaissance were applied to the design of a reclaimed landscape'.[1] A church, designed by Hendrick de Keyser (Fig. 2) was built at the centre of the polder, where the two main roads intersected. Its cemetery was located on the south side of the church and began to be used immediately after the church was consecrated in 1623.[2] Although originally five churches were planned for the Beemster polder, the Keyserkerk was the only one that was actually realised. As a result, the cemetery remained the only place for burial in the municipality of Beemster until 1847, when a Roman Catholic cemetery was opened in the nearby town of Westbeemster.[3] The Middenbeemster cemetery remained in use until 1867

1 World Heritage Committee 2000, 15.
2 Bouman 1857, 226.
3 Falger *et al.* 2012.

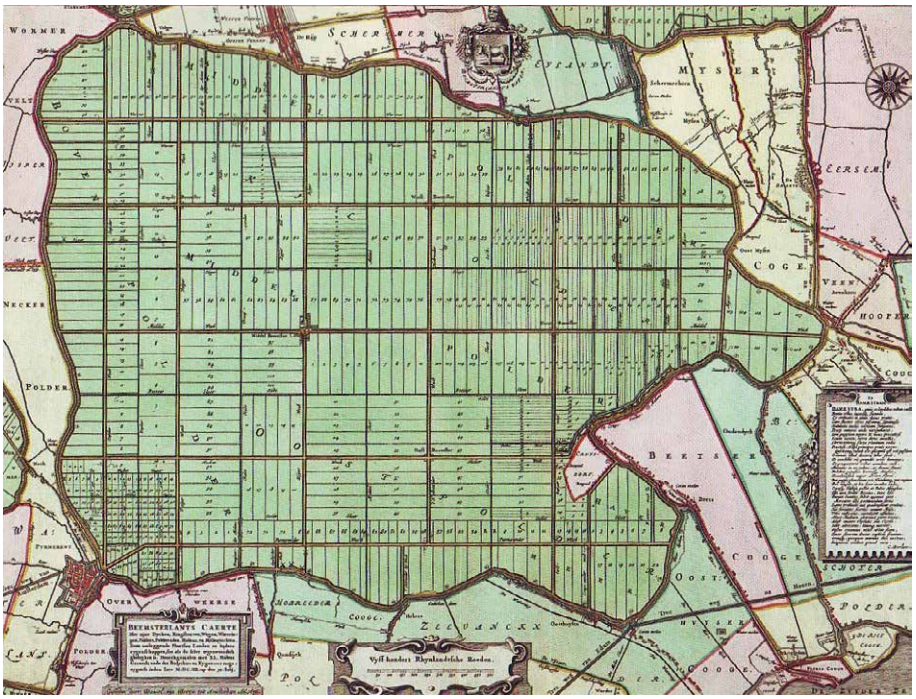


*Fig. 2: Map of the Beemster in 1658 showing the rectangular division of plots. The town of Middenbeemster is located just to the left of the centre, where the two main roads intersect (Wikimedia and Noord-Hollands Archief, inv.nr. NL-HlmNHA_560_001029_G
NL-HlmNHA_560_001030_XL
NL-HlmNHA_560_001405).*

when, due to new laws, a cemetery outside town limits was established. After the mandatory ten years of rest in the grave, a number of individuals were exhumed at the old cemetery in 1877 and transferred to their family graves at the new cemetery.[4]

Due to planned construction adjacent to the church, archaeological excavations were carried out in 2011. The commercial company Hollandia Archeologen and Leiden University joined forces to excavate a total of 488 graves and a small number of secondary ossuaries in the course of eight weeks. The vast majority of the graves were investigated and artefacts collected from them except for a small portion of the cemetery that remains in situ (as it was not in the construction area) and another small part that had been disturbed in the twentieth century. The subsequent analysis of the finds was carried out by Hollandia Archeologen, while the osteological analysis took place in the Laboratory for Human Osteoarchaeology at Leiden University. The skeletal assemblage forms an informative source that has been used for many research projects and publications such as master theses, PhD dissertations and journal articles.[5]

4 The maps of the old cemetery (*legger*) list the people buried in every plot as well as the clearings and transfers. Maps are available for research in the Waterlands Archief (archive), Purmerend (inv.-nr. 0131 57-1.).

5 The bachelor and master theses can be accessed online via the thesis repository of Leiden University (https://openaccess.leidenuniv.nl/handle/1887/16590, then search for 'Middenbeemster').

Layout and use of the cemetery

A rectangular plot of land was allotted for the building of the church, and a ditch was dug around this plot, the soil from which was used to raise the level of the plot. As a result, the church was slightly elevated in comparison to the surrounding area. Following the strict plot division of the Beemster, the church was placed on a northwest – southeast axis, and the cemetery was placed on the south side of the church. During excavation, it became clear that the cemetery had been divided into standard rectangular plots slightly larger than the size of an adult coffin (Fig. 3), orientated parallel to the church. Coffins were stacked on top of each other in the graves, usually three or four deep, but graves containing any number between one and six were no exception. Little to no disturbance of graves occurred in the horizontal planes; vertical disturbance was mainly due to collapse of coffins or new depositions in the same plot. The lack of horizontal disturbance indicates that the plots were marked and that the gravedigger knew exactly where to dig the grave. To avoid collapse of the narrow trench dug for the coffin, planks were used to support the sides. Traces of where the planks were placed could still be observed as soil marks during excavation (Fig. 4). No remains or traces of grave markers were observed during excavation, nor are they present on paintings or photographs from the eighteenth century onwards. Thus, how the grave plots were marked remains unknown at present.

During excavation, two major phases could be distinguished in the vertical stratigraphy. The lowest levels of burials were deposited in the original substrate, the clay from the surrounding ditches used to heighten the building plot. The material found in the graves deposited in the clay layer can be dated inter alia to the eighteenth century (see below). The burials from this phase, 56 in total, date to a period in which the interior of the church was also used for burial. It is thus likely that a division was present based on wealth or class, and that the individuals in the 'clay-phase' outside the church are from lower ranks of society than the individuals buried inside the church. The top layer consisted of a substrate of (dune) sand which was specially brought in to accommodate the burials. The material present in this sand layer dates to the nineteenth century and it is likely that the sand was brought in when the municipality acquired the cemetery in 1829. The original clay substrate was excavated and backfilled with sand for each grave plot individually over time when it was deemed necessary, for which the owners had to pay a fee.[6] Five grave plots were not cleared of clay at all and remain as a little clay island in the sea of sand. The graves in the sand, 432 in total, date to the period in which people from all classes were buried in the outside cemetery, as burial inside buildings was prohibited by law in 1829. The graves in the sand are confined to the burial plots as shown in Figure 3b. The graves in the clay are also laid out in plots, albeit less rigorously and deviating in the longitudinal axis in comparison to the graves in the sand layer. The archives of Purmerend contain a map which indicates the burial plots of the cemetery. Listed on every plot it is written who was buried there, the year of the burials, and when the plot was cleared, from 1829 onwards. A

6 Waterlands Archief, Beemster DTB 21b: Impost op begraven. Gaarder 1804-1805 (DTB stands for doop- trouw- en begraafregister: register of baptisms, marriages and funerals).

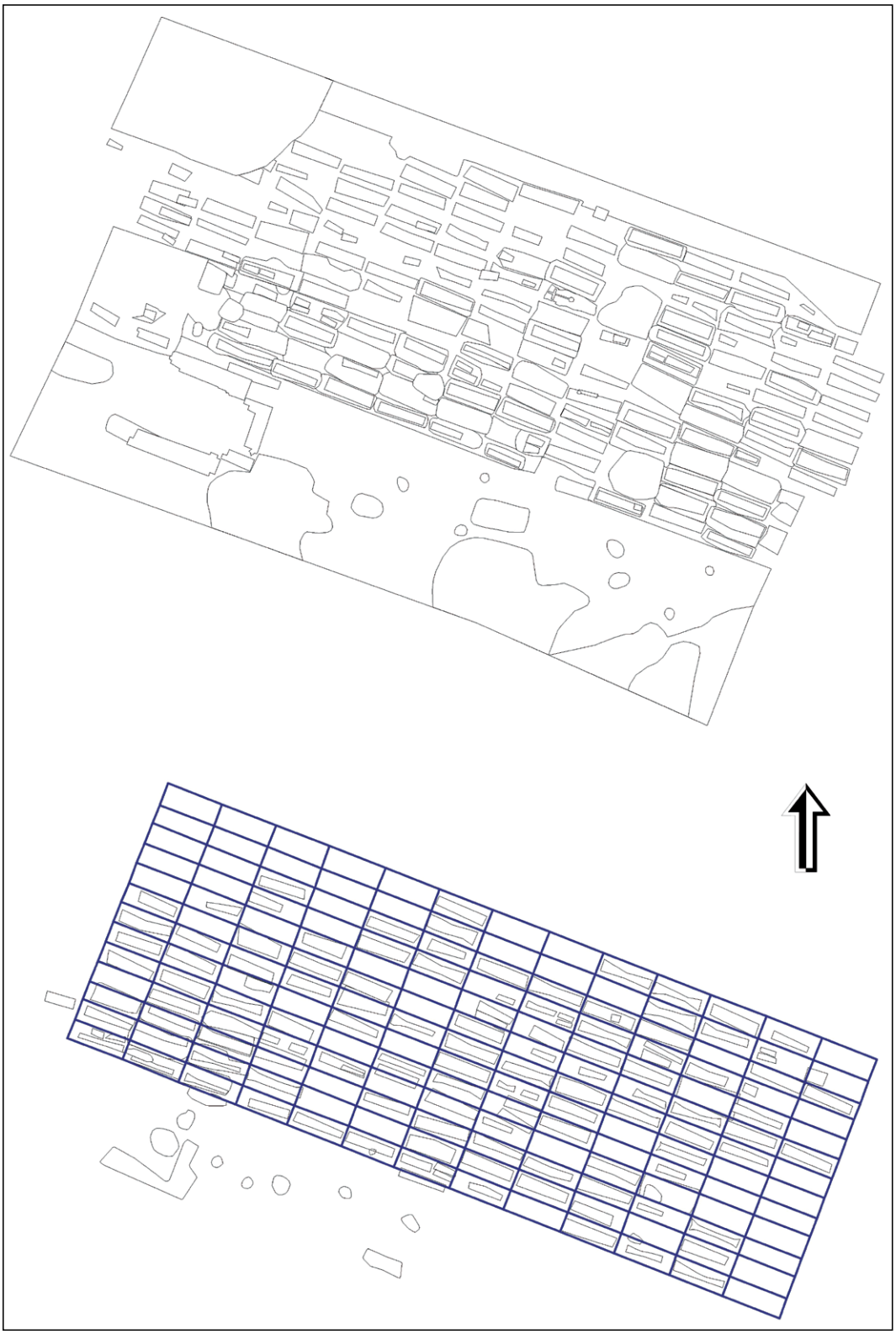


Fig. 3: Plan of first burial layer (top) and second burial layer with reconstructed burial plots (bottom), which are circa 2 meters long and 75 cm wide. Arrow indicates north (drawings by author.)

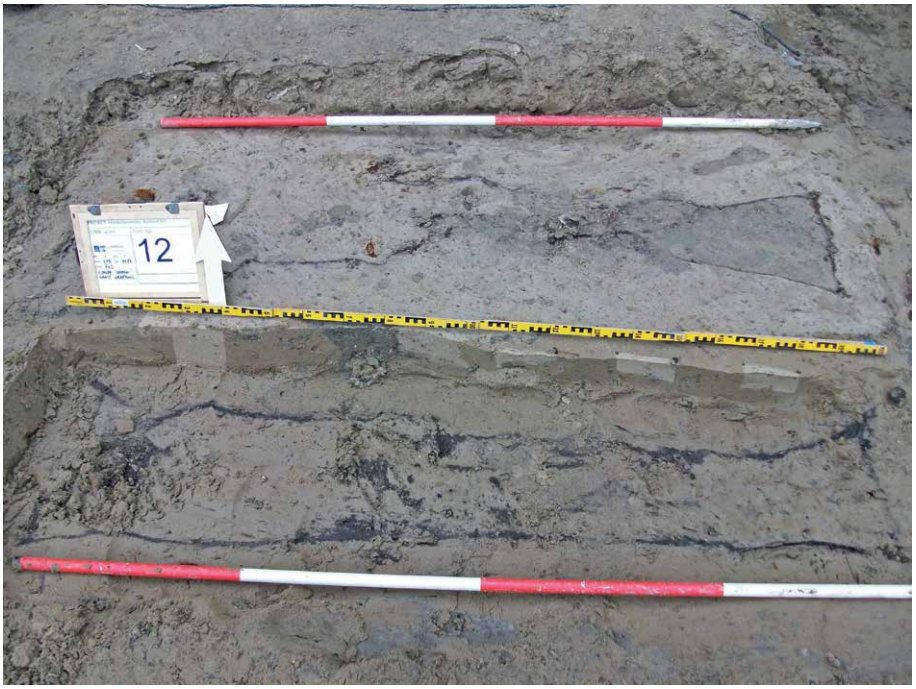


Fig. 4: Traces of two coffins in the sand. In the section between the two coffins the imprint of the planks can be seen filled up with light grey sand used to backfill the grave. Such prints were found in a number of graves (photo by author).

fortunate find of a coffin bearing a name made it possible to align the archival map with the excavation map. In theory, it was thus possible to identify the remains, although in practice it turned out to be less straightforward. For instance, the archival map shows 12 rows in the latitudinal axis, while the excavation revealed 13 rows, as seen in figure 3. The regular clearing of plots created another obstacle. A line underneath a row of names on the archival map indicates a clearing of the grave,[7] however, records do not state how many remains were actually removed at that point. As a result, identifying the skeletons remains a work in progress.

That the graves had to be cleared on many occasions is clear when the number of deaths in the Beemster municipality is calculated. After the ban of burial in churches in 1829, all people, of high or low rank, were buried in the cemetery. Although a number of people who died in the Beemster were buried elsewhere,[8] most were laid to rest in the Keyserkerk cemetery. An initial survey of the Beemster burial records of the period 1829-1867 produced an estimation of 6000 burials.[9] For the preceding period (the 17th and 18th century), the average number of burials

7 For which three guilders was charged (Waterlands Archief Purmerend, Beemster DTB 9).

8 Because the burial of people in other towns meant a loss of income for the church, a fee had to be paid to the church for the right of burial somewhere else. In 1811 the considerable amount of 7 guilders and 16 pennies had be paid, according to the Beemster burial registration (Waterlands Archief Purmerend, Beemster DTB 9).

9 Falger 2011, 19.

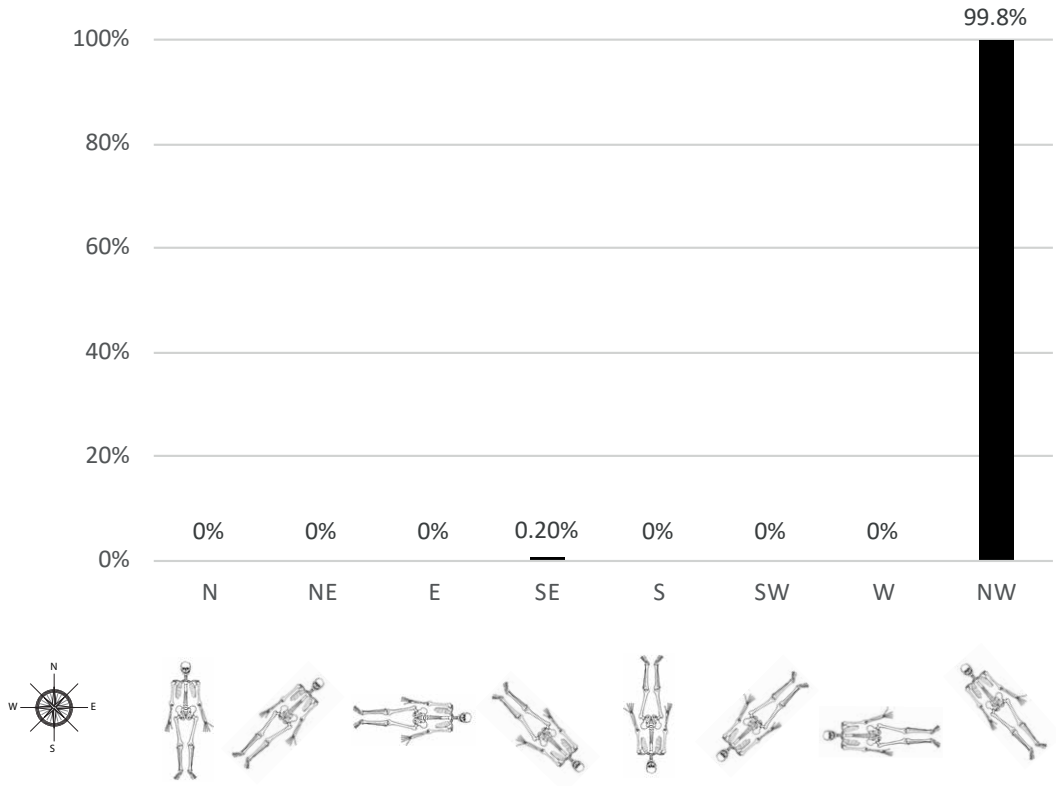


Fig. 5: Orientation at the cemetery of Middenbeemster.

per year ranged from 50 to 100.[10] If we use this number, an estimation of 2000-4000 burials is realistic for the period between 1829 and 1867. With a total of 204 plots and a maximum capacity of c. five coffins (although most graves contained less), the cemetery could have contained 1020 individuals at any given time. This means that the entire cemetery would have had to be cleared two to six times to accommodate the deceased of the Beemster municipality. Although some charnel pits have been excavated, of which two contained between 25 and 50 individuals, far less secondary deposited remains were found than would have been produced by the regular clearings. Where the rest of the remains are deposited (which would have been hundreds to thousands) is unknown.

As was mentioned above, the Keyserkerk cemetery remained the only cemetery in the Beemster until the Catholic community was allowed to establish a separate cemetery in 1847.[11] As a result, both Catholics, including priests, and Reformed were buried in the cemetery. People with all kinds of professions were laid to rest there, from gravediggers to landowners.[12]

10 Bossaers 2013, 25.
11 Bossaers 2013, 23.
12 Burgerlijke Stand Beemster, Waterlands Archief Purmerend inv.nr. 0246.

All people, with one exception, were buried in a northwest-southeast orientation, parallel to the church (Fig. 5). One individual was buried in the opposite direction. In the case of the Beemster cemetery, the ideal orientation of the polder plots was preferred over the orientation of the west – east Christian ideal. However, this is less divergent than it may seem. Many examples exist of (post-) medieval cemeteries in which the orientation of the graves was adjusted to the geographical contours.[13] All bodies in the Middenbeemster cemetery were deposited in individual graves, in a stretched position. The legs were positioned parallel. The positions of the arms were more variable. In the majority of graves, the hands were positioned on the pelvic region (Type I as defined by Nollen).[14] Another common position for the arms was lying next to the body (Types II and III) and more rarely, on the chest (Type IV), on the abdomen region or a combination of these. Everyone was buried in a coffin, some of which contained grave goods. These elements of material culture from the burial environment will be discussed in the following section.

Burial Architecture

The coffin

During the excavation of the Keyserkerk cemetery, remains of wooden coffins were uncovered in most of the graves. Although the conditions for preservation were unfavourable (sand above the groundwater level) traces of wooden coffins were preserved as either soil discolorations (Fig. 4), pulp remnants or more solid fragments of wood, in particular in the vicinity of metal objects (see, for instance, Fig. 13). Due to the poor preservation of the wood it was not possible to conduct a systematic survey of coffin types and sizes. However, it is clear that the coffins were either rectangular or tapered towards the feet and were outfitted with a flat lid, allowing a large number of coffins to be placed in one grave.

The popularity of the wooden coffins as a sepulchre for the corpse increased in the late medieval period to the point that no interments occurred without, as is seen in the Keyserkerk cemetery and many other early modern cemeteries. In the medieval period, a wide range of coffin shapes and sizes were in use,[15] but due to their universal use, the need for standardised coffins became more pressing. An ever increasing number of people had to be buried in graveyards with restricted space, and practical constraints began to play a major role in coffin design. Coffins with roof-shaped lids (designed to resemble the sepulchre as a house for the dead (Fig. 6)), a common coffin type in the late medieval period, were banned by law in the early modern period in most cities. The roofed lids were replaced by flat lids as they allowed the deposition of coffins with minimal space in between.[16] Furthermore, standardised coffin shapes, either rectangular or tapered, fit more easily into the pre-fixed burial plots. Although standardised coffins were the norm in the early modern period, differentiation was still possible in a wide range of details. For

13 See for instance Arts 2013; De Groote *et al.* 2011.
14 Nollen 2012, 140.
15 See for instance Vredenbregt & De Ridder 2004.
16 Kok 1970, 169; Portegies 1999, 87.

the coffin itself, the type of wood and thickness of the structural elements served as important differentiating aspects. The most expensive type of wood was oak, a material much more durable than the less expensive types such as pine. Because different woods and thicknesses were used, prices of coffins (excluding extras) could vary considerably. In late eighteenth-century Alkmaar, for instance, coffins cost between six and 60 guilders.[17] Higher-priced coffins were reserved for wealthy individuals (Fig. 7). Burial records from 's-Hertogenbosch indicate that the average price of coffins buried on the more desirable and therefore more expensive south side of the church was higher than coffins buried elsewhere in the cemetery.[18]

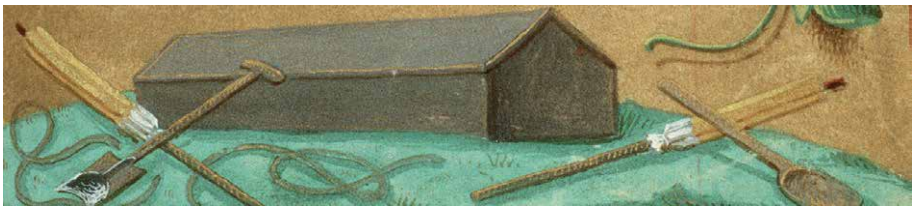


Fig. 6: Detail from a book of hours from southern Netherlands, ca. 1500-1510, showing an image of a typical coffin with a roof-shaped lid. In most cities, such lids were eventually banned by law for use in the cemetery as they required much more space than flat lids (The Hague, Koninklijke Bibliotheek, 76 F 20, f. 124r.).

Fig. 7: Tomb of the wealthy family Herkenrath in the town of Monster. The coffins date from the 19th and early 20th centuries. Note the dark brown coffin in the lower left corner decorated with copper studs (1850). Also note the rich decoration of the other coffins–handles, inscribed copper plates and lids covered in decorated screws. The screws with crosses became popular in the second half of the 19th century and are not found in Middenbeemster, but were in Tegelen, as described elsewhere in this volume (Photo by Frederique Baaij, Wikimedia).

17 Bitter 2002, 229.
18 Portegies 1999, 95.

Coffin handles

Further differentiation of coffins could be achieved by adding (semi-functional) decorations. A regular feature on coffins in cemeteries of the 18th and 19th centuries were coffin handles. Historical sources (inter alia from 19th-century Alkmaar and 's-Hertogenbosch[19]) indicate that people not only had to pay the manufacturer for the handles, but also the church for the right to attach the handles to the coffins and incorporate them in the grave.[20] The combined price of the handles and the associated burial fee made this kind of ornamentation expensive. Furthermore, the handles were probably of rather limited use. They would only have been used for lifting the coffin onto the bier, which was carried by hired men or relatives,[21] and from the bier into the grave, in order to avoid accidents during the funeral ceremony. Due to their limited usefulness combined with their high price, coffin handles can be considered a status marker, reserved for wealthy families. This is confirmed by excavations in which burial areas of different price ranges were investigated. For example, in Vlissingen, where areas both in and outside churches were excavated, 23 per cent of the coffins buried inside contained handles compared to only six per cent outside churches.[22] In the choir area of the Grote Kerk in Alkmaar, which had the most expensive plots, 39 per cent of coffins had handles, while in the remainder of the church, only nine per cent did.[23]

Although in Middenbeemster no graves inside the church could be examined, it is likely that a comparable situation existed before 1829. In the deepest layer of the cemetery (the 'clay phase'), predating 1829, no handles were found. In this period, burial occurred both in and outside the church, and it is likely that the burials inside included coffin handles, as these graves were used by the relatively wealthier classes.[24] During the deposition of the top layers, postdating 1829 (the 'sand phase'), burial inside the church was prohibited and all people from all ranks of society, were buried outside. Of the burials from this phase, three per cent of the coffins had handles (see Fig. 8 for an overview of material uncovered in Middenbeemster).

For handle types of the eighteenth and nineteenth centuries, a typology was set up by Bitter, based on material from Alkmaar,[25] which was extended by Nooijen, based on material from Tegelen.[26] Two graves from Middenbeemster contained handles of the rare type 2A2 in copper alloy (Fig. 9). These elaborate handles with skull-and-crossbones decoration were found on coffins which were also decorated with copper studs on the lid (see below). Eight graves contained handles of the more plain type 2A1. One grave contained two handles of a previously unknown

19 Adding handles to the coffin cost a minimum of 12 guilders in 's-Hertogenbosch, a large amount considering that an average burial in 1774 for an adult, including the coffin, cost just over 14 guilders.

20 Bitter 2002, 253; Portegies 1999.

21 Portegies 1999, 110-112; Bitter 2002, 243-245.

22 Claeys *et al.* 2010, 404.

23 Bitter 2002, 232-235.

24 Prices for a grave in and outside the church differed significantly. In 1811, an inside adult grave cost 8 guilders as opposed to 3 guilders for an outside one (Waterlands Archief Purmerend, Beemster DTB 9).

25 Bitter 2002.

26 Nooijen 2013.

type, defined as type 8 by Hakvoort.[27] The bail of this (also rather plane) handle type is increasing in thickness towards the centre. It was decorated by three beads in the middle of which the centre one was an elongated diamond shape (Fig. 10).

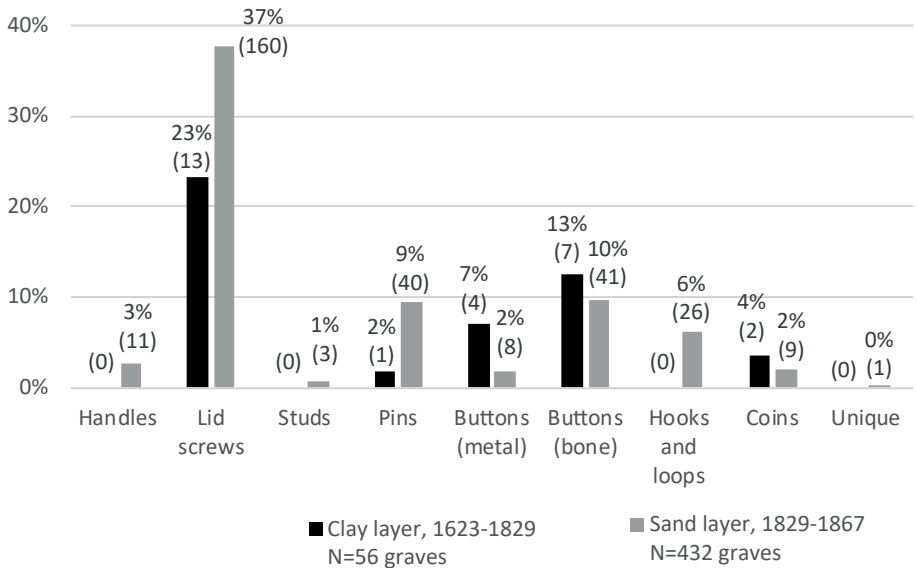


Fig. 8: Overview of the date, number of graves and material found in the cemetery of Middenbeemster. Although the clay phase began, in theory, in 1623, it is likely that the graves were confined to the eighteenth century due to regular clearings. Dated material from this phase confirms an eighteenth-century date.

Fig. 9: Handle type 2A2, found on two coffins which were also decorated with copper studs on the lid (Reproduced with permission from Hakvoort 2013, 68).

27 Hakvoort 2013.

Fig. 10: The previously unknown handle type 8, of which two were found on a single coffin (reproduced with permission from Hakvoort 2013, 68).

Stud decoration

On three coffin lids from the Middenbeemster cemetery, decorative patterns made up of dozens of small round-headed copper studs were found, a particularly rare practice (Fig. 11). This practice is also known from Alkmaar (10 [1%] coffins from the Grote Kerk) and from the Herckenrath tomb in Monster, where it can be seen on one coffin. It has also been identified on coffins from the United Kingdom.[28] Stud decoration was used primarily to convey biographical information, usually the name (or initials) of the deceased and the date of death, but in some instances it was purely decorative. The former is the case for two coffins from Middenbeemster, a third was decorated with a cross on a globe.[29] The decoration was certainly of an aesthetic nature, however, its incorporation may have had an underlying practical rationale. Although undisturbed burial until eternity or resurrection may have been the Christian ideal, people were aware that eternal rest in the overcrowded cemeteries of the nineteenth century was by no means guaranteed. To avoid ending up anonymously in one of the charnel pits, the copper studs stating the name of the buried individual may have been added to make identification and proper reburial possible (providing the lid would stay more or less intact). That reburial of probably known individuals took place in the eighteenth and nineteenth century is indicated by a find in Middenbeemster of a small decayed wooden box containing the remains of two individuals that were carefully re-deposited inside a burial plot (Fig. 12). This deposition stands in sharp contrast to the dozens of charnel pits that were scattered along the edges of the cemetery, where the bones were carelessly 'dumped' without any indication of care or ritual.

Similar to stud decoration, engraved copper plates on coffin lids were used to identify the buried body. Examples of this practice have been found in small numbers in graves but more often in crypts. None have been found in Middenbeemster.[30]

---

28 Cherrysson *et al.* 2012, 59.

29 Bitter 2002, appendix 1; Hakvoort 2013, 73.

30 One grave from the Grote Kerk in Alkmaar (and more in the crypts) and two from Vlissingen contained plates. Nearly all coffins from the Herckenrath tomb contained plates, and the practice is also known from the United Kingdom (Bitter 2002, 237; Claeys *et al.* 2010, 384, 393; Cherrysson *et al.* 2012, 57-66).

Fig. 11: Coffin with copper studs on the lid and six handles (type 2A2, see figure 9) on the sides. The copper studs indicate the name of the deceased (D.S. Oly), the date of death (March 2, 1833) and age of the individual (79 years and 5 months). The lid was pressed inside the void of the coffin by the pressure of the soil on top (photo by author).

Fig. 12: The redeposited remains of two individuals bodies found in a small wooden box. Based on the careful treatment and interment, which is in sharp contrast with the disorganized charnel pits, it is likely that the persons' identities were known at the time of their secondary deposition (photo by author).

Decorative screws

The lid of the coffin was sealed on the day of burial. Coffin lids were fastened in various ways, such as with a rope, plain nails or decorative screws. When the lid was closed a pall (doodskleed) was draped over the coffin, usually over a roof-shaped form,[31] and both the pall and the form were removed before the act of burial.[32] Similar to the handles, decorative screws were thus only visible briefly during the closing of the lid and later when the coffin was lowered into the grave. Decorative screws were not a standard addition but had to be specially ordered for an extra fee. Again, these were not cheap. According to a pricelist from Nijmegen dated 1772, 'for eight screws and six rings on a large coffin shall be paid six guilders; for eight screws on a large coffin without rings shall be paid 2 guilders and 80 cents'.[33] This is a considerable amount when compared to the cost of a standard adult coffin, which was seven guilders.[34] It is therefore not surprising that these screws only appeared in small numbers in the urban graveyards of the eighteenth and early nineteenth centuries. Remarkably, in the cemetery of Middenbeemster, they were found in relatively large numbers. In the period 1829-1867, 37 per cent of the coffins were decorated with screws, while 23 per cent of the coffins from the 'clay-phase', predating 1829 were decorated in this way. The length of the screws varied from 88 to 160 mm. The head was nearly always square and tapered towards the top (Fig. 13). The tip of the screw was threaded, making it easy to screw into a pre-drilled hole through the lid and into the sides of the coffin. In Tegelen, a cemetery from the second half of the nineteenth century was investigated in which one third of the graves also contained decorative screws.[35] Interestingly, of the

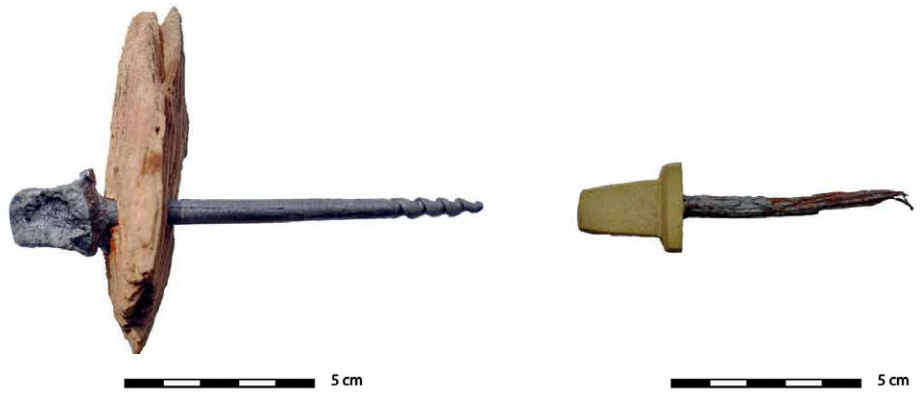


Fig. 13: Two examples of decorative screws found in Middenbeemster. Affected by corroding metals, the surrounding wood can sometimes be preserved. Note that only the small portion towards the tip is threaded. (Reproduced with permission from Hakvoort 2013, 68.)

31 This may be a remnant of the medieval practice of roofed coffins.
32 Bitter 2002, 245; Kok 1970, 171; Portegies 1999, 113.
33 Kok 1970, 170, translated by the author.
34 Kok 1970, 170.
35 Nooijen 2013, 51-53.

68 coffins containing screws, 37 also contained handles, emphasizing the role of the screws as status markers. The designs of the screws from Tegelen were much more elaborate than those uncovered in Middenbeemster with, for instance, floral motifs and crosses on globes. These motifs seem to have arisen in the last quarter of the nineteenth century, as screws with these decorations are also present on the coffins in the Herckenrath tomb, which dates to the same era (Fig. 7).

In today's world, the closing of the lid by friends or relatives is often an important feature of the funerary ritual. The act brings closure and provides the first symbol of physical separation between the living relatives and the deceased. Based on the regular occurrence of decorative screws in the Beemster, it is likely that this tradition already existed there in the eighteenth and nineteenth centuries, and possibly in other towns as well.

Burial attire

Introduction

Remains of clothes are rarely encountered in the archaeological record. Fibres, especially those made from plants, deteriorate rapidly in a burial environment. However, cloth fragments or even entire garments can be preserved if conditions are favourable. For instance, corroding copper, which is toxic for microbes, can act as a preservative by preventing bacterial activity.[36] The presence of metal hooks, buttons, pins, coins or other objects can therefore preserve cloth and other perishable material, such as human soft tissue (see Fig. 18). It is also possible for clothes to survive in an extremely dry environment, as happened in Alkmaar. When conditions are not favourable and no organic material remains, clothing accessories can still provide clues about how the dead were dressed for interment.

Regarding the clothing of the dead in the eighteenth and nineteenth centuries, archaeological investigations contradict the traditional view derived from historical records. It was believed that the dead were dressed in shrouds or shirts, to give the appearance of being in a peaceful sleep.[37] The unique finds of entire garments in Alkmaar and dozens of clothing accessories in Middenbeemster prove that this was not always the case. The attire used to clothe the bodies varied much more than the historical sources indicate. Although shrouds and shirts were indeed encountered, people were also buried in night dresses and even in daytime apparel. Clothing was primarily intended to make the corpse presentable when it was laid out in the coffin. The lower half of the body in the coffin remained undressed, as this part was covered by sheets of cloth.[38] Remarkably, most of the more elaborate clothing that was found in the Alkmaar graves, such as decorated vests, was very worn and was sometimes repaired on multiple occasions. Apparently expensive clothing and their accessories were valuable enough to be passed down or sold.[39]

---

36 Huisman *et al.* 2009, 85.

37 Kok 1970, 158-163.

38 The same custom was encountered in the nineteenth century Spitalfields cemetery, U.K. (Cherrysson *et al.* 2012, 28).

39 Bitter 2002, 239-241, 327-333.

During the excavation of the skeletons of the Keyserkerk cemetery, no large fragments of clothing were found. However, in many graves, objects were found that serve as secondary indicators of the attire of the deceased. Buttons of varying materials, metal hooks-and-eyes, copper pins and jewellery all provide valuable clues. Each category will therefore be discussed separately in the following section.

Pins

Pins were traditionally used in burials to fasten the shroud in which the corpse was wrapped, but in the post-medieval period they were used for a variety of purposes. Therefore, the position and the number of pins per individual reveals important information regarding how the body was dressed. Unfortunately, the small size and rapid deterioration of pins means that they are easily lost or overlooked in archaeological excavations. However, from the information we do have, some general trends can be observed.

In Middenbeemster it seems that pins were mostly associated with adult women, and these were commonly found near the head. These pins were used to fasten a headdress or hair.[40] They were also commonly found on and near the remains of babies, where they were positioned around the body. These were used to fasten the lengths of cloth in which the baby was swathed for burial.

Remains of death shirts recovered from Alkmaar show that they were not closed by pins but by other means, such as silk bows or laces,[41] a trend also observed at other sites, such as in the United Kingdom.[42] However, this was not the case in every town. For instance, in the Broerenkerk in Zwolle most of the late eighteenth- and early nineteenth-century graves produced pins, sometimes as many as ten on the remains of a single body. In this case, it is thought that these were used to fasten the death shirt.[43]

Buttons

Buttons are encountered in varying sizes and made of different materials. The majority are made of animal bone. When in the seventeenth century clothing with long rows of buttons came into fashion, the demand for cheap buttons grew.[44] As animal bone was readily available, relatively cheap and suitable, it was used to meet this demand. Other materials of which the buttons in the cemeteries were made of were metal, usually copper, ivory, mother of pearl, glass, porcelain, and combinations of these, such as glass in a copper fitting.[45] Finds of shrouds from Alkmaar and Spitalfields (UK) indicate that buttons were not normally used to fasten shrouds, but to fasten other pieces of clothing.

At this point a distinction should be made between undergarments, such as shirts, and outerwear, such as vests and jackets. Undergarments were worn both during the day and at night, outerwear only during the day. Especially the

40 Remains of headdresses have been found in Alkmaar (Bitter 2002, appendix 1).
41 Bitter 2002, appendix 1.
42 Cherryson *et al.* 2012, 24.
43 Aten 1992, 26.
44 Hakvoort 2013, 61.
45 Aten 1992, 26; Bitter 2002, appendix 1; Claeys *et al.* 2010; Hakvoort 2013; Van Spelde 2012.

outerwear of the men is recognizable in the archaeological record because it was fashionable in the early nineteenth century to use a large number of buttons. Jackets were fastened with a double row and a vest with a single row, a row containing approximately five to eight buttons.[46] It is therefore assumed that males with this kind of button configuration were buried in their outerwear. Several examples are found in Middenbeemster. Here, 12 per cent of the graves from 1829-1866 contained buttons, and 20 per cent of the graves predating 1829 did. One individual[47] was uncovered with a total of 27 bone buttons arranged in two rows on its chest (Fig. 14). Another[48] was found with a similar arrangement of two rows of copper buttons on his chest, and two buttons near his wrist (Fig. 15). In this case, pieces of thick cloth of a light colour, possibly wool, were preserved

Fig. 14: Male individual buried with 27 bone buttons arranged in two rows on its chest (photo by author).

46 See for instance Stamhuis 1997, 95.
47 MB11S226V0282.
48 MB11S497V1059.

around the buttons. The buttons probably belonged to a hemdrok, a piece of clothing worn beneath a jacket. For those individuals on which only a single or a few buttons were found, which was the case in 21 graves in Middenbeemster,[49] it is likely that they were buried only in their undergarments. Similar trends are seen in Alkmaar.[50] There it was only possible to confirm outerwear as burial apparel in nine cases (1% of the individuals).

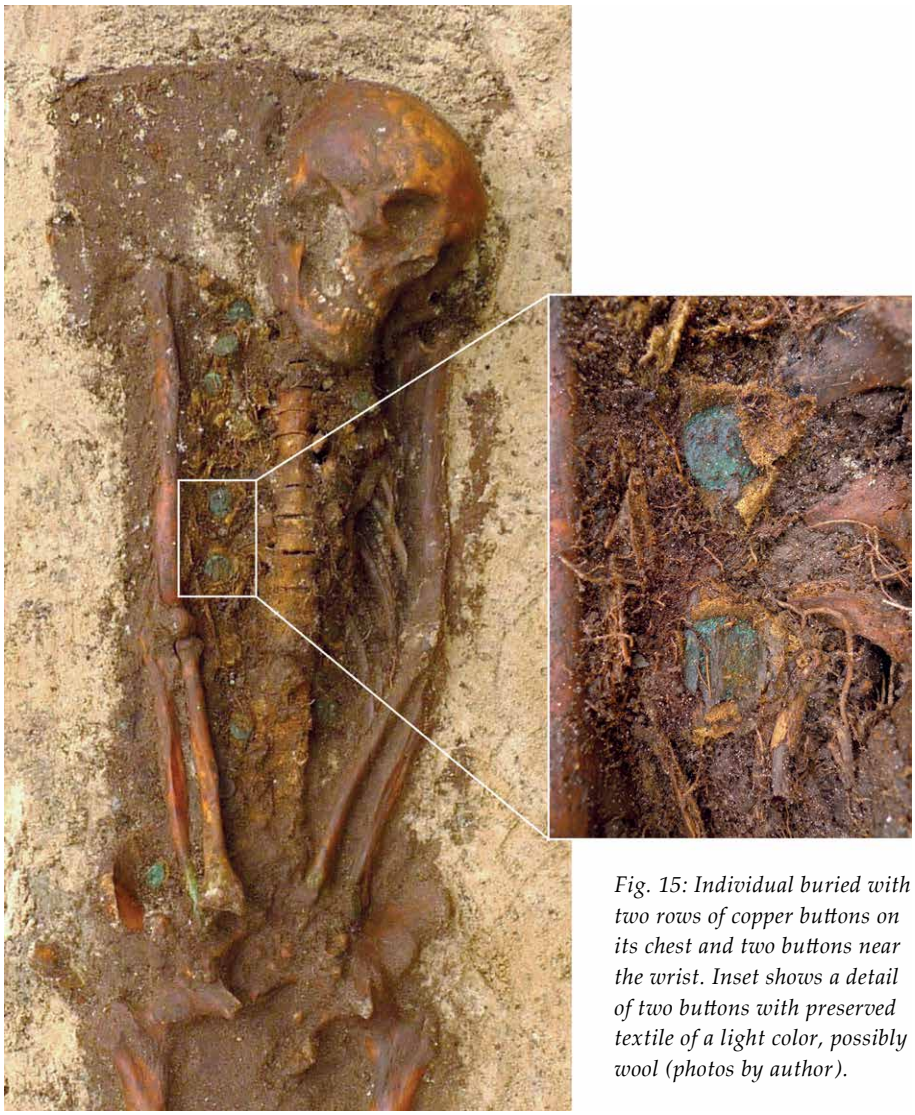


Fig. 15: Individual buried with two rows of copper buttons on its chest and two buttons near the wrist. Inset shows a detail of two buttons with preserved textile of a light color, possibly wool (photos by author).

49 Hakvoort 2013, 64.
50 Bitter 2002, 292.

Hooks and eyes

In addition to buttons, a combination of hooks and round rings (eyes, or loops) was another way to fasten clothes. The hooks and eyes were made of copper alloy wires twisted into the desired shape (Fig. 16). The design was simple and they were primarily used for their practicality, not for their aesthetic value. Usually the hooks and eyes were attached in such a way that they were hidden from view. Because they were used on both undergarments and outerwear,[51] these fasteners alone cannot determine how a person was dressed.

In the period 1829-1867, hooks and eyes were found in six per cent of the graves in Middenbeemster. Surprisingly, in the predating phase, no fasteners of this type were found at all. There are several possible reasons for this. Although they were certainly in use during the eighteenth century in parts of the Netherlands,[52] it is possible that hooks and eyes were not widely applied in the Beemster well into the nineteenth century. Hooks and eyes may have served as an alternative to buttons. The difference in the number of buttons for each phase (20% before 1829 as opposed to 12% after) may thus be a reflection of this trend. Another possibility is that hooks and eyes were already in use, but on types of clothes that were considered inappropriate for burial. As a result, they did not end up in the burial record, but they may be found in household refuse.[53]

Fig. 16: Hooks and eyes from Middenbeemster, used to fasten clothing (reproduced with permission from Hakvoort 2013, 70).

51 Stamhuis 1997.

52 Stamhuis 1997, 78.

53 A similar situation was encountered in Vlissingen. There, the cemeteries produced only one grave with a button. However, cesspits that were in use in the same period contained a button and hooks. So, while hooks and eyes were indeed in use, they did not end up in the cemetery assemblage (Jaspers 2010, 330).

Jewellery

Finds of jewellery such as necklaces or earrings are rare in early modern cemeteries and it is clear that they were not a standard element of burial attire. This is not surprising considering the monetary, and often also emotional value that jewellery holds, which makes them suitable as heirlooms. The jewellery that did end up in the graves may have been there for one of many reasons. For instance, it may have been interred by personal request. Some pieces, such as bronze earrings, may have been added to complement the appearance of the deceased. In the case of persisting rigor mortis, it may have been impossible to remove (wedding) rings without damaging the finger. Finally, jewellery may even have been interred by accident when it was concealed by clothing or hair.

Probate inventories (boedelinventarissen) set up for inheritance purposes show that between 1830 and 1890, in the area around the Beemster and Alkmaar, 96 per cent of the households owned one or more pieces of jewellery. In the area around 's-Hertogenbosch, this was far less, ranging from 25 per cent in 1830 to 58 per cent in 1860 and 77 per cent in 1890.[54] Although so many households in the province of North Holland possessed jewellery, the number of graves in which jewellery was found is very low. In Middenbeemster, only eight (1.5%) graves contained jewellery.[55] Most of the pieces found consist of simple earrings, either copper or silver (Fig. 17). One earring (the matching piece was not found) was more elaborately ornamented with a bee motif and made of gold. The excavations in the Grote Kerk in Alkmaar yielded even fewer pieces of jewellery. Eight adults were buried with jewellery[56] and two graves of children contained bead necklaces.[57] Not surprisingly, in 's Hertogenbosch, where according to the probate inventories far less jewellery was present in the households, no pieces were found at all during the excavations of the nineteenth-century Sint Janskerkhof.[58]

Fig. 17: Earrings found in the cemetery of Middenbeemster. Left: simple silver rings. Right: a golden earring decorated with a bee. (Reproduced with permission from Hakvoort 2013, 70.)

54 Schuurman 1990, 108.
55 Six graves earrings and two rings.
56 Five graves earrings, two rings and one a silver hairpin.
57 Bitter 2002, 241.
58 Portegies 1999.

Coins

Coins in the burial record of the early modern period is considered a separate category because there is no clear consensus about why they were interred. In his dissertation about death rituals in the Netherlands before 1700, Hirsch suggested multiple reasons, ranging from purely ritual to practical.[59] The occurrence of coins in graves is, almost a century later, still a topic of discussion.[60] Coins have been found on the eyes of individuals, and in or next to the coffin near different body parts (the pelvis, the head, etc.). These represent different customs.

Although coins on the eyes recall ancient rituals (for instance, to prevent the soul from returning to the body), a more likely and practical rationale in a modern setting is to enhance the appearance of the corpse. A few hours after a person passes away, rigor mortis (stiffness of the corpse) sets in. At normal room temperature, rigor mortis will last two to four days. However, at lower temperatures (for instance, during winter) this will become significantly longer and complete rigor mortis can last up till 17 days at four degrees Celsius.[61] When the eyes of an individual were still open after rigor mortis, coins on the eyelids kept them closed or concealed them (Fig. 18), mitigating the unpleasantness of an open-eyed stare.[62] Coins on the orbits are a rare but regular find in early modern cemeteries.[63] From the United Kingdom a considerable number of examples is known as well, albeit in similar small quantities per cemetery as in the Netherlands.[64] That the coins were left on the eyes was probably not customary and they could either have been forgotten or left intentionally, for instance when rigor mortis was still in effect.

Coins that were placed in the coffin or near the grave were more likely elements of ritual, although it seems not to be specifically connected to either Catholicism or Protestantism; in Alkmaar coins were found in graves of both Catholics and Protestants.[65] Hirsch provided several ritualistic explanations for the presence of coins on bodies.[66] First they might have been intended to buy off the earthly possessions of the deceased. It can then be considered as a pars pro toto ritual, as only coins of small denominations were interred that were by no means of equal value to the deceased's actual possessions. The second explanation is that the coins were intended for Charon from ancient Greek mythology who ferried the dead to the underworld. The third explanation is that the money was given to Petrus, to facilitate the opening of the heavenly gates.[67] Although it is not possible to reconstruct the exact meaning, it is most unlikely, given that both Catholic and Protestant graves yielded coins, that it was connected to ancient Greek mythology. Furthermore, it is possible that yet another explanation has to be sought, as rituals may have survived from the medieval period of which the meaning is now lost.

---

59 Hirsch 1921, 35-37.
60 For instance, Aten 1992, 27; Bitter 2002, 265-267; Pelsdonk 2013, 116.
61 Varetto & Curto 2004, 33.
62 Cherryson *et al.* 2012, 31; Dezutter 1975, 198; Hirsch 1921, 37.
63 Middenbeemster three graves, Alkmaar two, Zwolle two, Vlissingen one.
64 Cherryson *et al.* 2012, 29-31.
65 Bitter 2002, 267.
66 Hirsch 1921.
67 Hirsch 1921, 35-37.

Nine graves from the sand phase of Middenbeemster contained coins (of which three individuals were definitely buried with coins on their orbits) and another two from the earlier clay phase. One of the two bodies was buried with an exceptionally large number of coins. Usually graves contain a single specimen, however, this individual[68] was buried with 14 coins, of which 11 were made of silver.[69] All coins were found in a pile near the pelvis, and it can be concluded that they had been enclosed in a bag or purse. At the time of burial some of these coins were already quite ancient and it is possible that they were of value for the deceased or held some special meaning. Similar phenomena have been observed in Alkmaar. There, the grave of one individual, buried in 1777, contained a coin dating to 1618.[70] Another individual, that of a priest who was buried in his full attire in 1819, was buried with a coin from 1703 near his hand.[71]

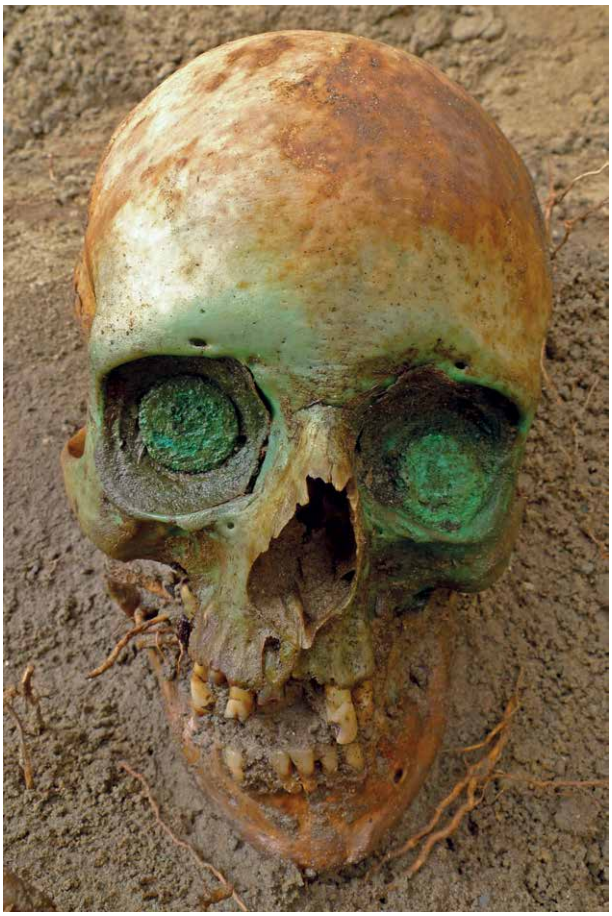


Fig. 18: Skull from Middenbeemster which was found with coins on the eyes. Due to the presence of the copper, the soft tissue in the orbits, including the eyelashes, were still preserved (photo by author).

68 MB11S350V0846.
69 Hakvoort 2013, 74.
70 Bitter 2002, 313.
71 Bitter 2002, 299.

Other material culture from the Middenbeemster burials

Rosaries and medallions

Although it is known that the Middenbeemster cemetery contained both Protestants and Catholics, very few devotional grave goods were found. The remains of only one person was found with a Catholic medallion near the head (Fig. 19). Although the copper is highly corroded, the faint outlines of the rim and text are still visible.

Laws set up after the Reformation banning Catholicism were more or less maintained until the annexation of the Netherlands by the French at the very end of the eighteenth century. Under French rule, state and church were separated and Catholicism was made equal to the dominant Protestant state religion.[72] In the south, a re-emergence of Catholic grave goods occurred more rapidly than in the northern Netherlands. This can be partially explained by the higher percentage of Catholics in the south. By the time the practice became more common in the north, a separate Catholic cemetery had been established in the Beemster (1847). Therefore, the cemetery in Middenbeemster never accumulated the numbers of devotional grave goods that are seen in other cemeteries. To compare, in the early nineteenth century, the Catholic cemetery of the Sint Jan Cathedral in 's Hertogenbosch contained 92 (22%) bodies that had been buried with a rosary. The beads of the rosaries were made of bone, glass, wood or fruit pits. Often a

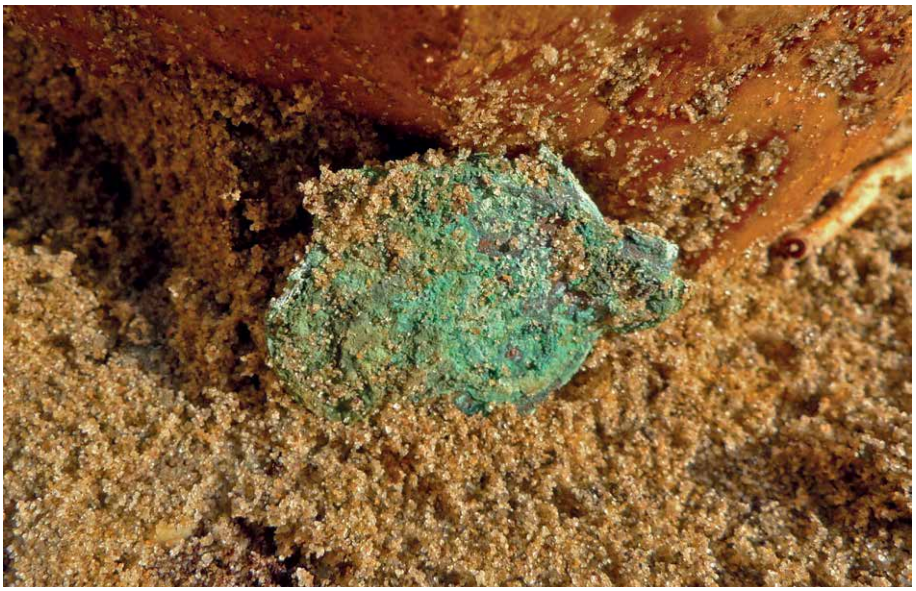


Fig. 19: Small medallion found to the right of a skull in the cemetery of Middenbeemster. Such medallions were found in great numbers in 's-Hertogenbosch but only one example was found in Middenbeemster, making it the only Catholic grave gift that was recovered there (photo by author).

72 Nooijen 2013, 71.

small copper medallion was also present on the rosary similar to the one found in Middenbeemster. The rosaries were usually laid in the hands that were folded over the pelvis.[73] In the late-19th century cemetery of Tegelen, more than half of the community was buried with a rosary.[74]

Unique grave goods

The presence of other grave goods is extremely rare, but they do exist. There is no straightforward explanation for their inclusion in the graves but it is likely that they are interred by the personal request of the deceased or their relatives. The occurrence of personal grave goods, not clearly linked to religion, can be considered as the first steps of the more individualistic funerary rituals characteristic of the modern age.

Only two unique grave goods were found in Middenbeemster. A glass bottle sealed with a cork was discovered between the feet of an adult male (Fig. 20). Unfortunately, the bottle broke during excavation when a shovel hit it, releasing a foul odour from the liquid inside. The contents were sampled but the substance could not be identified. It could have been anything from holy water to the deceased's favourite drink. It is noteworthy that the buried man was one of three individuals interred with coins on the eyes. The second unique find, recovered from a charnel pit, was a bone bullroarer (snorrebot), a flat piece of bone originally attached to a string that when swung around, made a roaring noise (Fig. 21). Unfortunately, because this was a secondary deposit, it is not entirely certain that the item was originally placed in a grave. However, as the charnel pits only contain material from emptied-out graves, it is highly likely that the bullroarer was once part of a burial assemblage. A bullroarer is a typical children's toy and was possibly deposited in the grave of a young individual.[75]

Some other early modern graveyards also contained unique grave goods but they do not bear any similarity with those from Middenbeemster. In the Grote Kerk in Alkmaar three graves contained unusual grave goods. One contained a glass vase and another a plain red earthenware plate. Both, probably, held flowers on the coffin. A third contained oyster shells; evidently the body had been buried in a coffin filled with oyster shells. The shells from the species Ostrea edulis were of a size smaller than those used for consumption. In addition, the skeleton of the individual was disarticulated and disorganized. It is thus possible that there was a long interval between death and burial and that the body was in an advanced state of decomposition when it was buried.[76] The oyster shells could have been added to obscure the foul odour of putrefaction.[77] In the Broerenkerk in Zwolle, a grave of a 66-year-old woman contained a bone knife handle. In a second grave, that of a child, a marble was found.[78]

---

73 Portegies 1999, 99-101.
74 Nooijen 2013, 71.
75 Hakvoort 2013, 66.
76 The person may have died at sea.
77 Bitter 2002, 258-259.
78 Aten 1992, 27.

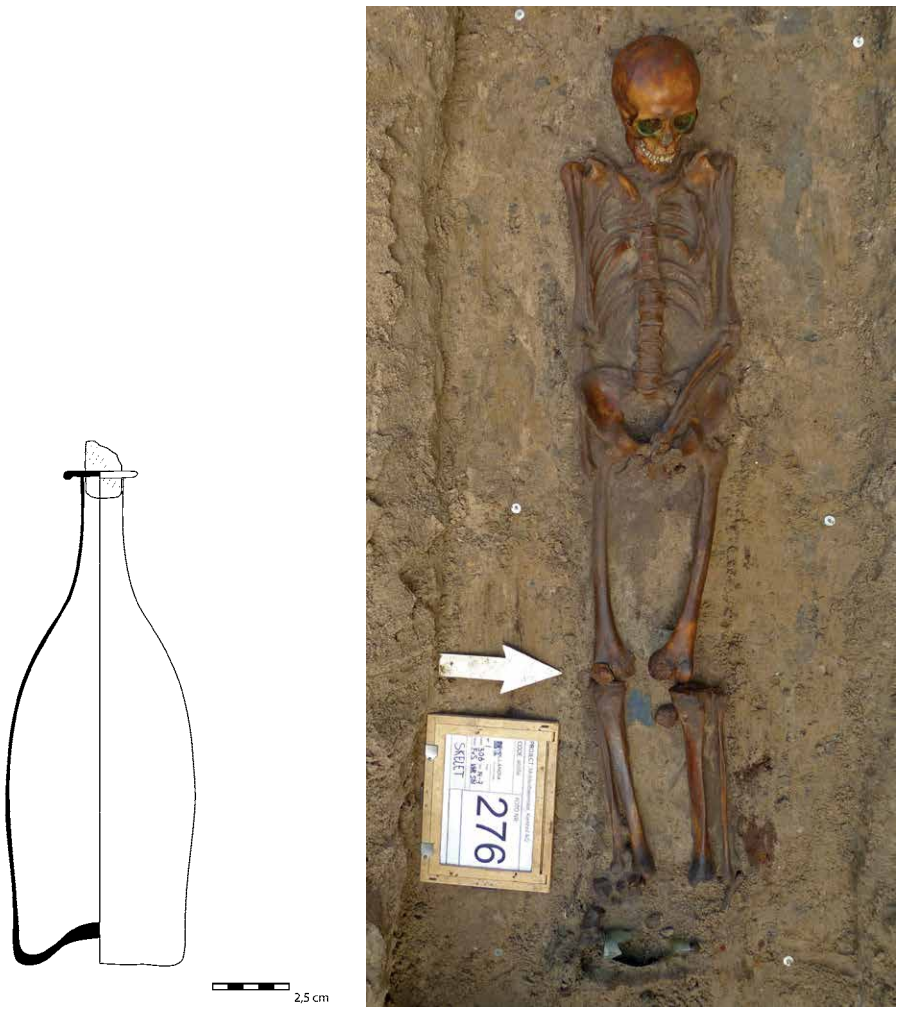


Fig. 20: Remains of an individual buried with a glass bottle at the foot of the coffin. The bottle contained a foul smelling liquid (photo by author; drawing reproduced with permission from Hakvoort 2013, 81).

Fig. 21: A bullroarer (snorrebot) found in a charnel pit in Middenbeemster. The bullroarer was originally attached to a string and when it was swung around, it made a roaring noise. This was a typical child's toy and was probably deposited in the grave of a child. (Reproduced with permission from Hakvoort 2013, 66).

Conclusions: Material characteristics of an early modern rural cemetery

Understanding changes in early modern attitudes towards death is fundamental to an understanding of the material culture in graves. In particular, the presentation of the deceased as a sleeping individual can be seen as vital in the development of certain material trends. A great emphasis was placed on the final moments before burial, when the body was viewed in the coffin.[79] The body was beautified, dressed and laid out after which family and friends could pay their last respects. At the same time, we see the emergence of the independent individual, one that was guided by their own choices and preferences, rather than the strict dictation of religion or social standing. How are these trends reflected in the burial assemblage of the early modern graveyards, and that of Middenbeemster in particular?

Burial architecture

After the seventeenth century, coffin sizes and shapes were standardized, mainly due to limited available burial space. The use of coffins became universal and differentiation was achieved in details and decoration. Popular items (which can be encountered in archaeological contexts) are handles of various designs, copper plates or studs, and decorative screws. The screws might have been used by the relatives of the deceased to fasten the coffin lid, and their emergence emphasizes the growing importance of final rituals. This trend persists up till the present day. Differentiation was also possible in the material used to construct the coffin and the thickness of the coffin sides. The relatively high price of the elaborative extras meant that in general only the upper classes were able to incorporate them. The elaboration of the coffin occurred quite frequently in Middenbeemster, mainly in the form of decorative screws. Handles and other decoration were also used but less frequently.

Burial attire

Burial attire best reflects the new notion of death as a beautified sleep. In the early modern period the shroud made way for the long death shirt in which the vast majority of people were still interred in the late eighteenth and early nineteenth centuries. However, a gradual change, in which a growing segment of the population was buried in their everyday clothes, is observable in some towns, of which Middenbeemster is one. The majority of these people were buried in their undergarments which they would normally wear to bed. Large numbers of buttons located in some graves have further shown that a small portion of the population was buried in their outerwear. Dressing the body in normal clothes and laying it out as a living, sleeping individual can be seen as a way to show that the individual is still part of the living community, thus delaying the inevitable separation and subsequent passing of the individual in the community of the dead. The liminal phase between the state of living and state of death is prolonged. Death is denied,[80] at least until this is no longer possible with the closing of the coffin lid. The

79 Cherryson *et al.* 2012.

80 A trend that emerged in the eighteenth century, according to Ariès (1981, 759-761).

growing emphasis on that moment of closure may therefore be linked to the higher occurrence of decorative screws.[81] It can further be concluded that the burial attire was a façade, not for the benefit of the person who had died but for their relatives. This is illustrated by the fact that only the upper body was dressed, while the lower half was covered by sheets in the coffin. The clothes were not intended for the afterlife but for the final moment of the person's 'life' on earth.

Grave goods

In the nineteenth century, personal grave goods were still rare, a persisting trend that started with the introduction of Christianity. Only two unique items were found in Middenbeemster, and they were probably interred by personal request. Devotional grave goods were present in only one grave. It is possible that it took several decades for the re-emergence of devotional items which appear in the burial record, such as rosaries, by which time Catholics in the Beemster had established a separate cemetery.

Acknowledgements

Firstly, we would like to thank all the students who contributed significantly to the excavation of nearly 500 graves in Middenbeemster in a very short time frame in the summer of 2011. Of equal value was the taskforce 'Wee Ons Gebeente', consisting of volunteers from the Beemster historical society. Over the course of many evenings, they cleaned skeletal remains and discovered many small items in the dirt, enlarging the dataset for this paper. Furthermore, a word of gratitude is due to our colleagues of the Laboratory for Human Osteoarchaeology of Leiden University. A further thanks to Hollandia Archeologen for their co-operation and the provision of reports and photographs. Lastly, we would like to thank the editors for their comments on the first draft of this paper.

81 The highest number of screws were found in the cemeteries with the highest number of clothing accessories.

Bibliography

Ariès, P., 1981: *The hour of our death*, New York.

Arts, N. (ed.), 2013: *Een knekelveld maakt geschiedenis: Het archeologisch onderzoek van het koor en het grafveld van de middeleeuwse Catharinakerk in Eindhoven, circa 1200-1850*, Utrecht.

Aten, N., 1992: 'De opgraving in de Broerenkerk', in: H. Clevis & T. Constandse-Westermann (eds.), *De doden vertellen: Opgraving in de Broerenkerk te Zwolle 1987-88*, Kampen, 13-29.

Bitter, P., 2002: *Graven en begraven: Archeologie en geschiedenis van de Grote Kerk van Alkmaar*. Hilversum (doctoral thesis University of Amsterdam).

Bossaers, K., 2013: 'Begraven in de Beemster in de 17e en 18e eeuw', *De Nieuwe Schouwschuit* 11.

Bouman, J., 1857: *Bedijking, opkomst en bloei van de Beemster, voorafgegaan door eene beschouwing van den vroegeren toestand van Noord-Holland*, Purmerend.

Cherryson, A., Z. Crossland & S. Tarlow, 2012: *A Fine and Private Place: the Archaeology of Death and Burial in Post-medieval Britain and Ireland*, Leicester.

Claeys, J., N.L. Jaspers & S. Ostkamp (eds.), 2010: *Vier eeuwen leven en sterven aan de Dokkershaven: Een archeologische opgraving van een postmiddeleeuwse stadswijk in het Scheldekwartier in Vlissingen*, Amersfoort (ADC-Monografie 9).

De Groote, K., W. De Maeyer, J. Moens, K. Quintelier, F. Van Cleven, I. Vanden Berghe & W. Vernaeve, 2011: 'Het karmelietenklooster van Aalst (prov. Oost-Vl.) (1497-1797): het gebouwenbestand, de begravingen en het fysisch-antropologische onderzoek', *Relicta* 8, 83-250.

Dezutter, W.P., 1975: 'Dodenmunt, penningkeerse en absolutiebrief', in: W. Van Nespen (ed.), *Miscellanea prof. em. dr. K.C. Peeters door vrienden en collega's hem aangeboden ter gelegenheid van zijn emeritaat*, Antwerpen, 193-206.

Falger, V.S.E., 2011: 'Het Kerkhof van Middenbeemster: een nieuwe Fundgrube van Beemsterse geschiedenis', *De Nieuwe Schouwschuit* 9, 18-25.

Falger, V.S.E., C.A. Beemsterboer-Köhne & A.J. Kölker, 2012: *Nieuwe kroniek van de Beemster*, Middenbeemster.

Hakvoort, A., 2013: *De begravingen bij de Keyserkerk te Middenbeemster*, Zaandijk (Hollandia reeks 464).

Hirsch, R., 1921: *Doodenritueel in de Nederlanden voor 1700,* Amsterdam (dissertation University of Amsterdam).

Huisman, D.J., I. Joosten & J. Nientker, 2009: 'Textile', in: D. J. Huisman (ed.), *Degredation of archaeological remains*, Den Haag, 71-90.

Jaspers, N.L., 2010: 'Roerende goederen aan de Dokkershaven: materiële cultuur tussen 1550 en 1850', in: J. Claeys, N. L. Jaspers & S. Ostkamp (eds.), *Vier eeuwen leven en sterven aan de Dokkershaven: Een archaeologische opgraving van een postmiddeleeuwse stadswijk in het Scheldekwartier in Vlissingen* (ADC Monografie 9), Amersfoort.

Kok, H.L., 1970. *De geschiedenis van de laatste eer in Nederland*, Lochem.

Nollen, J., 2012. 'Het grafritueel', in: N. Arts (ed.), *Een knekelveld maakt geschiedenis: Het archeologisch onderzoek van het koor en het grafveld van de middeleeuwse Catharinakerk in Eindhoven, circa 1200-1850*, Utrecht, 117-150.

Nooijen, C., 2013: 'De metaalvondsten 2007 en 2010', in: M. C. E. Houkes & C. Y. Burnier (eds.), *Tegelen-wilhelminaplein: leven en dood in de schaduw van de Martinuskerk: Archeologisch onderzoek naar de jonste fase (1867-1909) van het oude kerkhof van Tegelen*, Amersfoort (ADC-Rapport 1775), 49-69.

Pelsdonk, J., 2013: 'Begraven munten en penningen. Over grafgiften en vreemd geld', in: N. Arts (ed.), *Een knekelveld maakt geschiedenis: Het archeologisch onderzoek van het koor en het grafveld van de middeleeuwse Catharinakerk in Eindhoven, circa 1200-1850*, Utrecht, 106-116.

Portegies, M., 1999: *Dood en begraven in 's-Hertogenbosch: Het Sint-Janskerkhof 1629-1858*, Utrecht.

Schuurman, A.J., 1990: *Materiële cultuur en levenstijl: Een onderzoek naar de taal der dingen op het Nederlandse platteland in de 19e eeuw: de Zaanstreek, Oost-Groningen, Oost-Brabant*, Wageningen (doctoral thesis Wageningen University).

Stamhuis, I., 1997: 'Arm in Arm. Mode en dracht; de stillistische ontwikkeling', in: L. Ast-Boiten & J. Boot-van der Vlis (eds.), *De Groninger Dracht: Kleding en sieraden 18e en 19e eeuw*, Groningen, 70-165.

Van Spelde, F.J., 2012: *Contra vim mortis non est medicamen in hortis: Stageverslag opgraving Middenbeemster,* Leiden (Unpublished Internship report, Faculty of Archaeology, Leiden University).

Varetto, L. & O. Curto, 2004: 'Long persistence of rigor mortis at constant low temperature', *Forensic Science International* 147, 31-34. DOI: 10.1016/j. forsciint.2004.03.033.

Vredenbregt, A.H.L. & T. De Ridder (eds.), 2004: *Gat in de Markt 1.101: Houtgebruik in 11e-eeuwse graven*, Vlaardingen (VLAK-verslag 15.2).

World Heritage Committee, United Nations Educational, Scientific, and Cultural Organization, 2000: *Convention concerning the protection of the World Cultural and Natural Heritage. World Heritage Committee twenty-third session. Marrakesh, Morocco. 29 November – 4 December 1999*, Paris.

Abstracts Urban Graveyard proceedings volume 2

Ethical issues in human osteoarchaeology: Recommendations for best practice in the Netherlands

Andrea Waters-Rist, Rachel Schats & Menno Hoogland

Keywords: Ethics, human skeletal remains, the Netherlands, codes of practice, ethical guidelines

Skeletal human remains represent a special class of archaeological material. The fact that the skeletal remains are those of once-living humans, imbues them with significance not afforded other archaeological material. The question remains, is it ethical to excavate and study skeletal remains, given the sensitive nature of this type of material. This ethical dilemma is why many countries have codes of practice specifically dealing with the ethical consideration of excavation, research, and curation of human remains. However, while human skeletal remains are commonly encountered in Dutch archaeological excavations, specific recommendations or ethical codes for dealing with this type of find are lacking in the current archaeology and history legislation. This chapter demonstrates the necessity of ethical guidance in osteoarchaeology specifically by discussing the issues of excavation, analysis, reburial, and repatriation of human skeletal remains. The chapter concludes with a presentation of ethical, best practice recommendations for the treatment of human remains from archaeological contexts to serve as a starting point for the development of a code of ethics in the Netherlands.

Rural cemeteries, cult places and community identities in the central Middle Ages in the Kempen region (southern Netherlands)

Frans Theuws

Keywords: the Low Countries, central Middle Ages, parish churches, cemeteries

A number of churchyard excavations in the Kempen region in the Netherlands show that churches and churchyards were erected in two successive periods. In the first period, from the middle of the 10th century to the middle of the 11th, churches that served large parishes comprising several settlements or villages were constructed. These churches probably had the right of burial and baptism. In the second period, dating from the late 11th to the 12th century, cemeteries were initially created to serve the local population. Chapels were then built next to or on top of these cemeteries. This process of cemetery and church construction correlates to the institutionalisation of clerical power in rural areas and to the development of local hierarchies of power. It is also during this time that new local identities based on the parish and the community of believers were formed, replacing old villa identities. Parallel to these processes we can observe the fragmentation of the large, old property complexes that had determined local identities since the early Middle Ages.

Social differences in burial practices in the medieval cemetery of Reusel: An osteoarchaeological and mortuary archaeological study of burial practices in the southern Netherlands during the central Middle Ages

Catlijne Nater

Keywords: the Low Countries, late Middle Ages, central Middle Ages, cemetery, parish church, osteoarchaeological research

Cemeteries from the central and late Middle Ages have not yet been studied extensively, even though cemeteries can provide important information about societies. This study assesses patterns in the ways that individuals were buried at the central medieval cemetery of Reusel in the Netherlands. It also examines whether patterns in grave morphologies and distribution differed 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, e.g., one woman was buried in a priest-like position. Such patterns suggest that social differences between individuals were marked by burial in different parts of the cemetery, in different types of graves and with different orientations. Furthermore, this study confirms the existence of local variation in burial practices in this period.

Buried in Alkmaar: Historical and archaeological research on urban cemeteries

Peter Bitter

Keywords: Alkmaar, archaeology, cemetery, burial customs, funeral rituals, Church of St. Lawrence, Kapelkerk, monasteries

Before the Reformation of 1572, cemeteries were located in the churchyard and in the interior of the parish church of St. Lawrence and inside the Kapelkerk, as well as in or near the chapels of at least two of the five monasteries in Alkmaar. Due to a lack of written sources, the result of the dissolution of Catholic institutions in 1572, it remains unclear whether two other monasteries had their own cemeteries or not. Large-scale excavations of the fifth monastery, the Middelhof, rendered not a single human bone, not even in the chapel area, which shows that not every convent had its own graveyard. In contrast, from just a few archaeological finds at the women's convent Jonge Hof, it is evident that a graveyard for the inhabitants of the convent existed. The graveyard of the Franciscan friary Minderbroedersklooster, mentioned in written sources, was excavated in its entirety. Surprisingly, it was used by town laymen–their choice of burial grounds remains unexplained. After the abandonment of the monasteries, the deceased of all Christian churches, Protestant and Catholic, were buried next to or inside the Great Church. According to written sources, the interior of the Kapelkerk (a chapel connected to the parish church) became an additional burial ground after 1575. However, in a small-scale excavation, coffin graves rendered dates that may indicate that the church was used as a burial ground already earlier in the century.

The second part of the article deals with elite urban burial customs at the Great Church in the 18th and early 19th centuries and summarizes a detailed study of both archaeological and archival data that followed the extensive excavations of 1994-1995. Elite funerals were grand events, underlining the status of the deceased and his/her next of kin. Major changes in funerary practices were the abandonment of burial inside the church after 1780 by the middle class, the introduction of new rituals in the French period and, finally, the relocation of the main urban graveyard of Alkmaar in 1830 to the General Cemetery outside the town limits.

Medieval and postmedieval cemeteries in and around the city of Delft: Thirty years of rescue archaeology

Epko J. Bult

Keywords: urban archaeology, late medieval burial practices, cemeteries, Delft

Since 1985, several excavations of late-medieval and post-medieval sites in and around Delft have taken place. They provide information on the way people were buried in Delft and on the condition of their health before they died. People were not buried at random. Although not all were buried in the standard Christian fashion, their social, political, and economic status is mirrored in the location where they were buried, the way they were laid out, and in the state of their health as evidenced by physical anthropological research. Middle class persons were buried in the parish church in front of the altar or in the chapels of cloisters, nobles and the very rich probably in brick tombs. In general, the overall health of the population did not decline in the medieval period, but in the second half of the 16th century, when malnutrition and disease were prevalent, it did.

A thousand graves: differences and similarities between archaeologically investigated burial-grounds in 's-Hertogenbosch, the Netherlands (*c.* 1275-1858)

Ronald van Genabeek

Keywords: urban archaeology, 's-Hertogenbosch, burial practices, monks, villagers, soldiers, protestants

In the past 35 years, about a thousand graves have been excavated in 's-Hertogenbosch and its immediate environs. Although 's-Hertogenbosch was one of the largest towns in the Netherlands during the late Middle Ages, only a few hundred skeletons from the excavations date from that period, largely because many medieval burials were disturbed by the intensive use of graveyards in the 18th and 19th centuries. Our knowledge of burial practices of this early period can therefore only be generally reconstructed. We have much more information about the 18th and early 19th centuries, both from the burials themselves and from historical data. The burials in the Franciscan monastery and from the graveyard of the village of Engelen are most informative. The best dataset (c. 350 individuals) was excavated at the cemetery of St. John's Cathedral where, in the early 19th century, mainly poor citizens were buried. Many of the graves contained grave goods like rosaries and medals. From about the same period, the Dutch Reformed cemetery yielded c. 50 graves from the more well-to-do part of the population. A mass grave from 1794–1795 with bodies of 68 French soldiers shows how little care was sometimes taken when burying people. Most of the soldiers died from infectious diseases. The post-medieval graves give a lot of information on aspects such as burial rituals, coffins, orientation, autopsies, surgical techniques, and health.

In the shadow of St. Plechelmus: A thousand years of burials

Gavin Williams

Keywords: urban archaeology, Oldenzaal, churchyard, burial practices

In the period between September 2011 and March 2013, ADC Archeoprojecten in combination with RAAP carried out an excavation on and around the St. Plechelmusplein in Oldenzaal (Overijssel). During the excavation, 5,000 m² were investigated and 2,750 individuals were recovered. (Of these, 1,005 were sampled for DNA/isotope research, 37% of the total excavated population.) The excavation produced burials dating from the 7th/8th centuries through to the 19th century. During the post-excavation analysis, five zones at the periphery of the cemetery were selected for analysis. Two hundred individuals from these zones underwent a complete physical anthropological, DNA, and isotope analysis (the first time that such analysis has been carried out on such a scale in the Netherlands). The integrated approach to the analysis of the 200 individuals has produced a wealth of information. A number of noteworthy graves and rituals were also identified during the excavation, such as several coffins with clay linings as well as evidence for so called 'maiden crowns'. A cluster of north-south orientated burials was identified in the southwest periphery of the cemetery. The reason for this cluster is still unclear. As only two hundred individuals were analysed, we hope that this paper and the monograph do not mark the end of this excavation but rather the start of further research at an international level.

St. Rombout's cemetery in Mechelen, Belgium (10th – 18th centuries): A typical urban churchyard?

Katrien Van de Vijver, Frank Kinnaer & Silvia Depuydt

Keywords: Late medieval, post-medieval, contextual analysis, bioarchaeology, parish churchyard

During excavations at the northern cemetery of St. Rombout's Cathedral in Mechelen between 2009 and 2011, 4,158 individual human remains, found in 3,617 graves dating between the 10th and 18th centuries, were documented. The cemetery was originally used as the burial place of a chapter. In 1134, the collegiate obtained parish rights after which citizens of Mechelen were interred there. But later, only members of the St. Rombout's parish were buried in the cemetery. In 1785, the cemetery was closed and the space was converted into a park and later used as a car park.

Christian burials are generally considered to be uniform; individuals are buried in single, primary graves, in which the body is placed on its back in a west-east orientation, without grave goods. However, both the medieval and post-medieval interments in the St. Rombout's Kerkhof display a wide range of variation, especially in the presence/absence of a container, the position and orientation of the body, and the presence of objects, as well as more unusual characteristics, such as grave linings, and the number of individuals in the grave. There is some indication of simultaneous burial. Preliminary estimations of age and sex made during the excavation suggest that people of all ages and both sexes were interred in the cemetery, with some differences over time. The burial practices are correlated with the data from the skeletal analysis and historical documentation to gain a better understanding of the population that was buried in the cemetery, focusing specifically on social organization, funerary rituals and changes over time.

The Carmelite monastery in Aalst, Belgium, province of East Flanders (1497-1797): An urban burial-ground in a monastic environment

Koen De Groote, Jan Moens & Kim Quintelier

Keywords: Belgium, Low Countries, monastery, physical-anthropological research

In 2004-2005, a large excavation of the Hopmarkt in Aalst revealed the remains of a late medieval residential area on the former Veemarkt and the foundations of a Carmelite friary, which was founded in 1497 and dissolved in 1797. The core of the friary, including the church, the residential buildings, the cloisters and the cloister garden were excavated almost in their entirety. Historical sources indicate that the friary had three burial grounds: the church, the cloisters with cloister garth, and the cemetery. The cemetery itself was situated outside the excavated area, but in the two other parts of the friary, a total of 238 burials were discovered, on which a physical anthropological analysis was carried out. Stable isotope ratios of carbon and nitrogen were measured in 39 adult individuals from a mixed monastic and lay population buried in three different monastery locations, reflecting groups with differing social statuses. The data demonstrates the potential of stable isotope analysis to increase our knowledge of the complex interactions between lifestyle and burial in post-medieval times. The combined data of the archaeological evidence, the physical anthropological investigations, and the study of historical sources provide a picture of the burial practices in the Carmelite friary of Aalst.

Taking stock of burial archaeology: An emerging discipline in Denmark

Lene Høst-Madsen

Keywords: Denmark, post medieval archaeology, burial archaeology

'The closer we get in time, the thicker history gets' (Gaimster 2012, 51). This is old news, and a much cited statement, but most certainly the case when it comes to human remains. In modern northwestern European societies, many of the cemeteries that were originally located near churches in urban areas have been closed down. This means that burials in older, abandoned cemeteries are often disturbed when earthworks are undertaken. These excavations are controversial and receive much attention, because the question remains, what are we to do with the bones? Are they archaeological objects, are they to be ignored, or should they be considered sacred? This paper will reflect on the potential and the problems of post-medieval burial archaeology. The focus will be on Denmark, Danish legislation, archaeological practice, and future perspectives.

A rural view of early modern mortuary practices: Context and material culture of the 18th- and 19th-century cemetery of Middenbeemster, the Netherlands

Frank J. van Spelde & Menno L.P. Hoogland

Keywords: the Netherlands, early modern period, rural churchyard, burial practices

This paper explores the context and material culture of an 18th- and 19th-century cemetery in the rural town of Middenbeemster, the Netherlands. In particular, the chapter focuses on how changes in early modern burial practices and attitudes towards death are reflected in the archaeological material culture. Often the material culture of medieval and post-medieval burials is considered to be poor. However, in addition to skeletal remains, a multitude of finds can be retrieved from burials which provide a considerable amount of information. Coffins were made in different shapes and sizes, using a range of wood types, which varied significantly in quality and price. Further differentiation was possible by taking into account coffin decorations such as metal handles, copper studs, engraved plates, and decorative screws. While most of these had a limited functional use, their primary function was probably to communicate the status or wealth of the deceased and/or their families. In Middenbeemster, ornamentation of coffins occurred frequently, in particular, decorative screws were used, likely during the closing of the lid by relatives. Remains of burial attire were also frequently found in graves from the early modern period. Common finds in this category were buttons of various materials and copper hooks and eyes. The number and location of these clothing fasteners in individual graves are an indication of how the deceased were dressed when they were laid to rest. This has shown that in 19th-century Middenbeemster, some people were dressed in their 'normal' clothes, and not in specifically designed burial shrouds or clothes (*doodshemd*). Overall, it is clear from the material culture that there was a gradual shift in the early modern period from burial traditions strictly dictated by the church to traditions in which there was more latitude for personal preference and expression of individual identity.

About the contributors

Nico **Arts** studied cultural and physical anthropology at Leiden University and pre- and proto-history at the University of Amsterdam. Since 1989, he has been employed as the urban archaeologist for the city of Eindhoven. Nico has published many studies about the Stone Age in the south of the Netherlands and medieval and early modern archaeology in Eindhoven. He has edited several volumes focusing on the urban archaeology of Eindhoven. Most recently he has been responsible for a major publication on the results and analysis of the excavation of the Catharina graveyard. Currently, Nico is working on an archaeological synthesis of town and country in the Northern Kempen region between AD 1000 and 1650.

Peter **Bitter** (1958) graduated in medieval archaeology (drs.) from the University of Amsterdam in 1984. After a period of short-term contracts working on projects at various institutions, he was appointed municipal archaeologist of Alkmaar in 1991. He is the author of many publications, mostly on the archaeology of Alkmaar but also co-author of the Open University handbook *Pre- & Protohistorie van de Lage Landen* and of the chapter on towns of the National Research Agenda for Archaeology (www.archeologieinnederland.nl). In 2002, he received his doctorate, having written a dissertation on the Church of St. Lawrence in Alkmaar.

Since 2009, Jeroen **Bouwmeester** has been employed by the Cultural Heritage Agency as a senior researcher of medieval and early-modern cities. He studied archaeology of northwest Europe at VU University in Amsterdam. After his graduation in 1997, he worked as a senior archaeologist at BAAC and as director of Synthegra. During this period, Jeroen directed large-scale excavations near Zutphen (Bronze Age-Middle Ages). His research at the Cultural Heritage Agency focuses on the development of expectation models of suburban areas by combining historical, geographical, archaeological, and building historical data. He devotes special attention to the development of houses and other buildings in relation to urban planning, a topic which is being developed further in his PhD research.

Epko J. **Bult** studied human geography at the Vrije Universiteit and medieval archaeology at the Albert Egges van Giffen Institute for Prae- and Protohistory at the University of Amsterdam. From 1990 to 2006 he was town archaeologist for the municipality of Delft and also served as town archaeologist for the municipalities of Midden-Delfland, Pijnacker-Nootdorp, De Lier, and Monster. Since 2006 he has worked as a senior archaeologist for the municipality of Delft. In 2003, he became lecturer in Medieval Archaeology in the Faculty of Archaeology at Leiden University.

Koen **De Groote** is senior researcher at the Flanders Heritage Agency and guest professor at Ghent University and VUB (Free University of Brussels). He specialises in medieval archaeology with extensive experience in town archaeology and medieval and post-medieval ceramics. He studied history and archaeology at Ghent University and obtained a PhD at VUB on the topic of medieval ceramics in Flanders. His dissertation was later published as *Relicta Monography 1*. He has also published archaeological and historical research on the formation and development of the town of Aalst. Recent publications include research on pottery and identity, such as the use of scratch marks in convents and the symbolic meaning of Mediterranean tin-glazed wares.

Silvia **Depuydt** was employed as project archaeologist for the excavation of St. Rombout's cemetery by the Department of Archaeology of the City Council of Mechelen, Belgium. She has worked as a field archaeologist since 2001 in both rural and urban contexts and specialises in ceramics from the late medieval and modern periods.

Kerry **Fast** holds a PhD from the Centre for the Study of Religion at the University of Toronto. Her doctoral research was a historical-anthropological study of Canadian women's religious lives. In more recent years, she has focused her research attention on traditional, distinct Mennonite groups, which has taken her to Bolivia, Mexico, and across Canada where she has conducted ethnographic research in Mennonite communities. She has published several articles on aspects of Mennonite religious life and is co-editor of *Mothering Mennonite*. Kerry is also a full-time language and copy editor, specialising in academic editing in the humanities and social sciences. She lives in Toronto, Canada.

Menno **Hoogland** is a Professor in Caribbean and Mortuary Archaeology. He holds a degree from Leiden University in Cultural Anthropology with a focus on prehistory and physical anthropology. He wrote his PhD dissertation on settlement patterns of the Indigenous population of Saba, Netherlands Antilles. In 1992, he was appointed lecturer in the Faculty of Archaeology and presently he teaches courses in Caribbean archaeology and mortuary archaeology. The analysis of taphonomy, burial practices, and settlement organisation are the foci of his research. Together with Prof. dr. Corinne Hofman, he conducted fieldwork on Saba, Guadeloupe, St. Martin, St. Lucia, St. Vincent, Curaçao, and in the Dominican Republic. He is currently working on the recently excavated Dutch Middenbeemster skeletal collection focussing specifically on the archival records and taphonomical analysis of the burials. In addition, he has a position in a prestigious ERC Synergy project Nexus 1492: New World Encounters in a Globalising World that focuses on cultural evolution following Columbus's arrival in the Caribbean.

Lene **Høst-Madsen** has been Director of Museum Skanderborg since 2013. Before this she was Curator in Archaeology at the Museum of Copenhagen (2000-2013). During this time, Høst-Madsen conducted large-scale excavations in Copenhagen. Her research interest lies in post-medieval and later historical archaeology with

a special interest in material culture and politics. She has published articles and presented at international conferences on these themes. She has served in the capacity of chairperson of the Advisory Board for Archaeology at the Danish Cultural Agency under the Ministry of Culture (2009-2013). Currently she is an editorial advisor for *Post Medieval Archaeology*, an Examiner at the University of Copenhagen, Aarhus University, and University of Southern Denmark in archaeology, and an Examiner of Medieval and Renaissance archaeology at Aarhus University.

Frank **Kinnaer** works for the Department of Archaeology of the City Council of Mechelen, Belgium. He is responsible for the historical research of archaeological sites and assists in excavations. His main interests include urban development and archaeozoology.

Jan **Moens** is a master in archaeology specialising in the medieval period. He was active for the Instituut voor het Archeologisch Patrimonium (IAP), the Vlaams Instituut voor het Onroerend Erfgoed (VIOE), and is currently working for the Flanders Heritage Agency. A main part of his research has involved excavations and studies on the medieval town of Aalst. He has published several papers on these projects in the series *Archeologie in Vlaanderen* and *Relicta*. He also specialises in the study of medieval leather artifacts from Flanders, which is the topic of his PhD being undertaken jointly at VUB (Free University of Brussels) and Ghent University.

Catelijne **Nater** studied architecture at Delft University of Technology and prehistoric archaeology and medieval archaeology at Leiden University. During her master's thesis research on the cemetery of Reusel, she developed an interest in human osteology. Thereafter, she pursued additional specialisation in this area. In her master's thesis, Nater combined the discipline of Medieval Archaeology with Osteoarchaeology. Following her graduation in 2016 she published two articles based on her thesis and is now working as a field archaeologist in the southern Netherlands.

Kim **Quintelier** graduated in 2005 as a Master in Archaeology at KU Leuven. Between 2005 and 2016, she was employed at the Royal Belgian Institute of Natural Sciences (RBINS) and at the Flanders Heritage Agency as an osteoarchaeologist with expertise in the analysis of inhumated as well as cremated human remains from archaeological sites in Flanders and the Brussels-Capital Region. Her research focused on reconstructing aspects of demography, health/disease, diet, and funerary practices in past populations using human osteology and palaeopathology. Since 2016, she has been manager of the archaeological collections at the Flanders Heritage Agency, which she combines with osteoarchaeological work for this agency.

Rachel **Schats** studied archaeology with a specialisation in osteoarchaeology at Leiden University and University College London after which she was appointed as a research and teaching assistant for the Laboratory of Human Osteoarchaeology in Leiden. Her PhD (defended November 2016) aimed at gaining a better understanding of the physical consequences of medieval developments, such as urbanisation and commercialisation, by comparing rural and urban skeletal populations. Concurrently, Rachel taught numerous undergraduate and graduate courses on human skeletal material at Leiden University, VU Amsterdam, University of Groningen, and Saxion School for Applied Sciences. In January 2016 she was appointed Lecturer in Human Osteoarchaeology in the Faculty of Archaeology, Leiden University.

Frans **Theuws** is Professor of Medieval Archaeology at Leiden University. He studied history (BA) and archaeology (MA) at Nijmegen and Amsterdam Universities. He obtained his PhD at Amsterdam University. In his early career, he directed many excavations in southern Netherlands. He obtained several grants from the National Science Foundation, including a Pionier Grant. He was one of the initiators and later one of the team leaders of the European Science Foundation program 'The Transformation of the Roman World', which continues to be an area of focus of his research. At present, he directs the National Science Foundation-funded project 'Charlemagne's Backyard?', which deals with the nature of the Carolingian economy in the Netherlands. Most recently he obtained a European Research Council Advanced Grant to study the economic development of northwestern Europe in the post-Roman period.

Katrien **Van de Vijver** is a researcher at the Royal Belgian Institute of Natural Sciences and the University of Leuven. Her PhD centred around the study of St. Rombout's cemetery in Mechelen. She has a background in contextual analysis of human remains and is involved in anthropological studies of sites from Flanders and Brussels, the 'Sagalassos Archaeological Research Project' and the project 'Belgian Archaeological Expeditions to the Orient'.

Ronald **van Genabeek** (1969) graduated in medieval archaeology at the University of Amsterdam. He worked as senior archaeologist and manager at BAAC, a private research company. Since 2007 he has been municipal archaeologist of 's-Hertogenbosch. A main part of his research involves excavations in 's-Hertogenbosch and other medieval towns. He specialises in the study of urban monasteries and pottery. He is author of many publications on medieval archaeology and has also co-authored a chapter on towns of the National Research Agenda for Archaeology. Currently he is preparing an overview of the results of 40 years of archaeological investigation in 's-Hertogenbosch.

Roos **van Oosten** began her academic career studying medieval history after which she began her archaeological degree that culminated in a thesis on urban archaeology. Her PhD dissertation at the University of Groningen focused on sanitation management, which she successfully defended in 2014. In 2011, she

was appointed as university lecturer in urban archaeology at Leiden University. In addition to undergraduate and graduate teaching responsibilities, Roos is working on her VENI-funded project entitled 'Challenging the paradigm of filthy and unhealthy medieval towns'.

Frank **van Spelde** obtained both his bachelor and masters degrees at Leiden University, focusing on human osteology and funerary archaeology. Since 2010 he has conducted and supervised several excavations of medieval and post-medieval cemeteries and worked as a research assistant at the Laboratory for Human Osteoarchaeology at Leiden University. His main research interests are the cultural aspects of burial archaeology and medieval archaeology, in particular ceramics. His most recent research project consisted of the analysis of human remains and their cultural context from the early medieval site of Oegstgeest, in which taphonomic, osteological, and isotope analyses were combined to reconstruct aspects of the lives and deaths of the inhabitants of the settlement. Currently he is working as a field archaeologist for Archol B.V., excavating in various parts of the Netherlands.

Andrea **Waters-Rist** is an Assistant Professor in Human Osteoarchaeology with specializations in paleodiet, paleopathology, and dental anthropology. She received her PhD from the University of Calgary in Canada and has been with the Faculty of Archaeology at Leiden University since 2011. She has conducted fieldwork and labwork in many countries including Canada, Greece, Belize, Nicaragua, Russia (Siberia), and, most recently, the Netherlands. She heads the osteoarchaeological analyses of the post-medieval Dutch Middenbeemster skeletal collection, consisting of nearly 500 individuals, focusing on the interrelationship of diet, disease, and activity. Dr. Waters-Rist uses advanced methods based in biochemistry and physics, such as stable isotopes, trace elements, and synchrotron light, to reconstruct diet, in particular, infant feeding practices. Her interest in ethics in human osteoarchaeology arises from her experience with the marked differences in policies on human remains between countries and a desire to conduct scientifically sound research that benefits society within a framework that fairly balances the rights and needs of the stakeholders, descendant communities, and the general public.

Gavin **Williams** studied archaeology at the University of Nottingham (BA Hons) and the University of Leicester (MA). He now works at ADC Archeoprojecten as Senior Archaeologist/ Project Manager. He has been working in Dutch commercial archaeology since 1995 and has led excavations at a number of early medieval/ late and post-medieval cemetery sites within the Netherlands, including one at the Early Medieval Emporium of Dorestad as well as the one in Oldenzaal, discussed in this volume.

THE URBAN GRAVEYARD

It is commonly believed that in medieval and post-medieval towns and cities death outnumbered births and that these urban centres could only survive through the influx of migrants; a concept which has come to be known as the urban graveyard effect. Whether this was indeed the case for all cities and towns is still debated, but it is certain that urban citizens were more used to death that we are today. The medieval graveyards in which the deceased were interred, then still located within town limits, are an invaluable source of knowledge for reconstructing past lives. Systematic archaeological and osteoarchaeological research of urban graveyards has become the norm in the Netherlands and Belgium since the 1980s. However, many of the studies remain unpublished and larger, overarching publications in which comparisons are made between different studies are still lacking.

The urban graveyard presents several studies in which the results of older archaeological and osteoarchaeological research are compared to more recent excavation data from several Dutch, Belgian and Danish cities and towns. Both the archaeological data concerning burial position, orientation, and grave goods as well as osteoarchaeological data such as demographic information and pathological observations are discussed. This well-illustrated volume is a starting point and source of inspiration for more (inter)national comparative research.

Sidestone Press
ISBN: 978-90-8890-502-5
9 789088 905025 >

URBAN GRAVEYARD PROCEEDINGS 2