Cultural Heritage Agency
Ministry of Education, Culture and Science

Nederlandse Archeologische Rapporten 084

Osseous and keratinous objects from the Netherlands

M.J. Rijkelijkhuizen, J.T. Zeiler and J. van Dijk

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Colophon
Nederlandse Archeologische Rapporten 84
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Cover photo: J. van Horssen, Erfgoed Delft, Archeologie
Catalogue: M.J. Rijkelijkhuizen, J.T. Zeiler, J. van Dijk and K. Esser
Photo editing: M. Haars (BCL Archaeological Support) and A. Crabbé

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Authorization: R.C.G.M. Lauwerier, April 2024

Layout and production: Osage/Xerox

ISBN/EAN: 978-90-76046-93-8

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Contents

Preface

Until recently, a good archaeological review study of bone and antler objects from Dutch contexts was lacking. With the publication 'Osseous and keratinous objects from the Netherlands', colleagues working in archaeology and archaeological heritage management now have access to such an overview, which covers the entire period from the Palaeolithic to the Early Modern period. Comprising both a textual section and a catalogue, the work allows a search by two different entries to enable quick identification of a newly found object, and – through the text – what its potential meaning and implications are. At the same time, the text emphasizes that familiarity with the material is indispensable to be able to differentiate between for example bone, antler, ivory and horn, or the species of animal, and to realize the potential implications. The authors have mercifully decided not to include a list of misidentifications to illustrate this problem! The study of such objects is evidently not a mere hobby but instead requires solid specialist knowledge and experience.

After all, bone and antler objects do not stand in isolation. They create an image of past developments in raw material use and technology. Moreover, they provide insight into matters such as taste and fashion, daily life, direct or indirect contact with distant regions, their significance for religion and funeral ritual, and so on. In other words, these objects tell eminently relevant stories, large and small, about people in the past.

As an 'extra', a comb typology for the Netherlands is included to facilitate a more important role for these items in for instance studies of changes in material use, interregional contacts, trade routes and exchange of ideas.

Information on many of the objects is poorly accessible because it is unpublished or deeply buried in excavation reports. Not only is this overview of the different object types therefore very useful, but many have also been dug up for the first time out of the 'grey' literature and depot or museum collections. If not included in the publication itself they have now at least been recorded and described in an extensive database accessible through the national Data Archiving and Networked Services (DANS). Moreover, because this NAR edition is in English, international colleagues will now better be able to familiarize themselves with this part of Dutch material culture.

This publication is another fruit of the efforts of the Cultural Heritage Agency of the Netherlands to regularly provide the archaeological field with overviews to ensure that the hundreds of reports and other publications coming out every year are not gathering dust in physical and digital bookcases but can substantially contribute to our knowledge of the Netherlands' past.

Finally, I would like to compliment the authors and other persons involved with this thorough review and the creation of this volume. I sincerely hope that archaeological colleagues will enjoy using this practical manual, and I hope that the Agency will continue this NAR series of archaeological overviews, which are highly valued by the colleagues in the Netherlands.

Roel Lauwerier

Summary

Presenting an overview of the accumulated knowledge of the different types of objects found in the Netherlands that are made of bone, antler, ivory and other animal materials like shell and horn, from the Prehistoric to the Modern period. That was the aim of this research project, which has now resulted in a database in which 21,000 objects can be accessed, and in an accompanying report comprising a textual section and a catalogue.

Both the text and the catalogue are divided into three chronological sections: Palaeolithic to Iron Age, Roman period to Early Medieval, and Late Medieval to Modern. Over two-hundred object types are being discussed, from a decorated bone of an aurochs or steppe wisent dated to 11,560 ± 50 BP – possibly the oldest object – to a twentieth-century manicure set.

The tools and other objects included here are agricultural and craft tools like adzes, axes, awls, ripples, planes, marlin spikes, spindle whorls, bodkins and lace bobbins; weapons for hunting or warfare and fishing tools, like spears, harpoons, fishing hooks, (elements of) swords, daggers, knives, backswords and crossbows; domestic items like spoons, butter knives, sieves, pastry cutters and mountings for chests; objects for personal hygiene, ornamentation and dress such as dress pins, brooches, beads, combs, toothbrushes, razors, syringes and artificial dentures, powder compacts, spectacles and binoculars; and finally items relating to games, play, and music, like dice, gaming pieces, knucklebones, jingles, whistles, tuning forks, and tuning pegs.

Special attention was given to combs, a category that is frequently encountered in archaeological contexts. For this group, a more detailed typology was constructed with indications as to origin and chronology, when possible.

Nearly all artefacts are tied to certain periods. Projectile points no longer occur after the Mesolithic period, ripples are mostly Neolithic. Dice, chapes and bone hinges were introduced in the Roman period (and to some extent disappear afterwards), while items like spectacles, binoculars, pocket sundials and powder horns are typical of the Late Medieval and (Early) Modern periods.

Different periods are also characterized by different materials. For example, bone of steppe bison and reindeer were used up until the most recent Ice Age; the most commonly used species in the Mesolithic period were red deer and aurochs; and from the Neolithic onwards bone and other materials of domesticated species like cattle, sheep and pig dominate the assemblages. In later periods, the spectrum expands to include the ivory of exotic species like elephant, walrus and hippopotamus as well as tortoiseshell and mother-of-pearl, while antler now had to be imported as local populations were becoming depleted by the end of the Early Medieval period. Less is known about the use of horn as this material is highly perishable. In time, animal materials were gradually replaced by metal, and with the introduction of synthetic materials animal materials virtually ceased to be used.

The regions of origin of materials and objects were equally diverse. Some materials were sourced locally but others were directly or indirectly imported from elsewhere. Panther cowry shells come from the Red Sea or the Gulf of Aden while tiger cowries occur naturally in the Indian Ocean and the Pacific. Elephant ivory was imported on a modest scale in the Roman period but between the sixteenth and eighteenth century reached the Dutch Republic from West Africa in large quantities. Also the other exotics mentioned earlier arrived in the Low Countries through trade.

Besides these topics this overview also addresses themes such as the role of animal materials in daily life, and how this role might change due to factors like outside cultural influences. Crafts and trade are also discussed: domestic versus workshop production, import of and trade in objects and raw materials, techniques and production methods, and the standardization which started after the Medieval period.

One of the goals of this project was to make the frequently 'hidden' information on objects of bone, antler, ivory and other hard animal materials more easily accessible in the form of a database. Recorded in this database are objects published in reports and other publications as well as unpublished items in depots and museum collections. The database can be accessed via *Data Archiving and Networked Services* (DANS). The level of detail and the accuracy of the data with regard to for instance material or object type are variable. This does not diminish the database's usefulness as a starting point for studies of certain object types

or their use and meaning during specific periods. A concluding chapter offers suggestions for future research and other recommendations.

This report and the accompanying database are part of the Cultural Heritage Agency's Valetta Harvest research programme. This programme aims to make existing information on specific geographical, chronological or thematic archaeological topics more widely accessible.

Samenvatting

Een overzicht van de kennis over de verschillende typen voorwerpen van bot, gewei, ivoor en andere dierlijke materialen zoals schelp en hoorn van prehistorie tot nieuwe tijd in Nederland, dat was het doel van dit onderzoeksproject. Het heeft geresulteerd in een database waarin 21.000 voorwerpen zijn ontsloten, en een publicatie met een tekstdeel en een catalogus. In de tekst en de catalogus worden de objecten in drie perioden behandeld: van paleolithicum tot en met de ijzertijd, van Romeinse tijd tot en met de vroege middeleeuwen en van late middeleeuwen tot en met de nieuwe tijd. Alles bij elkaar zijn ruim tweehonderd typen voorwerpen beschreven, van een versierd bot van een oeros of steppewisent met een ouderdom van 11.560 ± 50 BP – mogelijk het oudste object – tot een twintigste-eeuwse manicureset.

Het gaat om werktuigen voor landbouw en ambacht zoals dissels, bijlen, priemen, bobbelkammen, schaven, marlpriemen, spinsteentjes, rijgnaalden en kantklosjes; om wapens, jacht- en vistuig zoals speren, harpoenen, vishaken, onderdelen van zwaarden, dolken, messen, houwdegens en kruisbogen; om huishoudelijke artikelen als lepels, botermessen, zeven, deegwielen en kistbeslag; om voorwerpen voor persoonlijke verzorging, opsmuk en kleding zoals kledingspelden, broches, kralen, kammen, tandenborstels, scheermessen, injectiespuiten en kunstgebitten, poederdozen, brillen en verrekijkers; en, tot slot, voorwerpen die te maken hebben met spellen, speelgoed en muziekinstrumenten zoals dobbelstenen, speelstukken, bikkels, rinkelbellen, fluiten, stemsleutels en snaarhouders.

Kammen hebben extra aandacht gekregen. Voor deze archeologisch veel aangetroffen groep is een meer gedetailleerde typologie opgesteld met waar mogelijk indicaties voor herkomst en datering.

Bijna alle artefacten zijn periodegebonden. Zo komen spitsen na het mesolithicum niet meer voor, zijn bobbelkammen typisch voor het neolithicum, worden dobbelstenen, zwaardpuntbeschermers en benen scharnieren in de Romeinse tijd geïntroduceerd (en verdwijnen daarna deels), en zijn zaken als brillen, verrekijkers, zonnewijzers en kruithoorns typische laat- en postmiddeleeuwse objecten.

Het gebruikte materiaal varieerde van periode tot periode. Zo werd tot de laatste ijstijd bot van soorten als steppewisent en rendier gebruikt, in het mesolithicum vooral dat van edelhert en oeros en vanaf het neolithicum steeds meer dat van de gedomesticeerde soorten rund, schaap en varken. In de latere perioden komen daar exotische soorten bij zoals ivoor van olifanten, walrussen en nijlpaarden, schildpad en parelmoer, terwijl gewei, dat aan het einde van de vroege middeleeuwen nauwelijks meer beschikbaar is, moet worden ingevoerd. Door de grote vergankelijkheid van hoorn is over het gebruik ervan minder bekend. In de loop van de tijd werden dierlijke materialen geleidelijk vervangen door metalen, om uiteindelijk met de introductie van kunststof praktisch helemaal te verdwijnen.

De herkomstgebieden van zowel grondstoffen als objecten waren zeer divers. Deels werden lokale materialen gebruikt maar er was ook sprake van directe of indirecte import. Zo komen schelpen van panterkauri's uit de Rode Zee of de Golf van Aden en de tijgerkauri uit het Indo-Pacifische gebied. Olifantivoor komt in kleine hoeveelheden met de Romeinen mee, maar vanaf het einde van de zestiende tot achttiende eeuw wordt het door de Nederlandse Republiek in grote hoeveelheden uit West-Afrika geïmporteerd. Ook de eerdergenoemde exotische materialen kwamen via de handel naar wat nu Nederland is.

Naast bovengenoemde onderwerpen komen ook andere thematische onderwerpen aan bod, zoals het gebruik van dierlijke materialen in het dagelijks leven en de veranderingen daarin, bijvoorbeeld onder culturele invloeden van buitenaf. Ook wordt ambacht en handel besproken: huisvlijt versus ambachtelijke productie, de import van en handel in objecten en grondstoffen, de manier van vervaardiging en de standaardisatie in de postmiddeleeuwse periode.

Een van de doelstellingen van het project was het ontsluiten van de vaak 'grijze' informatie over voorwerpen van bot, gewei, ivoor en andere harde dierlijke materialen door middel van een database. In deze database zijn zowel voorwerpen uit rapportages en publicaties als uit depots en museale collecties samengebracht. De database is te raadplegen via *Data Archiving and Networked Services* (DANS). De nauwkeurigheid en juistheid van de gegevens, zoals materiaalsoort of type voorwerp, is niet altijd correct. Als attenderend systeem is de database echter

een waardevol startpunt voor nader onderzoek aan bijvoorbeeld bepaalde typen voorwerpen of het gebruik en de betekenis van objecten in een bepaalde periode. Voorstellen voor dergelijk onderzoek worden, naast andere aanbevelingen, in een afsluitend hoofdstuk gedaan.

Rapport en database maken onderdeel uit van het 'Oogst voor Malta' onderzoeksprogramma van de Rijksdienst voor het Cultureel Erfgoed dat als doel heeft het ontsluiten van kennis over specifieke geografische, temporele of thematische archeologische onderwerpen.

Part I - Introduction, methodology and identification

1 Introduction

1.1 Aim of the project

In the last 20 years Dutch archaeology has experienced a strong growth, partly due to the Valletta Treaty.[1] This has resulted in the discovery of a vast amount of archaeological material that has been published in excavation reports and is kept in archaeological depots. However, our knowledge of material culture has not kept pace with this development. For objects made of organic materials in particular, no up-to-date review studies are available.[2]

In 2012 the *Rijksdienst voor Cultureel Erfgoed*, the Cultural Heritage Agency of the Netherlands (RCE, part of the Ministry of Education, Culture and Science), set up the *Kenniskaart Archeologie* (Archaeology Knowledge Kit) programme.[3] Under this programme, the *Oogst voor Malta* (Valletta Harvest) project was designed to generate syntheses of different aspects of archaeological research relating to specific themes, areas and archaeological time periods, which could potentially answer questions raised in the National Archaeological Research Agenda.[4] Starting when the Valletta Treaty became effective in the Netherlands in 1997, but with particular emphasis on the period from 2005 until 2017, these syntheses were to be based on relevant literature and archaeological reports. Several of these gaps have now been successfully addressed through funding from Valletta Harvest, such as for instance studies of wooden artefacts.[5] The new insights gained from these research projects are in turn used as input to revise questions raised by the National Archaeological Research Agenda (*Nationale Onderzoeksagenda Archeologie* or NOaA).

This current research strand of the Valletta Harvest project was commissioned to address these issues for objects made of osseous and keratinous tissues (such as bone, antler, ivory and horn) with the aim of increasing our (typo-chronological) knowledge of these artefacts by means of a systematic inventory and a basic analysis. The results are relevant to most of the national research questions relating to social-economic issues, such as crafts, industry and (international) trade.

1.2 Analysis of osseous and keratinous objects

Osseous and keratinous tissues have been important raw materials for the production of many objects from Prehistory until the Modern period. Speaking in general, the proportion of recovered osseous and keratinous objects is small compared to for example pottery. This is partly a matter of taphonomy and preservation. Keratinous materials, such as horn and baleen, will quickly decay once discarded and rarely survive unless the archaeological deposits are waterlogged and anoxic. Even osseous tissues, such as bone, will only survive in sediments that fall within a certain range of acidity or alkalinity. Nonetheless, the use of these materials was widespread and their working, use and trade formed an important part of daily life. Most of these materials were sourced fairly locally but they can also include raw materials or finished objects traded over vast distances.

Several studies of osseous and keratinous objects have been undertaken, but a general synthesis was lacking prior to this project.[6] This was due in part to the vast size of this research area which comprises many different animal tissues with a variety of properties, worked and used in very different ways over a long time span. Most studies are limited in their scope to a specific subject, material or excavation. Examples include bachelor, master and PhD theses, longer chapters in excavation reports, and many smaller reports.[7] Only a few monographs are completely dedicated to objects in osseous and keratinous materials: Roes, Van Vilsteren and Dijkman and Ervynck.[8] The first unfortunately lacks context information because the terp sites from which the material was recovered were levelled without any archaeological supervision. In addition to discussing archaeological finds, Van Vilsteren's study also deals with historical objects. Dijkman and Ervynck's publication is restricted to finds from Roman and early medieval Maastricht. Finally, several archaeologists have analysed and published in (scientific) papers a selection of finds from for instance a single excavation, object or area.[9]

1 Council of Europe 1992.
2 Van Heeringen 2020.
3 Lauwerier 2017; continued in 2018 under the name Knowledge for Archaeology programme; Rijksdienst voor het Cultureel Erfgoed & EMMA 2021.
4 Eerden *et al.* 2017; Groenewoudt *et al.* 2017.
5 Lange 2017.
6 Van Heeringen 2020.
7 Theses and dissertations: e.g. Van der Pal 1988; Niklewicz-Hokse 1989; Rijkelijkhuizen 2004; Kromotaroeno 2015; Spithoven 2015, 2018; Van Riel 2014; Huisman 2022. Longer chapters in excavation reports: e.g. De Jong 1992b; 1994a; Verhagen 1993, García-Díaz 2013; Louwe Kooijmans *et al.* 2001; Louwe Kooijmans, Oversteegen & van Gijn 2001; Esser *et al.* 2006; Groot 2006; Rijkelijkhuizen 2011e; 2018b; 2018c; 2021c; 2024.
8 Roes 1963; Van Vilsteren 1987; Dijkman & Ervynck 1998.
9 E.g. IJzereef 1974; Prummel 1977, 2018; Prummel & Van Gent 2010; Prummel, Manuel & Post 2014; Prummel & Hullegie 2016; De Jong 1986; Tuohy 1992; Bulten & Clason 2001; Clason 1978, 1980; Hottentot & Van Lith 1990; Lauwerier & Van Heeringen 1995, 1998; Van Gijn 2006; Hupperetz 1991; Knol & Looijenga 1990; Knol 2006; Verhagen 1993, 2001; Kramer & Prummel 1992-1998; Lauwerier & Thach 2021; Louwe Kooijmans *et al.* 2001; Louwe Kooijmans, Oversteegen & van Gijn 2001; Nieuwenburg-Bron & Van Vilsteren 2007; Rijkelijkhuizen 2009, 2010, 2011d, 2011g, 2011h, 2013a, 2017d, 2021a; Rijkelijkhuizen & De Raat 2015; Rijkelijkhuizen, Kootker & Davies 2015; Rijkelijkhuizen & Greep 2019; Spitzers 1997, 2006, 2012, 2013; Van Genabeek 2022; De Groote *et al.* 2018; Bottelier & Rijkelijkhuizen, in prep.; Prummel, Halici & Verbaas 2011.

1.3 Organization of this volume

This volume is divided into three parts. Part I sets out the project's goals, the research history, and the research questions addressed by this project. Part II is a synthesis comprising a basic typo-chronological overview of osseous and keratinous artefacts in the Netherlands. Although these chapters discuss recent theoretical approaches, this summary overview is not meant to be a substitute for an in-depth study of individual artefact types.

Part III is a catalogue of the common finds made of osseous and keratinous tissues. Information on distribution and chronology generated by national and international studies is discussed in Part II.

The synthesis covers three time periods: Prehistory (before 12 BC), Roman-Early Medieval period (12 BC-1050 AD) and Late Medieval-Modern period (1050 AD-recent). Each period section is organized in the same way. A brief introduction is followed by a functional description of the objects in each category, addressing variation, typology, raw material and technique. The information for each time period is similarly organized with separate sections for each object category: agricultural and craft tools; weaponry (hunting, fishing and military); household items; personal hygiene; personal adornment and religion; games, toys and musical instruments; other objects; daily life; crafts and trade.

Chapter 7 discusses the current national research questions and offers recommendations for new general research questions, further research, and conservation and storage. The final chapter provides information about the database.

The images in the texts are not to scale, as is customary in NAR publications. Dimensions of the individual objects can be found in the captions and the catalogue. Appendix I and II provides Dutch-English and English-Dutch glossaries for the types of objects discussed.

1.4 Acknowledgements

We would like to thank the members of the advisory committee for their kind assistance and expertise: Sonia O'Connor (University of Bradford), Annet Nieuwhof (University of Groningen) and Roos van Oosten (Faculty of Archaeology Leiden University). An additional thank you to Sonia O'Connor for her help in writing Chapter 3 on the identification of osseous and keratinous tissues. Also to be mentioned here are Roel Lauwerier, Ian Riddler, Stephen Greep, and Steve Ashby; their help and expertise was very much appreciated.

Leida van Hees built an Access database for entering information on osseous and keratinous objects from archaeological contexts in the Netherlands, and Ronny Kost entered all collected data into the database. Thank you both!

Equally thanks to Gerre van der Kleij (GrondTaal), who read along with us and saved our work from many mistakes and ambiguities. Any remaining errors are our own.

A sincere 'thank you!' is also due to the following museum colleagues who helped us when (digitally) consulting their valuable museum collections: Diana Spiekhout and Nellie Vrijburg (Fries Museum); Annemarieke Willemsen, Luc Amkreutz and Sasja van der Vaart-Verschoof (National Museum of Antiquities/*Rijksmuseum van Oudheden*/RMO); Else Hartoch (Gallo-Romeins Museum); Bibi Beekman (Limburgs Museum).

And equally, to our colleagues from the provincial and municipal depots or departments: Peter Kranendonk, Ron Tousain and Gerard Graas (Amsterdam), Peter Bitter and Sjaak Waterlander (Alkmaar), Ronald van Genabeek and Bart van Gils ('s-Hertogenbosch), Anja van Zalinge, Francis Robbesom and Theo Bottelier (Haarlem), Maarten van Dijk (Amersfoort), Michel Groothedde and Renske den Boer (Zutphen), Martin Veen (Noord-Holland/Huis van Hilde), Bart Vermeulen (Deventer), Joep Hendriks and Martijn Spinder (Nijmegen), Marijne Magnée-Nentjes (Gelderland/Valkhof), Theo de Jong (Eindhoven/Helmond), Hans Stuurop and Joran Smale (Batavialand), Mark Phlippeau (Zuid-Holland), Joost van den Berg (Zeeland), Deborah Paalman (Dordrecht), the colleagues at Delft, and all colleagues from the depots who responded to

our request for information.

We are indebted to our zooarchaeological colleagues and other researchers who have sent us their reports, information and photographs: Wietske Prummel, Heleen Kranenburg, Arjan Hullegie, Theo de Jong, Maaike Groot, Martijn van Haasteren, Hülya Halici, Annabel Medard, Sjoerd van Riel, Merel Spithoven; Monica Dütting; Senne Diependaele; Jordy Aal, Johan van Gent, Youri van den Hurk, Cynthia Kromotaroeno, Roel Lauwerier, Hanneke van Engeldorp-Gastelaars, Jessica Grimm, Lourens van der Feijst, Bernard Meijlink, Niels van Steijn, Henri Jansen, Henk Houtgraaf, Joris Brattinga, Janneke Groeneweg, Lisette de Vries, Thomas Spitzers, Tijmen Moesker, Brenda Huisman, Hana Anthony, Epko Bult, Aad and Rob Schapers.

Finally, we would like to express our gratitude to the following colleagues for providing images and drawings: Harold Strak, Anneke Dekker, Raf Timmermans, Mikko Kriek, Paul van de Peppel, Marlon Hoppel, Anne Boogert, Barbara Mattick, Jorrit van Horssen for the cover picture, Diederick Habermehl, Willem-Simon van de Graaf, colleagues at Restaura, Frans de Vries and Jaap Buist.

2 Methodology and source criticism

This research project brings together objects excavated in the Netherlands or found on the beaches of the North Sea, made of bone, antler, ivory, horn, tortoiseshell, baleen, hoof, teeth and shell, from the Palaeolithic to Early Modern periods (Fig. 2.1). All these objects have been published in research reports, articles and theses or have been recorded in unpublished datasets, archaeological archives and museum storage facilities. Part of the published data reached us through colleagues in response to a request to send us artefact publications. A number of these sources were used and various datasets were studied by the individual authors of this volume. Each period had its own approach. For example, published data could be used for the chapter on Prehistory, while such data are far less available for the later periods so that we had to rely more on unpublished material from museums and depots. The resulting scientific synthesis, supplemented with a catalogue and a publicly accessible database, presents the current state of our knowledge on this topic. Waste fragments from the working of these tissues could not be systematically studied but were included when encountered. We assumed that most production waste was unlikely to have been identified as artefacts during excavation, and that amongst the unstudied zooarchaeological material from pre-2007 excavations waste fragments can still be found.

Fig 2.1 Map of the Netherlands with the location of the provinces.

2.1 Source criticism

Although the Valletta Harvest project purports to base its syntheses solely on published literature and archaeological reports, this approach is not quite practical for this specific research area, because particularly the reports for the historical periods cover only a fraction of the artefacts that were actually recovered. Due to the specific circumstances surrounding past excavations and the backlog in the analysis of pre-2007 excavations, many objects remain unanalysed or unregistered, hidden away in their storage boxes.

In addition, even in cases where primary reports described artefacts a specialist was not always consulted.[10] These reports may consequently be flawed by incorrect material identifications and misunderstandings relating to the objects' function. In some cases only photographs of osseous artefacts were published while further information or interpretations were completely lacking.[11] Such shortcomings in the data can lead to misconceptions as regards daily life, trade and craft activities.

What is equally problematic is that some artefacts can appear quite similar, making it difficult to assess their exact nature, and different authors may offer their different personal interpretations, often without clarifying their criteria for the interpretation (see Section 4.1).

Because of these problems, this report is based primarily on specialist studies. In addition, to the extent Covid restrictions allowed, finds in storage were physically examined by the authors themselves.

The highly diverse nature of some of these osseous and keratinous materials can also make them difficult to trace in collections and depots. After excavation, osseous and keratinous materials may be boxed separately because they require

[10] See also Habermehl 2019 for general conclusions on the use of excavation reports for syntheses.

[11] Van Heeringen 2020.

very different conservation conditions. For instance, osseous materials can be dried whilst keratinous objects may end up in wet storage to be treated alongside waterlogged wood. Consequently, a keratinous object may not be recorded or researched together with the osseous material. Whilst museums and archaeological archives are actively working to register their collections in storage, large collections, especially if collected in the past, remain hidden or only partially accessible online. However, by comparing the number of objects from fully excavated sites or locations with those that have not been fully excavated, we are slowly starting to get an idea of the proportion of finds yet to be identified.

Together these factors make it difficult to get an accurate overview of the distribution of osseous and keratinous finds in collections across the Netherlands. However, the published data tentatively suggest variations in regional distribution. These partly reflect differences in publication rates and access to specialist expertise, but also museum collection policies influence which objects were collected or bought, with potential biases against finds of certain periods, object types or materials. Differences in the archaeology of different regions is another factor. Finds assemblages reflect the activities that created the deposits, and these vary greatly with context and period. At the same time, differences in burial environments and excavation bias affect the proportion of finds that are recovered. For example, depending on soil and water conditions osseous and particularly keratinous materials may be well preserved or entirely lost, even if they come from adjacent features. For all these reasons, some regions are better represented in this study than others.

Excavation bias can have a profound effect on the recovery and research of these materials. For instance, prehistoric osseous and keratinous finds recovered from the North Sea have not yet been systematically studied. They are brought to the surface by fishing trawlers or found in sand replenishments by citizen scientists. The research project *Resurfacing Doggerland*, still in progress, aims to fill at least part of this gap in our knowledge.

Dating the finds is equally problematic. When stored collections are analysed, chronological information is often lacking because the sites they come from have not been studied or lack datable contexts, such as previously disturbed northern coastal dwelling mounds (terps).

For this reason, object frequencies were omitted from the typological overviews. Find chronologies were established by comparisons with typologically similar material, well-dated objects, and previous studies.

2.2 Data selection

In light of the identified problems as regards to the excavation reports and the accuracy of their data on osseous and keratinous objects, we decided to modify our approach to data selection for this synthetic study. We opted for personal examination by the authors of finds kept in storage and in museum collections, and for concentrating on studies carried out by specialists. This includes finds publications from key excavations (including theses or major chapters in published reports) and scientific papers by specialists in this field. This approach allowed us to produce a reliable synthesis, which can serve as a basis for future excavation reports. Information from excavation reports by appropriate specialists was also included, but identifications in other excavation reports could not all be verified. Some of the data on raw material identification in the database is therefore incomplete and/or unreliable.

2.3 Synthesis and research questions

The general research questions we tried to answer for each period, when possible, are:

- What types of objects were made of osseous and keratinous tissues?
- Were these objects also made of other, organic or inorganic, materials?
- What is the chronology of these objects?
- What is their geographical distribution?

The next section of each chapter addresses daily life. It presents a general interpretation of the finds for each period and historical context. The research questions are:

- How did artefact types develop?
- Was this development continuous?
- What caused certain changes in artefact types?
- How can the presence of artefacts in a specific context be explained?
- How can the geographical distribution be explained?

Then follows a discussion of general developments in trade and crafts. The research questions are:

- Which raw materials were used and in what ratio?
- Which raw materials were locally available?
- Which raw materials and/or objects were imported?
- What caused certain changes in raw material use?
- How did techniques/crafts develop in this period?
- Where were the production centres?

2.4 Comb typology

During this research it became clear that a description of the various early medieval combs was hampered by the fact that existing typologies were inadequate to describe the Dutch corpus of combs. Although combs have been studied fairly extensively, more research of this large object group is needed to recognize regional differences. A Dutch typology has thus far been lacking, and studies of Dutch combs have been based on a limited number of published specimens. Although this was not the initial goal of this research, a typology of combs found in the Netherlands has been drawn up and incorporated in this study. More research is still needed, but this typology may serve as a basis for further studies on combs and subjects such as migration, personal identity, trade and craft and (inter)regional connections.

Comb typologies have been based on various factors including shape, cross-section, size, decoration, position of decoration, and raw material, but the many variables and regional differences as well as the large time span complicate an overall classification. Ashby has provided a very useful typology for North-West Europe.[12] More specifically, regional typologies are useful to further date the combs and provide information about workshops and (inter) regional contacts.[13] Furthermore, identifying raw material use and combining this with information about (local) production and decoration provides important additional information about these subjects.[14]

A major obstacle in Dutch comb research is the fact that most of the large collection of objects from terps lack a date, rendering the chronology of the comb types uncertain. The various comb types here presented were therefore dated on the basis of a few datable specimens from the Netherlands, but to a great extent also on finds from other countries. The proposed comb type chronologies are therefore preliminary and may be changed by new finds or fresh insights.

Published finds from the tenth to twelfth century are scarce, and combs from this period need more study. The comb typology for this period is therefore less detailed and may need to be revised as more combs from this period are identified.

At this stage in our analysis of Dutch combs it was unable to study the combs in detail. Raw material use and techniques, such as riveting, require further investigation and are here dealt with only superficially.

2.5 Database

All collected data were entered into a specially designed Access database. The original data was entered into the database without modifications. Chapter 8 presents a description of the database.

It should be noted that not all identifications of the objects' raw materials or their functional assessments were carried out by a specialist. Unfortunately, it was impossible to verify all the data in this database. To complicate matters further, different researchers sometimes used different terminologies. We therefore recommend that users of the database view the information on an object's raw material and function with caution.

This extensive data set is meant to be a reference collection. Although far from complete, it may be a useful starting point and inspire future research.

12 Ashby 2011a.
13 E.g. Tempel 1969, 1979; Ambrosiani 1981; Luik 1998; Smirnova 2005; Ashby 2005, 2009; Cnotliwy 1973; Riddler, Trzaska-Nartowski & Hatton 2023.
14 Von Holstein *et al.* 2014; Ashby 2009; Ashby, Coutu & Sindbæk 2015.

3 Identification of osseous and keratinous tissues

3.1 Introduction

In the past, osseous and keratinous tissues were important raw materials for objects. Osseous tissues include bone, antler, ivory and other teeth. They are largely composed of the structural protein, collagen, combined with a calcium mineral which makes them hard and stiff yet resilient. Horn, tortoiseshell, baleen and hoof are called keratinous tissues as their structural protein is keratin. Largely lacking mineral components, these tissues are tough but flexible when fresh. Shell, and occasionally hard corals as well, were also used to make objects. Both these materials are highly mineralised, like osseous tissues, but their composition, growth and structure are different. Nevertheless, shell and coral objects are also included in this publication.

Although the focus of this publication is on recognizing the function of objects and their significance for archaeological interpretation, it begins by correctly identifying these materials. This is important for the interpretation of the finds but also for their conservation, restoration and storage. The survival of osseous and keratinous tissues in the soil varies considerably, as keratinous objects degrade rapidly unless local conditions inhibit microbial activity. On archaeological sites in temperate climates keratinous objects rarely survive except in constantly anoxic, waterlogged contexts, such as a cesspit, and upon excavation they require immediate conservation treatment.

Working these materials into artefacts progressively removes their natural surface features and gross morphology, the features a zooarchaeologist relies on to determine the species and skeletal elements in a bone assemblage and the age and sex of the individual animals they represent. Such assemblages may include bones of wild and domesticated animals, food debris, and the remains of pets or fauna such as rodents (mice, voles, rats) and amphibians.

Identifying the material an artefact is made of is a separate discipline that relies to a great extent on understanding the formation, composition, and detailed structure of these tissues. Some zooarchaeologists have developed expertise in this specific field, while many material identification specialists have backgrounds in finds research or conservation. Whether it is a zooarchaeologist or an artefact specialist who identifies caches of production waste, it is important that they pool their results to provide a complete picture of the harvesting of local resources and the wider trade in raw materials for artefact production.

3.2 Identification techniques

Identification of osseous and keratinous materials depends on detailed knowledge of and experience with these materials, including how they are modified by being worked and by deteriorating in archaeological environments. Ivory combs stained brown in archaeological contexts are often incorrectly identified as wood, and objects cut from certain large nuts have been confused with bone. Furthermore, organic tissues may have been deliberately altered to imitate other, more desirable materials. Horn, for example, was sometimes deliberately stained to look like tortoiseshell. In the case of nineteenth-century archaeological finds one should be on the alert for synthetic materials used to fake ivory or tortoiseshell. Several techniques can be helpful to identify osseous and keratinous tissues, each of them with its own advantages and limitations. These techniques have been described in detail by O'Connor. The first and most crucial step, however, is visual identification.[15]

3.2.1 Visual identification

Visual identification relies on clues like an object's shape and size and the structure of the material. However, the nature and the amount of work that has gone into converting the raw material into a decorative or functional object, and the deterioration the material has undergone while buried may either help or hinder identification. In general, the more extensively worked and the smaller the object, the less clues there will be to identify skeletal element or species. For example, bone size and detailed shape are indications as to the skeletal element and species. If the material has undergone only limited alteration, what survives may be

[15] O'Connor 2016.

sufficient for direct identification. Even if the more characteristic external features have been removed, the dimensions of the object or its component parts may still be an indication as to the source material and rule out other options. Closer examination of the shape of internal cavities, the position of larger blood vessel openings and the texture of fragments of unworked surface may together be enough evidence to confirm the identification of the bone. However, when an object has been more intensively worked it may be necessary to look at its meso- and macro-structure to determine if the raw material was indeed bone.

The structure of different osseous and keratinous tissues is mainly the result of their development and function and makes it possible to distinguish for instance bone from ivory, bone of terrestrial mammals from that of marine species, or horn from tortoiseshell. The presence or absence of a blood vessel system, and the organization of that system and of the surrounding tissue matrix all need to be observed and recorded. The structures that make up these materials are non-isotropic and three-dimensional, and their appearance may therefore vary considerably between surfaces even on the same object. Deterioration may cause changes in colour, translucency and texture and make these materials look very different from fresh specimens or those in reference collections, yet the manner in which they fracture or break up will still reveal their structure and can be very specific of particular materials. Some combinations of features together allow identification of a tissue down to a genus or even species. If enough detail survives, roe deer, red deer and reindeer antler can be distinguished at species level and cattle horn can be told apart from that of sheep or goat. The ivory of walrus, hippopotamus, sperm whale and narwhal can be distinguished from elephant ivory. While it is often possible to identify mammoth ivory, separating the various extant species of elephant ivory really requires DNA analysis.

Several authors have written about the identification of osseous and keratinous issues from different perspectives, as for instance the analysis of historical or archaeological objects in general or from specific regions, or in the context of wildlife protection.[16] Nevertheless, experience with these materials is crucial to correctly identify the various tissues. Usually a hand-held loupe at 10x magnification suffices for identification, but a microscope can be useful too.[17]

3.2.2 Species identification and provenance

Archaeologists today have access to a broad spectrum of analytical techniques to refine their identifications. Three of these techniques are briefly mentioned here, listing their uses and limitations and illustrating how they can contribute to the study of osseous and keratinous tissues.[18] None of these techniques is a substitute for visual identification, which should always be undertaken prior to applying these techniques.

All osseous tissues share a very similar composition, as do keratinous tissues. Various attempts have been made to use vibrational spectroscopy techniques to detect and characterize ivories of different species. Studies of samples from reference collections have revealed differences in for instance the ratios of the mineral components of bone and ivory, and between ivories of different species. When applied to archaeological material, however, these techniques are unreliable; as the ivory ages its crystalline structure changes, the organic components degrade, and some minerals will leach out whilst others may be absorbed from the ground water.[19] Vibrational spectroscopy can however be used to discriminate between ivory and different synthetic substitutes, and to identify the level of degradation of ivories, which could have implications for their conservation.

When the state of preservation allows it, DNA analysis allows species identification of all these materials, but even today's techniques require a sizeable sample and taking this from archaeological remains may not always be justifiable. DNA analysis of modern ivory can even be used to establish familial links so as to determine the region where illegally traded ivory came from.[20] In archaeology, stable isotope analysis has been used more often to locate the provenance of the ivory, but the technique plays no role in its identification.[21]

The most recently developed technique for taxon identification (to genus level but not always species) is called Zooarchaeology by

16 Penniman 1952; Miles & White 1960; Thornton 1981; Espinoza & Mann 1992, 1993; MacGregor 1985; O'Connor 1987; Krzyszkowska 1990; Deschler-Erb 1998; Rijkelijkhuizen 2008.
17 O'Connor 2016.
18 Techniques are described in detail by O'Connor 2016.
19 Burragato *et al.* 1998; Brody *et al.* 2001; Edwards *et al.* 2005; Edwards *et al.* 2006.
20 Comstock *et al.* 2002.
21 Lafrenz 2004.

Mass Spectrometry (ZooMS). This technique was developed to analyse the 'fingerprint' of bone collagen in order to identify small bone fragments in food. For archaeological purposes, it has the advantage that the sampling methods are far less destructive than for DNA analysis, and as collagen is more stable than DNA and less liable to contamination, it can provide meaningful results in circumstances where DNA might fail. ZooMS is now used for species identification of all osseous and other collagenous tissues, including parchment, and today 'fingerprinting' keratins allows species identification of horn, tortoiseshell and baleen.[22]

However, DNA analysis and ZooMS are no substitutes for visual identification techniques. An object may be identified as red deer, but visual identification is necessary to establish whether the material is bone, antler or tooth, and the choice of material may be culturally significant. Carrying out visual identification before commissioning other analytical identification studies may thus prevent unnecessary costs and lead to better informed questions.

[22] Osseous: Buckley *et al*. 2009; collagenous tissues, including parchment: Fiddyment *et al*. 2015; keratinous: O'Connor, Solazzo & Collins 2015; Solazzo *et al*. 2017.

Part II - Research results and synthesis

4 Osseous and keratinous artefacts in Prehistory (<12 BC)

J.T. Zeiler and J. van Dijk

4.1 Introduction

Determining the function of a prehistoric artefact is not always simple. It depends first of all on the conservation and the completeness of the object in question. Apart from that, some artefacts can look quite similar, which sometimes makes it difficult to assess what specific tool it is. In these cases, different authors' personal interpretations may vary. For instance, a certain object may be called a socketed axe by one author and a socketed adze by another. Pointed tools – some of the most numerous artefacts – can be interpreted either as needles or as awls, often without clarification of the criteria behind these interpretations.[23] Use-wear analysis could be very helpful in this respect although – as Louwe Kooijmans, Oversteegen and Van Gijn stated – it is important to keep in mind that tools can have had more than one function and that use wear only reflects the most recent one, which may be secondary: what started out as an axe may have been used as a scraper later on.[24]

The geographical distribution of the artefacts is very uneven, as Fig. 4.1 shows. The vast majority derive from the wet, low-lying Holocene western and central Netherlands (including the North Sea shores), the provinces Noord-Holland and Zuid-Holland being the most proliferous by far.[25] The higher, Pleistocene sandy parts in the east and south are relatively poor in artefacts, with the exception of river and stream valleys where the wet conditions favour good preservation. This explains the relatively many artefacts in the eastern provinces Gelderland and Overijssel. The small numbers in the two north-eastern provinces of Groningen and Friesland can be explained by the fact that in Prehistory these regions were sparsely inhabited. In the case of the south-eastern province of Zeeland, its recent turbulent history of heavy flooding may explain the very low number of prehistoric artefacts.[26]

Names of places and other indications of locations mentioned in the text of this chapter are indicated in Fig. 4.1. Province names are shown on a separate map (Fig. 2.1).

4.2 Agricultural and craft tools

4.2.1 Adzes, axes, chisels and gouges

Adzes

An adze is a hand tool for shaping wood or other materials. It is similar to an axe, but the blade is set perpendicular to the handle instead of parallel. This allows it to be deployed for a range of tasks, such as smoothing or carving curved surfaces. Adzes are reported almost exclusively from Mesolithic and Neolithic sites, with only four specimens dating from the Iron Age. Adzes were made of bone, antler or wild boar tusks. The latter type was present at Hardinxveld-Polderweg (Mesolithic) and Hardinxveld-De Bruin (Late Mesolithic - Early Neolithic). Confusingly, different names are used for these tools; sometimes they are called 'adzes' and sometimes 'chisels'.[27] Equally confusingly, they often share the morphological characteristics of axes (see below). A specimen from Hardinxveld-Polderweg that looked like a socketed axe probably was used as an adze, as use-wear analysis pointed out.[28]

Recently a double adze was found at a Middle Bronze Age site near Heiloo, in the west of the Netherlands.[29] The handle is made of oak wood and a willow wedge had been used to fixate the adze onto the handle (Fig. 4.2). Use-wear analysis showed that it had not been used to chop, but most likely to process plant material. It was made from the bone of a right whale (identified by ZooMS), making it the only prehistoric whale-bone tool known so far. In historic times, right whales appear to have avoided the Dutch coasts; not a single one of the over 10,000 documented whale strandings between the thirteenth and twentieth century AD concerned a right whale.[30] This unusual adze could mean that right whales were not that rare during the Bronze Age.

As far as the antler adzes are concerned, both red deer and elk antler was used (in some cases only 'antler' is mentioned, without further specification of the species). Most elk antler adzes were found in Mesolithic contexts in the eastern Netherlands (Overijssel). One was recently fished up on the North Sea, while in October 2019 another one was found on

23 An exception is the classification made by Louwe Kooijmans *et al.* (2001) for the different types of awls from Hardinxveld Giessendam. A recent attempt to clarify the criteria to differentiate between awls and needles was made by Zeiler, Verbaas, Esser & Ten Anscher (2023). See Section 4.2.2.

24 Louwe Kooijmans, Oversteegen & Van Gijn 2001, 323.

25 Most finds from the North Sea shores were not included in the database, as these are subject of another research project (*Resurfacing Doggerland*) still in progress.

26 Müller & Dijkstra 2022.

27 Louwe Kooijmans, Oversteegen & Van Gijn 2001; Louwe Kooijmans *et al.* 2001.

28 Louwe Kooijmans, Oversteegen & Van Gijn 2001, 320.

29 Verbaas & Brattinga 2023.

30 R.C.G.M. Lauwerier (RCE), oral communication.

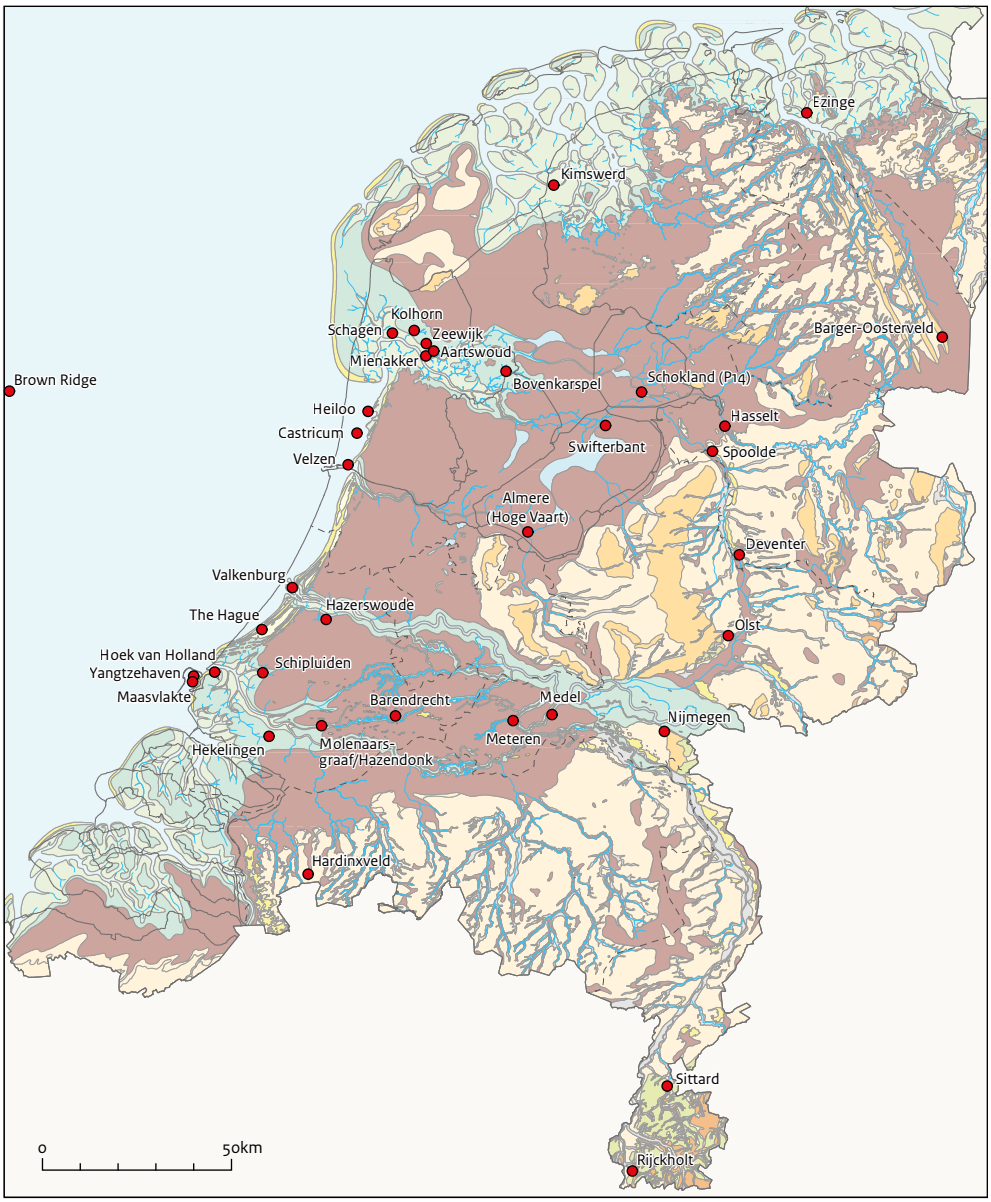


Fig. 4.1 Palaeogeographic map of the Netherlands (2750 BC) showing locations mentioned in this chapter. After Vos *et al.* 2020.

Maasvlakte 2 near Rotterdam; both most probably date from the Mesolithic.[31] Beside these, there is an Iron Age specimen made of elk antler from The Hague. It has a hole in the shaft in which wood fragments are still present.[32]

Red deer antler adzes are recorded for three Mesolithic sites in the province of Drenthe, in the eastern part of the country.

Axes

Axes were common tools in the Mesolithic and Neolithic period. The most common type has a straight handle and a head with a sharp edge on one end and a flat or slightly curved poll or butt on the other end. Most axes were made of antler. They are mainly found in Mesolithic and Neolithic contexts, but appear in small numbers throughout the Bronze and Iron Age. They show a wide variety in typology, depending on the part of the antler from which they were made (Fig. 4.3).

To start with, there is a difference between antler axes with or without a shaft hole. Shaft holes tend to be cylindrical but some are rectangular. The latter type seems to be restricted to the Bronze and Iron Ages.[33]

Second, they can be made from different parts of the antler. Those made from the beam with or without the base are called base axes and beam axes, respectively. The well-known T-axes are made from the central part of the beam. So-called J-axes are made from the tines, while for the production of I-axes either beams or tines were used. Y-axes were made from the upper part of the beam, right below the crown, while those made from an undefinable part of a beam are called X-axes.[34]

Most of these axes were made of red deer antler, but for a few, elk antler had been used. This may be due in part to the two species' different population sizes. Elk seems always to have been less common, while red deer remains are far more numerous throughout Prehistory. Antler axes could have several functions including wood working and hide processing, and they could also be used as adzes.

For the manufacture of so-called socketed axes bone was used, usually aurochs metapodials (Fig. 4.4a) but also other long bones. Three socketed axes from Neolithic Swifterbant were made from radii of both aurochs and domestic cattle, while one from the east of the Netherlands (Koerhuisbeek, near Deventer) was made from an aurochs radius.[35] Socketed axes have a hole drilled through the proximal epiphysis and a bevelled working edge at the distal end of the bone. In general, the working edge is at the rear of the bone, i.e. the palmar or the plantar face of foreleg and hind-leg bones, respectively; only rarely is it at the front. Axes were used for wood working, or as adzes (see above). Socketed axes occur in small numbers from the Early Boreal onwards throughout the Mesolithic and Neolithic, with finds reported from the Netherlands, England (Starr Carr), Denmark (Holmegaard and Svaerdborg I) and the North Sea (Brown Ridge and Maasvlakte 2).[36]

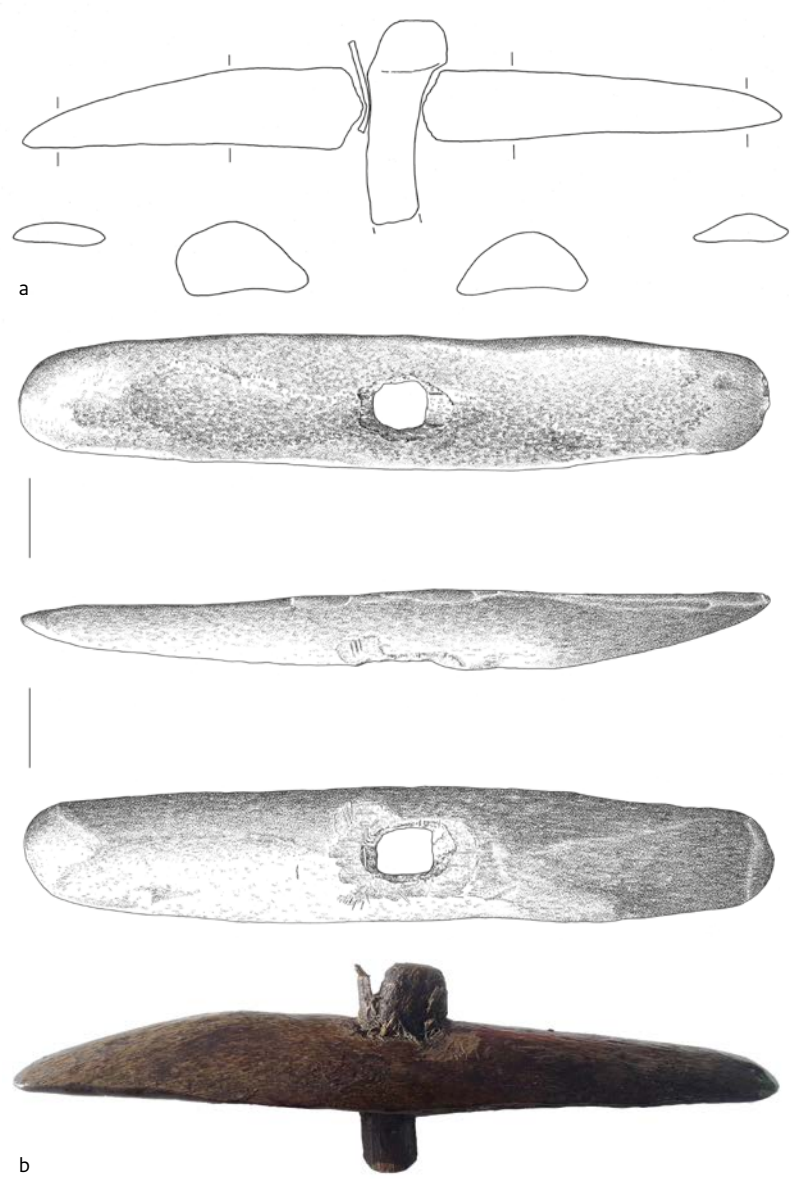


Fig. 4.2 Almost 30 cm long double adze made of bone of a right whale (*Eubalaena glacialis*) from Heiloo, a. longitudinal and cross sections, drawing R. Timmermans; b. image M.E. Hemminga.

31 Zeiler 2018.
32 Collection RMO: h 1996/2.1.
33 Lauwerier 1999b, 227.
34 Louwe Kooijmans, Oversteegen & Van Gijn 2001; Louwe Kooijmans *et al.* 2001.
35 Bulten & Clason 2001; Louwe Kooijmans 1971.
36 Louwe Kooijmans 1971; Louwe Kooijmans *et al.* 2001; Zeiler 2021.

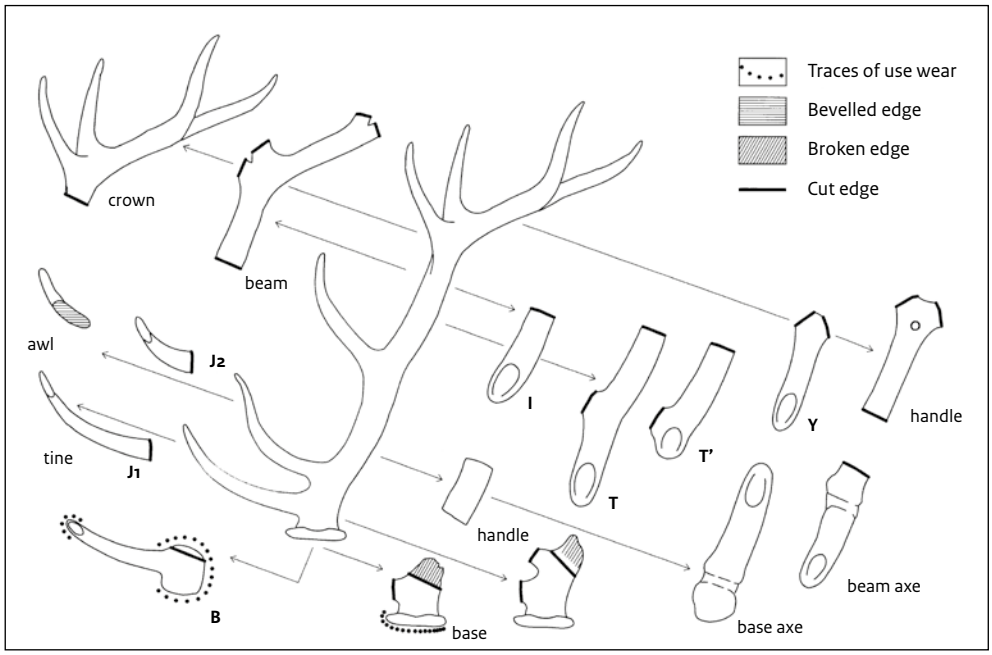


Fig. 4.3 Production of different types of antler axes (after Fig. 11.6, Louwe Kooijmans, Oversteegen & van Gijn 2001).

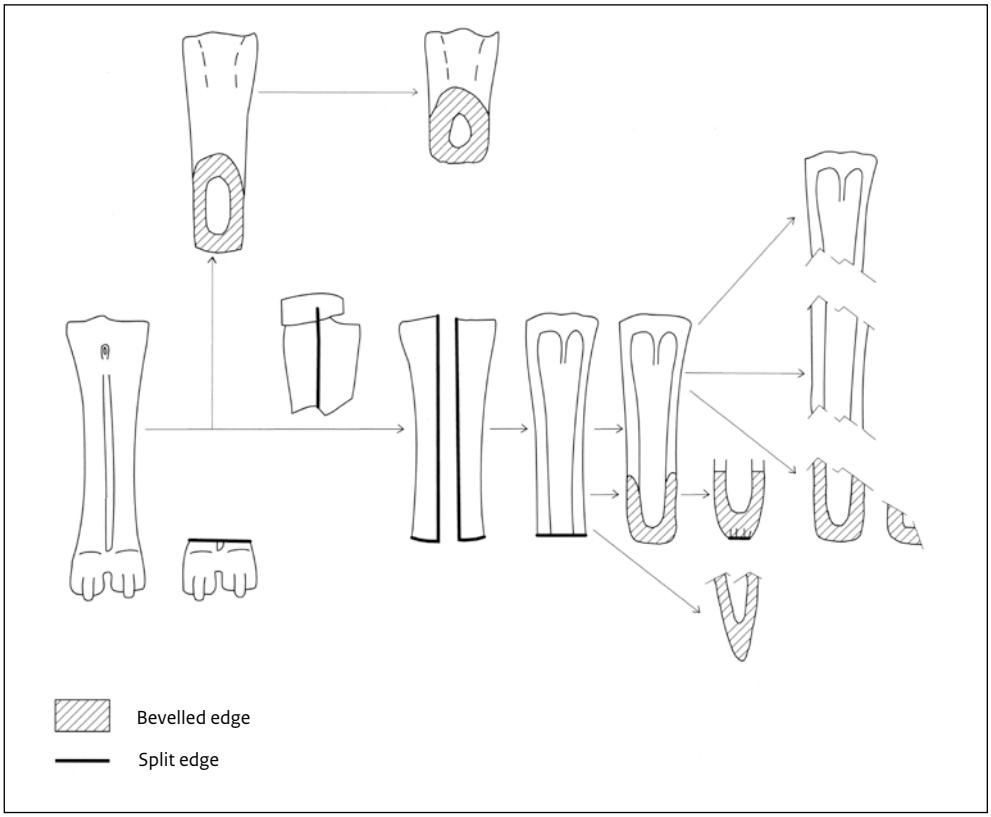


Fig. 4.4a Manufacturing sequence of bone socketed axes and chisels (after Fig. 11.15a, Louwe Kooijmans, Oversteegen & van Gijn 2001).

Chisels and gouges

Chisels and gouges, used for wood working, mainly occur during the Mesolithic and Neolithic periods. A few have been reported from Bronze Age sites, but so far known none from the Iron Age. Chisels and gouges look very similar: more or less flattened, with an impact surface on the upper side and a cutting edge that is bevelled with on the lower side a sharp/straight cut (chisel) or more rounded cutting edge (gouge). Sometimes they are shafted and so without impact surface. Chisels differ from adzes by their smaller cutting edge. Adzes are better suited for preparing large areas and shaping curved surfaces, while chisels are better suited for more detailed work and cutting precise shapes and angles. As for skeletal elements and species, most of these tools are made from long bones (mainly metapodials) of large bovids and cervids: aurochs, domestic cattle, and red deer. One tool was made out of a long bone of an unidentifiable, medium-size mammal; another was made out of a cattle mandible. The most common method for making chisels, gouges, awls and needles was the so-called metapodial technique (Fig. 4.4b). This involved deepening the natural grooves of metapodials with flint implements, cutting off the distal or proximal part, splitting the remaining bone shaft, and grounding it into shape.[37]

Three specimens from Aartswoud (Late Neolithic) were made from ulnae of brown bear, which is unique for the Netherlands. The only similar objects elsewhere in Europe came from Neolithic lake dwellings in Switzerland and Slovenia.[38] Use-wear analysis made clear that at least one of the specimens from Aartswoud was a chisel used to process wood (Fig. 4.5). A second specimen from Aartswoud may not have been a chisel, but a tool (probably an awl, judging by the shape) to process hides or bark.[39]

Beside bone and antler, beaver teeth and wild boar canines were also used to make chisels. Most specimens of the latter type come

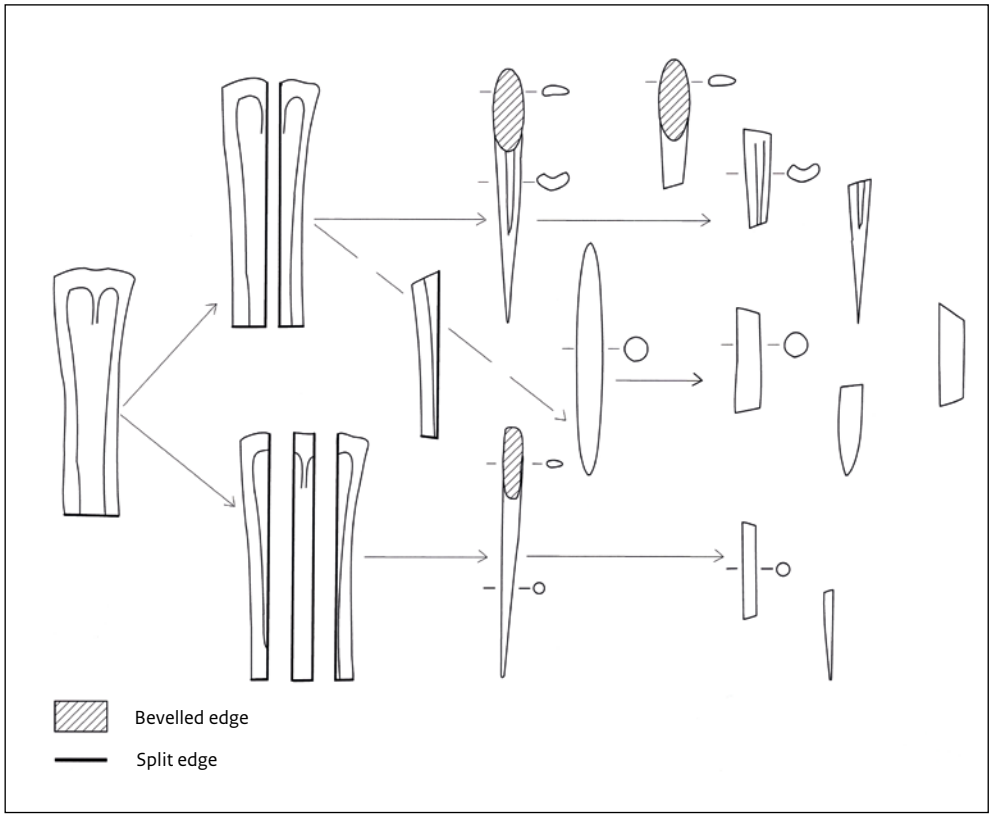


Fig. 4.4b Manufacturing sequence of awls (after Fig. 11.15b, Louwe Kooijmans, Oversteegen & van Gijn 2001).

[37] Maarleveld 1985; Van Gijn 1990: Fig. 59; Louwe Kooijmans *et al.* 2001.

[38] Zeiler 2018. The objects were found by Mr Harrie van der Meij.

[39] The third specimen was too heavily worn to allow use-wear analysis.

Fig. 4.5 A chisel from Aartswoud, made from an ulna of brown bear, used to process wood (length 22 cm). Collection H. van der Meij. Image J. Buist.

Fig. 4.6 A 6.3 cm long chisel made from a wild boar canine, found at the beach of Hoek van Holland. Collection and image N. van Steijn.

from Hardinxveld-De Bruin, but in smaller numbers they also occur at Hardinxveld-Polderweg, and two were found on North Sea beaches (Fig. 4.6).[40] They are also known from Danish Early Mesolithic sites.[41] Thus, this chisel type is limited to the Mesolithic and Early Neolithic. Traces of use wear on one of the specimens from Hardinxveld-Polderweg suggests it was used as a chisel on a fairly hard material.

Worked beaver teeth are reported for both Hardinxveld sites, although they are absent from the last (Early Neolithic) habitation phase at Hardinxveld-De Bruin. This could mean that this chisel type was no longer used, although it cannot be ruled out that they can be difficult to recognize. This type was most probably used for wood working.[42]

4.2.2 Awls, points and needles

Awls, points and needles are the most commonly found tools at Mesolithic and Neolithic sites. Distinguishing between awls and needles can be complicated as they often have the same shape and overlap in size. As was mentioned before, recently criteria were defined to differentiate between needles and awls. Elongated, narrow pointed objects (narrower than 10 mm) broadening only slightly from the tip onwards at an angle of less than 6^0 are defined as needles. If the object is broader than 10 mm and the angle from the tip onwards exceeds 6^0 (so the object expands significantly from the tip upwards) the object is defined as an awl. Three types of awls were defined: needle-shaped awls, awls and double-pointed awls. With the exception of a single rounded specimen, awls are flattened.[43] Overall, pointed objects cover a broad functional spectrum, ranging from projectile points to needles or clothing pins.[44] This makes use-wear analysis very useful for shedding more light on the function of such an object, as was demonstrated by Van Gijn for awls from Schipluiden. The most commonly documented contact material was plant material whereby the awl was used in a rotating fashion; but traces of hide piercing were also found.[45] At Hardinxveld-Polderweg and De Hardinxveld-De Bruin, Louwe Kooijmans differentiated between four distinct awl types based on the shape of the working surfaces. Small, sharp awls and (possibly) wide-ended awls were used for hide

40 Louwe Kooijmans, Oversteegen & Van Gijn 2001; Louwe Kooijmans *et al.* 2001; Louwe Kooijmans 1971; Van Steijn 2012.
41 Louwe Kooijmans 1971.
42 Louwe Kooijmans, Oversteegen & Van Gijn 2001; Louwe Kooijmans *et al.* 2001.
43 Zeiler *et al.* 2023.
44 See e.g. Van den Broeke 1983.
45 Van Gijn 2006.

working; spatula-shaped awls and thick round awls were use for basket making and wickerwork.[46]

Awls and needles were made of bone or antler. As regards bone the most common source of raw material were long bones such as metapodials of red deer and aurochs, and (from the Neolithic onwards) cattle and sheep or goat. In several Iron Age specimens the proximal end of the metapodials had been removed to create a shaft for a handle. Some have perforations in the side of the shaft to secure the handle. One example is decorated with twenty-nine 'ring-and-dot' motives.[47] In addition to bones of these species, fibulae of pig or wild boar were used as well. Some tools were made from long bones of large birds, such as crane and white-tailed eagle. Van Wijngaarden-Bakker mentions three such objects from Late Neolithic Aartswoud, defined as awls although based on the criteria listed above they should be defined as needles.[48]

The natural shape of antler points, i.e. the tips of the antler beams, makes them very appropriate for the fabrication of awls and needles. Some fine examples were found at the Early Neolithic site of Medel-De Roeskamp: antler points with one or two sloping edges (working surfaces) at the end. Use-wear analysis revealed that these were awls used to process several kinds of plant material, for instance to make baskets and other containers.[49]

4.2.3 Hammers

In general, hammers are tools composed of a weighted head attached to a handle. They are used to drive wedges, break objects or other activities where they make contact with other tools. Most tools classified as hammers are made from antler bases and can be recognized by traces of wear on the surface. In some cases bone was used, such as the distal epiphysis of a red deer metapodial from Hardinxveld-Polderweg (Mesolithic) and three cattle humeri from Bovenkarspel-Het Valkje (Bronze Age).[50] The latter show traces of wear on the cranial side of the distal joint; the heavy wear suggests intensive use.

It is not entirely clear how long and for what purpose these hammers were used. They date from the Mesolithic up to the Bronze Age, but some specimens may be younger. At the site of Sittard-De Dominicaan an antler-base hammer was found in a layer with Iron Age pottery, as was an antler-base axe that was probably used as a hammer. A third specimen from Sittard-De Dominicaan was dated to the Late Bronze Age - Early Iron Age but could be younger, up to the Middle Roman period.[51]

4.2.4 Picks

A pick has a pointed end for breaking up hard materials and a flat end for prying or scraping. Throughout the Mesolithic and Neolithic red deer antlers were used as picks. These tools have been found in the Rijckholt-St. Geertruid flint mines in the south of the Netherlands, and also at Spoolde in the east. In the mines they were used to dig out tunnels and loosen flint nodules.[52] Clason mentions four different types:

- Picks made from the base, beam and brow tine (the first tine branching off). If a bay tine (the second tine branching off) was present, it was removed;
- Picks made from the tray tine (the third tine branching off) and part of the beam;
- Picks made from the surroyal tine (the fourth tine branching off) and part of the beam or the crown;
- Picks made from the last tines of the crown.

The only bone pick known so far came out of the North Sea. It was made from the distal part of an aurochs radius; the proximal end had been worked into a smooth and symmetrical point, while near the distal end an almost cylindrical shaft hole was made. However, this specimen has also been described as a pointed adze, another example of archaeologists' sometimes confusing terminology.[53]

4.2.5 Retouchoirs

One of the oldest bone tools is a retouchoir, an implement used in flint working. It was made of the shaft of a long bone of a large mammal.[54] The object was found during sand suction activities near Empel and dates back to the Palaeolithic, probably Middle Palaeolithic. Characteristics are four groups of elongated,

46 Louwe Kooijmans, Oversteegen & Van Gijn 2001; Louwe Kooijmans *et al.* 2001.
47 Groot & Van Haasteren 2017, 1150-1153.
48 Van Wijngaarden-Bakker 1997.
49 Zeiler *et al.* 2023.
50 Louwe Kooijmans *et al.* 2001; IJzereef 1981.
51 Oral communication W.-S. van de Graaf (Historalis BV).
52 Clason 1983, 1998.
53 Louwe Kooijmans 1971.
54 Stapert 1977.

approximately parallel impressions of which two can be seen on the large convex face and two smaller groups on one of the sides. Other objects described as retouchoirs are six specimens from the Late Neolithic site of Kolhorn. One was made from the basal part of a cattle mandible while the other five are sharpened long bone fragments described as 'awls or retouchoirs'.[55] The criteria these identifications are based on are unknown.

4.2.6 Ripples

This is a very specific object group, limited to the Late Neolithic period and (probably) the Early Bronze Age. Their function has long remained uncertain. Made from ribs and shoulder blades of domestic cattle, with one characteristic undulating/notched edge (Fig. 4.7), they were part of the toolkit at several sites in the province of Noord-Holland and at De Bogen (Meteren) in the central Netherlands. Originally, they were thought to have been used to process flax fibres. However, use-wear analysis of a specimen from Aartswoud and one from Zeewijk showed that these had been used to scrape and otherwise work hides, with the addition of a mineral material.[56] Northe discusses similar objects ('notched implements') from Neolithic and Early Bronze Age sites in Central Europe.[57] Based on use-wear traces he likewise concludes that they had not been used to process flax fibres but to work hides: 'The varying degrees of wear on the different parts of the notched implements points ... toward the cleaning, stretching and smoothing of tendons and guts.'

4.2.7 Scapula scoops

These specific tools are made from cattle scapulae of which the spines have been removed. The scoops show traces of working or usage and are only known from the Bronze Age site of Bovenkarspel-Het Valkje.[58] It is assumed that some of these scoops were used as spades, as probably was also the case with similar tools from the Iron Age site of Ashville Trading Estate (UK) and the Early Bronze Age site of Ardnave, Islay, in Scotland.[59] As regards a specimen from Stonehenge, Serjeantson and Gardiner consider it unlikely that it was used as a spade or shovel, as it would break easily on the hard limestone ground.[60]

4.2.8 Smoothers, polishers and scrapers

Smoothers and/or polishers (the difference between the two is hard to make) were used for hide or textile working. These tools can be recognized by their (often heavily) polished

a

b

Fig. 4.7 Two ripples from Zeewijk, used for scraping and polishing hides, a. length 9.5 cm, inv. 6286-2; b: length 16 cm (from Theunissen *et al.* 2014, Fig. 10.4). Collection Provinciaal Depot voor Archeologie Noord-Holland.

55 Niklewicz-Hokse 1989.
56 Verbaas 2018; Zeiler 2018; García Díaz 2013.
57 Northe 2001.
58 IJzereef 1981.
59 Parrington 1978; Harman 1993.
60 Serjeantson & Gardiner 1995.

surface. They are almost exclusively reported from Iron Age sites, with the Bronze Age specimen from Bovenkarspel-Het Valkje as the only exception. In all cases cattle bones were used, mostly metapodials such as the tools from Middle/Late Iron Age layers at the artificial dwelling mound (terp) of Ezinge (province of Groningen),[61] but also astragali and a rib. The fact that this type of smoother/polisher has not been reported from earlier periods is quite remarkable, as hide working will have been practised throughout Prehistory. But perhaps we simply fail to recognize other types of smoothers/polishers without use-wear analysis, as the two ripples mentioned before do show.

Likewise, scrapers are often hard to distinguish from smoothers and polishers. In general, they are supposed to have been used to work (fresh) hides. Finds of bone scrapers are limited to Bronze and Iron Age contexts, although some may be dated to the Late Neolithic. Scrapers can have different shapes and comprise both small flat-tipped tools and larger ones like those made from scapulae and ribs of cattle or other large mammals, with wear and/or scratches on the surface

4.2.9 Spatulas

Spatulas occur from the Mesolithic period up to the Bronze Age. These tools have a flattened shape and a rounded working edge. Most are made of mammal bone, such as ribs and (longitudinally split) metapodials and other long bones. The three specimens of (red deer) antler are all Neolithic.

It should be noted that it is not always clear if these objects should really be called spatulas. For instance, two specimens from Hardinxveld-De Bruin, made from a wild boar scapula and (probably) a rib, are described as 'flat awl/spatula'. Among the artefacts of Hardinxveld-Polderweg is an awl with a 'spatulate working end', probably used to process plant material; according to the shape it could have been a tool to mend nets.[62]

The classification of the specimen from Late Neolithic Zeewijk is stated to have been based on the shape, as the surface of the tool was too abraded for use-wear analysis.[63] The two spatulas from De Bogen (Late Neolithic-Early Bronze Age) were also classified on the basis of their shape.[64]

4.2.10 Spindle whorls

Bone spindle whorls occur at sites from the Iron Age onwards. They are discoid or hemispherical in shape and made out of the proximal head of a cattle femur or humerus which is cut or sawn off to create a flat surface. All spindle whorls have a central perforation. The Middle Iron Age layers at the terp site of Ezinge yielded five spindle whorls (Fig. 4.8).[65] For later periods, use-wear analyses on supposed spindle whorls point to a function as '*oesdop*', i.e. a semi-circular component of horse gear (see Section 5.2.9).

Fig. 4.8 Two spindle whorls from Ezinge. a: made from the proximal head of a cattle femur, diameter about 3 cm and b: made from the proximal head of a cattle humerus, diameter about 5.5 cm. Unlike other spindle whorls, these are discoid in shape instead of hemispherical in shape (from Prummel, Manuel & Post 2014, Fig. 6). Collection Noordelijk Archeologisch Depot.

4.2.11 Bobbins

This category encompasses pieces of long bone with V-shaped short edges, creating rod-like objects that are interpreted as bobbins, a tool for winding yarn. Bobbins occur in contexts dating from the Late Iron Age/Early Roman period.[66]

4.2.12 Knives

Objects identified (or interpreted) as knives are very rare in prehistoric contexts. An antler knife handle was found at De Bogen-Voetakker (Meteren; Late Neolithic-Early Bronze Age). One of the artefacts found at Neolithic Swifterbant (S4) was a knife made from a wild

61 Prummel, Manuel & Post 2014.
62 Louwe Kooijmans, Oversteegen & Van Gijn 2001; Louwe-Kooijmans *et al.* 2001.
63 García Díaz 2014.
64 Van Dijk, Esser & Zeiler 2002.
65 Prummel, Manuel & Post 2014.
66 Groot 2009, 361; Groot & Van Haasteren 2017, 1149.

boar tusk.[67] At the site of Hardinxveld-De Bruin a half-incised rib fragment of aurochs may point to the making of so-called rib knives, known from several Late Mesolithic and Neolithic sites in the Netherlands and abroad (Hazendonk (the Netherlands), Spiennes (Belgium), and Ringkloster (Denmark)). The rib fragment from Hardinxveld-De Bruin may be interpreted either as a semi-finished product or as production waste.[68]

4.2.13 'Household' items

Although knives may be interpreted as household items, a more general definition as 'tools' is more likely as far as prehistoric finds are concerned. In the Netherlands, clear examples of household items such as spoons or sieves only appear in the Roman period, be it in small numbers (Section 5.4.3 and 5.4.4). On a European scale this seems different. In the Iron Age site of Lochlea Crannog (UK) a bone spoon (with a hole in the centre) was found; it was identified as a household item. Early Neolithic sites in Anatolia and southwestern Europe revealed hundreds of bone spoons, but their function is still not clear. They may have been used for cosmetic purposes, or for applying pigments. It is also possible that some of them had certain symbolic value.[69]

4.3 Weapons (hunting, fishing and warfare)

4.3.1 Projectile points

Projectile points, also called barbed points because of the notches (barbs) on one side of the point (Fig. 4.9) include several types of (hunting) weapons, such as harpoons and arrow heads. Projectile points are almost exclusively limited to the Mesolithic period, with a few dating to the Palaeolithic period. With few exceptions all come from Zuid-Holland coastal area or the North Sea. So far over one thousand are known, mainly from private collections. Projectile points can be short or long; the first are regarded as arrowheads and the second as points for spears or harpoons. According to Verhart the maximum length of a small point is 8.5 cm and the minimal length of a large one 9.4 cm. Spithoven uses a different classification and places the separation between small and large specimens at a length of 8.9 cm.[70] Small projectile points may have been used to hunt small mammals and birds (and probably also to fish), while large points are assumed to have been used to hunt larger mammals and fish.[71]

Projectile points can be made of antler or bone. A recent study using the ZooMS technique concluded that not only animal bone was used but also human bone.[72]

4.3.2 Fish hooks

Bone or antler fish hooks are known from the Mesolithic and Neolithic periods, although some specimens may be younger. They occur in two main types, with or without barbs. Examples of the latter type were found on the North Sea beaches (Maasvlakte 1 and Hoek van Holland; both Mesolithic; Fig. 4.10), the Neolithic site P14 (Schokland, Noordoostpolder), and a burial at the Late Neolithic (Bell Beaker) site Molenaarsgraaf.[73] Fish hooks vary in shape and size; those from Maasvlakte 1 and Molenaarsgraaf are more slender and smaller than those from Hoek van Holland (50 mm). Of the three hooks from P14, one is more or less the same size as those from Maasvlakte 1 and Hoek van Holland, while the other two are smaller.

Barbed hooks are known from the Noordoostpolder and the river IJssel (near the village of Olst). At 7.6 to 11.7 cm they are larger than unbarbed hooks. Both Clark and Brinkhuizen consider this type of fishing hooks as more recent, at the earliest Late Neolithic but probably younger.[74]

In addition to fish hooks, double pointed rods can be used in fishing. However, such alleged fishing gorges ('*slikhaken*' in Dutch) can be more difficult to recognize than their shape

67 Bulten & Clason 2001.
68 Louwe Kooijmans, Oversteegen & Van Gijn 2001.
69 Source: Bonetool Archives 2020, can be found at: https://www.wbrg.net/; Spoon, Lochlea Crannog, can be found at: https://www.futuremuseum.co.uk/.
70 Verhart 1988; Spithoven 2015.
71 See e.g. Brinkhuizen 1985.
72 Dekker *et al.* 2021.
73 Verhart 1988; Zeiler 2018; Louwe Kooijmans 1974, 1985.
74 Clark 1948; Brinkhuizen 1985.

Fig. 4.9 A 13.5 cm long projectile point made of bone, found on Maasvlakte 1 (from Amkreutz & Van der Vaart-Verschoof 2021, 14). Collection (inv. h 2021/1.6) and image RMO.

Fig. 4.10 Fish hook without barb (height 5.0 cm, inv. H 2017/11.4) found at the beach of Hoek van Holland (from Amkreutz & Van der Vaart-Verschoof 2021, 76). Collection and image RMO.

might suggest. Thus, similar looking specimens are not always interpreted as fishing gear, as those from Late Neolithic Kolhorn were,[75] but may also be listed as 'double-pointed awl' or 'pin beater'. Brinkhuizen mentions that some authors interpreted these objects as spinning tools, while others refrain from drawing any conclusions as to their function.[76] According to Brinkhuizen, some of these double-pointed sticks may indeed have been fishing gorges. Similar objects are known from the medieval *terp* site Elisenhof on the northern coast of Germany; these vary in length from 10 to 13 cm and are assumed to have been used to catch cod.[77] In the Netherlands, large-scale cod fishing did not take place until the Late Neolithic period (and even then has only been attested at the site of Mienakker),[78] but that does not rule out a possible function of these double-pointed rods as gorges to catch other (large) fish species.

4.3.3 Daggers

Van Vilsteren published a bronze dagger with a horn handle from Barger-Oosterveld, dated to the Bronze Age.[79] It is not clear what exactly 'horn' stands for, but most probably antler is meant, as the same publication also uses the term '*hertshoorn*' ('deer horn').

4.4 Personal hygiene

Items of personal hygiene are absent during most of the Prehistoric period. It is not until the Bronze Age that combs appear, presumably used to comb human hair. They remain the only items of personal hygiene up to the end of Prehistory.

A highly decorated comb, made of mammal bone, was found at Bovenkarspel-Het Valkje (Bronze Age). Another Bronze Age find, a double dentate comb, comes from the province of Overijssel and is described by Van Vilsteren as made of 'horn'.[80] Just as in the case of the dagger handle (see above) the term 'horn' could mean either antler or cattle horn. There is no uncertainty as to the material used for the four combs found in the Middle Iron Age layers of the terp at Ezinge; it was cattle horn. All four have a curved upper side. One carries a ring-and-dot decoration on both sides, while two other combs have a cavity on one side (Fig. 4.11).[81]

Fig. 4.11 Comb (length 5.5 cm) from Ezinge made of cattle horn, with a cavity on one side (from Prummel, Manuel & Post 2014, Fig. 1). Collection Noordelijk Archeologisch Depot.

Long-handled combs are found at Iron Age sites, possibly continuing into the Early/Middle Roman period. They are usually made from an antler beam which has been cleaved or sawed lengthwise. As a result the combs follow the natural shape of the antler and are curved. Some combs are made from a large mammal long bone.[82]
The combs are characterized by a long handle (13-17 cm). They are usually dentate at one end, with only a small number of teeth (between 7-12), and the dentate part is somewhat concave. The butt end usually is tapered but in two

75 Niklewicz-Hokse 1989.
76 Brinkhuizen 1988.
77 Heinrich 1986.
78 Zeiler & Brinkhuizen 2013.
79 Van Vilsteren 1987.
80 Van Vilsteren 1987, 36, 38.
81 IJzereef 1981; Van Vilsteren 1987; Prummel *et al.* 2014.
82 Roes 1963, 26.

specimens it is rounded.[83] In one comb an attempt was made at perforation about mid-shaft. Most of the combs are undecorated – apart from one specimen found at Nijmegen-Dijkteruglegging[84] – but they show traces of wear, between and on the teeth and on the tapered handle. It has been suggested that the tapered end was also functional. A long-handled comb found near Nijmegen (Bemmel/Ressen) has teeth at both ends.[85]

4.5 Personal adornment and clothing

4.5.1 Beads

Beads are small, pierced, rounded objects. The oldest beads known so far come from the Mesolithic site of Yangtzehaven. All the other beads are Neolithic or Bronze Age in date. Most publications only mention that they were made of bone, without further specification about species and skeletal element. Exceptions are the beads from Hazendonk (Neolithic) and Yangtzehaven (both long bones of bird), and a bead from the Bronze Age site of P14 (Schokland) that was made from a sheep/goat metatarsus.[86] In general, all beads were made by cutting off segments of long (hollow) bones of mammals and birds.

4.5.2 Pendants or amulets

Pendants and/or amulets (the distinction between the two is hard to make) are almost completely restricted to Neolithic contexts, with a remarkable concentration at Late Neolithic Kolhorn. Nearly half of the number of known pendants/amulets from prehistoric contexts (19 out of 42) were found at this site. They include perforated teeth of wolf and/or dog, brown bear, otter and wild boar as well as perforated metapodials of fox. Perforated teeth also occur at other Neolithic sites, such as Aartswoud where a perforated tooth of domestic pig was found,[87] Hekelingen, and Hazerswoude-Rijndijk. Sometimes other skeletal elements were used. A perforated intervertebral disc of porpoise or bottle nose dolphin was found at Aartswoud.[88] At the Early Neolithic site of Medel-De Roeskamp a pendant or amulet made from a shell fragment was found.[89]

Pendants/amulets are extremely rare at sites from other Prehistoric periods. A perforated mandible of wildcat, found on a North Sea beach (Fig. 4.12), is most probably Mesolithic in date, while the only find from a Bronze Age context is a perforated tooth of pig/wild boar from Barendrecht.[90]

A highly unusual find is the perforated vertebra of a meagre (*Argyrosomus regius*, Fig. 4.13) – nowadays and probably also at that time a very rare fish species in Dutch coastal

Fig. 4.12 Perforated mandible of a wildcat (length 5.5 cm) found at the North Sea beach (Maasvlakte 2). Collection and image H. Houtgraaf.

83 Roes 1963, Plate XXXIII.
84 Rijkelijkhuizen & Verbaas 2016, 739-740.
85 Unpublished.
86 Van Wijngaarden-Bakker 1997; Zeiler & Brinkhuizen 2014; Gehasse 1995.
87 Piena & Drenth 2001.
88 Van Vilsteren 1987.
89 Zeiler *et al.* 2023.
90 Zeiler 2000, 2018; Moree *et al.* 2011.

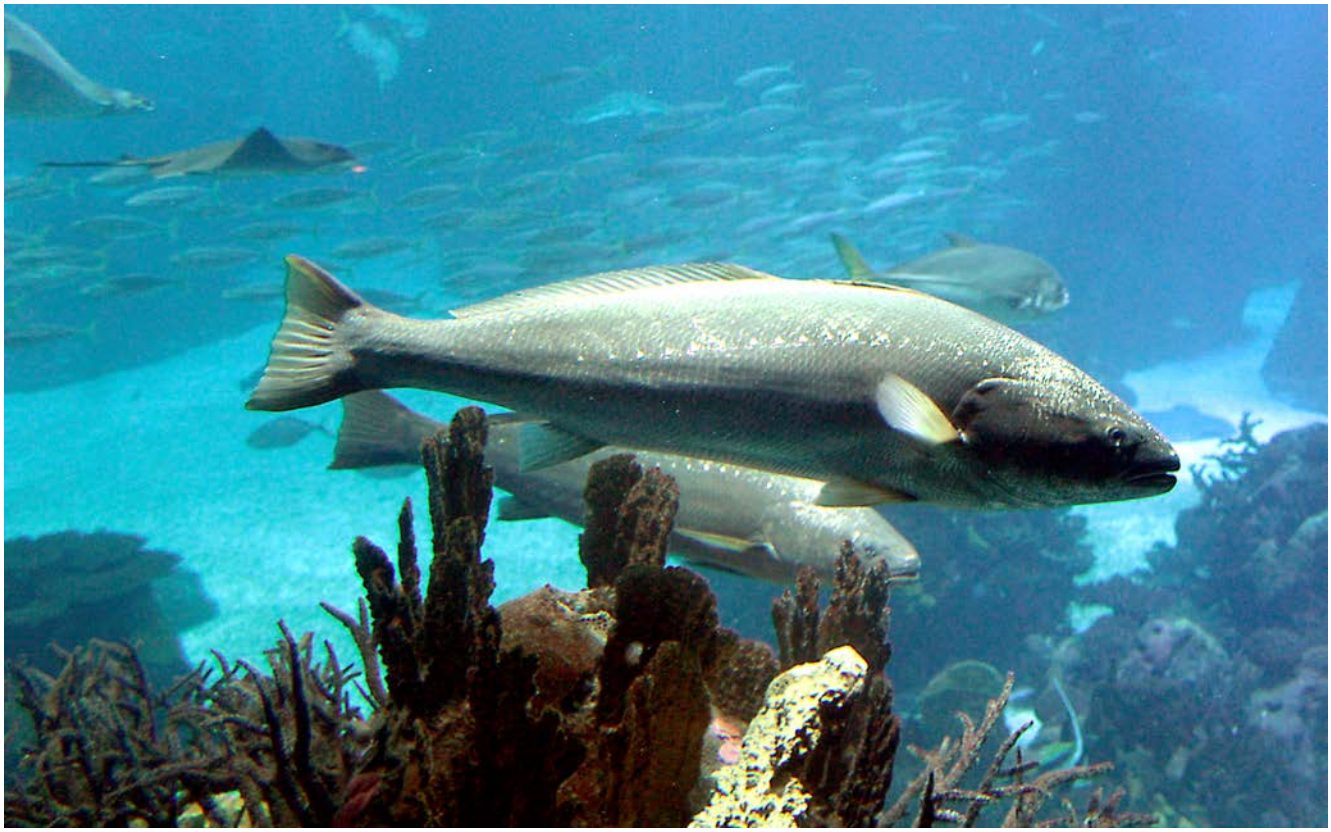


Fig. 4.13 Meagre (*Argyrosomus regius*). Image from Lisbon Oceanarium, can be found at: https://en.wikipedia.org/wiki/Argyrosomus_regius#.

waters – from a Middle Iron Age layer at the site of Ezinge.[91] Other remains of meagre were found in Roman contexts at Valkenburg, Velsen and Castricum, but none of these were worked.[92] The impressive appearance of the fish, which can be up to 2 m long and weigh up to 65 kg, may have been the reason why in this case a vertebra was turned into a pendant.

4.5.3 Toggle buttons

Toggle buttons, small rectangular pieces of bone with a hole in the centre and originally interpreted as flutes, are limited to the Late Neolithic and Bronze Age, and possibly also the Early and Middle/Late Iron Age.[93] Prummel, Manuel & Post describe a similar object from the Middle/Late Iron Age site of Ezinge. However, this specimen has two round holes in the centre and is described by the authors as a buzz bone.[94] In addition to finds from sites and burial mounds in the Netherlands, toggle buttons are also reported from Bronze Age cremation graves in Devonshire and Yorkshire.[95] Both Dutch and British specimens are made from long bones of medium-sized mammals, such as tibiae of sheep/goat. A characteristic feature, apart from their similar shape and decoration of several groups of parallel carvings (Fig. 4.14), is their one-sided, central perforation, often with wear around the edges.

Although the interpretation as flutes proved to be incorrect, the objects may have been ornamental rather than functional, as García Díaz suggested for the specimens from Late Neolithic Zeewijk.[96]

Fig. 4.14 Calcined fragment of a toggle button from Late Neolithic Aartswoud (length 2.2 cm). Collection H. van der Meij. Image J. Buist.

91 Prummel, Manuel & Post 2014, 210.
92 Gehasse 1997; Brinkhuizen 1988, 227-229; Lauwerier & Laarman 1999.
93 A toggle button from Sittard-De Dominicaan, made from a sheep/goat tibia, probably dates to the Late Bronze Age - Early Iron Age (Zeiler 2014).
94 Prummel, Manuel & Post 2014, 212.
95 Piggott 1958.
96 García-Díaz 2014.

4.6 Games, toys and musical instruments

4.6.1 Gaming counters

Two small round artefacts were interpreted as gaming counters. One came from Barendrecht (Neolithic) and the other from Medel-De Roeskamp (Bronze Age); both were made of bone.[97] The first one has two convex sides, while the second one has one flat and one slightly convex side.

4.6.2 Flutes

Two flutes currently at the Fries Museum can be assigned to the Iron Age. One flute (21.5 cm) is made out of a long bone, possibly of a bird. On the inside of the natural curve of the bone are six rounded similarly sized tone holes. Another flute, found at Kimswerd, is 17.7 cm long and made out of an ovicaprid tibia. Both ends have been removed and the created openings served as windways. A row of five irregularly spaced holes was made in the plantar side. Of these the largest, shaped more or less like a rounded triangle and near the proximal end, functioned as a window. Three round holes in the middle section of the diaphysis are finger holes. The fifth hole is situated just above the distal end; although it resembles the finger holes in shape, dimensions and finish its function may have been different. Most likely it was a suspension hole through which a string was attached.[98]

4.7 Other objects

Finally, there are many objects and fragments of objects of which the function remains unclear. It would take too far to discuss all these here, but some are worthwhile to be mentioned.

4.7.1 Tubes

These mostly date from the Neolithic period, with only a few objects dating from the Bronze and Iron Age. The Neolithic tubes were made from long bones of geese and unidentifiable medium-sized mammals. The Bronze Age tube was made from a long bone of a medium-sized mammal. One Iron Age example is a small tube or broad ring made out of a cattle horn-sheath.[99]

4.7.2 (Fragments of) objects with unknown function

A unique object was found in The Hague.[100] It is of red deer antler and is about 17.5 cm long. It has a large hole at one end; the other end is broken off. Near this broken end is a second hole perpendicular to the first, and at the broken end is a third hole. The object is richly decorated on one side with 'ring-and-dot' motives and parallel lines. Use-wear analysis shows wear caused by (leather or other material) straps inside the two holes, showing that the object could slightly move between the straps. The rounded side has been in contact with a soft material. Despite this information about how the object was used, its function is still not clear.

Other objects of unknown function are three small bone discs from the Early Bronze Age site Schagen-Hoep Noord. Two of them are round, 1 and 1.5 cm in diameter, respectively, while the third is roughly rectangular and measures 1.5 x 1 cm. Perhaps these three objects are gaming counters, although they differ in shape from those from Barendrecht and Medel-De Roeskamp described above. On the other hand, there is no clear definition of what exactly should be considered a gaming counter.

Two other objects with uncertain functions were found at Sittard-De Dominicaan (Iron Age/Roman period). One is made of red deer antler. It has two tapered ends and two holes have been drilled vertically above each other in the centre of the object. Both holes show use wear around the edges. Another object is made out of the rib of a large mammal.[101] It is unfinished; two drilled holes at the centre are conical in shape and the edges are still sharp, indicating that the

97 Diameters 9.1 and 15.6 mm, respectively. Moree *et al.* 2011; Zeiler 2018; Zeiler, Verbaas & Esser 2023.
98 Milojković & Brinkhuizen 1984.
99 Prummel, Manuel & Post 2014, 212.
100 Rijkelijkhuizen & Verbaas 2014, 273-277.
101 Zeiler 2014, 3.

Fig. 4.15 Decorated bovid metatarsal from the North Sea. a: front view, b side view; length about 16 cm (from Amkreutz & Van der Vaart-Verschoof 2021, 65). Collection and image RMO.

Fig. 4.16 Decorated aurochs metatarsal from the North Sea (length about 37 cm). Collection K. Tanis. Image F. de Vries/Toonbeeld.

object has not been used. Both tapered ends show cut marks. These two objects were interpreted as 'weaving coils' (i.e. weaving shuttles), but that is not certain; other suggested functions are toggles or fish gorges.

A very special category is that of decorated objects. One of the most spectacular is a metatarsal of a bovid (aurochs or steppe bison), dredged up in 2005 from the North Sea south-west of the Brown Ridge. The decoration on the bone (of which only the longitudinally split proximal half is preserved) consists of five longitudinal rows of zigzags (Fig. 4.15).
The object was dated 11,560±50 BP, making it the oldest known example of art from the Dutch mainland or territorial waters until now.[102]
A second object from the North Sea, a complete aurochs metatarsal, has a similar decoration (Fig. 4.16) but is still undated. Another object might be older, a mammoth rib decorated with a series of scratches arranged in a kind of herringbone pattern. The bone was found in

[102] Amkreutz *et al.* 2018.

a sand quarry near Hasselt in the eastern Netherlands. The object is heavily worn, making it difficult to be sure whether the traces are man-made. They could be gnawing marks, but the fact that they are only visible on one side of the rib makes that less likely. Moreover, the pits that are sometimes seen on gnawed bones at the beginning of a scratch are missing here, and the traces seem too regular and relatively straight to be gnaw marks.[103]

4.8 Production waste

This is a somewhat difficult category, in that it is not always mentioned specifically. So far as is known, most production waste is reported from Mesolithic and Neolithic contexts, with a small amount from Bronze Age and Iron Age sites. The category comprises remains both from antler and bone processing but at 84% of the total number antler fragments are far more numerous. If an animal species is mentioned, this is in all cases red deer with the exception of a few elk antler fragments from the North Sea. Often the waste consists of the base and the lower part of the beam, with the beam and the first or the first and second tines branching off having been carved in and then broken off (Fig. 4.17).

Apart from a rib fragment found at the Neolithic site of P14 (Schokland), all reported bone waste consists of fragments of long bones, mainly metapodials of large mammals such as aurochs that were used to make socketed axes. The antler remains from Hoge Vaart, Spoolde and Swifterbant-S4 were identified as waste of the production of (T-)axes or adzes. In most cases, however, the exact production process is not known or specified.

Fig. 4.17 Red-deer antler production waste from the North Sea (diameter of the burr 76 mm). The beam has been carved in and then broken off. Collection RMO. Image J.T. Zeiler.

4.9 Objects in daily life

Utensils made of bone, antler or horn played a major role in Prehistory. To the modern eye it is not always clear what their use was in daily life. Although some objects, such as awls, are found throughout Prehistory the appearance of other objects changed over time. Next to this, we have to keep in mind that our interpretations may be distorted both by geographic limitations and the fact that artefact numbers vary between periods. For instance, there are very few Palaeolithic finds. Without doubt, the still expanding number of beach finds will considerably broaden our knowledge of this period in the near future, but for now the information is very limited. For example, it is not clear whether there were any changes in artefact types and production from the Palaeolithic to the Mesolithic, simply due to a lack of sufficient data on the oldest period. Moreover, sites were sometimes occupied for multiple periods which makes it difficult to contribute a certain artefact type to, for instance, the (Late) Neolithic or (Early) Bronze Age.

Nevertheless, there are some notable differences between periods from which we may - with some caution - draw conclusions about changes and trends in artefact typology and fabrication as well as their use in daily life in different periods. Several artefact types are restricted to one or two periods. With regard to agricultural and craft tools, socketed axes and antler picks as well as beaver and wild boar tooth chisels are all limited to the Mesolithic and (Early) Neolithic. Antler axes, on the other hand, were used much longer, although their numbers in the Bronze and Iron Ages are considerably smaller than in the Mesolithic and Neolithic. Ripples seem to have been a typical Late Neolithic invention, but they did not stay in use for very long, at the latest until the Early Bronze Age.

The most remarkable change in hunting and fishing gear is the disappearance of projectile

[103] Oral communication A. Verbaas, University of Leiden.

points/barbed points after the Mesolithic period, unlike fish hooks which persist up to the Late Neolithic (and probably beyond). As hunting and fishing still played an important role throughout the Neolithic period, and to a lesser extent the Bronze Age, this absence can only be explained by the introduction of new tools or techniques such as fish traps and weirs. In the Netherlands as well as abroad (for instance in Denmark) the oldest archaeological weirs and wickerwork traps date from the Neolithic period and Bronze Age.[104] These structures made it possible to catch fish on a larger scale. It is tempting to link this to demographic developments, i.e. human population growth, but there may well be other factors that played a role. As for the Iron Age, the role of fish in the diet appears to have been much smaller than before.[105]

Objects for personal hygiene are rarely found throughout Prehistory. Combs do not appear before the Bronze Age. Objects for personal adornment and clothing – beads, toggle buttons and pendants/amulets – are more common. Beads appear from the Mesolithic onwards up to the Bronze Age, but remarkably no finds from the Iron Age are known. Toggle buttons, on the other hand, were used from the Late Neolithic onwards, including the Iron Age. Pendants (perforated teeth and bones) are almost exclusively found at Neolithic sites, with a remarkable concentration at the Late Neolithic site of Kolhorn. The (supposedly) Mesolithic wildcat mandible pendant from the North Sea coast and the Iron Age specimen from Ezinge made from a meagre vertebra are both unique pieces.

With one recent exception, bone or antler implements used in textile production (spinning and weaving) do not appear at sites before the Iron Age. This is remarkable for two reasons. Firstly, at least the technique of weaving cloth with plant fibres was already known in the Neolithic. This is shown, for instance, by the find of flax fibres at the Late Neolithic site of Zeewijk. Perhaps we simply do not recognize objects with this specific function without use-wear analysis. On the other hand, use wear suggesting plant-fibre working is often being linked to the production of baskets and/or containers even if the use wear was produced by flax (as at Medel-De Roeskamp), but remarkably enough not with cloth production. Secondly, domestic sheep were already introduced in the Neolithic, and they were kept for their wool at least as early as the Bronze Age.[106] Their introduction made wool available as a new raw material for textile production, and with it introduced the need for new tools such as spindle whorls and bobbins. This raises the question how wool was worked before the Iron Age. Do we not recognize the tools as such or were they made of other organic materials?

One such tool might be a double-sided bone awl or spatula from the Early Neolithic settlement phase at Medel-De Roeskamp, which showed use wear pointing to both plant fibre processing and wool working.[107] If indeed wool working was practised at this site, the question arises where the wool came from. It is not clear if the skin of the primitive breeds of sheep that were kept in low numbers during the Early Neolithic produced suitable wool; their fleeces might have been more hairy. On the other hand, a primitive breed like the Drenthe Heath, still kept today, has a fleece consisting of a fine undercoat, a hairy part, and kemp, a thick and hollow fibre.[108] Archaeological evidence from Iran suggests that selection for wool sheep may have started around 6000 BC, while the earliest known woven wool garments date two to three thousand years later.[109]

Long-handled combs seem to be restricted to the Iron Age and the Early/Middle Roman period. The overall appearance is that of a long handle with short teeth on the short end. The number of teeth may vary, the teeth may be on one or both ends, or on one side with the other end tapered, squared or rounded, and the combs may be decorated or non-decorated. In Britain, these long-handled combs first appear in middle or late Bronze Age contexts and become more common in the Iron Age.[110] Tuohy was the first to note that these combs are also found in the Netherlands. Our inventory located nine long-handled combs in total. Although still sometimes called 'weaving combs' Tuohy has argued that the combs were probably used for making braids and straps.[111] Others argue for a use in plucking the fleeces of sheep or combing human hair.[112] This latter explanation seems to be corroborated by use-wear analysis on the teeth of the long-handled comb from the site Nijmegen-Lent Dijkteruglegging.[113]

Although people have been making music (of any kind) for much longer, the oldest bone musical instruments known thus far are two

104 Brinkhuizen 1985; Bulten, Van der Heijden & Hamburg 2002; Brinkhuizen & Hänninen 2011.
105 Çakirlar *et al.* 2019.
106 Van Amerongen 2016.
107 A second bone awl also shows traces suggestive of wool working, but these are less clear.
108 Pelleboer 2014.
109 Cottle 2010.
110 Tuohy 1992.
111 Tuohy 1999, 56-58.
112 Coles 1987, 105-106.
113 Rijkelijkhuizen & Verbaas 2016, 739-740.

flutes from the Iron Age. From the Roman period onwards, finds of (fragments of) musical instruments become more regular.

As stated in Section 4.1, the geographical distribution of the objects is mainly determined by the conservation conditions of the various landscapes and provides little information on possible regional differences in the use of the objects. The objects' context information is insufficient to go beyond a general conclusion that the objects mainly relate to the daily habits of prehistoric people. It is not yet possible to link specific types of objects to for example daily activities or funeral rites.

4.10 Crafts and trade

4.10.1 Availability of raw materials

Besides changes in artefact types throughout Prehistory, there were also changes in the materials that were used to make them. Changes in the local faunal spectrum reflect changes in the occurrence of the animal species from which the materials were derived. Palaeolithic species that supplied the bone and antler, like bison and reindeer, disappeared after the last Ice Age. In the Mesolithic, red deer antler and aurochs bones were the most commonly used materials. This was probably not only because of the suitability of their skeletal elements for tool production, but also because these species were more abundant than others such as roe deer, elk, wild horse and brown bear. Wild boar, however, must have been quite numerous but their bones and teeth are much less frequently used throughout Prehistory. An unusual case is the use of human bone for Mesolithic barbed points. With the intensification of land use for agricultural purposes from the Neolithic onwards, wild mammals such as aurochs became scarcer, and with them the use of their bones. At the same time newly introduced species were used for tool production: domestic cattle, sheep and pig. Sheep bones, for instance, were used to make awls and needles as well as toggle buttons. Bird bones were rarely used throughout Prehistory. In one case, whale bone was used. Artefacts made of ivory are unknown during the entire Prehistoric period in the Netherlands; they first appear in the Roman period.

Antler, one of the main materials for artefact production, shows an overall decline as a raw material from the Mesolithic to the Neolithic, from *c.* 33% to *c.* 15% of all artefacts. However, there are notable differences between Neolithic sites. This can be seen on a local scale, such as at Swifterbant-S3 where the proportion of antler tools is relatively small compared to Hoge Vaart, Medel-De Roeskamp and Hardinxveld-De Bruin. The small proportion of antler at S3 was originally explained by referring to (apparently) unsuitable environmental conditions for red deer.[114] However, the environment in the Swifterbant area was practically identical to that at Early Neolithic Medel-De Roeskamp, where both antler artefacts and production waste are far more numerous. This points to local specializations in tool use and tool fabrication. The same applies to the remarkably frequent use of bird bones for the production of awls at Hardinxveld-De Bruin, and the striking concentration of perforated teeth and bones used as pendants or amulets at Late Neolithic Kolhorn. In both cases this may have to do more with local technology and/or preference than with the availability of specific materials.

On the other hand, it is likely that the open Late Neolithic landscape in the province of Noord-Holland offered less favourable conditions for red deer and this may explain why only a very small part of the over 400 artefacts (*c.* 3%) was made of antler. As antler artefacts account for a considerable part of the total number of Neolithic artefacts it can be concluded that the overall decline in the use of antler is heavily influenced by the composition of this regional Late Neolithic toolkit. Leaving out this category, the percentage of antler at Neolithic sites increases to *c.* 32%, almost the same as for the Mesolithic period. In the Bronze Age the percentage of antler drops to *c.* 11% but it almost triples again in the Iron Age, which could mean that antler still was available in large quantities at the time. However, the total number of artefacts from the Iron Age is much less than those from previous periods, which may create a distorted picture. The reason for the low number of antler artefacts during the Bronze Age is not clear. The picture might well be quite different if we had more material from higher, more wooded areas. The question still remains if the changes in use of antler as they appear from our data are real.

[114] Zeiler 1997.

4.10.2 Cultural changes

Another cause for changes through time will have been the introduction in the Bronze and Iron Ages of new techniques and products (e.g. weaving equipment for wool) as well as new materials for artefact production (bronze, iron). This could explain, for instance, the disappearance from the toolkit of socketed axes after the Neolithic. Although in part the result of a decline of the aurochs population these axes were also made from domestic cattle bones, which were still amply available in the Bronze and Iron Ages. Also the disappearance of retouchoirs after the Neolithic is likely to have been due to the introduction of bronze and iron, as by then flint working ceased to play a significant role.

An increasing differentiation within the society that seems to have developed in the Iron Age, as manifested in for example chieftain graves, could be another factor but this is not apparent from our data.

To what extent the patterns and developments described above are comparable to data from other parts of north-western Europe (Belgium, Germany, Denmark, UK) is not clear. Although a large dataset exists, regional or diachronic overviews are lacking.[115] Data at site level may be very useful and valuable but are not necessarily representative for a region or time period, as the composition of the tool kits may differ considerably from site to site. One of the few exceptions is Pratsch' publication, but even this study comprises a mere five Mesolithic sites in northern Germany and Poland, and only deals with antler artefacts.[116] All we can do for now is to identify the contemporaneous presence of similar artefacts in neighbouring countries, such as socketed axes during the Mesolithic and Neolithic in the UK and Denmark, ripples in the Neolithic and Early Bronze Age in Central Europe, antler picks at Neolithic Stonehenge,[117] or toggle buttons from Bronze Devonshire and Yorkshire. However, a detailed comparison is impossible for the time being.

4.10.3 New research questions

One of the major problems we encountered during our analysis was that different researchers apply different interpretations to the same artefacts. Quite often the (morphological) criteria on which these interpretations were based were not clear. Objects with the same shape were identified as different tool types. For example, an elongated, double-pointed object was identified as a double-sided awl, a pin beater, or a fishing gorge. These different interpretations illustrate the difficulties when determining the function of an artefact, which is a question of both typology and use.
A typological interpretation implies a certain use, but that does not necessarily mean that the object was actually used as such. Moreover, typology and use are not unambiguous.
Based on typological criteria an object might be described as an axe, pick, chisel or adze, depending on the researcher in question.
There is very little difference in the function of these objects, and all can be used for more than one purpose.

Clearly, there is no consensus among archaeologists about definitions at this point. Moreover, it is clear that morphological criteria alone are insufficient for a correct interpretation of the function of an artefact. In several instances, the function indicated by use-wear analysis was a different one than what the shape of the artefact suggested. Use-wear analysis should therefore be a substantial part of artefact analysis for a better interpretation of the artefacts and thus a better understanding of the material culture and activities of prehistoric people.

A second recommendation for future research is the consistent and standardized registration of production waste, be it antler, bone or other osseous or keratinous material. At present this category is often omitted from the reports, which means that a significant part of artefact production remains invisible.

[115] The only overviews we were able to find concern Eastern European sites.
[116] Pratsch 2011.
[117] Serjeantson & Gardiner 1995.

5 Osseous and keratinous artefacts in the Roman and Early Medieval period (12 BC-1050 AD)

M.J. Rijkelijkhuizen

5.1 Introduction

In the first century BC the Romans conquered large parts of the area that is nowadays the Netherlands. This conquest is also visible in the archaeological deposited material. Although in smaller quantities than in the following periods, osseous and keratinous artefacts from the Roman period have been found and provide information about trade, crafts and socio-economic influences. Large find concentrations come from a few key excavated Roman settlement sites and military contexts, such as Valkenburg, Aardenburg, Tiel-Passewaaij, Den Haag-Scheveningseweg and Velsen, and from cemetery contexts such as Huissen.[118]

Early medieval osseous and keratinous artefacts mainly come from Merovingian and Carolingian sites, such as Nijmegen-Lent (Merovingian cemetery), Maastricht (several contexts), Oegstgeest (settlement, sixth-seventh century AD), Valkenburg-De Woerd (late Merovingian-Carolingian settlement), Dorestad and Leiderdorp.[119] Noticeable is the large number of osseous artefacts from terp sites (artificial dwelling mounds in the coastal zone of the provinces of Friesland and Groningen) from the Roman and Early Medieval period. Unfortunately, this corpus is largely undated.[120] More recent excavations however have provided more reliably dated examples.[121] For this chapter, the large collection of the Fries Museum was studied to construct a typology of Dutch combs. In contrast to the Merovingian and Carolingian objects, the finds from Oost-Souburg and Deventer are among the few that represent the tenth century AD.[122]

The objects were studied on the basis of these published sites and the (digital) collections of the Rijksmuseum van Oudheden (RMO) and the Fries Museum in combination with relevant literature and collections. However, as yet not all osseous and keratinous objects have been completely studied or registered information on the geographical distribution of the objects and raw materials is therefore still lacking, but a general typology is presented and some preliminary conclusions can be drawn.

Names of places and other indications of locations mentioned in the text of this chapter are indicated in Fig. 5.1. Province names are shown on a separate map (Fig. 2.1).

5.2 Agricultural and craft tools: wood, skin, pottery, leather and plant working tools and textile implements

5.2.1 Rakes and picks

Not many osseous agricultural tools are known from the Roman period onwards. The so-called antler rakes or clod breakers could fall into this category. As regards the hafted rakes MacGregor distinguished two types. The first type is made of the base of the antler, which was cut above the bez tine.[123] The brow and bez tine form the actual tool. The second type is made of the upper end of the antler whereby two tine tips are used as a forked tool. A hole was made in the base of the tool to allow hafting. The function of these objects is not yet well understood. Different agricultural functions have been suggested, such as a pitch-fork, a harrow, a rake, or a clod-breaker for breaking up the soil, or a combination of functions.[124] These tools are only known from terp sites and they are often not securely dated,[125] but according to MacGregor these tools are restricted to the Roman period.[126] The example from Ezinge, however, was dated to the fourth or fifth century AD.[127] The used antler species mostly come from red deer, but elk antler was also used.[128]

Handheld antler picks where the beam formed the handle and the brow tine was used as the functional end have also been interpreted as agricultural tools.[129] Use-wear analysis confirms the usage in soil of an antler pick from the terp site Feddersen Wierden, Germany.[130] However, individual objects may have been used differently or for different purposes. Antler picks have also been found at terp sites.[131] Another undated example comes from the province of Groningen,[132] and an undated example from Amsterdam. The latter has three holes in the bevelled beam to attach a wooden shaft. However, a medieval date for this piece is also possible.[133] A late Roman antler pick was found at Dorestad.[134]

118 Valkenburg: Verhagen 1993. Aardenburg: collection Erfgoed Zeeland. Tiel Passewaaij: Groot 2006. Den Haag-Scheveningseweg: Waasdorp 1999. Velsen: Bosman 1997; collection RMO. Huissen: Rijkelijkhuizen 2017; Van der Feijst, Verniers & Blom 2017.

119 Nijmegen Lent: Rijkelijkhuizen 2021c. Maastricht: Dijkman & Ervynck 1998. Oegstgeest: Kromotaroeno 2015. Valkenburg-De Woerd: Van der Pal 1988. Dorestad: Roes 1965; collection RMO. Leiderdorp: Van Riel 2014; Verhoeven 2016.

120 Roes 1963.

121 For example: Knol 2019; Prummel & Van Gent 2010; Prummel, Halici & Verbaas 2011; Prummel, Manuel & Post 2014.

122 Oost-Souburg: Lauwerier 1995; Lauwerier & Van Heeringen 1995. Deventer: Rijkelijkhuizen 2011e; 2011f.

123 MacGregor 1985.

124 MacGregor 1985, 178-179; Roes 1963, 48-49.

125 Roes 1963; Fries Museum; Miedema 1983, 242-243; 1990, 166; Kramer & Prummel 1992/1998, 104-105; Midlum, collection RMO; Van Gent 2015, 167-169; Prummel, Manuel & Post 2014, 218, 219; Nieuwhof 2020, 93, 127; Miedema 1990, 166.

126 MacGregor 1985, 179.

127 Prummel, Manuel & Post 2014, 218.

128 Kramer & Prummel 1992/1998, 104-105; Van Gent 2015, 167-169.

129 Van Vilsteren 1987, 25.

130 Struckmeyer 2011, 71-72.

131 Roes 1963; Miedema 1983, 243; 1990, 166; Kramer & Prummel 1992/1998, 105.

132 Van Vilsteren 1987, 24.

133 Rijkelijkhuizen 2004.

134 Lauwerier & Thach 2021, 272.

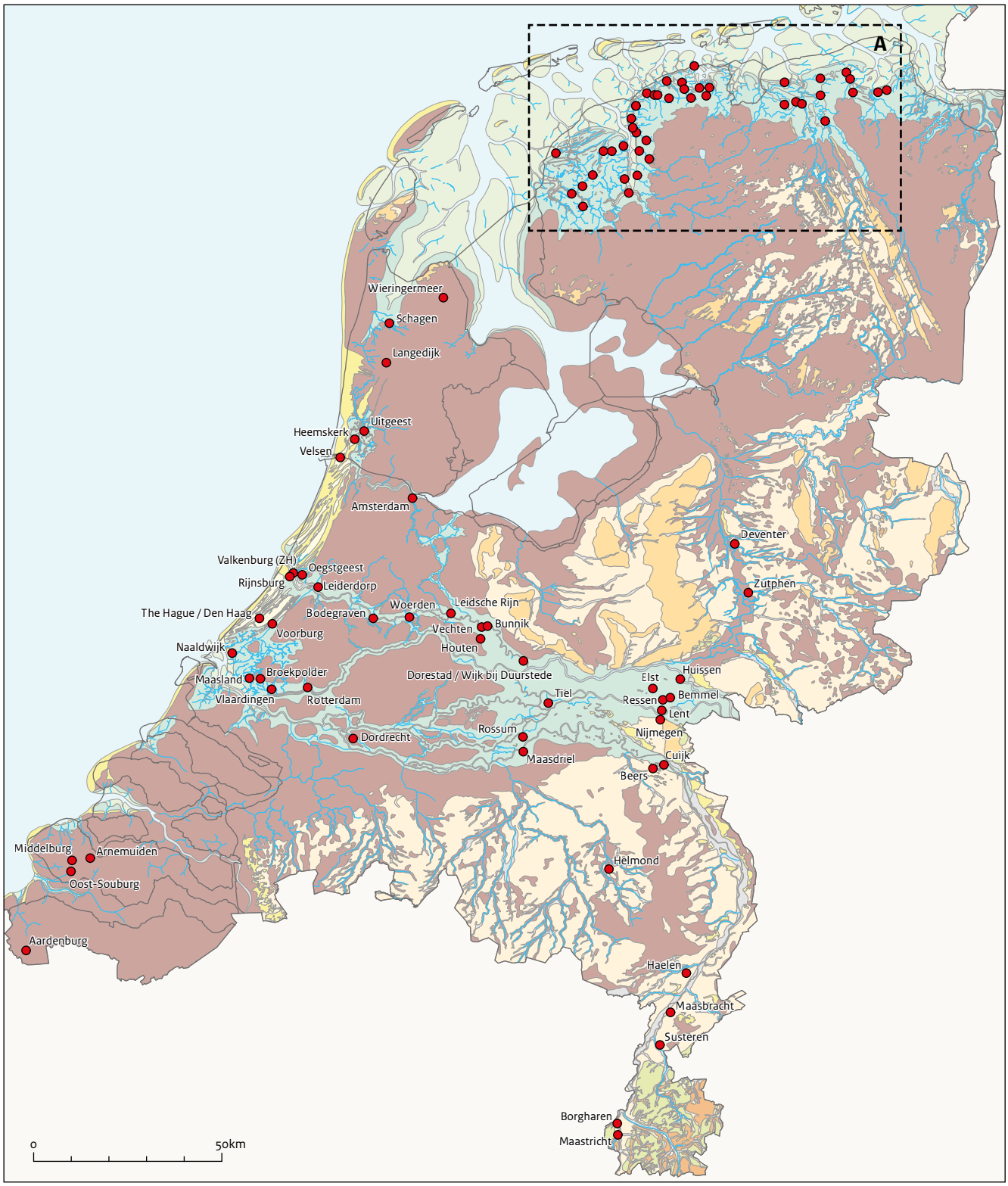
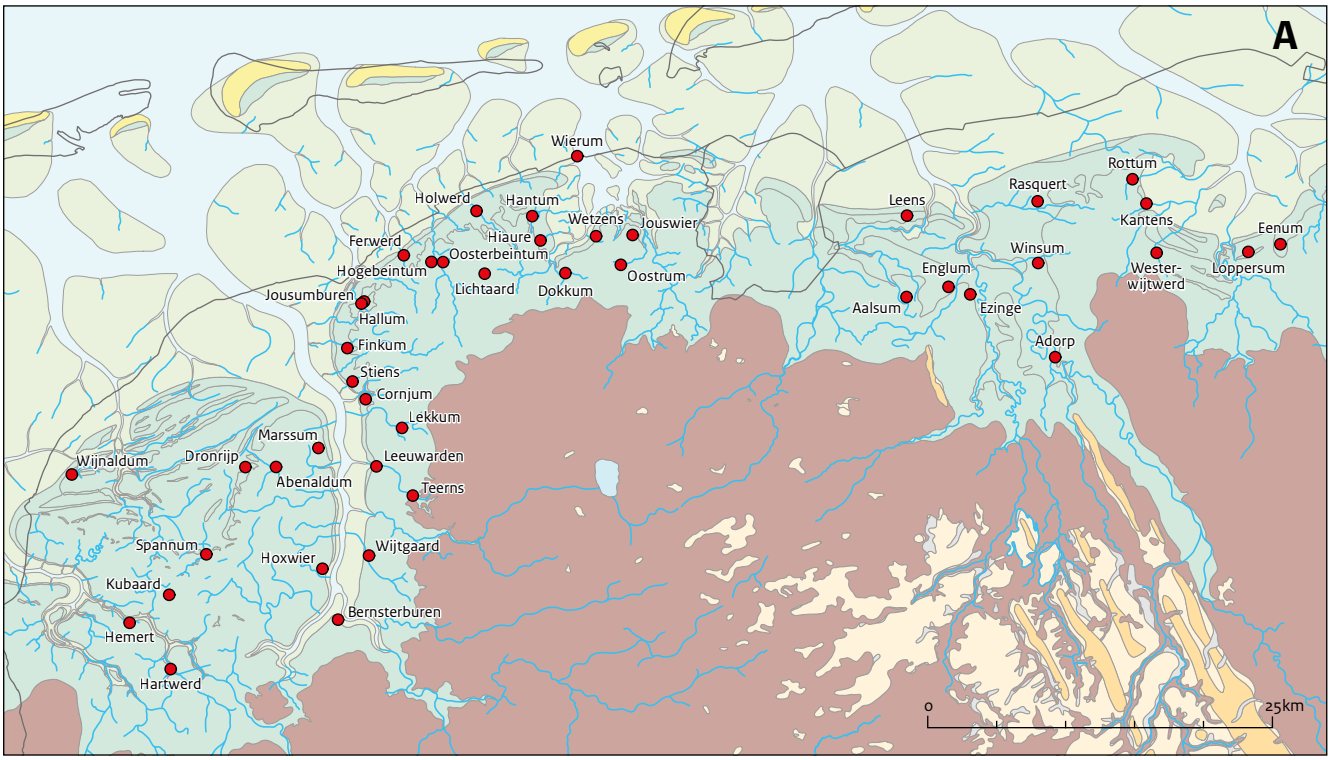


Fig. 5.1 Palaeogeographic map of the Netherlands (100 AD) showing locations mentioned in this chapter. After Vos *et al*. 2020. A: detail of the map showing locations in the terp area.



Paleogeography 100 CE

- Location within the terp area
- Outer water and inner water
- High/river dunes
- Tidal flats
- Salt marshes and floodplains
- Peat areas
- Pleistocene sand areas
- Floodplains and stream valleys
- Ice-pushed ridges

5.2.2 Planes

A specific artefact made of osseous materials that has been interpreted as a specialized tool for high-quality woodworking is the plane (Fig. 5.2).[135] A wooden example from the Roman period is known from Velsen,[136] but planes made of osseous materials are restricted to terp sites. A small collection of such planes was recovered from several terps; these are probably early medieval in date.[137] The raw material in most cases is likely to have been antler due to the size and flexibility of the raw material. Planes have also been found in England and Scandinavia but they are not common finds.

Fig. 5.2 Plane (Hallum, length 16.4 cm, inv. 27A-141). Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap.

5.2.3 Chopping blocks

A whale vertebra from the early medieval settlement of Dorestad features several chopping traces and was probably used as a chopping block, but it is unknown whether it was used in for example butchering or as part of another craft.[138] Whale bones with chopping marks have also been found in other locations in the Netherlands and north-western Europe. These are often vertebrae, but other bones were used as well.[139]

135 MacGregor 1985, 173-174.
136 Bosman 1997, 130; collection RMO.
137 Roes 1963, 41-42; Kramer & Prummel 1992/1998, 106; Van Vilsteren 1987, 27; collection Fries Museum.
138 Esser, Beerenhout & Rijkelijkhuizen 2012.
139 Prummel 2008a; Van den Hurk 2020.

5.2.4 Scrapers, smoothers and polishers

Various artefacts described as scrapers, smoothers or polishers may have been used in skin, leather or textile working. Plant processing, decorating pottery and descaling fish have also been mentioned as possible functions for these types of artefacts.

One type of polisher or smoother is made of a rib of a large mammal and had no or little modification prior to its use. Rib polishers or smoothers mainly date from Roman-period contexts. Many of these artefacts were found at the Valkenburg excavations, which implies a certain activity at the site, but they are also known from several other contexts.[140] A smaller specimen comes from Hoxwier, where only a partial rib was used.[141] Several possible functions have been discussed; proposals include tools for hide- or leather working, or a weaving implement. However, use-wear analysis of objects from the Feddersen Wierde terp site points to a pottery implement to smoothen the clay, and dismisses a function as a weaving sword or an implement for leather or hide-working, at least for these particular finds from Feddersen Wierde.[142] Other rib tools from other sites, however, may have been used for different tasks. From Englum comes a scraper or polisher made of a partial shoulder blade.[143]

Another common object in numerous Roman-period contexts in the Netherlands is a serrated rib of a large mammal.[144] A large part of the rib may have been used, or a smaller piece as in the case of an object from Hallum; it has a length of *c.* 7.8 cm and one serrated edge, and two holes in the middle (Fig. 5.3). Serrated ribs have also been found in other European countries and may have been used for different activities.[145] Fish descaling is already mentioned by Roes,[146] but another interpretation is a function as musical instrument.[147] This particular type of object needs further study. Analysis of the Feddersen Wierde artefacts suggested several functions, depending on the shape and size of the serrations, such as cleaning animal skins, possibly the softening of leather, and a function as musical instrument. A function as a pottery tool, however, has not been dismissed.[148] We should realize that not all toothed ribs necessarily had a similar function, and that they could also be multifunctional.

Fig. 5.3 Partial rib with serrations and two holes (Hallum, length 7.8 cm, inv. 27-35). Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap.

Other bones, such as metapodials or knuckle bones, may also have been used as polishers, usually with little or no previous modification of the bone itself.[149] Their use should be studied further; various functions are possible such as a smoother for textiles, or leatherworking.[150]

5.2.5 Pottery decorating tools

A few more elaborately worked tools from one of the terp sites, with a handle and at the short end an (oblique) serrated edge, are being interpreted as tools to shape or decorate pottery, or both.[151] Another tool used to decorate pottery also comes from terp sites. Small bone or antler stamps for decorating pottery feature decorations that occur on early medieval pottery (Fig. 5.4). Most of the stamps were made of antler tine tips. Similar objects can be made of wood or metal.[152] Early medieval antler stamps could also be used to decorate other materials, such as leather.[153]

Fig. 5.4 Antler pottery decorating tool (Dronrijp, length 5 cm, inv. 48-7). Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap.

140 For example Prummel 2008a, 144-146; Verhagen 1993, 347; Rijkelijkhuizen 2014b; Groot 2006.
141 Nieuwhof & Prummel 2007, 33-34.
142 Struckmeyer 2011, 30.
143 Prummel 2008a, 146.
144 Prummel, Manuel & Post 2014, 215; Thach & Lauwerier 2010; Lauwerier & Thach 2021, 267; Lauwerier & Laarman 1999, 130-131; Roes 1963; Uitgeest, collection Huis van Hilde; Van Gent 2015, 162; Prummel 2008a, 148; Miedema 1999/2000, 321, 412.
145 Rijkelijkhuizen 2014a.
146 Roes 1963.
147 Van Vilsteren 1987; Prummel, Halici & Verbaas 2011; Miedema 1983, 245-246; Miedema 1999/2000, 321.
148 Struckmeyer 2011, 33-36.
149 For example Clason 1978; Lauwerier & Laarman 1999, 130-140; Van der Pal 1988; Hullegie & Prummel 2015, 143; Prummel 2008a, 144-147; Nieuwhof & Prummel 2007, 33.
150 Struckmeyer 2011, 43-47.
151 Wieuwerd, collection RMO; Willemsen 2014, 77; collection Fries Museum.
152 Roes 1963, 40; collection Fries Museum.
153 Riddler 2018.

5.2.6 Awls and points

Multipurpose tools that may have been used for several activities are awls and points. These tools have been found in large quantities and from all time periods. They could readily be made of bone or antler without much prior modification and were locally made. Use-wear analysis is necessary to be able to determine their function.

Because these tools are locally made many variations occur. One method is to cut obliquely a long bone from a medium-sized mammal so as to get a gouge-shaped point. The function of these implements is a subject of debate, one of the suggestions being an awl or '*spleutsteker*' used in basket weaving.[154] These awls date from the Iron Age to the Medieval period but they are predominantly Roman or early medieval.[155] Use-wear analysis on one of the medium mammal bone points from the Feddersen Wierde terp site shows contact with siliceous plant material, which supports the basketry theory. This point may have been used to make baskets, mats, bee hives or fish traps.[156] However this use does not necessarily apply to all the medium mammal points.

Socketed bone points made of medium mammal long bones and attached to wooden shafts have been interpreted as spear points. The interpretation of socketed bone medium mammal points rests solely on the finds from the Iron Age site of Hjortspring, Denmark, where iron as well as antler and bone spear points were found, but a different function is conceivable. According to Roes the points may have been used as a fishing spear.[157] However, as yet there is insufficient evidence and use-wear analysis may change this point of view.

Numerous socketed bone points made of a large mammal bone from the Roman and Early Medieval period have been found. Their function is being debated and several functions have been suggested, such as fishing spears or tips for prickers used with bone skates.[158] Large mammal bone points without a socket or hole to attach a shaft are interpreted as tallow horns or awls used in various crafts.[159] Points made from cattle femurs, from the Dorestad site, have not been studied in detail.[160] A bone point from the Feddersen Wierde terp site made of a cattle femur shaft was interpreted based on the use wear as an agricultural tool, for example a digging stick to loosen the soil or make planting holes.[161]

Awls and pointed tools could also be made of a bone splinter,[162] or from a (partial) antler tine.[163] Use-wear analysis shows that some antler points were used on plant materials, for example for thatching or as a marlinspike.[164] A forked tine of a roe deer antler from the Feddersen Wierde terp site had also been used on plant material.[165]

An unusual tool is a needle or awl made of crane bone. At least four specimens were recovered from terps, and the tool must have had a specific function. They were not strong enough for heavy-duty work, but probably had a function in making or repairing fishing or fowling nets or basket weaving, or as an awl in soft material.[166]

Its natural shape makes the second or fourth metacarpal of a horse very suitable for making needles and awls.[167] Use-wear analysis indicates that an example with worked tip from Oegstgeest was probably used to puncture holes in dry smoked hides.[168] However, a similar example from the Feddersen Wierde terp site had been used on plant material.[169] This shows that awls were often multifunctional tools.

5.2.7 Needles

Sewing needles are most often made of metal. Bone needles are usually coarser and could have several functions. Use-wear analysis on pig fibula needles from the terp Wijnaldum-Tjitsma, for example, shows that these were used on plant fibres. A probable use therefore is making or repairing fishing or fowling nets or a function in basket weaving.[170] By contrast, use-wear analysis on a pig fibula needle from Feddersen Wierde shows contact with leather, skin or textiles. The tip and the greatest width of the needle suggest that it may have been used on for instance coarse woven textiles.[171] MacGregor suggest that some of the pig fibula pins, with or without holes, were used as clothing pins and that those with holes may have been linked and used together as a pair.[172]

Pig fibula needles are common finds at medieval sites across a large part of north-western Europe.[173] Their use continued into the

154 Roes 1963.
155 Rijkelijkhuizen 2014b; Lauwerier & Laarman 1999, 130-140; Prummel, Manuel & Post 2014; Groot 2006; Miedema 1983, 241-242; Miedema 1990, 166; 1999/2000, 321; Groot & Van Haasteren 2017.
156 Struckmeyer 2011, 59.
157 Roes 1963, 34.
158 Hullegie & Prummel 2015, 150-152; Prummel & Van Gent 2010, 256; Kramer & Prummel 1992/1998, 111; MacGregor 1985, 174-176; Roes 1963, 36; Lauwerier 1995; Lauwerier & Van Heeringen 1995, 1998; Prummel, Halici & Verbaas 2011; Lauwerier & Laarman 1999, 147; Verhoeven 2016; Van der Pal 1988; Küchelmann & Zidarov 2005.
159 Roes 1963, MacGregor 1985, Van Vilsteren 1987; Groot 2006; Miedema 1990, 166; Miedema 1999/2000, 321.
160 Clason 1978.
161 Struckmeyer 2011, 55.
162 Rijkelijkhuizen 2014, 2019; Waasdorp 1999, 127-128; Aardenburg, Erfgoed Zeeland; Lauwerier & Laarman 1999, 130-140.
163 Van der Pal 1988; Miedema 1983, 240.
164 Struckmeyer 2011, 64.
165 Struckmeyer 2011, 70.
166 Prummel 2018, 213-215.
167 Miedema 1983, 239; Prummel, Manuel & Post 2014, 219.
168 Kromotaroeno 2015.
169 Struckmeyer 2011, 56-57.
170 Prummel, Halici & Verbaas 2011; MacGregor 1985, 120-121, 193.
171 Struckmeyer 2011, 61.
172 MacGregor 1985, 121.
173 For example: Prummel, Manuel & Post 2014, 218; Nieuwhof 2020, 17; Van der Pal 1988; Lauwerier 1999; Miedema 1983, 232-233; MacGregor 1985.

Fig. 5.5 Arrowhead needle (Hemert, length 15.8 cm, inv. a 1931/2.37). Collection and image RMO.

Late Medieval period,[174] largely due to the natural shape of the bone, which is highly suited to make coarse needles, rather than as a result of a continuous development. It is possible that in the Early Medieval period these needles were not home products, but the evidence for this in the Netherlands is insufficient. In the later Middle Ages domestic production seems likely.[175]

Needles are present in all periods and have been found in many contexts but use-wear analysis has not been done on all of them and their use may vary from specimen to specimen.[176] Large needles are often interpreted as netting needles for making large nets,[177] and a curved needle from a terp site is being interpreted as a sacking needle.[178]

'Arrowhead' needles are unique to the terp area. They are made of bone, 13.5 to 24 cm long, and with a triangular point and a hole at the other end (Fig. 5.5). They have commonly been described as arrowheads, but according to Roes they were used as needles for sewing or tying together a coarse material. The broad triangular point prevents its slipping back into the material.[179] Use-wear analysis has not been performed on these artefacts.

5.2.8 Unidentified and other craft tools

Several implements that were used as ad-hoc tools have an unknown function. Use-wear analysis could help in the interpretation of individual objects. Only a few obvious examples are described in this chapter, but many more bones could have use-wear traces which are less obvious, but still indicate the use as a tool.

From the terp sites come several long bones of large mammals, such as cattle or horse, which show intensive use-wear on part of the shaft.[180] Use-wear analysis on objects from the Feddersen Wierde terp site shows that the sometimes largely hollowed out sections are caused by the deliberate manufacture of the object and are not solely caused by use. Use-wear shows that cord, rope or sinew was wrapped around it. The exact use was not clear, but the lack of fastening holes indicates a hand-held tool.[181] A similar find from a Roman site at Utrecht was made of a horse metacarpal. Use-wear analysis showed that the metacarpal bone was first shaped with an axe by hollowing out a section just off-centre towards the distal end, and then finished further with a knife.
The hollow section shows a broad zone of use wear caused by plant fibres, probably rope.
The object is covered in a black residue, possibly tar.[182]

The use of the fulcra bone of a sturgeon as a tool is a subject of debate. Roes suggests it was used to eat crustaceans, but other researchers deny the use as a tool.[183] However, Struckmeyer did observe manufacturing traces and this proves that these bones were modified for use. For what purpose the bones were used could not be established.[184]

5.2.9 Spindles and spindle whorls

Spinning dates back to Prehistory. Evidence for the use of a hand spindle dates from the Iron Age onwards. The implement that was used consists of two parts, the spindle itself and a spindle whorl. The spindle is a long rod with a light swelling or notch. The spindle whorl was fitted onto the spindle.[185] Most spindles were made of wood, because a considerable length is required. Double-pointed bone rods are often labelled as spindles, but they can have multiple functions. Only long double-pointed rods with a circular cross-section could be used as such. Other single or double-sided rods may have been used as for example a pin beater, or they may have had multiple uses (see Section 5.2.11). Greep described several Roman types, one of which is often interpreted by other authors as a stylus.[186] Objects from this type come from Vechten and Velsen, and these have also been interpreted as styli (see Section 5.8.1).[187]

A spindle whorl is discoid or hemispherical in shape and could be made of various materials, such as fired clay, bone or antler. In early medieval contexts they are quite numerous. In the Late Medieval period the spinning wheel was in use. Spinning with a hand spindle was not completely replaced, but spindle whorls are far less numerous from this period. Different types of osseous objects have been described as

174 Rijkelijkhuizen 2004.
175 Rijkelijkhuizen 2004.
176 MacGregor 1985, 193.
177 Large nets: for example Van der Pal 1988.
178 Roes 1963.
179 Roes 1963, 37, Plate XXXVIII, 1-6; Miedema 1990, 166.
180 Roes 1963, Plate XXXVIII; Miedema 1983, 256; 1999/2000, 322, Fig. 161.
181 Struckmeyer 2011, 51-54.
182 Van Dijk, Rijkelijkhuizen & Verbaas, 2016.
183 Roes 1963, 38.
184 Struckmeyer 2011, 62.
185 Greep 1983a, 145-152.
186 Greep 1983a, 145-152.
187 Bosman 1997, 45, Collection RMO.

spindle whorls, but their use is debatable. Examples made of the articular ends of large mammals' bones, usually cattle femora or humerus heads, have been found in the Netherlands in contexts ranging in date from the Iron Age to the Early Medieval period.[188] These objects are also being identified as '*oesdop*', part of horse gear.[189] However, when '*oesdoppen*' were introduced is unknown. Furthermore, Bronze Age examples have been interpreted as dress fasteners or ornamental elements.[190] Use-wear analysis on an object from Oegstgeest made of a femur head showed traces that coincided with those on an experimental '*oesdop*'.[191] However, this does not refute Becker's hypothesis. Another hemispherical object from Oegstgeest, made of the compacta of a large mammal's bone, did show use-wear traces from a use as a spindle whorl.[192] This means that femur heads were used for the manufacture of objects with several functions.

A second category of objects which have been labelled spindle whorls are discoid composite objects made of bone or antler. These are known only from the terp area.[193] However, their function is questionable and they may have been too light to be used as spindle whorls. This also applies to smaller bone discoid objects, made of a cow's mandible with central hole.[194] However, alternative functions are conceivable, and further research is necessary. Finds from terp sites are largely undated, but reliably dated bone composite examples from the terp site Ezinge and from an excavated a workshop at Tolweg-Zuid/Kinkhorsterweg also revealed a late medieval date.[195]

Early medieval spindle whorls are usually made of the burr of an antler. The burr provides a solid raw material with few spongiosa.[196] Early medieval examples are decorated with geometrical patterns of ring-and-dot motifs, lines, and circular lines. However, one example from Oegstgeest shows traces of use as '*oesdop*';[197] other use-wear studies are unknown. These objects are widespread across north-western Europe.[198] Antler spindle whorls are occasionally found in (women's) graves.[199]

5.2.10 Weaving swords

In the Roman and Early Medieval period, weaving was done on a vertical warp-weighted loom. These were made of wood and therefore usually left no traces in the soil. However, some bone or antler implements are associated with weaving. A weaving sword was used to beat down (a large part of) the weft by inserting it horizontally into the warp shed.[200] Possibly this use was combined with a function as shed-rod. It is possible that the origin of the weaving sword goes back to the Bronze Age, but examples are only known from the Early Medieval period. Most weaving swords were probably made of wood, which explains the few examples that survived.[201] A few wooden examples are known from the Early and Late Medieval period.[202] Iron examples have also been discovered.[203] Iconographical sources of wooden weaving swords are also present from the Late Medieval period. When looking at skeletal materials, only whale bone provides a large enough size to make such an object, but whale bone was not widely available. Whale bone weaving swords are more common in Scandinavia; only a few have been found in the rest of north-western Europe.[204] A few examples are known from the Dutch northern coastal area from Stiens, Leens and Rottum, all dating to the Early Medieval period.[205] Two of these have been identified as to species by using the ZooMS technique. One turned out to have been made of bone of the North Atlantic right whale, and the other from a bone of a grey whale.[206] A possible weaving sword from Rasquert has runic inscriptions.[207]

5.2.11 Single and double-pointed rods

A weaving sword may have been combined with a pin beater.[208] A pin beater is an implement to beat down the weft. According to MacGregor a pin beater was inserted between the individual warp threads to beat down one at a time.[209] This would explain the different grades of use wear sometimes observed along the length of the rod.[210] Single and double-pointed rods probably served as such implements, but they

188 Clason & Prummel 1982, 77-78; Miedema 1983, 235; 1990, 166; MacGregor 1985, 187.
189 Schoenmaker 1983; Van Vilsteren 1987.
190 Becker 2005.
191 Kromotaroeno 2015.
192 Kromotaroeno 2015.
193 Prummel, Manuel & Post 2014; Roes 1963; Miedema 1983, 235.
194 Roes 1963; MacGregor 1985, 187.
195 Prummel *et al.* 1999; Prummel, Manuel & Post 2014, 219.
196 Rijkelijkhuizen 2008a, 46.
197 Kromotaroeno 2015.
198 In the Netherlands for example: Dijkman & Ervynck 1998; Lauwerier 1995; Lauwerier & Van Heeringen 1995; Miedema 1983, 235; 1990, 166; 1999/2000, 320; Roes 1963, 1965; Van Vilsteren 1987; Willemsen 2009, 43.
199 Rijkelijkhuizen 2021c; Cuijpers *et al.* 1999, 309-310; Knol *et al.* 1995/1996, 335.
200 MacGregor 1985.
201 MacGregor 1985, 188.
202 Lange 2017; Aalsum: Rijkscommissie voor de Monumentenzorg 1930, 256.
203 MacGregor 1985, 188; Lange 2017.
204 MacGregor 1985, 188.
205 Collection Fries Museum; collection Groninger Museum; Boeles 1927; Van Vilsteren 1987, 64; Van den Hurk *et al.* 2018, 2020.
206 Van den Hurk *et al.* 2018, 2020.
207 Looijenga 1997.
208 MacGregor 1985, 188.
209 MacGregor 1985, 188.
210 Rijkelijkhuizen 2003.

may also have been used for several other activities.

Single-pointed rods from the Roman period which have been interpreted as pin beaters have been found at Valkenburg, Tiel-Passewaaij and Maastricht.[211] Single-pointed rods are also known from the Early Medieval period,[212] when they are far less numerous than double-pointed rods. No use-wear analysis has been carried out on single-pointed rods.

The double-pointed rod was a multi-purpose tool which was ubiquitous in the Early Medieval period.[213] Although Roman-period finds occur elsewhere,[214] not many rods from this period are known in the Netherlands. Only one example comes from a Roman context at Dorestad.[215] Variations in shape, size and decoration do occur. Double-pointed rods are usually made of bones of large mammals, but occasionally wooden examples have also survived and these were probably more abundant. One rod from Wijnaldum, interpreted as a pin beater, was made of a whale jawbone.[216]

Some of the double-pointed rods show intensive use wear which indicates that these were frequently used for a long period of time. Intensive use wear on some of the double-pointed rods also points into the direction of a pin beater.[217] Besides the use as a pin beater many other interpretations have been mentioned. A function as spindle was rejected because the rods are sometimes oval in cross-section and are too short to hold the wool.[218] However, some of the double-pointed rods are quite long and circular in cross-section, and so may be used as a spindle.[219] Roes mentioned an alternative function as a shed-rod for belt looming.[220] Another alternative function is a fishing hook or gorge.[221] However, fishing gorges have an indentation or groove in the middle.[222] Use-wear analysis on some of these rods from Oegstgeest indicate that double-pointed rods may have been used in wool processing, plant processing, or possibly for puncturing skins or hides.[223] This indicates that the double-pointed rods were multi-purpose tools and may have been used in different activities.

5.2.12 Weaving tablets

Weaving tablets (Fig. 5.6) were used in multiple numbers to weave narrow bands. By turning the weaving tablets a pattern could be created. Iron Age cloth fragments from several sites in Europe were made by tablet weaving,[224] but the first archaeological evidence of weaving tablets comes from the Roman period. They are less common in the Early Medieval period, according to MacGregor.[225] Weaving tablets are flat and relatively small and could be made of several materials, including wood, metal, leather and osseous and keratinous materials. The shape could be triangular, round, square or hexagonal. Weaving tablets occur across a large area in north-western Europe.[226] Finds from the Netherlands are not numerous, and it is likely that most weaving tablets were made of more perishable materials such as wood, explaining why finds are few. The Dutch weaving tablets have been dated to the Roman or Early Medieval period.[227]

Fig. 5.6 Weaving tablet (Ferwerd, diameter 3.5 cm, inv. 145-164). Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap.

5.2.13 Three-pronged tools

Three-pronged tools are mostly made of cattle metatarsal and metacarpal bones, but also long bones of horse or deer were used. Part of the diaphysis was sawn off and on one side usually three pronges were made, close together, on the posterior side of the bone. Occasionally two pronges were present. The anterior side of the bone can be decorated. Three-pronged tools

211 Valkenburg: Verhagen 1993, 357-359. Tiel-Passewaaij: Groot 2006. Maastricht: Dijkman & Ervynck 1998, 46, 74.
212 Rijkelijkhuizen 2023d; Van Engeldorp-Gastelaars 2018; Dijkman & Ervynck 1998, 46, 74.
213 Dutch finds for example: Prummel, Manuel & Post 2014, 218; Nieuwhof 2020, 28, 156; Roes 1965, RMO, Dorestad collection; Roes 1963, collection Fries Museum; Miedema 1983, 233-234; 1990, 165; Dijkman & Ervynck 1998; Van Engeldorp-Gastelaars 2018, 73-74.
214 Greep 1983a, 164-165; MacGregor 1985, 189.
215 Thach & Lauwerier 2010; Lauwerier & Thach 2021, 266.
216 Prummel, Halici & Verbaas 2011.
217 Rijkelijkhuizen 2003.
218 Roes 1963, 33.
219 For example Dijkman & Ervynck 1998, 46, 74.
220 Roes 1963.
221 Miedema 1983, 233-234; 1990, 165-166; 1999/2000, 320.
222 Riddler 2006.
223 Kromotaroeno 2015.
224 Banck-Burgess & Ræder Knudsen 1999; Ræder Knudsen & Mannering 2007; Ræder Knudsen & Grömer 2012.
225 MacGregor 1985, 191.
226 Greep 1983a, 178-181; MacGregor 1985, 191; MacGregor, Mainman & Rogers 1999; Jung 2013, 96; Deschler-Erb 1998, 137-138, Tafel 17.
227 Dijkman & Ervynck 1998; collection Gallo-Romeins Museum Tongeren; Van Vilsteren 1987, 64; Verhoeven 2016; Boeles 1927; Roes 1963; collection Fries Museum; Willemsen 2009, 43.

date from the ninth to twelfth centuries, and they have been found in mainly settlements contexts but also in a woman's grave in Germany.[228] Their function is still widely debated.[229] Use-wear analysis showed that these implements were used on wool or woollen textiles.[230] The exact function however remains a mystery. Van der Tuuk and Lauwerier have stated that these tools occur in settlements with a central economic function.[231] Three-pronged tools have also been found in convents.[232] The relatively large number of three-pronged tools from Zeeland is noteworthy, but these tools have also been found in other areas in the Netherlands, Belgium, Germany and France.[233]

5.2.14 Thread holders

At the Roman site of Valkenburg some sheep/goat metapodials have been found with a hole in the proximal articular end and with visible use wear on the diaphysis. These have been interpreted as thread holders.[234] The hole at the articular end was probably made in order to extract the marrow.[235] Although metapodial bones from sheep/goat with holes have also been found at early medieval sites, these do not always display a secondary use as thread holder.

5.3 Weaponry

5.3.1 Swords and daggers

Sword hilts consist of a handle, a pommel and a guard. Depending on design and the dimensions of the raw material these could be made of separate parts.

Roman sword handles are characterized by three ridges to accommodate the fingers to ensure a firm grip. Although wood was probably favoured for the manufacture of sword handles from the end of the Roman period, other raw materials are bone or ivory.[236] According to Roes only a few finds are known from terp sites of which one is made of ivory with a matching pommel also made of ivory.[237] Several more bone or ivory handles are in the collection of the Fries Museum (Fig. 5.7).[238] The general shape probably

Fig. 5.7 Sword handle (Hallum, length 9 cm, inv. 27A-12, Spiekhout, Nijdam & Van Dijk 2023). Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap.

continues into the Early Medieval period and a similarly shaped sword handle from Dorestad, made of an osseous material, is said to be of Carolingian date.[239]

A large single-piece hilt, probably made of ivory, was found in Rossum. The date of this piece is uncertain but it may date to the Roman period.[240] Greep suggest a first-century date for these single-piece hilts.[241]

Only a few separate guards (Fig. 5.8) are known from terp sites.[242] Different osseous materials may have been used,[243] but not all guards have been identified as to their raw material. Their chronology is also uncertain and the guards could date from the Roman to the Early Medieval period. Roman guards have been found in The Hague; one was identified as having been made of the cleithrum of a haddock.[244] Several types of guards can be recognized,[245] but the few finds from the Netherlands are usually flat oval types. One unusual guard has an exact parallel from Niederbieber.[246] Unfortunately, the precise context and date of this piece are unknown.[247]

A dagger found in a late Roman well at Dorestad has an antler handle and guard. A separate antler pommel was found at the same site.[248]

Fig. 5.8 Guard (Abenaldum, length 8.5 cm, inv. a 1931/2.66). Collection and image RMO.

228 Lauwerier & Van Heeringen 1995; Van Klaveren 1995; Lauwerier 1995, 1999; Van der Tuuk & Lauwerier 2014.
229 Van Vilsteren 1987; Van Klaveren 1995; Nieuwenburg-Bron & Van Vilsteren 2007; Van der Tuuk & Lauwerier 2014.
230 Siebelink & Verbaas 2012.
231 Van der Tuuk & Lauwerier 2014.
232 Van KLaveren 1995, 212; Rijkelijkhuizen 2023d.
233 Van Klaveren 1995; Esser, Rijkelijkhuizen & Beerenhout 2012; Rijkelijkhuizen 2023d.
234 Verhagen 1993, 347.
235 Bigelow 1993
236 Greep 1983a, 95-100; MacGregor 1985, 165-166; Lange 2017, 297; Gostenčnik 2005a, 199-201; Obmann 1997, 52-53, Tafel 1; Jung 2013, 108, Tafel 91; Crummy 1983, 134; Deschler-Erb 1998, 174, Tafel 40.
237 Roes 1963, 75, Plate LVIII.
238 Spiekhout, Nijdam & Van Dijk 2023.
239 Van Vilsteren 1987, 31.
240 Van Vilsteren 1987, 31-32.
241 Greep 1983a, 108.
242 Roes 1963, 75, Plate LVIII; Spiekhout, Nijdam & Van Dijk 2023; collection Fries Museum; collection RMO.
243 Bone, ivory and antler, for example, have been identified elsewhere: Greep 1983a, 101.
244 Carmiggelt, Laarman & Waasdorp 1998, 32; Waasdorp 1999, 50.
245 Greep 1983a, 101-105.
246 Illustrated in MacGregor 1985, 166.
247 Van Vilsteren 1987, 31.
248 Thach & Lauwerier 2010, 215-216; Lauwerier & Thach 2021, 270.

The lower part of a leather scabbard was usually protected by a metal, bone or ivory scabbard chape. Bone scabbard chapes occur in the late second and third centuries AD and several probable production places in north western Europe have been identified. Scabbard chapes are typically Roman military objects. Due to restrictions in thickness bone examples are made in two separate sections, one a rectangular, trapezoidal or round part with rimmed sides, and the other a flat back part (or chape slide) that was slid into place, resulting in a box-shaped object. Both parts were either riveted or glued together. Noticeable is a pair of opposed pelta-shaped holes or decoration which often occur on scabbard chapes. Comparable scabbard chapes also occur in bronze, but these are made in a single piece.[249]

In the Netherlands, bone scabbard chapes are known from Vechten, Voorburg, Aardenburg, Valkenburg, The Hague and Wijk bij Duurstede.[250] A different type, made in one piece, was found in Velsen (Fig. 5.9). The raw material of this single-piece scabbard chape has been wrongly identified as wood, bone or walrus ivory,[251] but it is in fact made of elephant ivory. An exact parallel was found at Xanten, Germany.[252]

Scabbard slides are part of sword scabbard fittings. A scabbard slide was attached to the scabbard to provide a suspension loop for the shoulder strap.[253] These could be made from metal, bone or ivory. Not many have been found in the Netherlands, although fragmentary objects may be difficult to identify. Metal examples come from The Hague and an osseous example from Stiens.[254]

Fig. 5.9 Ivory scabbard chape (Velsen, length 7 cm, inv. nr. 6026-06). Collection Provinciaal Depot voor Archeologie Noord-Holland. Image K. Zwaan, Huis van Hilde.

5.3.2 Composite bows

Composite bows from the Roman period were made of wood but had reinforced splints with incorporated nocks made of bone or antler. Antler was often used because of its suitable properties. Other reinforcements are strips of cattle horn or sinew. When a composite bow is unstrung its curve in the opposite direction of when it is strung, putting an enormous tension on the bow even before it is drawn.
The reinforcements protected the wooden core from breaking when the archer drew his bow.[255] Only a few osseous reinforcements, splints with incorporated nocks which were originally used in pairs, have been found in the Netherlands. All examples are coming from Roman military contexts. Five have been found at Velsen and one from Valkenburg and one from Utrecht.[256]

5.3.3 Leather belt mounts

At Velsen some small bone artefacts have been found that have been interpreted as possible mounts for a belt or other leather part of military equipment. The two objects are round with a planoconvex profile and a flat rectangular plate with a central nail hole.[257] However, belt mounts are usually made of metal.

Two antler irregular pyramidical objects from an early medieval grave from Oosterbeintum perhaps represent belt mounts. An iron attachment was still present on one of the objects. Perhaps the objects attached something to the belt, such as a knife sheath or pouch. Similar items in bronze were found in another grave at Oosterbeintum.[258]

5.4 Household items

5.4.1 Hinges

Small components of furniture were made of osseous materials and are occasionally excavated in Roman contexts. Since osseous raw materials are usually small, such furniture components

249 Greep 1983a, 109-118; MacGregor 1985, 163; Schallmayer 1996, 74; Obmann 1997, 54, Tafel 216; Jung 2013, 109, Tafel 92; Crummy 1983, 137-138; Deschler-Erb 1998, 176, Tafel 42-43.
250 Vechten: Van Vilsteren 1987, 32. Voorburg: Van Vilsteren 1987, 32. Aardenburg: collection Erfgoed Zeeland. Valkenburg: Verhagen 1993, 370. The Hague: Waasdorp 1999, 51-53. Wijk bij Duurstede: Thach & Lauwerier 2010; Lauwerier & Thach 2021, 269.
251 Vons 1972; collection Provinciaal Depot voor Archeologie Noord-Holland.
252 Jung 2013, 109, Tafel 92.
253 Greep 1983a, 119; MacGregor 1985, 163-164; Van Vilsteren 1987, 32; Obmann 1997, 53, Tafel 2; Jung 2013, 109, Tafel 92; Deschler-Erb 1998, 176, Tafel 42.
254 The Hague: Waasdorp 1999, 58. Stiens: Van Vilsteren 1987, 32; Collection Fries Museum.
255 Greep 1983a, 124-128; MacGregor 1985, 155-156; Schallmayer 1996, 74; Obmann 1997, 55, Tafel 218; Crummy 1983, 138; Vass 2014.
256 Velsen: Van Vilsteren 1987, 33; Bosman 1997, 45; collection RMO. Valkenburg: collection RMO; Glasbergen & Groenman-van Waateringe 1974, 42. Utrecht: Kalee & Isings 1980.
257 Collection RMO; Bosman 1997, 45.
258 Knol *et al*. 1995/1996, 335.

were also small, like hinges, bone cylinders with one or more lateral holes for the dowels. Several hinges could be combined depending on the size of the cabinet or casket. They were connected by a wooden plug, the dowel, inserted through the medullary cavity.[259] One half of the dowel would be connected to the casket and the other half to the door or lid. Hinges of this type are restricted to the Roman period and are made of cattle metapodials turned on a lathe. Dowels are lathe-turned from wood or compact bone tissue. Hinges are also relatively common in Roman contexts in north-western Europe.[260] A few have been found in the Netherlands in Roman settlements and grave contexts.[261] For example, a complete set of four bone hinges with bone dowels was found in a cremation grave at Gulpen,[262] and a bone dowel was found in The Hague.[263] Bone dowels are also known from Helshoven, Hopertingen, Belgium.[264] Bone hinges no longer occur in the Early Medieval period.

5.4.2 Furniture and casket mounts

Throughout north-western Europe fragments of furniture and casket mounts have been found in Roman age contexts.[265] Finds from this period from the Netherlands are rare and only a few fragments of Roman-period mounts have been found, mostly in cremation graves. Richly ornamented mounts are absent in the Netherlands. Some tentatively identified mount plates have been recovered from Valkenburg, where cremation grave contexts yielded some fragments. Noteworthy is a square flat object with five double ring-and-dot motives from a cremation grave interpreted by Verhagen as a mounting plate.[266] Similar finds come from cremation graves at Huissen and Haelen,[267] and from The Hague.[268] A similar, burnt example from Dorestad, however, is described as a gaming piece.[269] A flat triangular piece with ring-and-dot decoration from Cuijk has been interpreted as a possible clothing implement.[270] A possible mount piece or border comes from a cremation grave in Maasmechelen, Belgium.[271]

Fragments of mounts from the Early Medieval period are usually interpreted as casket mounts. Decorated (fragments of) casket mounts have been found in the terp area, in Maastricht and in Susteren, and several possible fragments come from Dorestad.[272] The Maastricht find comprises an almost complete set of casket mounts.

5.4.3 Spoons

Most Roman-period spoons are metal, like bronze or silver. Various shapes and sizes occur and their function is not always clear. Small spoons with narrow, elongated bowls could represent spatulas for cosmetics.[273] Roman bone spoons are fairly common in north-western Europe,[274] but in the Netherlands only a few have been found at Velsen.[275] A spoon-shaped object was found in Aardenburg.[276]

A spoon of osseous material was found in Dorestad while an early medieval antler example was excavated at the terp Wijnaldum-Tjitsma.[277] A frontal bone of a cattle foetus from the same terp which had been cut into an oval shape has also been interpreted as a spoon. Cattle foetal frontal bone is also known from two other terp finds. These enigmatic objects were carefully selected and cut into an oval shape, with a perforation in the middle. Their function is unknown.[278]

A few remarkably well-preserved collection of horn spoons comes from terp sites (Fig. 5.10). Although not all spoons can be precisely dated, some of them are probably early medieval.[279] Horn spoons may have been more widespread, but these are only preserved when the soil conditions are favourable.

Fig. 5.10 Horn spoon (Dokkum, length of fragment c. 11.5 cm, inv. 109-19). Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap.

259 Greep 1983a, 193-208; MacGregor 1985, 203; Schallmayer 1996, 72; Gostenčnik 2005a, 152-159.
260 MacGregor 1985, 202-205; Obmann 1997, 57-60, Tafel 7-12; Deschler-Erb 1998, 182-189; Béal & Rodet-Belarbi 2003, 74-76; Gostenčnik 2005a, 152-159; Jung 2013, 110.
261 Esser, Beerenhout & Rijkelijkhuizen 2009; Lauwerier 2020.
262 Van Vilsteren 1987, 70.
263 Waasdorp 1999, 159-160.
264 Roosens & Lux 1974; collection Gallo-Romeins museum Tongeren.
265 Greep 1983a, 211-234; Gostenčnik 2005a, 159-163.
266 Verhagen 1993, 399-400; see for mounting plates for example Gostenčnik 2005a, Tafel 31 and 32.
267 Rijkelijkhuizen 2006a; Rijkelijkhuizen 2017; Van der Feijst, Verniers & Blom 2017.
268 Waasdorp 1999, 167.
269 Collection RMO.
270 Lauwerier 1990.
271 Kootker & Rijkelijkhuizen 2012.
272 Terps: Roes 1963; collection Fries Museum; collection RMO. Maastricht: Dijkman & Ervynck 1998. Susteren: Rijkelijkhuizen 2023d. Dorestad: collection RMO; Esser, Beerenhout & Rijkelijkhuizen 2012.
273 Gostenčnik 2005a, 79.
274 Greep 1983a, 423-433; MacGregor 1985, 181; Gostenčnik 2005a, 78-89; Obmann 1997, 73-74, Tafel 34-35.
275 Van Vilsteren 1987, 45; Bosman 1997, 45; collection RMO.
276 Collection Erfgoed Zeeland.
277 Dorestad: collection RMO; Roes 1965. Wijnaldum-Tjitsma: Prummel, Halici & Verbaas 2011, 90.
278 Prummel & Hullegie 2016.
279 Collection RMO; collection Fries Museum; Van Vilsteren 1987, 45; Miedema 1990, 166; 1999/2000, 322.

Fig. 5.11 Possible sieve (Spannum, diameter 10 cm, inv. 65-21). Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap.

5.4.4 Sieves

The Wijnaldum-Tjitsma terp also produced an exceptional find of a possible sieve made of a cattle scapula. The scapula was rounded and holes were drilled into the complete surface.[280] A comparable object was found at Spannum (Fig. 5.11).

5.4.5 Scapula scoops

Scapula scoops are known from Prehistory until the Early Medieval period.[281] Their manufacture is relatively easy and scoops can be considered a homemade tool. Usually only the spina is removed of a sheep, goat or cattle scapula, and sometimes the edges are cut; although a few more elaborately worked or inscribed scoops have been found in England. Especially sheep or goat scapula are too fragile for heavy use and MacGregor suggests a domestic function for the more elaborately worked specimens, such as scooping flour or grain.[282]

Finds from the Netherlands are rare and only two examples from the Roman period are known, a cattle scapula scoop from Valkenburg and a cattle scapula from Bodegraven.[283] From the Medieval period no scapula scoops have been found in the Netherlands.

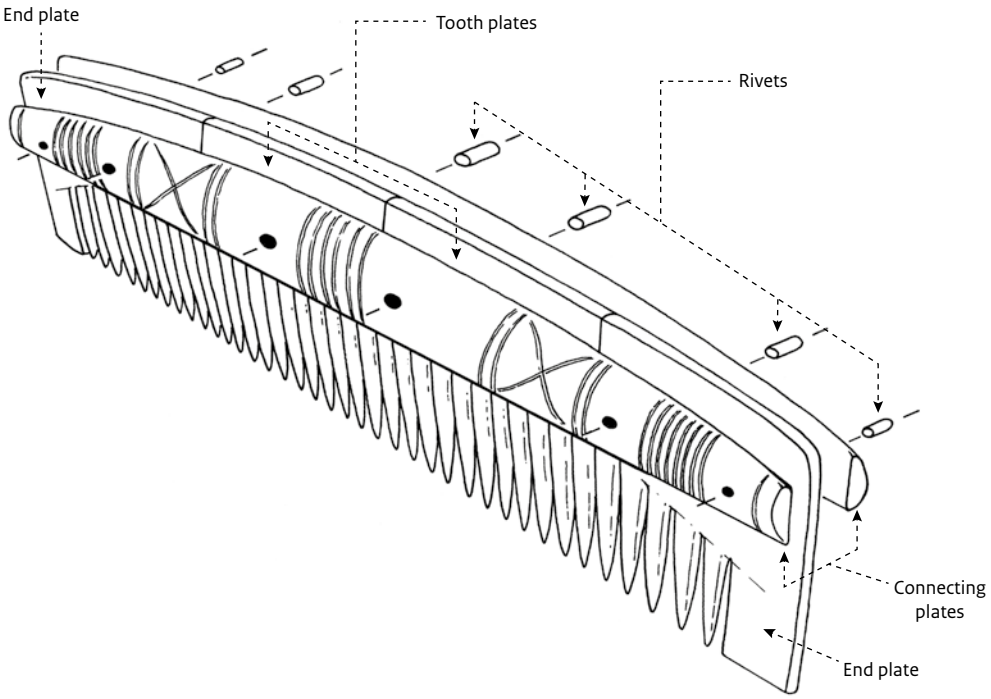


Fig. 5.12 The components of a composite comb. Drawing R. Timmermans.

280 Prummel, Halici & Verbaas 2011, 90.
281 MacGregor 1985, 179-180.
282 MacGregor 1985, 179-180.
283 Valkenburg: Verhagen 1993, 390-392. Bodegraven: Lauwerier, Wouda & De Groot 2005.

5.5 Personal hygiene

5.5.1 Combs

The large (digital) collection of the Fries Museum was used for a first attempt at a typology of combs found in the Netherlands, combined with the (digital) collection of the RMO and publications from key sites, such as Dorestad, Maastricht, Leiderdorp, Oost-Souburg, Deventer and Amsterdam.[284]

The overview is largely based on Ashby's typology but with the addition of local types or subtypes.[285] For example, Ashby Type 1b, barred combs, is common in the terp area and have been classified in this typology as different subtypes of existing types. Furthermore, other typologies were used for dating and comparisons. For example, Ambrosiani has described Scandinavian types while Carolingian straight combs were described by Tempel but are not included in Ashby's typology.[286]

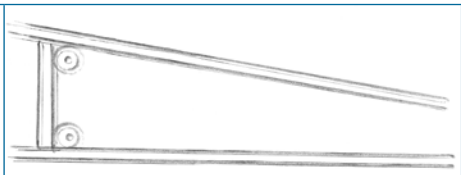
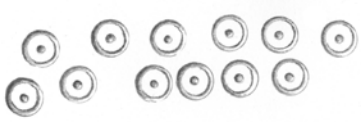
A highly detailed and reliably dated corpus of combs from Ipswich, mainly from the Middle Saxon period, was described by Riddler and provided references as regards decoration styles and chronology.[287]

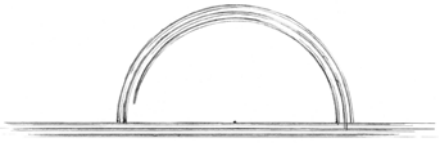
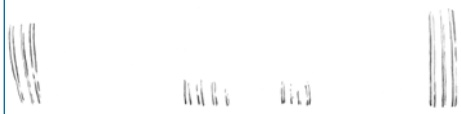
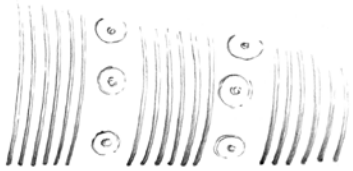
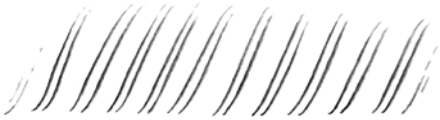
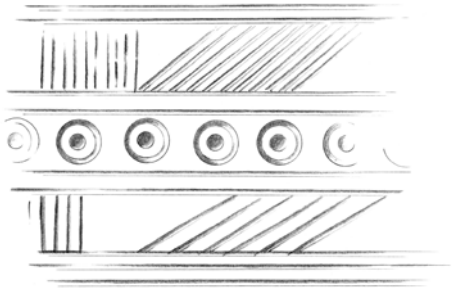
Two major combs classes can be distinguished, based on the manufacture method: one-piece combs and composite combs. Composite combs are made of several tooth plates held together by a pair of side plates or connecting plates (Fig. 5.12); these types survive well into the Late Medieval period. Their manufacture has been described elsewhere in detail and will not be discussed here.[288]

Composite combs can be broadly subdivided into subgroups, based on the placement of the teeth: single-sided, semi-double-sided and double-sided. Some types, such as handled combs, could be either single or double-sided. The classification of the various recognized types and subtypes is largely based on the profile and cross-section of the side plates, the shape of the endplates, and the decoration style (Table 5.1 and 5.2).

[284] Terp area: Roes 1963; Miedema 1983, 1990, 1999/2000; Knol 1993; Prummel, Halici & Verbaas 2011; Prummel, Manuel & Post 2014. Dorestad: Roes 1965; Rijkelijkhuizen 2012b; Esser, Beerenhout & Rijkelijkhuizen 2012. Maastricht: Dijkman & Ervynck 1998. Leiderdorp: Van Riel 2014; Verhoeven 2016. Oost-Souburg: Lauwerier 1995; Lauwerier & Van Heeringen 1995. Deventer: Rijkelijkhuizen 2011e, 2011f. Amsterdam: Rijkelijkhuizen 2004.
[285] Ashby 2011.
[286] Ambrosiani 1981; Tempel 1979.
[287] Riddler, Trzaska-Nartowski & Hatton 2023.
[288] Ambrosiani 1981; Galloway & Newcomer 1981; MacGregor & Currey 1983; MacGregor 1985.

Table 5.1 An overview of decoration types on combs. Drawings R. Timmermans.

Decoration type		
(Double or multiple) borderlines ('Rahmenornament')		
Dots		
Ring-and-dot motif		

Decoration type		
Double or multiple ring-and-dot motif		
(Double or multiple) (semi)circles		
(Double or multiple) longitudinal horizontal lines		
(Double, multiple or bundles of) short vertical lines		
(Double, multiple or bundles of) oblique lines		
Chevron: (double or multiple) zigzag lines		
Saltire: (double or multiple) diagonal cross		

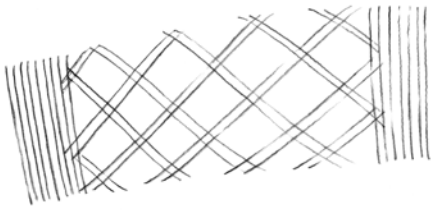
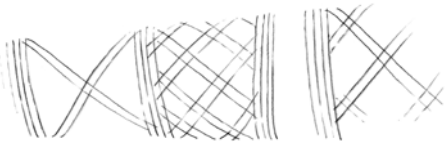
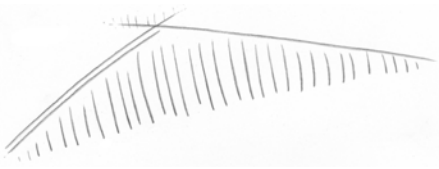
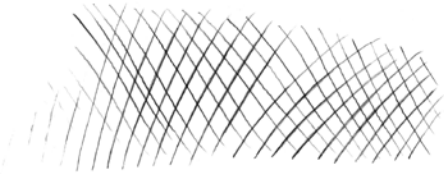
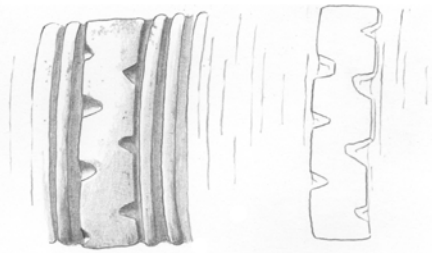
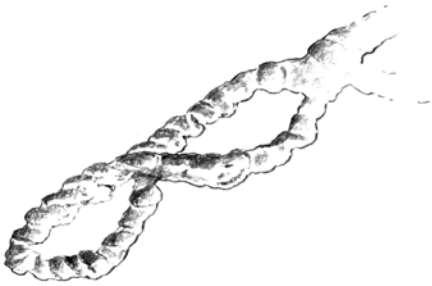
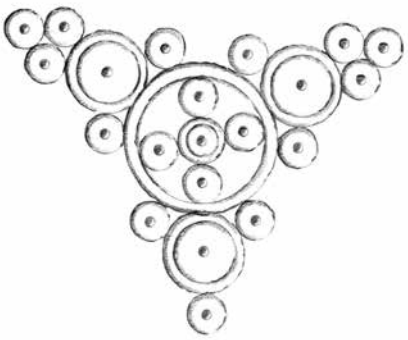
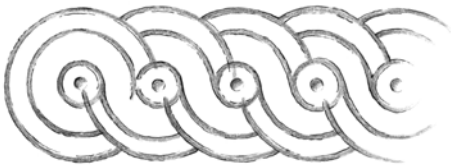
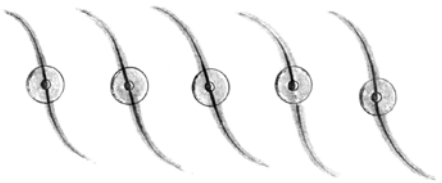
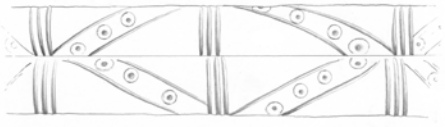
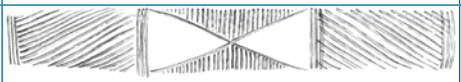
Decoration type		
Lattice: double or multiple crossed lines		
Herringbone		
Hatching: tightly packed vertical or diagonal lines		
Cross-hatching: crossing tightly packed lines		
Wolfszahnmuster		
Chiselled		

Table 5.2 An overview of patterns or designs on combs. Drawings R. Timmermans.

Pattern or design		
Clustered ring-and-dot motif		
Ring-and-dots in lemniscate pattern		
Ring-and-dots in T-pattern		
Interlaced ring-and-dot motif		
Interconnected (multiple) ring-and-dot motif. Variations occur		
		
Tiled (double) semicircles		

Pattern or design		
Geometrical		
Interlace design ('Flechtband')		
Panelled		
Infill ornament ('Rautenornamentik'): decoration patterns are partially infilled with vertical or oblique hatching or ring-and-dot motif		

5.5.2 A typology of Dutch combs

For a description of the late and post-medieval comb types see Section 6.5.2.

One-piece long-handled combs ('weaving combs')
Iron Age to Early Roman period (Fig. 5.13)
So-called weaving combs date to the Iron Age until the early Roman period.[289] Antler was the primary material for these combs. For a long time, these objects were commonly interpreted as wool working or weaving tools; the general consensus is that they were textile implements, and according to the most recent hypothesis they were used in making narrow bands or braids.[290] Coles, however, already suggested a function as a hair comb.[291] Use-wear analysis on one of the Dutch examples, however, shows wear resulting from the combing of human hair.[292] Use wear similar to that on composite combs was observed on a second weaving comb; no further use-wear analysis was conducted.[293]

Several types occur. There are combs with curved handles, straight handles or rounded butt handles, and double-sided combs. The combs come from the terp area, Nijmegen, Vlaardingen, Maasland, Ressen, Tiel and Houten.[294]

Various shapes and decoration styles occur in England, and decorations ring-and-dot motifs

a

b

Fig. 5.13 Iron Age/Early Roman one-piece long-handled combs.
(a. Hartwerd, length 19.5 cm, inv. 92-43, Roes 1963, Plate XXXIII, 1. Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap; b. Nijmegen Lent, length 12.6 cm, Rijkelijkhuizen 2019a). Collection Depot voor Bodemvondsten van de gemeente Nijmegen. Image M.J. Rijkelijkhuizen.

or interlaced ring-and-dots occur on finds from the British Isles.[295] Dutch examples are not so numerous and are often undecorated or sparsely decorated with for example vertical lines or saltires.

One-piece single-sided combs
Iron Age; first/second to fourth/fifth century AD (Fig. 5.14)
One-piece single-sided combs are uncommon in the Netherlands. These combs are made out of one piece of osseous material, often antler, and have a round back which can be decorated with ring-and-dot motifs and incised lines. The

289 Greep 1983a, 166-171.
290 Tuohy 1999.
291 Coles 1987, 105-106.
292 Rijkelijkhuizen & Verbaas 2016.
293 Rijkelijkhuizen 2019.
294 Tuohy 1992; Rijkelijkhuizen & Verbaas 2016, 735; Rijkelijkhuizen 2019; Roes 1963, collection Fries Museum; collection Het Valkhof; Van Vilsteren 1987; Groot & Van Haasteren 2017, 1145.
295 Greep 1983a, 166-171; Tuohy 1999.

Table 5.3 Dutch comb typology.

Comb class	Subgroup	General type	Comb type	Subtypes	Dating
One-piece	single-sided		one-piece long-handled combs	-	Iron Age-early Roman
			one-piece single-sided combs	-	Iron Age; 1st/2nd-4th/5th century AD
One-piece	double-sided		Roman double-sided one-piece combs	-	Roman period
Composite	double-sided		composite ornate double-sided combs	-	3rd/4th-5th century AD
			composite concave/convex double-sided combs	-	5th century AD
			composite Merovingian double-sided combs	-	late 5th-7th century AD
			composite double-sided combs	-	8th-10th century AD
Composite	single-sided	broad types	composite round-backed combs	barred, crested	2nd/3rd-5th century AD
			composite bell-shaped combs	-	3rd/4th-5th century AD
			composite triangular-backed combs	barred, crested	late 3rd/4th-5th/6th century AD
			composite barred zoomorphic combs	-	5th century AD
Composite	single-sided	elongated types	composite elongated round-backed combs	barred, winged	5th/6th-6th/7th century AD
			composite Merovingian plano-convex combs	barred, winged	late 5th-7th century AD
			composite Carolingian plano-convex combs	winged	7th/8th-9th century AD
			composite Scandinavian plano-convex combs	-	7th/8th-9th century AD
			composite Merovingian straight combs	-	6th-7th century AD
			composite Carolingian straight combs	-	7th/8th-9th century AD
			composite bowed combs	barred, winged, crested	7th-9th century AD
			composite coped combs	-	7th-early 9th century AD
Composite	single-/double-sided	asymmetrical types	composite handled combs	-	8th-11th century AD
Composite	single-sided	asymmetrical types	composite asymmetrical combs	-	7th-11th century AD
Composite	semi-double-sided	asymmetrical types	composite semi-double-sided combs	-	8th-9th century AD
Composite	single-sided	late types	composite short plano-convex combs	-	10th century AD
			composite irregular combs	winged, crested	10th-11th/12th century AD
			composite triangular/trapezoidal cross-section combs	winged, crested	10th-12th century AD
Composite	double-sided	late types	horn composite combs	-	9th/10th-12th century AD
			composite late medieval double-sided combs	-	12th -15th century AD
One-piece	single-sided		one-piece longbone combs	-	9th/11th-15th/16th century AD
One-piece	double-sided		one-piece double-sided trapezoidal combs	-	11th-14th century AD
			one-piece small double-sided combs	-	16th-18th century AD
			one-piece double-sided wooden combs	-	14th-17th century AD
			one-piece ornate double-sided combs	-	10th-15th century AD
			one-piece large double-sided ivory combs	-	late 14th - 15th century AD
			one-piece ivory lice combs	-	late 16th- early 19th century AD
One-piece	single-sided	-	one-piece elongated single-sided combs	-	postmedieval
			one-piece large ornamental combs	-	postmedieval

handle part is usually rather thick and tapers towards the teeth.[296] A north-east European or Scandinavian origin has been suggested. MacGregor describes these as 'Germanic' single-sided combs. He also distinguishes 'Germanic' miniature one-piece single-sided combs, often found in fifth-century graves in England. Some of them could be manufactured specifically as grave goods.[297] Others show intensive use-wear.[298] Some of the miniature combs from other contexts are interpreted as beard combs.[299] An example of a miniature comb, measuring 4.3 to 3.6 cm, was found at the terp Jousumburen.[300]

MacGregor dates the one-piece single-sided combs to between the first or second and the fourth century AD but also mentions the Iron Age comb from Ghegan Rock.[301] Although the Ghegan Rock comb differs from the four combs from Ezinge in shape and raw material the Ezinge specimens are also Iron Age in date. The Ezinge combs are made of horn and one is decorated with ring-and-dot motifs.[302] The date of a few other horn combs from the terp area is more uncertain.[303] All horn combs have a rounded back, but one example from Westerwijtwerd had open-work decoration.[304]

Whether the horn combs are all Iron Age is unknown, but the osseous examples are probably later. One antler one-piece single-sided comb was found in an early medieval cremation grave of a 2 to 4-year-old child at Hogebeintum. The comb's dimensions are 7.8 by 3.1 cm by a thickness of 0.9 cm. Other grave goods were a pig tooth amulet and two pyramidical amulets.[305]

These combs are sparsely decorated with ring-and-dot motifs, multiple ring-and-dot motifs, or (partial) border lines.

Roman double-sided one-piece combs
Roman period

The Romans mainly used boxwood for their combs. Double-sided boxwood combs have been found in military contexts in the Netherlands, as well as one example from the terp area.[306] A similarly shaped comb of osseous material with multiple ring-and-dot decoration also comes from the terp area.[307] These combs usually have a fine and a coarse side and are not regular finds in the Netherlands. Ivory examples have been found in the Mediterranean area.[308]

Fig. 5.14 One-piece single-sided combs (a. Hallum, height 4.3 cm, inv. 27AA-68; Roes 1963, Plate I, 5; b. Holwerd, length 9 cm, made of horn, inv. 30-87, Roes 1963, Plate I, 4; c. Hogebeintum, length 8 cm, inv. 28-339A; Knol 2019). Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap.

Composite ornate double-sided combs (Ashby Type 10)
Third/fourth to fifth century AD (Fig. 5.15)

Late Roman and early medieval composite double-sided combs comprise several types. They occur in large parts of north-western Europe except Scandinavia. Composite ornate double-sided combs date from the third or fourth to the fifth century AD. The main characteristics are the flat or shallow plano-convex cross-section of the connecting plates and the ornately finished endplates.[309] The rivets can be of copper-alloy.[310] Riveting is done in a double row (comparable to the composite round-backed combs, which are contemporaneous), or the rivets are alternating at the long sides. A single row of riveting also occurs. The teeth are often differentiated (fine on one side and coarse on the other side). In the Netherlands this type has been found in Maastricht and the terp area.[311]

Decoration: multiple ring-and-dot motifs, multiple border lines, multiple longitudinal horizontal lines; bundles of oblique lines, bundles of short vertical lines.

296 MacGregor 1985, 77.
297 MacGregor 1985, 78.
298 Trzaska-Nartowski & Riddler 2014.
299 MacGregor 1985, 78.
300 Roes 1963, Plate I, 5; collection Fries Museum.
301 MacGregor 1985, 77-78; Laidlay 1870.
302 Prummel, Manuel & Post 2014; Miedema 1983, 219-220; Van Vilsteren 1987.
303 Roes 1963, Plate I; collection Fries Museum; Miedema 1999/2000, 318; Struckmeyer 2011, 86.
304 Miedema 1999/2000, 318, Fig. 128.
305 Knol 2019, 173-174; Knol *et al.* 2019, 192; collection Fries museum.
306 Derks & Vos 2010; Roes 1963, 6, Plate I,1.
307 Roes 1963, 6, Plate I,2.
308 MacGregor 1985, 78.
309 Ashby 2011; Dijkman & Ervynck 1998, 68-69.
310 Dijkman & Ervynck 1998.
311 Maastricht: Dijkman & Ervynck 1998. Terp area: Roes 1963; collection Fries Museum; collection RMO. Hogebeintum: probably fifth century AD, Knol 2019, 173; Knol *et al.* 2019, 210-211.

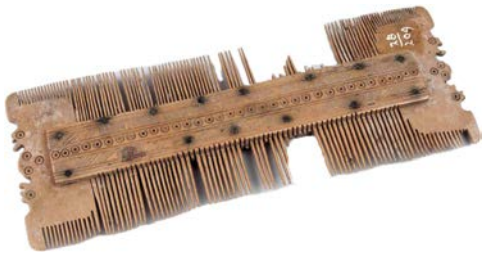


Fig. 5.15 Composite ornate double-sided comb (Hogebeintum; length 15.2 cm, inv. 28-209). Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap.

Composite concave or convex double-sided combs (Ashby type 10)
Fifth century AD (Fig. 5.16)
Combs with concave or convex curved endplates have a thick cross-section; the connecting plates can be plano-convex or trapezoidal in cross-section. The riveting on these combs can be in a single or double rows and the combs can have differentiated teeth (fine on one side, coarse on the other). Combs with concave or convex sides are probably later than ornate double-sided combs.[312] Double-sided combs with concave endplates from Spong Hill have been dated to the fifth century AD.[313] Combs of this type are known from Maastricht and terp area.[314]

Decoration: often undecorated, or longitudinal horizontal lines, bundles of short vertical lines, ring-and-dot motifs, multiple ring-and-dot motifs.

Composite Merovingian double-sided combs (in part Ashby Type 11 & 12)
Late fifth to seventh century (Fig. 5.17)
From the late fifth until the seventh century decorated or undecorated double-sided combs occur with straight endplates. The connecting plates are plano-convex in cross-section. The combs are often accompanied by comb cases which are more heavily decorated with geometrical designs. These geometrical designs show uniformity across much of north-western Europe.[315] Examples from the Netherlands have been found in Maastricht, the terp area, and Lent.[316]

Variations in size and length-width ratio occur, but does not seem to be a chronological feature and elongated types, often without

a

b

Fig. 5.16 Composite concave and convex double-sided combs (a. Hallum, length 12.6 cm, inv. 26-57; b. Finkum, length 9.5 cm, inv. 24B-63, Roes 1963, Plate XVI, 7). Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap.

a

b

Fig. 5.17 Contemporaneous composite Merovingian double-sided combs (Lent, Nijmegen, grave context, length a. *c.* 14 cm; b. *c.* 16 cm, Rijkelijkhuizen 2021c). Collection Depot voor Bodemvondsten van de gemeente Nijmegen. Image R. Mols, gemeente Nijmegen.

312 Dijkman & Ervynck 1998, 68-69.
313 Riddler & Trzaska-Nartowski 2013.
314 Miedema 1983, 222-223; Roes 1963; collection Fries Museum.
315 For example Lambert 1987, 204.
316 Maastricht: Dijkman & Ervynck 1998. Terp area: Roes 1963; Collection Fries Museum. Lent: Rijkelijkhuizen 2021c.

comb case and undecorated (Type 12 Ashby), have been found alongside shorter examples.[317] The teeth of both shorter and longer examples are often differentiated.

Decoration: longitudinal horizontal lines, herringbone, crosses, (double) semicircles, ring-and-dot motifs. Patterns: interconnected ring-and-dot motifs, panelled, infill ornament with ring-and-dot infill, geometrical.

Composite double-sided combs (in part Ashby Type 11 & 12)
Eighth to tenth century AD (Fig. 5.18)
Double-sided combs continue to the end of the Early Medieval period, but both reliably dated and later specimens are rare in the Netherlands. A ninth-century double-sided comb was found in Leiderdorp, and one tenth-century specimen is known from Deventer and another from Oost-Souburg.[318] Furthermore, terp sites have probably produced later specimens as well, but undecorated double-sided combs are difficult to date.

Decoration: often undecorated, or bundles of short vertical lines.

Fig. 5.18 Composite double-sided comb (Deventer, tenth century AD, length fragment *c.* 6 cm, Rijkelijkhuizen 2011e, 2011f). Collection Provinciaal Depot voor Bodemvondsten Overijssel. Image M.J. Rijkelijkhuizen.

Composite round-backed combs (Ashby Type 1a)
Second/third to fifth century AD (Fig. 5.19)
Round-backed combs (and triangular-backed combs, see below) are among the earliest examples of composite combs in north-western Europe. Both types have a broad handle, similar to the one-piece single sided combs. Round-backed combs have a high round back (usually

Fig. 5.19 Composite round-backed combs (a. Hallum, length *c.* 10 cm, inv. 26-60; b. Ferwerd, length *c.* 8 cm, inv. 101-680; c. Ferwerd, length *c.* 13 cm, inv. 101-942, Roes 1963, Plate IV, 2). Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap.

lower than the bell-shaped combs, with the exception of a specimen in Roes, Fig. V, 1; described by Miedema as a comb with a semi-circular back with rivets along the edges).[319] The height-width ratio varies. The handles usually become thicker towards the end, and a filling strip may be present between the two connecting plates.[320] Round-backed combs seem to be earlier than triangular-backed combs and probably appear around the second or third century AD and continue until the fifth century AD,[321] but many Dutch round-backed combs lack a precise date.[322] A few dated round-backed combs come from Ezinge, one which dates to the second or third century AD and two others to the fourth or fifth century AD.[323] A fifth-century round-backed comb was found in an inhumation grave at Hogebeintum.[324] A few round-backed combs show a chiselled decoration; for example a small zigzag pattern, a swastika pattern or

317 Rijkelijkhuizen 2021c.
318 Leiderdorp: Van Riel 2014; Verhoeven 2016. Deventer: Rijkelijkhuizen 2011e, 2011f. Oost-Souburg: Lauwerier 1995; Lauwerier & Van Heeringen 1995.
319 Miedema 1989, 220-221.
320 Roes 1963, 7; Miedema 1983, 220.
321 Miedema 1989, 220-221; Struckmeyer 2011, 87; Ashby 2011.
322 Miedema 1983, 221-222; 1990, 165 (in both described as triangular combs); MacGregor 1985, 83; Dijkman & Ervynck 1998, 68; Roes 1963, 7-12.
323 Prummel, Manuel & Post 2014, 215, Nieuwhof 2020, 129; Miedema 1983, 221-222, Fig. 168, 1,3; 1990, 165 (in both described as triangular combs).
324 Knol 2019, 170, 173; Knol *et al*. 2019, 221.

irregular semicircles or triangles.[325] According to Roes this was an old technique.[326]

A few rare subtypes can be distinguished: round-backed barred combs and round-backed crested combs.[327]

Decoration: chiselled, (multiple) border lines, single or multiple ring-and-dot motifs, saltires. Patterns: interconnected (multiple) ring-and-dot motifs.

Composite bell-shaped combs (Ashby Type 1a)
Third/fourth to fifth century AD (Fig. 5.20)
High round-backed combs are probably earlier than combs with bell-shaped connecting plates, and the date of the latter probably coincides with that of the triangular combs, between the third/fourth and fifth century AD. Bell-shaped combs usually have flaring endplates while high round-backed combs can also have widened or flaring endplates. In eastern Europe, bell-shaped combs occur in several other types.[328]

Decoration: multiple border lines, single or multiple ring-and-dot motifs. Patterns: clustered ring-and-dot motifs.

Composite triangular-backed combs (Ashby Type 1a)
Late third/fourth to fifth/early sixth century AD (Fig. 5.21)
Triangular-backed combs have connecting plates that are triangular in shape and are widespread throughout north-western Europe.[329]
These combs are also abundant in the terp area, but only a few can be dated.[330]

Triangular-backed combs from north-western Europe date from the end of the third or the beginning of the fourth century to the fifth and perhaps into the early sixth century AD.
Finds from Maastricht date from the second half of the fourth to the first half of the fifth century.[331] A few dated examples from terp sites probably date to the late fifth or early sixth century. A triangular-backed comb from Ezinge dates to the fourth or fifth century AD.[332] From an inhumation burial at Oosterbeintum comes a triangular-backed comb which probably dates to the late fifth or early sixth century AD.[333]
A triangular comb from Englum probably dates to the late fifth century AD.[334]

Bohme divides triangular-backed combs into Type A and B based on their decoration. Type A is decorated with ring-and-dot motifs, type B with geometric patterns. According to

Fig. 5.20 Composite bell-shaped combs (a. Ferwerd, length 9.5 cm, inv. 101-140, Roes 1963, Plate X, 5; b. Ferwerd, length *c.* 10.8 cm, inv. 101BIS-1511, Roes 1963, Plate XI, 6,7). Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap.

Fig. 5.21 Composite triangular-backed combs (a. Hallum, length *c.* 12.8 cm, inv. 27AA-64; b. Hallum, length *c.* 10.6 cm, inv. 27A-161, Roes 1963, Plate IX, 3). Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap.

325 Roes 1965, Plate II-III.
326 Roes 1963, 8.
327 Roes 1965, Plate IV-2 and V-4.
328 Cnotliwy 2010; Petković 1995, 2006; Tica 2018; Masek 2016.
329 Böhme 1974; Ashby 2011.
330 Roes 1963; collection Fries Museum; Miedema 1983, 221; Miedema 1999/2000, 318.
331 Dijkman & Ervynck 1998, 67-68.
332 Prummel, Manuel & Post 2014, 218.
333 Knol *et al*. 1995/1996, 334.
334 Prummel 2008a, 149-150.

Fig. 5.22 Composite triangular comb with zoomorphic tooth plates (terp area, length 8.6 cm, inv. 2016-413). Collection and image Fries Museum, Leeuwarden.

Fig. 5.23 Barred zoomorphic comb (Hogebeintum, 450-500 AD, inv. 28-375A, Roes 1963, Plate XII, 4, 5, Knol 2019, 172, Knol *et al*. 2019, 195). Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap.

Bohme the ring-and-dot decoration dates to the first half of the fourth century (type A) and the geometrical design to the second half of the fourth century (type B). The large corpus of undated finds from the Netherlands cannot confirm that.

The teeth of triangular-backed combs with more upwards swaying endplates become progressively shorter to the sides (Bohme Type C). Crested triangular-backed combs (Bohme Type D) can also have swaying endplates and gradually diminishing teeth. The protruding endplates can be plain, perforated, dentated or a combination of both. Bohme Type E is a broad group of combs featuring animal heads (Fig. 5.22). This type is also widespread in Europe.[335]

Subtypes: Composite barred triangular-backed combs (rare); composite crested triangular-backed combs.

Decoration: border lines, multiple border lines, single or multiple ring-and-dot motifs. Patterns: interconnected (multiple) ring-and-dot motifs, clustered ring-and-dot motifs, tiled single and double semicircles.

Composite barred zoomorphic combs
Fifth century AD (Fig. 5.23)

Roughly triangular, barred zoomorphic combs may have evolved from the triangular-backed type. In the older literature barred zoomorphic combs were referred to as 'Frisian' combs, but this name was already refuted in the 80s by the number of combs found in England, for example at Spong Hill.[336] Most English finds date to the fifth century.[337]

Barred zoomorphic combs are quite common in the terp area.[338] The few dated examples also point towards a fifth-century date. A comb from Hogebeintum was found in an inhumation grave together with other grave finds including a fifth-century fibula.[339] Another terp find, from Kantens, also dates to the fifth century AD.[340] These combs usually have a single flat side plate on one face and two somewhat thicker side plates on the other, thus three side plates in total. Based on the decoration, the barred side is the display side. Teeth are diminishing in length towards the end, and each of the two top corners features a zoomorphic head. At the centre of the back is a rounded grip, often in the shape of two additional zoomorphic heads. This is a variation within this type, not a separate subtype. Corresponding comb cases are manufactured in the same manner with one flat side plate at the back and two or three bars at the front. Comb cases can also have zoomorphic heads at both ends.

Decoration on the combs and comb cases: multiple border lines (especially the singular back connecting plate), single or multiple ring-and-dot motifs, clusters of short vertical lines (alternating on the double or triple bars), oblique lines. Patterns: interconnected ring-and-dot motifs, panelled.

Composite elongated round-backed combs
Fifth/sixth to sixth/seventh century AD
(Fig. 5.24)

Elongated round-backed combs probably evolved out of broad comb types. Elongated broad comb types have wide plano-convex connecting plates fastened by a double row of rivets along the edges, similar to round-backed combs. Occasionally the rivets are not placed along the edges in a straight line but alternatingly closer and further away. The endplates can widen at the lower ends and are occasionally winged. Elongated round-

335 Böhme 1974; Petković 1995; 2006.
336 Riddler & Trzaska-Nartowski 2013.
337 MacGregor 1985, 85; Riddler & Trzaska-Nartowski 2013.
338 Roes 1963; collection Fries Museum.
339 Knol 2019, 172; Knol *et al*. 2019, 195; Roes 1963, XII, 4, 5.
340 Düwel & Tempel 1970, 354-357.

Fig. 5.24 Composite elongated round-backed combs (a. Hogebeintum, length 10.2 cm, inv. 28-829, Roes 1963, Plate XVII, 2; b. Aalsum, length 18 cm, inv. 33-323, Roes 1963, Plate XX, 4; c. Ferwerd, length 23.6 cm, inv. 101BIS-1935). Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap.

backed combs are probably transitional towards plano-convex combs. Ambrosiani dates similar Scandinavian examples to the migration and Vendel periods and also considers them transitional.[341] However, no dated examples from the Netherlands are known. If it is indeed a transitional form between the round-backed and the plano-convex combs, a date around the fifth/sixth to seventh century AD is probable. In contrast to Ambrosiani's statement these transitional comb types and local types do occur in the terp area.[342] In fact, elongated round-backed and Merovingian plano-convex types are quite common in the terp area.

Rare subtypes: barred elongated round-backed combs and winged elongated round-backed combs.

Decoration: multiple border lines, single or multiple ring-and-dot motifs, double/multiple longitudinal horizontal lines. Patterns: interlaced ring-and-dot motifs, interconnected (multiple) ring-and-dot motifs.

Composite Merovingian plano-convex combs (Siegmund Ger. 3.11)
Late fifth to seventh century AD (Fig. 5.25 and 5.26)

Merovingian plano-convex combs have plano-convex connecting plates with flat or shallow plano-convex cross-sections; these combs can be seen as a development of the elongated round-backed type. No dated examples are known from the Netherlands, but their overall date is based on their decoration which is similar to that of the Merovingian straight combs (both Siegmund Type Ger. 3.11).[343] It is possible to distinguish between combs with little decoration and irregular double or multiple border lines, and combs with geometrical design; the latter occurs in a larger area in Europe. Some of the examples with irregular border lines can be small, with a length of *c.* 11 to 13 cm. Their small size could indicate the use of a different raw material, but this requires further study. The smaller examples are thus far known only from terp sites, and this could indicate a local variation.

Fig. 5.25 Composite Merovingian plano-convex combs (a. Leeuwarden, length 11 cm, inv. 15A-69; b. Oosterbeintum, length 10.5 cm, inv. 28BIS-185; c. Friesland, length 24.5 cm, inv. 87-97, Roes 1963, Plate XXIV, 3). Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap.

[341] Ambrosiani 1981, 21.
[342] Ambrosiani 1981, 34.
[343] Siegmund 1998.

Fig. 5.26 Composite Merovingian plano-convex comb (Loppersum, length 19.7 cm, inv. b 1931/2.44, Roes 1963, Plate XX, 1). Collection and image RMO.

Subtypes: winged Merovingian plano-convex combs (possibly later than those without wings); barred Merovingian plano-convex combs; barred winged Merovingian plano-convex combs.

Decoration: (irregular) double/multiple border lines, bundles of vertical stripes at the end of the connecting plates, oblique lines, herringbone on the second bar, dots, single or multiple ring-and-dot motifs. Patterns: interconnected ring-and-dot motifs, geometrical.

Composite Carolingian plano-convex combs Seventh/eighth to ninth century AD (Fig. 5.27)
Composite Carolingian plano-convex combs are the successors of Merovingian plano-convex combs, but with different decoration. However, the transition is not abrupt and some combs are hard to classify as one or the other type. Border line and ring-and-dot motifs are less common, and the decoration becomes more linear with lattice decoration and panelled decoration patterns. Carolingian plano-convex combs are known from the terp area and Leiderdorp.[344]

Subtype: winged Carolingian plano-convex combs.

Decoration: lattice, cross-hatching, saltires, bundles of short vertical lines, oblique lines, ring-and-dot motifs, *Wolfszahnmuster*. Pattern: panelled. Often features a display side.

a

b

c

Fig. 5.27 Composite Carolingian plano-convex combs (a. Hantum, length 18 cm, inv. 31-34; b. Hiaure, length 14.8 cm, inv. 32-37; c. Aalsum, length 12.8 cm, inv. 33-181). Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap.

Composite Scandinavian plano-convex combs (Ashby Type 5; Ambrosiani A-comb) Seventh/eighth to ninth century AD (Fig. 5.28)
This comb type originated in Scandinavia; it has been described in detail by Ambrosiani as 'A-comb'.[345] Ashby dates the type to the eighth to ninth century AD.[346] In Scandinavia the type continues well into the first half of the tenth century.[347] This comb type occurs throughout north-western Europe and further east. Many combs of this type have been found in Dorestad and at terp sites.[348] A few examples are known from Leiderdorp.[349]

Ambrosiani's typology identifies three subtypes of the A-comb based on the decoration of combs from Birka and Ribe.[350] A1, A2 and A3-combs all have a border line decoration. In addition, A1 combs may feature vertical lines,

a

b

c

Fig. 5.28 Composite Scandinavian plano-convex combs (a. Wetzens, length 21 cm, inv. 34B-233, Roes 1963, Plate XIX, 4; b. Ferwerd, length 16.8 cm, inv. 27C-60; c. Hogebeintum, length 14 cm, inv. 28764BIS). Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap.

344 Roes 1963; collection Fries Museum; Miedema 1983, Fig. 172.
345 Ambrosiani 1981.
346 Ashby 2011.
347 Ambrosiani 1981.
348 Dorestad: Rijkelijkhuizen 2012b; Esser, Beerenhout & Rijkelijkhuizen 2012; collection RMO. Terps: Roes 1963; collection Fries Museum.
349 Van Riel 2014; Verhoeven 2016.
350 Ambrosiani 1981.

A2 ring-and-dot motifs, and A3 '*Flechtband*' decoration. All these subtypes have been found in the Netherlands.

Analysis of the raw materials by means of ZooMS revealed many of these combs to have been made of reindeer antler.[351] Some of the specimens from the Netherlands have also been identified as reindeer antler, such as finds from Dorestad and Leiderdorp, both of which are A2 combs with a lemniscate pattern of ring-and-dot motifs.[352]

Decoration: border line, multiple border lines, ring-and-dot motifs; (clusters of) vertical lines. Patterns: ring-and-dots in lemniscate pattern, ring-and-dots in T-pattern, '*Flechtband*' pattern. Each side can be decorated differently.

Composite Merovingian straight combs (Siegmund Ger. 3.11)
Sixth to seventh century AD (Fig. 5.29 and 5.30)
Merovingian straight combs have straight endplates that are slightly longer than the connecting plates in order to fit inside a comb case. The chronology is somewhat uncertain but they definitely occur from the sixth and into the seventh century.

Merovingian straight combs are often plain but can have comb cases with elaborate geometrical decoration which is similar across a wide area. A small central extension is sometimes present at the back of the comb.[353] This central extension can also occur on bowed combs, suggesting a connection or at least a (partial) chronological overlap of the two types.[354] Irregular border line decoration was also present on some of the Merovingian straight combs.[355] As in the case of the Merovingian plano-convex combs, we can distinguish more simply decorated combs with irregular border lines, and more elaborately decorated combs which occur across a wider area in north-western Europe.

Merovingian straight combs are rare in the Netherland, where a few come from Merovingian graves. A single-sided comb from Maastricht, not reliably dated, has iron and copper-alloy rivets and a (partial) decoration of semicircles.[356] Four examples found in a cemetery in Lent date to the sixth century AD, three of them were found with comb case.[357] The combs' connecting plates were sparsely decorated, but the decoration on the comb cases was elaborate. Other Dutch examples

Fig. 5.29 Composite Merovingian straight combs (a. Ferwerd,comb case with runic inscription, length 14.5 cm, inv. 101-1337, Roes 1963, Plate XXXI, 1, Carmiggelt 2000, 47; b. Hogebeintum, length 11.8 cm, inv. 28-836, Roes 1963, Plate XVIII, 1). Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap.

Fig. 5.30 Composite Merovingian straight comb with comb case (Lent, Nijmegen, grave context, front and back, length *c.* 14 cm, Rijkelijkhuizen 2021c). Collection Depot voor Bodemvondsten van de gemeente Nijmegen. Image R. Mols, gemeente Nijmegen.

come from terp sites.[358]

Decoration: (irregular) multiple border lines, ring-and-dot motifs, semicircles, occasionally notches at the edge of the back of the comb.[359] Patterns: interconnected ring-and-dot motifs, panelled, geometrical.

Composite Carolingian straight combs (Tempel Elisenhof Gruppe B)
Seventh/eighth to ninth century AD (Fig. 5.31)
Carolingian straight combs have fairly narrow and straight connecting plates. The endplates extend beyond the connecting plates so that the combs fit into a comb case.[360] The chronology of this comb type is based on the Elisenhof finds which date to the eighth or ninth century, but the starting date is uncertain. Miedema suggest a date in the seventh to eighth century AD.[361]

[351] Ashby 2009; Luik *et al.* 2020; Von Holstein *et al.* 2014.
[352] Dorestad: Rijkelijkhuizen 2012b; Esser, Beerenhout & Rijkelijkhuizen 2012. Leiderdorp: Van Riel 2014; Verhoeven 2016.
[353] Rijkelijkhuizen 2021c; Petitjean 1995; Theune-Großkopf 1996, 87; Roes 1963, Plate XVIII; Riddler, Trzaska-Nartowski & Hatton 2023.
[354] Siegmund 1998.
[355] Roes 1963, Plate XVIII; Theune-Großkopf 1996, 90.
[356] Dijkman & Ervynck 1998, 70.
[357] Rijkelijkhuizen 2021c.
[358] Roes 1963; collection Fries Museum.
[359] Compare to Theune-Grosskopf 1996, 87, Fig. 5.
[360] Tempel 1979.
[361] Type 4.5.1.1.2.2.2; Miedema 1999/2000, 318-319.

Fig. 5.31 Composite Carolingian straight combs (a. Oostrum, length 11 cm, inv. 35B-113; b. Wijtgaard, length 14.5 cm, inv. 17A-48). Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap.

A straight comb with comb case from an inhumation grave from the cemetery at Ezinge-De Bouwerd dates to the seventh or eighth century AD.[362] A comb with comb case from Beers comes from a ninth-century female grave.[363]

This comb type probably derives from Merovingian straight combs, but the decoration moves towards a more linear style, often without border lines. This means a continuation of this comb type from the Merovingian to Carolingian period. However, the Carolingian straight comb seems to be mainly restricted to the terp area with some additional finds from Leiderdorp.

Decoration: lattice, oblique lines, hatching, bundles of short vertical lines at the edges of the connecting plates, bundles of short vertical lines along the back of the connecting plates, *Wolfszahnmuster*. Patterns: panelled, infill ornament. The type often features a display side, or each side is decorated differently.

Composite bowed combs (hogbacked; Ashby Type 2b)
Seventh to ninth century AD (Fig. 5.32)
The connecting plates of this comb type are curved and concavo-convex in profile. These combs can have large side-plates (wings). A large variety exists within this type, and the shape may vary from slightly to strongly curved. The starting date of this comb type is earlier than the Carolingian plano-convex type and lies in the seventh to ninth century AD.[364] The barred subtype is earlier and probably dates to the seventh century AD. The decoration of the barred types is transitional, which helps to date individual combs.

Composite bowed combs are spread

Fig. 5.32 Composite bowed combs (a. Leeuwarden, length 18.8 cm, inv. 14J-168, Roes 1963, Plate XXIII, 5; b. Aalsum, length 21 cm, inv. 33-475, Roes 1963, Plate XXIII, 4; c. Wijtgaard, length 16 cm, inv. 17A-45; d. Hallum, length 12.2 cm, inv. 1983-V-137). Collection and image a, b, c: Fries Museum, Leeuwarden - Koninklijk Fries Genootschap; Collection and image d: Fries Museum, Leeuwarden, Provincie Fryslân.

throughout north-western Europe but are absent in Scandinavia, except for Denmark. Dutch examples of this type are mainly known from the terp area, but combs with exceptionally large wings are uncommon.[365] A bowed winged comb with runic inscription was found in an inhumation grave at Hogebeintum.[366] Other sites are Oegstgeest and Leiderdorp.[367]

Crested combs have tooth plates which protrude above the side plates. The most common type has slightly bowed side plates and a plain crest. The date of this probable subtype is uncertain.

One comb pictured in Roes has two connecting plates on each side, but these do not follow the same curve, which leaves space between the connecting plates.[368] The area where the tooth plates are visible is decorated with holes and ring-and-dot motifs. This comb could be a subtype of the bowed combs, but little information is available and therefore more

362 Knol 2007, 84; Hijszeler 2007, 101; Miedema 1983, Fig. 171.5, 175.1-2.
363 Carmiggelt 2000, 51.
364 Ashby 2011; Riddler 2011.
365 Roes 1963; Miedema 1983, 226-227; 1999/2000, 319-320; Kramer & Prummel 1992-1998.
366 Düwel & Tempel 1970; Knol 2019, 173; Knol *et al*. 2019, 197-198; Looijenga 1997; collection Fries Museum.
367 Oegstgeest: Rijkelijkhuizen 2011a. Leiderdorp: Van Riel 2014; Verhoeven 2016.
368 Roes 1963, Plate XXIII, 2.

research is necessary. A few of these combs have been found for example in England.[369]

Subtypes: composite bowed combs, composite bowed winged combs, composite bowed crested combs and a rare subtype composite bowed barred combs.

Decoration: ring-and-dot motifs, (multiple) borderlines, bundles of short vertical lines, lattice, saltires, hatching, cross-hatching. Patterns: panelled, infill ornament. This comb type can feature a display side.

Composite coped combs (Ashby Type 2c)
Seventh to early ninth century AD (Fig. 5.33)
Combs of this type have a coped profile and connecting plates which are plano-convex in cross-section. Here only combs with a strong coped profile are classified as coped combs. Combs of this type have been found in the terp area.[370] Ashby dates combs with a more gently coped profile to the eighth and ninth centuries, but one of the strongly coped examples shows a riveting pattern along the edges and a decoration of interconnected ring-and-dot motifs, which seems to indicate an earlier date or another region of manufacture. Coped combs resemble combs from for example Pasym, which date from the seventh to the early ninth century AD.[371] An Eastern European origin can therefore be suggested. However, this comb type requires further study.

Decoration: multiple border lines, multiple ring-and-dot motifs. Pattern: interconnected ring-and-dot motifs.

a

b

Fig. 5.33 Composite coped combs (a. Ferwerd, length 15.3 cm, inv. 101-1038; b. Kubaard, length 15 cm, inv. 143-49, Roes 1963, Plate XVIII, 6). Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap.

Composite handled combs (Ashby Type 3)
Eighth to eleventh century AD (Fig. 5.34)
Composite handled combs occur in many variations and seems restricted to the Netherlands, Belgium, France and England. They date to the eighth to eleventh century.[372] Dutch sites include the terp area, Dorestad, Leiderdorp (ninth century) and at least two tenth-century examples from Oost-Souburg.[373] Most handled combs are made of antler, but bone handled combs also occur.[374] Many finds are known from England.[375]

Riddler distinguishes two different manufacturing techniques. The handled slotted comb is made of an antler tine in which a slot was made to fix the tooth plates. The second method is comparable to the manufacturing method of other composite combs (riveted). The comb consists of two side plates and several tooth plates.[376] Most if not all handled comb from the Netherlands have been made according the first method.

Two subtypes can be distinguished, handled combs with teeth on one side or on both sides: composite single-sided handled combs; composite double-sided handled combs.

Decoration: lattice, bundles of oblique or vertical lines, cross-hatching, saltires, ring-and-dot motifs, *Wolfszahnmuster*. Pattern: panelled. Decoration may vary on both sides.

Fig. 5.34 Composite handled comb (Ferwerd, length 11 cm, inv. 165-43, Roes 1963, Plate XXVIII, 3). Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap..

Composite asymmetrical combs (Ashby type 3)
Seventh to eleventh century AD (Fig. 5.35, 5.36 and 5.37)
Asymmetrical combs have been mainly found in north-western Europe, but only a few examples are known from Scandinavia and England. This type of comb has one endplate (largely) without teeth, which could serve as a handle.[377] Ashby dates both handled and asymmetrical combs to the eighth to eleventh century, but the Dutch examples are largely undated. Some seventh-century German examples are known, so a wider date range is proposed in this typology.[378]

This comb type can have straight or curved

369 MacGregor 1985, 86-87.
370 Roes 1963; Miedema 1983, Fig. 170, 1.
371 Wadyl 2018.
372 Riddler 1990, 1997; Ashby 2011.
373 Terp area: Roes 1963. Dorestad: Roes 1965; collection RMO. Leiderdorp: Van Riel 2014; Verhoeven 2016. Oost-Souburg: Lauwerier 1995; Lauwerier & Van Heeringen 1995.
374 Riddler 1990, 1997; Riddler, Trzaska-Nartowski & Hatton, 2023.
375 Riddler 1990, 1997.
376 Riddler 1990, 1997.
377 Ashby 2011.
378 Siegmund 1998, ger. 3.13; Aufleger 1996 and catalogue; Theune-Großkopf 1996, 89; Kind 2007, 376-377.

a

b

Fig. 5.35 Composite asymmetrical combs (a. Leeuwarden, length 9.9 cm, inv. 15A-24, Roes 1963, Plate XXIX, 5; b. Deventer, 800-925 AD, Rijkelijkhuizen 2011e, 2011f). Collection and image a: Fries Museum, Leeuwarden - Koninklijk Fries Genootschap. Collection b: Provinciaal Depot voor Bodemvondsten Overijssel. Image b: M.J. Rijkelijkhuizen.

Fig. 5.36 Composite asymmetrical comb (Aalsum, length 14 cm, inv. 33-7, Roes 1963, Plate XXIX, 3). Collection and image Fries Museum, Leeuwarden.

a

b

Fig. 5.37 Composite asymmetrical combs with curved connecting plates, subtype III (a. Wetzens, length 14.7 cm, inv. 34B-89; b. Jouswier, length 13.5 cm, inv. 34D-65, Roes 1963, Plate XXIX, 1). Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap.

connecting plates with a flat, plano-convex or trapezoidal cross-section (Fig. 5.35, 5.36 and 5.37). One of the endplates is rectangular without teeth but can have decoration. The other endplate often follows the curve of the connecting plates and does have teeth. One comb has an endplate with a somewhat triangular shape, but this seems to be an exception. The endplate without teeth of the combs with curved connecting plates can be (slightly) winged (Fig. 5.37).

There are clearly early and late examples, the earliest dating to the seventh or eighth century AD and the latest to the tenth or eleventh century AD.[379] Early examples cannot always be easily distinguished from later ones.[380] Sometimes the decoration helps to further date an individual comb, for example in the case of an interconnected ring-and-dot design (until the seventh or eighth century AD). Some of the tenth or eleventh-century examples from Deventer and Dorestad have a ring-and-dot design on the rectangular endplate.[381] A trapezoidal cross-section indicates a later date, contemporaneous with the combs with a triangular or trapezoidal cross-section.

Decoration: often (largely) undecorated, ring-and-dot motifs, bundles of short vertical lines, chevron, saltires, cross-hatching. Pattern: interconnected ring-and-dot motifs. Combs may feature a display side.

Composite semi-double-sided combs
Eighth to ninth century AD (Fig. 5.38 and 5.39)
The date of the semi-double-sided combs is uncertain, and so far few examples are known. The few dated examples suggest that this type occurs in the eighth and ninth century AD, but new finds may alter this chronology. Connecting plates can be curved or straight. Semi-double-sided combs have been found at terp sites, at Leiderdorp (ninth century AD), Valkenburg and Dorestad.[382] A semi-double-sided comb from Dorestad without any direct parallels dates to the eighth century.[383] The variation observed in these combs appears to be individual; their numbers are too small to be able to define subtypes. Sometimes both coarse and fine teeth are present.

Fig. 5.38 Composite semi-double-sided comb (Wetzens, length 21 cm, inv. 34B-231). Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap.

379 Rijkelijkhuizen 2011e, 2011f; Esser, Beerenhout & Rijkelijkhuizen 2012.
380 For example Lent, van Es & Hulst 1991, 136, 268; see also Theune-Großkopf 1996, 89.
381 Rijkelijkhuizen 2011e, 2011f; Esser, Beerenhout & Rijkelijkhuizen 2012.
382 Terp area: Roes 1963; collection Fries Museum. Leiderdorp: Van Riel 2014; Verhoeven 2016. Valkenburg: Van der Pal 1988, 1990. Dorestad: collection RMO.
383 Esser, Beerenhout & Rijkelijkhuizen 2012.

Fig. 5.39 Composite semi-double-sided comb (Dorestad, eighth century AD, length longer than 15 cm, inv. WD 07 2062i, Esser, Beerenhout & Rijkelijkhuizen 2012). Collection RMO. Image M.J. Rijkelijkhuizen.

Decoration: undecorated, or bundles of vertical lines, ring-and-dot motifs, cross-hatching, lattice, multiple border lines. Pattern: panelled. Some examples may feature a display side.

Composite short plano-convex combs (Ashby Type 6; Ambrosiani Type B)
Tenth century AD (Fig. 5.40)

Short plano-convex combs are widely distributed in north-western Europe. Ambrosiani's Type B falls within this category and dates to the tenth century.[384] An example was found in Deventer but other finds are unknown.[385] However, the comb from Deventer probably dates to the first half of the eleventh century.[386]

Decoration: bundles of vertical lines at the end of the connecting plates.

Fig. 5.40 Composite short plano-convex comb (Deventer, 1000-1050 AD, length 9.3 cm, Mittendorff 2005; Rijkelijkhuizen 2011e, 2011f). Collection Provinciaal Depot voor Bodemvondsten Overijssel. Image M.J. Rijkelijkhuizen .

Composite irregular combs (Ashby Type 7)
Tenth to eleventh/twelfth century AD (Fig. 5.41)

Ashby's Type 7 comprises combs with a planoconvex cross-section and a range of irregular profiles; these can be slightly curved or plano-convex, and the endplates can have small wings.[387] A combination of coarse and fine teeth is possible.[388] These combs resemble earlier comb types, and Ashby dates these combs to between the tenth and eleventh century.[389] A few tenth-century examples are known from Oost-

a

b

Fig. 5.41 Composite irregular combs (a. Lichtaard, length 14.3 cm, inv. 1983-V-209; b. Deventer 900-1100 AD, Rijkelijkhuizen 2011e, 2011f). Collection and image a: Fries Museum, Leeuwarden, provincie Fryslân. Collection b: Provinciaal Depot voor Bodemvondsten Overijssel. Image b: M.J. Rijkelijkhuizen.

Souburg, Deventer and Tiel.[390] However, the irregular comb type display much variation. The composite irregular comb type could be developed from the bowed combs, which can also be winged or crested.

Possible separate comb types or subtypes are in this typology assigned to the composite irregular comb type or group due to the low number of (securely dated) combs. Some undated combs from terp sites, for example, show similarities with eleventh or twelfth-century combs from Schleswig and are therefore assigned to this comb type/group as well. The date of this comb type/group should therefore be extended to the twelfth century AD. Noticeable are the crested combs with perforated crests, and combs with winged and shaped endplates which show similarities with the Schleswig combs (Fig. 5.41a).[391] The combs with perforated crests can have connecting plates with a flat or plano-convex cross-section, but can also with a trapezoidal cross-section and are therefore contemporary with the composite combs with triangular or trapezoidal cross-section.

Although the raw material of the combs could not be analysed in the context of the present study, bone was also used as a raw material in this and subsequent periods.[392]

Subtypes: composite winged irregular combs, composite crested irregular combs, composite winged crested irregular combs.

Decoration: undecorated, or chevron,

384 Ambrosiani 1981.
385 Rijkelijkhuizen 2011f.
386 Mittendorff 2005.
387 Ashby 2011.
388 See for example Lauwerier 1995; Lauwerier & Van Heeringen 1995; collection Fries Museum.
389 Ashby 2011.
390 Rijkelijkhuizen 2011e, 2011f; Oudhof, Verhoeven & Schuuring 2013, 17, 55.
391 Ulbricht 1984
392 Prummel *et al*. 1999; Rijkelijkhuizen 2011e, 2011f.

lattice, herringbone, ring-and-dot motifs, *Wolfszahnmuster*, (bundles of) short vertical lines, (bundles of) diagonal lines. This comb type could feature a display side.

Composite combs with triangular or trapezoidal cross-section (Ashby Type 8a and 8b)
Tenth to twelfth century AD (Fig. 5.42)
Ashby recognizes these as two subtypes. Type 8a has a triangular cross-section dated by Ashby mainly to the tenth and eleventh century.
Type 8b has a trapezoidal cross-section and also dates to the tenth to twelfth century AD. Ornamentation is often adapted to the shape of the connecting plates, and the endplates can have small wings. Combs with trapezoidal cross-section can be very long.[393] Both subtypes are here classified as one type, for the number of combs from this period are low. The only known examples of combs with a triangular of trapezoidal cross-section come from Deventer and the terp area.[394]

Combs of a few other comb types can also feature a trapezoidal cross-section which suggests a similar date as the combs with triangular or trapezoidal cross-section.
For example, some of the asymmetrical combs also have a trapezoidal cross-section, as well as the irregular combs with perforated crests which resemble combs from Schleswig.

Subtypes: composite winged combs with triangular or trapezoidal cross-section, composite crested combs with triangular or trapezoidal cross-section, composite winged crested combs with triangular or trapezoidal cross-section.

a

b

Fig. 5.42 Composite combs with trapezoidal and triangular cross-section (a. Deventer, 1000-1050 AD, length 24 cm, Mittendorff 2005; Rijkelijkhuizen 2011e, 2011f; b. Deventer, 900-1000 AD, length 15 cm, Rijkelijkhuizen 2011e, 2011f). Collection Provinciaal Depot voor Bodemvondsten Overijssel. Images M.J. Rijkelijkhuizen.

Decoration: undecorated, or border lines, longitudinal horizontal lines, bundles of short vertical lines at the edges of the connecting plates, ring-and-dot motifs.

Horn composite combs (riveted mounts; Ashby Type 4)
Ninth/tenth to twelfth century AD (Fig. 5.43)
Composite riveted mounts are made of a single piece of flattened horn plate with a bone or antler connecting plate on each side.
The connecting plates are often made of rib bone and the comb is usually double-sided, often with a coarse and a fine side. This type is abundant in England but it has also been found in great numbers in Ireland and France. It dates from the ninth century onwards, but most specimens dated to the tenth to twelfth century.[395] Only a few have been found in the Netherlands. In the case of one comb from Middelburg, part of the horn element had been preserved and the bone or antler connecting plates were decorated with a double zigzag line. The Middelburg comb dates between the tenth and the first half of the eleventh century. It is double-sided and has fine teeth on one side and coarse teeth on the other.[396] Sites in Vlaardingen and Rotterdam have each produced only one connecting plate. The context and date of the Vlaardingen connecting plate are uncertain but it was made of rib bone. The Rotterdam connecting plate is also rib bone and dates between the second half of the tenth and the eleventh century.[397]

Decoration: little or no decoration, double zigzag lines on the connecting plates.

Fig. 5.43 Horn composite comb (Middelburg, 900-1050 AD, length *c.* 15 cm). Collection and image Walcherse Archeologische Dienst.

5.5.3 Pyxides

Small boxes, or pyxides, from the Roman period, serving as containers for make-up, (medical) cream or perfume, were made of wood, metal or bone.[398] Bone pyxides usually consist of a short bone lathe-turned tube-shaped body with a

393 Ashby 2011.
394 Deventer: Rijkelijkhuizen 2011e, 2011f. Terp area: Roes 1963; collection Fries Museum.
395 Riddler, Trzaska-Nartowski & Soulat 2012; Ashby 2011.
396 Collection Walcherse Archeologische Dienst.
397 Esser, Rijkelijkhuizen & Beerenhout 2012.
398 Greep 1983a, 439-440; Gostenčnik 2005a, 122-130; Obmann 1997, 60-61; Jung 2013, 113-114, Tafel 100.

bottom and a lid. The lid could be a disc and a plug inserted in a central hole in the disc.

The discs and plugs are similar to those of other composite objects. They consist of two cylinders which were fixed together and closed on each side with a disc and terminal. The possible function of this object is a subject of debate and discussed elsewhere (Section 5.8.2). Discs and terminals without cylinders have also been found in graves.[399] However, if the cylinder(s) is/are missing the discs and terminals cannot be linked to a specific artefact. Parts of possible pyxides come from various cremation graves.[400]

A fragment of a Carolingian box, possibly for storing ointments or small items, was found at Wijnaldum.[401]

5.6 Personal adornment

5.6.1 Clothing and hair pins

Hair or clothing pins are common finds in Roman contexts throughout Europe. Roman hair or clothing pins were made of various materials such as metal and bone and were used to fasten the clothing or to keep the hair in place.[402] The interpretation as hair or clothing pin is based on the location of the pins in inhumation graves. Placement near the head suggests a function as hairpin, or a fastener for a hairnet or head scarf.[403] Most of these pins were undoubtedly used as hairpins, but pins have also been found near the shoulders or the feet of the deceased. These could indicate the fastening of clothing or a shroud.[404] Pins could also have been used to close the cloth in which the cremation remains were buried.[405] Most pins from the Netherlands have a conical, round or oval head and are made of bone.[406] These pins are functional items and less decorative. Pins with more elaborately designed heads are rare in the Netherlands. Only a few are known from Roman contexts, such as a pin with a pine-cone shaped head from The Hague, a pin from Valkenburg with an anthropomorphic decoration, and a pin from Nijmegen with a head shaped like a dog (Fig. 5.44).[407] A bone pin with a bronze dog-shaped head from a terp site is being interpreted on the museum website as a stylus.[408] Pins with dog-shaped heads are known from Germany.[409] The head of a pin from a grave context in Maasmechelen, Belgium, was decorated with oblique grooves.[410]

Early medieval hair or clothing pins differ from the Roman examples,[411] although Dutch specimens are difficult to date. Axe-headed pins from terp sites, for example, could date to either the late Roman or Early Medieval period (Fig. 5.45). The symbol of a double axe also appears on a metal fibula from The Hague which dates to the Roman period. English axe-headed pins are dated mainly to the fourth century AD.[412]

Other pins from terp sites are decorated with ring-and-dot motifs and often have a hole, possibly for a metal chain to link two pins together. However, Roes does not rule out a possible function as bodkin for some of the pins.[413]

So-called spatula-shaped pins mentioned by Roes have also been recorded by MacGregor, who describes them as expanded-head pins. Some examples are known from the terp area; their date is probably early medieval but this remains uncertain.[414] According to Roes these pins also exist in wood and were not used as hair or clothing pins. As an alternative Roes suggests

Fig. 5.44 Roman pin (Nijmegen, Length 9.5 cm, inv. e 1897/8.37). Collection and image RMO.

Fig. 5.45 Pin with an axe-shaped head (Friesland, length 11.3 cm, inv. 87-216). Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap.

399 Rijkelijkhuizen 2016.
400 Greep & Rijkelijkhuizen 2019; for a complete set of pyxides see Biró *et al.* 2012.
401 Prummel, Halici & Verbaas 2011, 88.
402 Greep 1983a, 313-369; MacGregor 1985, 113; Obmann 1997, 63-70, 19-28; MacGregor, Mainman & Rogers 1999; Béal & Rodet-Belarbi 2003, 58-61; Jung 2013, 74; Crummy 1983, 19-30; from England for example jet pins are known, see Greep 1983a and MacGregor 1985.
403 MacGregor 1985, 113; Bíró 2005, 199-200; Gostenčnik 2005a, 91; Vanvinckenroye 1984, 195.
404 Bíró 2005, 199; Mikler 1997, 50.
405 Mikler 1997, 50.
406 Types 1 and 3 of the typology of Crummy 1979; A2.1 and B1 from Greep 1983a, 325-326; MacGregor 1985, 113-122; Rijkelijkhuizen 2016; Esser, Beerenhout & Rijkelijkhuizen 2009.
407 The Hague: Waasdorp 1999, 109. Valkenburg: Verhagen 1993, 384-386. Nijmegen: collection RMO.
408 Collection RMO.
409 Greep 1983a, 366.
410 Kootker & Rijkelijkhuizen 2012.
411 See for example Schwarz-Mackensen 1976.
412 Greep 1983a, 366.
413 Roes 1963, 65.
414 Prummel, Manuel & Post 2014, 219; Roes 1963; collection Fries Museum.

the objects having been used in French knitting.[415] However, their use must be studied further.

Use-wear analysis was done on Merovingian hair or clothing pins from the Wijnaldum terp. An antler pin had been used on wool and was therefore interpreted as clothing pin. Another pin from Wijnaldum was made of compact bone tissue and had been used in slightly oily or dirty hair, and thus as hair pin.[416]

5.6.2 Fasteners

Before the invention of buttons different kind of fasteners were used, such as clothing pins and fibulas. From the Roman period two types of fasteners made of bone are known, the button-and-loop fastener and the double-headed fastener. Both are typical military items.

Button-and-loop fasteners were mainly made of metal, and these were sometimes richly decorated. Bone examples do occur, but are rare in the Netherlands. They exist of a head and triangular shank and were made of a single piece of bone or two pieces riveted together.[417] A few bone examples have been found in Europe; in the Netherlands one was found at Velsen and one at Bunnik (Fig. 5.46).[418]

A second type of fastener is the double-headed fastener, which is also known in metal.[419]

Fig. 5.46 Fastener (Bunnik, length 3 cm, inv. VF* 557). Collection and image RMO.

These fasteners are rare in bone; a few have been found in Europe.[420] Examples from the Netherlands have been found in Valkenburg, The Hague, Huissen (Fig. 5.47) and Tiel-Passewaaij.[421] These objects are dated to the second and third centuries AD and were

Fig. 5.47 Double-headed fasteners (Huissen, diameter 1.2 to 1.6 cm, van der Feijst, Verniers & Blom 2017). Image ADC ArcheoProjecten.

415 Roes 1963, 69-70.
416 Prummel, Halici & Verbaas, 2011, 83.
417 Wild 1970.
418 Europe: Wild 1970; Greep 1983a, 135-137; MacGregor 1985, 101-102; Jung 2013, 110; Deschler-Erb 1998, 178; Mikler 1997, 17; Gostenčnik 2005a, 110. Velsen: collection RMO; Bosman 1997, 45. Bunnik: collection RMO.
419 Greep 1983a, 138; Mikler 1997, 17.
420 Greep 1983a, 138; Deschler-Erb 1998, 178; Mikler 1997, 17; Obmann 1997, 55, Tafel 6.
421 Valkenburg: Verhagen 1993, 386. The Hague: Waasdorp 1999, 65. Huissen: Rijkelijkhuizen 2017; Van der Feijst, Verniers & Blom 2017. Tiel-Passewaaij: Groot 2006.

probably used to fasten leather belts, but they have also been described as mounts.[422]

A different type of object, probably dating to the Early Medieval period, has been described by Roes as 'enigmatical'.[423] These flat oblong objects with one or two holes at each end are sometimes identified as belt buckles. This could be the case for the examples with wider holes. Examples with small circular holes are too small for a belt but could be another type of fastener. So far no use-wear analysis has been carried out, but intensive use wear on some of the holes in different directions could confirm the use as fasteners.

A unique flat oblong object with five rectangular holes from the terp Oosterbeintum has been interpreted as a belt buckle or clasp.[424] No similar objects from other countries have been published.

5.6.3 Belt buckles

Buckles and belt strap-ends are usually made of metal. Bone buckles occur from the Roman period onwards. Bone and ivory buckles, however, are rare and can probably often be considered as imitations from metal examples.[425] Only a few undecorated Roman bone belt buckles have been found in the Netherlands and these are coming from military contexts.[426] Some of the finds are fragmentary, but most are probably D-shaped buckles. The frames were made of bone and the bars and pins (or tongues) were probably made of metal and are not present anymore.

Elaborately decorated early medieval belt buckles are known from other European countries,[427] but are absent from Dutch excavations. Several early medieval belt buckles have been found at terp sites.[428] Roes suggests a Carolingian date for these buckles.[429] Different types of belt buckles have been found, such as single-piece buckles with or without a fixed pin (or tongue) or buckles with separate pin which could be made of metal. The buckle could have a fixed buckle plate, in some cases a rather long one.[430] Decorations are sparse but can be present on some of the more elaborately worked buckles.

Some semi-finished belt buckles are known from terp sites. The corpus of belt buckles from terp sites has not been studied, and it is possible that both bone and antler were used for their manufacture. From Dordrecht an osseous belt buckle was found near an early medieval skeleton.[431] At Maastricht an early medieval bone strap-end has been identified (Fig. 5.48).

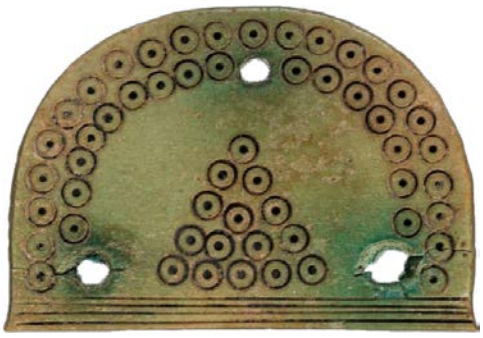


Fig. 5.48 Early medieval belt strap-end (Maastricht, length 4.2 cm, inv. l 2021/2.22). Collection and image RMO.

5.6.4 Brooches

Another method to keep clothing in place, and one that was highly ornamental was using a fibula or brooch. Most brooches are made of metal or a combination of various materials like different metals, enamel, etcetera. Only a few cases are known from the Netherlands where osseous materials had been used. A small possible fibula was found in Oost-Souburg. The circular bone object, measuring only 2 cm across, probably had two eyes at the back to attach a metal needle. The front was decorated with four half ring-and-dot motifs.[432]

The second object is a flat ring-shaped golden frontal plate of a fibula, found in an early medieval grave in Hogebeintum. It is decorated with gold filigree and four hemispherical mounts.[433] The raw material of these mounts has been reported as bone or horn, but it is possible that tooth or ivory was used.

5.6.5 Amulets and pendants

In general, five categories of amulets and pendants existed in the Netherlands in the Roman and Early Medieval period. These are tooth pendants, discoid antler pendants, conical

422 Greep 1983a, 138; Mikler 1997, 17; Obman 1997, 55; Waasdorp 1999, 65.
423 Roes 1963.
424 Kramer & Prummel 1992/1998.
425 Greep 1983a, 130; MacGregor 1985, 103; Gostenčnik 2005a, 108-109; Jung 2013, 109, Tafel 93.
426 Bosman 1997, 44-45; collection RMO; collection Provinciaal Depot voor Archeologie Noord-Holland; Van Dijk 2008, 312.
427 MacGregor 1985, 104; Theune-Großkopf & Röber 1996.
428 Roes 1963, 77-78; collection Fries Museum, collection RMO.
429 Roes 1963, 79.
430 Roes 1963.
431 Pers comm Deborah Paalman, Dordrechts Museum.
432 Lauwerier 1995, 205-206; Lauwerier & Van Heeringen 1995, 87-88.
433 Carmiggelt 2000, 56; Knol 2019, 171; Knol *et al*. 2019, 215, collection Fries Museum.

or pyramidical pendants, cowrie shell pendants, and other forms.

Tooth pendants have a long history and occurred from the Prehistoric period onwards (see Section 4.5.2).[434] Roman-period finds from the Netherlands are not very common.
A perforated boar tusk interpreted as a pendant was found at the settlement of Tiel Passewaaij.[435] Another perforated boar tusk comes from a late Roman fortification site at Maastricht, and a perforated boar tooth from Maastricht perhaps also dates from the late Roman period but may also be early medieval.[436] Two boar tusks with a bronze fitting come from Maasdriel and Nijmegen (collection RMO). Both objects are incomplete, but the Nijmegen bronze fitting had an eye which facilitated its use as a pendant. Fitted boar tusks (and teeth of other species) are present across much of north-western Europe in the Prehistoric and Roman period.[437] Roman-period finds have often been interpreted as amulets owned by Germanic auxiliaries serving in the Roman armies.[438] Fake teeth made of bone also occur, but are rare in the Netherlands.[439] Only one possible tooth or fang imitation made of bone or antler comes from the terp area.[440] Although finds are not numerous a preference for boars tusks can be observed in the late Roman period.

Tooth pendants from the Early Medieval period are usually made from other species than boar, and are associated with women's and children's graves where tooth pendants of brown bear, red deer, beaver and dog or wolf have been found.[441] A pendant made of a horse incisor comes from the terp Oosterbeintum.[442] Early medieval tooth pendants have been found in a large part of north-western Europe.
They were probably worn suspended from the belt or a chatelaine, or alternatively could also have been carried in a belt bag.[443]

Discoid pendants are known from the Roman and Early Medieval periods and are made of the burr of an antler. Roman examples from the Netherlands have been described by Hottentot and Van Lith. These authors recognize four different types in the Netherlands: pendants with a phallus decoration, pendant with a vulva-like decoration, pendants with a lathe-turned centre, and amulets without decoration.[444]
Greep recognizes seven different types in north-western Europe: amulets with a plain central field, a perforated central fields, a lathe-turned centre, carved decorations (often a phallus), serrated edges and phallus decoration, smooth edges and surface and dome with central hole, or lathe-turned with serrated edges.[445]
The distribution of the types seems to vary from region to region, and some of the types identified by Greep seem to be absent in the Netherlands. Roman-period discoid amulets usually have one to four suspension holes and were used not only as pendants but could also be attached to for example doors or walls of houses or other buildings for protection.[446]
A function as part of horse gear is debatable.[447]

An undecorated Iron Age precursor is a subject of debate, and only a few examples are known.[448] The date of the Roman examples is uncertain due to the many undated examples yet mostly tends towards the first and second century AD; this is especially true for the specimens with a phallus decoration, although Mikler dates these to between the first and fourth century AD.[449]
Discoid antler pendants which are less extensively decorated seem to occur in a later Roman period as well, but the small number of dated finds from the Netherlands precludes any conclusions as to their chronology.[450] The amulets with phallic decoration are mainly found in military sites along the Rhine and Donau and in England.[451]
Dutch examples come exclusively from military sites and are absent in the terp area.[452]

Antler burr as a raw material for discoid pendants continues into the Early Medieval period, although a continuous development is a subject of debate.[453] Early medieval examples differ in thickness, decoration, use, and find context. The irregular edges of the burr were largely removed, the pendants are usually thinner, and their decoration consists of ring-and-dot motifs or geometric designs. The pendants usually have one suspension hole. Some pendants have a (large) central hole.[454]
Amulets with ring-and-dot motifs and geometric designs are quite widespread in north-western Europe.[455]

Finds from the Netherlands come from terp sites, from Dorestad, and from grave contexts.[456]
The discoid antler pendants found in cemetery contexts were associated with women's or children's graves.[457] Pendants from north-western Europe show similarities in decoration, but more research is necessary.[458] Their position in graves suggests that the pendants were usually worn on a belt or chatelaine suspended from a belt.[459] However, at Oosterbeintum

434 Greep 1983a, 287.
435 Groot 2006.
436 Dijkman & Ervynck 1998.
437 Greep 1983a, 287; Biel 1996, 61; Obmann 1997, 55, Tafel 6; Obmann points out these could also be part of horse gear.
438 MacGregor 1985, 109.
439 Mikler 1997, 20.
440 Roes 1963, 64, Plate LI.
441 Rijkelijkhuizen 2021c; Van der Jagt *et al.* 2014; Knol 2019, 174; Knol *et al.* 1995/1996, 392, 395; Knol *et al.* 2019, 192; Theune-Grosskopf 1996, 92-93; MacGregor 1985.
442 Kramer & Prummel 1992/1998, 112.
443 MacGregor 1985; Rijkelijkhuizen 2021c.
444 Hottentot & Van Lith 1990.
445 Greep 1983a, 275-284; Greep 1994.
446 Greep 1994, Hottentot & Van Lith 1990.
447 Hottentot & Van Lith 1990; Obmann 1997, 71; Gostenčnik 2005a, 272-278; Deschler-Erb 1998, 168-170; Mikler 1997, 21.
448 Mikler 1997, 21; Greep 1994; Obmann 1997, 72; Gostenčnik 2005a, 272.
449 Greep 1994; Hottentot & Van Lith 1990; Gostenčnik 2005a, 273; Mikler 1997, 20-21, Tafel 12; Obmann 1997, 71-72, Tafel 29; Jung 2013, 115, Tafel 101-103; Deschler-Erb 1998, 168-170.
450 Greep 1994.
451 Greep 1994; Mikler 1997, 21, Karte 5.
452 Hottentot & Van Lith 1990; Roes 1963.
453 Greep 1983a, 278; Greep 1994.
454 MacGregor 1985, 108; Greep 1994; Roes 1963, 1965; Knol 1993; Rijkelijkhuizen 2021c.
455 For example Faider-Feytmans 1970, Plate 113, 130; Wamers 1986, 55.
456 Terps: Roes 1963; Miedema 1983, 258-259; 1999/2000, 322; Carmiggelt 2000, 49. Dorestad: Roes 1965; Willemsen 2009, 168. Cemetery context: Rijkelijkhuizen 2021c; Dijkman & Ervynck 1998; Knol *et al.* 1995/1996.
457 Knol *et al.* 1995/1996; Dijkman & Ervynck 1998; Rijkelijkhuizen 2021c.
458 Rijkelijkhuizen 2021c.
459 Roes 1963; Rijkelijkhuizen 2021c.

a plano-convex antler pendant was found at the neck of a child.[460]

An unusual variation is an object made from an antler burr where only the outer irregular edge was retained. MacGregor suggests a possible use as a buckle or girdle ring for some pieces, but a function as amulet or pendant is also likely.[461] In the Netherlands, these objects are known only from the terp area, but only in small numbers.[462]

Conical or pyramidical pendants are sometimes referred to as Donar ('Thor') amulets, analogue to the Roman 'Hercules club' amulets.[463] They are usually made of antler tine tips but the raw material of some objects was not identified. Conical or pyramidical pendants are widely distributed in north-western and central Europe but vary in shape, size and decoration, dating from the late Roman until Early Medieval period.[464] Decorations consist of ring-and-dot motifs, lines, and dots. In the Netherlands these pendants are mainly known from early medieval grave contexts, where they are again associated with women's and children's graves just as the discoid antler pendants.[465] One example comes from a settlement context at Leiderdorp and two from Dorestad while the context of many terp finds is unknown.[466] Two examples from the excavations at Broekpolder: Heemskerk-Beverwijk are believed to have been ritually deposited.[467] Conical/ pyramidical pendants were also frequently suspended from a belt or a chatelaine, although other uses have been proposed.[468] The find of several flat decorated pendants at a terp site found in association with several conical or pyramidical pendants is unique and has been interpreted as necklace.[469]

Tiger cowrie shells used as pendants in the Early Medieval period are known from north-western Europe from settlement and grave contexts, but finds from the Netherlands are rare.[470] A panther cowrie shell is known from an eighth-century grave from Ferwerd and a few examples were excavated at Dorestad.[471] Two other finds come from the terp sites Lekkum and Adorp; the first is a panther cowrie and the second a tiger cowrie.[472] A panther or tiger cowrie was found in an early medieval grave of a woman at Borgharen.[473] A partial panther cowrie shell with suspension hole was found at Holwerd. It was probably re-used after breakage.[474]

The shells were not locally obtained but must have been imported. The panther cowrie is endemic to the Red Sea and the Gulf of Aden and the tiger cowrie comes from the Indo-Pacific region. Knol suggest that the shells were imported through the harbour of Dorestad.[475]

Several pendants are unique finds and have not been further categorized. This applies to a fish-shaped pendant from the Roman castellum at Woerden.[476] Animal pendants are quite rare in the Netherlands and occur only occasionally in other countries.[477] Two Roman phallus-shaped pendants have been found thus far in the Netherlands. One comes from Vechten and the second from a terp site.[478] The phallus was a well-known symbol in the Roman period and phallus amulets are more common elsewhere, but in the Netherlands these pendants are unique finds.[479] At Oosterbeintum two antler planoconvex pendants were found in a child's inhumation grave.[480] Roes described a claw-shaped pendant.[481]

5.6.6 Beads

Beads from the Roman and Early Medieval period made of glass, amber or shell are well known, and many of them come from early medieval graves.[482] However, beads made of osseous materials are rare. Three bone cylindrical beads come from the excavations at Valkenburg while a cylindrical bead made from a sheep's radius from the terp site Ezinge.[483] Early medieval bone beads have been found in Oost-Souburg and the terp Wijnaldum-Tjitsma;[484] the first is spherical in shape and ridged, the second is made of antler and short and cylindrical. Bone and antler were not important raw materials for bead making in the Roman and Early Medieval period.

5.6.7 Rings

Rings made of ivory, bone or antler occur from the late Roman to the Early Medieval period. Although their exact distribution has not yet been fully analysed we may tentatively distinguish two types.

460 Knol *et al*. 1995/1996, 334-335.
461 MacGregor 1985, 108; Roes 1963, 73.
462 Roes 1963, 73.
463 MacGregor 1985; Werner 1964.
464 Faider-Feytmans 1970, Plate 121, 130.
465 Rijkelijkhuizen 2021c; Prummel, Halici & Verbaas 2011, Cuijpers *et al*. 1999, 305-308; Knol *et al*. 1995/1996; Van Vilsteren 1987, 59; collection RMO; Knol 1988, 2019, 174-175; Knol *et al*. 2019, 188, 192; Knol 1988.
466 Leiderdorp: Verhoeven 2016. Dorestad: Roes 1965. Terp area: Roes 1963; Knol 1988, 1993.
467 Therkorn *et al*., 2009, 106-108, 154, collection Huis van Hilde.
468 Roes 1963; Werner 1964; Rijkelijkhuizen 2021c.
469 Roes 1963, 63, Plate LI.
470 Knol 1988; 2006.
471 Ferwerd: Carmiggelt 2000, 50; Knol 2006; Fries Museum. Dorestad: Prummel 1983.
472 Knol 2006.
473 Lauwerier & Laarman 2011, 112-113; Van der Jagt *et al*. 2014.
474 Prummel 2008b.
475 Knol 1988; 2006; Prummel 1983.
476 Van Dijk 2008, 313.
477 Greep 1983a, 287.
478 Vechten: Van Vilsteren 1987, 59. Terps: Roes 1963, 64, Plate LI.
479 Greep 1983a, 285.
480 Knol 1993; Knol *et al*. 1995/1996, 334-335.
481 Roes 1963, 64, Plate LI.
482 MacGregor 1985, 99; Knol 2019; Ma *et al*. 2023.
483 Valkenburg: Verhagen 1993, 385-386. Ezinge: Prummel, Manuel & Post 2014.
484 Oost-Souburg: Lauwerier & Van Heeringen 1995. Wijnaldum-Tjitsma: Prummel, Halici & Verbaas 2011.

The first type of ring is usually thin and somewhat flat in cross-section and often made of a strip of osseous material. These osseous rings are usually described as bracelets, analogue to bronze specimens.[485] Rings made of a (bent) strip of bone or antler required some kind of (metal) clasp or joint to link two sections together or create a clasp. This is not necessary for ivory rings, which could be made in one piece but a metal clasp could be present. Antler rings with clasps seems to be restricted to the Late Roman period and are interpreted by Deschler-Erb as imitations of Roman ivory bracelets.[486] Late Roman rings of antler and ivory occur throughout north-western and central Europe and are often found in grave contexts, but are rare in the Netherlands.[487] From the Netherlands only a few finds are known, from Maastricht. A fragment was found of a fourth or early fifth-century decorated bracelet of an osseous material. Furthermore, a partial ivory ring with a metal clasp from an early medieval grave context has also been interpreted as a bracelet.[488] Two possibly osseous rings from Dorestad have not yet been analysed.[489] Bracelets from osseous materials are also known from Tongeren (Belgium).[490]

The second type are thicker, solid ivory rings, usually oval in cross-section and dating to between the fourth and seventh century AD. Some of the ivory rings were found in association with bronze discs. Bronze pierced discs with metal, wood, bone or ivory rings are well known from the sixth and seventh centuries AD, mainly from women's graves. The bronze discs have a diameter of 6 to 10 cm, the surrounding rings are somewhat larger.[491]

Their interpretation is somewhat more controversial. Some authors interpret the ivory rings as having been suspended from a belt, whereas others described them as bag rings.[492] Bag rings are used to open and close a bag. According to MacGregor bag rings are (slightly) larger, up to 15 cm,[493] but estimating the size is difficult if only fragments were found, which are usually warped and degraded. Whereas the rings are in England usually interpreted as bag rings, the prevailing interpretation on the continent of the ivory rings with bronze discs is that they were pendants suspended from a belt.[494]

A study of ivory rings from England indicated that these rings were made from African elephant ivory and that they were imported from Africa as finished items.[495]

Fig. 5.49 Ring and disc (Lent, Nijmegen, diameter *c.* 12 cm, Van Es & Hulst 1991). Collection and image Valkhof Museum, Archeologisch Depot Gelderland.

Ivory rings have also been found in the Netherlands, with or without bronze disc. At the early medieval cemetery of Borgharen, fragments of an ivory ring were found which probably came from a woman's grave.[496] At Lent, an ivory ring and disc came from an early medieval grave (Fig. 5.49). The ring showed signs of intensive use and several repairs.[497] During excavations of a Roman villa at Maasbracht a pit was found to contain metal weapons from the late Iron Age, as well as a fragment of an ivory ring or bracelet which however is unlikely to be Iron Age in date.[498] The ring was sawn on one edge; it could therefore be a partially open ring, or it had some kind of clasp that is now absent. It may also have been sawn on purpose as part of a burial ritual.[499] Bronze discs without ring have been excavated at for instance Dorestad, Cornjum, Hallum, Ferwerd and Borgharen.[500]

5.6.8 Knives

Most excavated knives were personal possessions and often had multiple uses. One exception is a probable Roman kitchen knife with an antler handle which was found at Wijk bij Duurstede.[501] Knife handles could be made of wood, bone, antler or to a lesser extent ivory. Roman-period handles are usually ornamented and may have played a role in a display of identity and social status. Knives have been found in settlement and grave contexts. Knives from the Roman period can be divided into different types:

485 Greep 1983a, 292.
486 Deschler-Erb 2005.
487 Greep 1983a, 292-297; Crummy 1983; MacGregor 1985, 112; Deschler-Erb 1998, 167; 2005; Béal & Rodet-Belarbi 2003, 63-64; Biro *et al.* 2012; Jung 2013, 88.
488 Dijkman & Ervynck 1998, 47-48, 69.
489 Collection RMO.
490 Vanvinckenroye 1995; collection Gallo-Romeins Museum Tongeren.
491 Renner 1970.
492 Theune-Großkopf 1996, 92-93; MacGregor 1985, 110.
493 MacGregor 1985, 111-112.
494 Theune-Großkopf 1996, 92-93; Renner 1970; Wamers 1986.
495 Riddler & Trzaska-Nartowski 2011; Hemer *et al.* 2023.
496 Van de Jagt *et al.* 2014, 161-164.
497 Outer diameter c. 12 cm; Van Es & Hulst 1991, 89, 269.
498 Esser, Laarman & Rijkelijkhuizen 2017.
499 Biro *et al.* 2012.
500 Renner 1970, 49, 123, 137, 191; Van der Jagt *et al.* 2012, 180.

with handle plates, with a single-piece handle, and folding knives.

Knives with two handle plates made of bone or antler, attached to the tang with metal rivets, often have a characteristic curved blade. Examples with a metal suspension ring occur in the first and second centuries AD in a wide area across north-western Europe.[502] Another variation, without suspension ring but with a handle with concave sides, probably also dates to this period. Decoration often comprises ring-and-dot motifs and straight, oblique and crossing lines. Such variations in decoration could be significant.[503] Handle plates were made of bone or antler, but regional differences in raw materials have not been studied in full yet.

Only a few knives with plate handles are known from the Netherlands, from settlements and military contexts, but most stem from graves, both male and female.[504] These typically Roman-period knife handles are rare finds in the Netherlands and absent from terp sites. Their occurrence ceases at the end of the Roman period.

A second type are knives with handles made in one piece. Osseous materials used for these handles are compact bone, antler, the diaphysis of long bones of large mammals, or ivory. The tang was inserted into the natural medullary canal or a drilled cavity.[505] However, the handles are difficult to interpret and could be from different tools. Decorated antler (knife) handles have been found in for example Maastricht and Valkenburg. The Valkenburg handle has a parallel in Tongeren, Belgium.[506] An ivory knife handle that depicts a Roman emperor comes from Eenum in the terp area. [507]

The third type is the folding knife or clasp knife. The handles of folding knives are made in one piece of for example bone or ivory and are often richly decorated.[508] They are largely unknown in the Netherlands, except for a few ivory examples from the terp area, one of them a figural clasp (Fig. 5.50).[509]

No early medieval knife handles of osseous tissues could be positively identified. Possible handles of osseous material from this period were found, but is it uncertain if these were knife handles or handles from other tools.

Fig. 5.50 Roman ivory folding knife (Friesland, length *c.* 7 cm, inv. vdT zn 83, Rijkelijkhuizen 2003). Collection and image RMO.

5.7 Games, toys and musical instruments

5.7.1 Skates and sledges

Although most bone skates dated to the Medieval period, the oldest finds from the Netherlands are from the Roman period, although they are few in number.[510] From early medieval contexts several skates are known as well.[511] Skates were made of long bones of large mammals, especially from horse and cattle and less often from deer or other species. Their production was a home industry, but a few overall modifications can be identified. The articular surfaces could be modified, usually to remove edges and to create an upward end. Furthermore, the front of the bone, the gliding surface, was often flattened before use. This is not always visible, because of the intensive use wear visible on some specimens. It was not necessary to tie the skates to the feet, due to a different skating technique than what is customary today, but holes could be made to string the skates together or, optionally, attach them to the feet. Gliders with large holes from the front to the back of the bone are interpreted as gliders for small sledges.

501 Thach & Lauwerier 2010, 215-216; Lauwerier & Thach 2021, 270.
502 Greep 1983a, 403-415; Jung 2013, 93, Mikler 1997, 58-59, Tafel 46, Deschler-Erb 1998, 133, Tafel 9; Béal & Rodet-Belarbo 2003, Fig. 28; Gostenčnik 2005a, 204-207, Tafel 44-46.
503 Greep 1983a, 403- 415; Gostenčnik 2005a, 204-207, Tafel 44-46.
504 Settlements: Verhagen 1993, 391, 394; Groot 2006. Military contexts: Vechten: collection RMO. Graves: Rijkelijkhuizen 2017; Van der Feijst, Verniers & Blom 2017; Helmond, Van As & van der Linde 2018; Kootker & Rijkelijkhuizen 2012.
505 Greep 1983a, 374-401; Mikler 1997, 59-61, Tafel 46-50.
506 Maastricht: Dijkman & Ervynck 47-48. Valkenburg: Verhagen 1993, 390-191. Tongeren: Vanvinckenroye 1984, 198.
507 Nieuwhof & Nicolay 2018, figure 3.11.
508 Greep 1983a, 415-422; Mikler 1997, 57-58, Tafel 45; Deschler-Erb 1998, 129-130, Tafel 6.
509 Rijkelijkhuizen 2003.
510 Verhagen 1993, 399; see also Küchelmann & Zidarov 2005.
511 For example Roes 1963; Roes 1965; Miedema 1990, 166; Lauwerier & Thach 2021.

5.7.2 Gaming counters

Gaming counters were used in several games and have been found in many Roman contexts.[512] MacGregor distinguishes gaming counters with countersunk obverse surfaces, counters with multiple concentric rings, and examples with flat surfaces. The three subtypes were contemporary.[513] Greep's Type 4 and 5 can also been dated to the Early Medieval period and are here discussed as gaming pieces.[514] Gaming counters are made of the compact bone of a large mammal, and a lathe or centre-bit was used in their manufacture.[515] Gaming counters were widespread throughout north-western Europe and have been found in various contexts. Besides bone they were also made of other materials such as fired clay, pottery shards or glass.[516] They are also numerous in the Netherlands.[517]

5.7.3 Astragali

Using sheep or goat astragali as gaming pieces was widespread in the Roman and Early Medieval period in north-western Europe and elsewhere.[518] However, many authors have also proposed a more ritual use.[519] Not many astragali have been recorded from the Netherlands from this period, but these could well be underrepresented when unworked astragali went unnoticed as artefacts. Sheep or goat astragali have been found in both Roman and early medieval contexts.[520] Burned or unburned sheep or goat astragali were found in early medieval cremation and inhumation graves at Hogebeintum and Oosterbeintum.[521] Another possible early medieval grave find is a sheep or goat astragalus from the Rijnsburg cemetery.[522]

5.7.4 Gaming pieces with ring-and-dot motifs

Other 'gaming bones' found in great numbers on terp sites include flat-convex objects with dots, ring-and-dot motifs, or crosses and long bars with ring-and-dot motifs. These were made of the compact bone of large mammal's long bones, of a medium mammal's long bone diaphysis, or for example a large mammal's rib bone. Also ring-and-dot decorated first and third phalanges of horse, cattle and horse metapodials and cattle astragali have been interpreted as gaming pieces. These gaming pieces could be used in several games.[523] Finds from Marssum date to the late Roman and Early Medieval period.[524] A cattle astragalus with ring-and-dot motifs from the Bullepolder, Leeuwarden dates to the first to third century AD.[525] Several cattle astragali from the terp area have artificial holes.[526]

Comparable gaming pieces with ring-and-dot motifs have been found in Uitgeest and Broekpolder. The Uitgeest gaming piece dates to the Roman period; it is rather crudely made and the ring-and-dot motifs were not made with a specialized tool.[527] The Broekpolder gaming piece has an early medieval date and strongly resembles gaming pieces from terp sites.[528]

5.7.5 Plano-convex, conical and dome-shaped gaming pieces

In the Early Medieval period, different kinds of gaming pieces occur. A couple of small plano-convex pieces from terp sites have been described by Roes as gaming counters but could well have been used as gaming pieces.[529] Two antler examples from Ezinge date to the fourth or fifth century AD.[530] A plano-convex piece with ring-and-dot decoration was found in Dorestad.[531] Plain or ring-and-dot decorated plano-convex gaming pieces are also known from other countries and were often found in grave contexts.[532]

Conical and dome-shaped gaming pieces made from a molar of a large mammal are known from terp sites and from Dorestad (Fig. 5.51).[533] Similar pieces have been found in England, Ireland and Scandinavia.[534] Dome-shaped gaming pieces (sometimes onion-shaped) made of bone, whale bone or antler have been found in the same regions and are connected to the arrival of the Norse in England.[535] Onion-shaped gaming pieces are unknown from the Netherlands. A complete set of dome-shaped gaming pieces, probably made of antler or whale bone and including a die was found in Dorestad. The pieces have a peg-hole in the bottom. One of these gaming pieces is clearly different from the others and has an iron pin at the top of its dome.[536]

512 Greep 1983a, 255-262; MacGregor, Mainman & Rogers 1999; Béal & Rodet-Belarbi 2003, 53-56.
513 MacGregor 1985, 133.
514 Greep 1983a, 255-262.
515 MacGregor 1985, 133.
516 Greep 1983a, 255-262; Crummy 1983, 91-92; Deschler-Erb 1998, 147-153, Tafel 24-27; Gostenčnik 2005a, 169-191; MacGregor 1985; Jung 2013, 100-107, Tafel 70-83; Obmann 1997, 76-77, Tafel 41, Crummy 1983, 91-96; Mikler 1997, 28-31, Tafel 18-20; Luik 1994.
517 For example: Verhagen 1993, 376-378; Esser, Beerenhout & Rijkelijkhuizen 2009; Aardenburg: collection Erfgoed Zeeland; Van Dijk 2008, 312; Rijkelijkhuizen 2014; Waasdorp 1999, 153-155; Bunnik: collection RMO; Bosman 1997; Alblasserdam: collection RMO.
518 Greep 1983a, 236-237; Gostenčnik 2005a, 196-197; Knol 2019, 175-176.
519 Knol 1988, 2019, 175-176; Gostenčnik 2005a, 196-197.
520 For example Bosman 1997, collection RMO; Halici 1997; Lauwerier & Laarman 1999, 130-140.
521 Van Vilsteren 1987, 49; collection Fries Museum; Knol *et al.* 1995/1996, 335-336; Carmiggelt 2000, 39; Knol 2019, 175-176; Knol *et al.* 2019, 191, 205, 210, 212, 216.
522 Collection RMO; Wimmers 1986.
523 Roes 1963, 54-57; Miedema 1983, 250-251.
524 Van Gent 2015, 164-169.
525 Halici 2002, 40-41.
526 For example Prummel, Halici & Verbaas 2011; Terp area: collection RMO; Prummel 2008, 145.
527 Collection Huis van Hilde.
528 Therkorn *et al.* 2009, 155, collection Huis van Hilde.
529 Roes 1963; Miedema 1983, 247.
530 Prummel, Manuel & Post 2014, 218.
531 Roes 1965.
532 MacGregor 1985, 133; Riddler & Trzaska-Nartowski 2013.
533 Roes 1963; Miedema 1983, 247; Hall 2021; collection RMO.
534 MacGregor 1985, 134; Barton-Murray, Johnson & Riddler 2012; Hall 2021.
535 MacGregor 1985, 135.
536 Diameter 1.9-2.9 cm; height 1.6-2.3 cm; Clason 1978, 1980; Hall 2021; Collection RMO.

Fig. 5.51 Gaming piece (terp area, molar of a large mammal, height: 2.3 cm, inv. 2019-210). Collection and image Fries Museum, Leeuwarden.

5.7.6 Dice

The long history and various appearances of dice have been set out by Van der Heijdt in his publication (in Dutch) '*Oog om oog*'.[537] In this section only cubical, cuboid and (semi-)rounded dice are discussed. Astragali and other decorated gaming bones are discussed separately as gaming pieces. In north-western Europe, cubical dice were introduced by the Romans.[538] Dice were used in several games and above all to gamble. Despite all prohibitions and fines that existed dice are common finds in contexts from the Roman period up to the Modern Age. In the Roman, Early Medieval and Modern periods, the sum of opposite sides is usually seven. Only in the Late Medieval period, between the thirteenth and fifteenth century, a different system was used.[539]

Cubical and cuboid dice from the Roman period could be made of several materials, such as fired clay, metal and glass, but most were made of various osseous tissues.[540] Compact bone tissue was used for dice with a thickness up to 1 cm. The diaphysis of a bone was also used for the manufacture of dice, but in that case the marrow cavity had to be closed off with two bone inserts, although it is also possible that such dice were used without inserts. Finds come from Velsen, Schagen and terp sites.[541] Most Roman-period cubical dice from osseous tissues are solid and were made of compact bone or antler, such as specimens from Vechten, Velsen, Nijmegen, The Hague, Valkenburg and terp sites.[542] One dice from Valkenburg has a more rounded shape. Such rounded dice have also been found at terp sites but their date is uncertain; they could be either Roman or early medieval.[543] A dice from Ezinge made from a sheep metacarpal dates to the fourth to fifth century AD.[544]

Manufacturing techniques remained the same in the Early Medieval period, and both solid and hollow dice of bone or antler have been found.[545] A rectangular die was found at excavations at Dorestad, together with the set of gaming pieces mentioned earlier,[546] but most dice are cubical. A few early medieval die has been found in a grave context at Borgharen.[547]

5.7.7 Flutes and whistles

Musical instruments were often made of wood and metal and occasionally of pottery or bone. Bone flutes are the oldest archaeological instruments ever found. Roman-period bird bones with holes are often interpreted as flutes or hunting whistles. Various animal species were used, such as geese, white tailed eagle, stork, crane and swan.

A sawn ulna of a white-tailed eagle with a proximal hole from Velsen has been interpreted as a flute or perhaps a hunting whistle. It is the only known example from the Netherlands with graffito: ACVTVS.[548] Another flute, recovered at Velsen and made of the ulna of a stork, has three holes.[549] At the Roman site of Valkenburg several whistles, whistle fragments and waste of whistle manufacturing have been recovered. The whistles were made of geese humeri and in one case of a crane humerus. The whistles have one central hole and are interpreted as hunting whistles.[550] A possible flute or whistle made of a swan humerus was found at Den Haag-Scheveningseweg.[551] A flute from Langedijk, with five fingerholes, is made of a crane ulna.[552]

Bird bones were still used for flutes in the Early Medieval period, for example the ulna of a swan from Elst, or an ulna of a whooper or mute swan from Wijnaldum.[553] But sheep/goat tibiae were equally popular for flutes.[554] Flutes of sheep/goat bones have one to five fingerholes; a thumbhole is not always present.[555]

537 Van der Heijdt 1990.
538 Van der Heijdt 1990, 16.
539 Greep 1983a, 242-250; Van der Heijdt 1990.
540 Greep 1983a, 242-250; Gostenčnik 2005a, 191-196; Jung 2013, 107, Tafel 85-90; Crummy 1983, 96-97; Deschler-Erb 1998, 147, Tafel 24.
541 Velsen: Bosman 1997; collection RMO. Schagen: collection Huis van Hilde. Terps: Roes 1963, 52; Miedema 1983, 248; Prummel, Manuel & Post 2014, 218; Halici 2002, 40-41.
542 Vechten: collection RMO. Velsen: collection RMO; Bosman 1997. Nijmegen: Lauwerier 1988, 160. The Hague: Waasdorp 1999, 153. Valkenburg: Verhagen 1993, 375-376. Terps: Roes 1963.
543 Roes 1963, 52, Plate XLIV; Miedema 1983, 248; 1999/2000, 321.
544 Prummel, Manuel & Post 2014, 218.
545 Solid: Lauwerier & Laarman 2011, 113-114. Hollow: Wieringermeer, collection RMO; Broekpolder, Collection huis van Hilde; Prummel, Halici & Verbaas 2011.
546 Collection RMO, Clason 1980.
547 Lauwerier & Laarman 2011, 113-114.
548 Bosman 1997, 50, 82; Tamboer 1999, 12-14; collection RMO.
549 Bosman 1997, 45, collection RMO.
550 Verhagen 1993, 363-366.
551 Waasdorp 1999, 153.
552 Kootker 2012, Collection Huis van Hilde.
553 Elst: collection RMO. Wijnaldum: Prummel, Halici & Verbaas 2011.
554 Loppersum: collection RMO. Teerns: collection RMO; Roes 1963; Miedema 1983, 246-247; 1999/2000, 321; Prummel, Halici & Verbaas 2011. Rijkelijkhuizen 2023d.
555 Tamboer 1999, 10.

5.7.8 Stringed instruments: tuning pegs, tailpieces and bridges

Stringed instruments are made of wood, but some parts can be made of osseous tissues. Tuning pegs of stringed instruments have been found at terp sites in large numbers; most of these are undated, but a few dated examples are Merovingian or Carolingian.[556] One tuning peg was found at Dorestad.[557]

One tailpiece of a stringed instrument was found in the terp area.[558] Bridges from stringed instruments are known in bone or antler and also in metal and amber.[559] An example from Dorestad is made of amber.[560]

5.7.9 Dolls and miniatures

One ivory artefact from the Roman period was interpreted as doll, but it could also be a figurine (Fig. 5.52).[561] It is incomplete and the arms are now missing; these were made separately and could probably rotate. The legs are absent and may have been broken off and/or also made separately.

Fig. 5.52 Roman ivory doll (Voorburg, height *c.* 8 cm, inv. h 1929/3.24). Collection and image RMO.

5.8 Other

5.8.1 Reading and writing

The point of bone or metal styli was used for writing on wax tablets and the blunt or flattened side was used to erase the written text. However, the interpretation of styli is not always straightforward and the function of rod-shaped artefacts with an oval-shaped head and marked junction is a subject of debate. Most often these implements are interpreted as styli, but comparable objects have also been interpreted as make-up appliers or possibly spindles.[562] Similar objects have been found at Velsen and these have decorative ridges.[563] Other finds from the Netherlands comprise undecorated examples with a flattened side such as those found at Valkenburg or Bunnik (Fig. 5.53).[564] A possible stylus, shaped like a hand holding a set of wax tablets, comes from Vechten.[565]

A grave at the cemetery at Huissen produced a writing set consisting of a bronze inkwell, a knife with bone handle and a rectangular bone plate (Fig. 5.54).[566] The knife was probably a penknife.[567] The bone plates, often with a suspension hole, have been found in association with other writing implements and are therefore interpreted as such. They may have functioned as rulers, for instance.[568] Writing implements were found in several grave contexts from Nijmegen. Writing sets consisted

Fig. 5.53 Possible stylus (Bunnik, length *c.* 17 cm, inv. f 2019/12.1145). Collection and image RMO.

556 Roes 1963; Miedema 1983, Fig. 200; 1999/2000, 321; Prummel, Halici & Verbaas 2011.
557 Roes 1965.
558 Van Vilsteren 1987, 56; collection Fries Museum.
559 MacGregor 1985, 148.
560 Roes 1965.
561 Voorburg, collection RMO.
562 Styli: Gostenčnik 2005a, 41-74; 2005b, 218-219; Mikler 1997, 25-27, Tafel 15-17; Deschler-Erb 1998, 143-144, Tafel 22). Make-up appliers: Obmann 1997, 62, Tafel 16-17. Spindles: Greep 1983a, 145-152, Greep 1983b.
563 Bosman 1997, 45; Collection RMO; Greep 1983b.
564 Valkenburg: Verhagen 1993, 386, Cat. No 123, 390. Bunnik: collection RMO.
565 Van Vilsteren 1987, 69-70.
566 Van der Feijst, Verniers & Blom 2017, 93-94.
567 Božič 2001; Van der Feijst, Verniers & Blom 2017, 93-94.
568 Božič 2002; Gostenčnik 2005b, 222-223.

a

b

Fig. 5.54 Ruler (a) and penknife with bone handle (b) (Huissen, length ruler 11 cm and handle 3 cm, Van der Feijst, Vernier & Blom 2017). Image ADC ArcheoProjecten.

of a bronze inkwell, a penknife, writing pens and bone or iron plates, in the publication called spatulas to put wax on wax tablets.[569]

5.8.2 Objects made of bone cylinders, discs and terminals

Certain roman-period objects composed of cylinders, discs and terminals are intriguing finds. These objects exist of two cylinders made of metatarsal bones and are connected to each other with a wooden core. At both ends a disc and terminal was present. The most striking complete examples from the Netherlands have been found at Valkenburg, Huissen and Bemmel (Fig. 5.55).[570] Fragments of discs and terminals have often been interpreted as parts of similar objects; however, a combination of disc and terminal also occurs in other objects such as pyxides or other objects. A functional identification is therefore difficult without all the parts.

The function of this object is widely debated, but an interpretation as container was dismissed when complete objects were found, due to the technical construction with a wooden core. The original interpretation as hinge terminal was also dismissed when it was clear that discs and terminals were present at both ends. A function as a distaff is most commonly accepted, but use wear traces are lacking. A symbolical function is therefore often mentioned.[571] An alternative explanation is that the object was a parchment holder.[572]

Fig. 5.55 Object made of bone cylinders, discs and terminals (Huissen, length without the terminals 23 cm, van der Feijst, Verniers & Blom 2017). Image ADC ArcheoProjecten.

5.8.3 Containers

Various containers were made of osseous materials. It is conceivable that many of them were not recognized as such as they could also be a home-made product with little modification of the bone. Often the original contents will remain unknown, but in at least two cases from the Roman period the contents could be studied. A container from Valkenburg, made from a fallow deer metacarpal bone, contained two metal implements, probably a bronze surgical spoon probe and iron tweezers.[573] A second container from Houten was made of a sheep or goat femur and contained henbane seeds.[574] A wooden box with bone lids decorated with ring-and-dot motifs from Enum dates to the Roman period.[575]

a

b

Fig. 5.56 Antler container (Deventer, front and back, length 13 cm, Rijkelijkhuizen 2011e, 2011f). Collection and image Provinciaal Depot voor Bodemvondsten Overijssel.

569 Bogaers & Haalebos 1987, 47.
570 Valkenburg: Verhagen 1993, 346; Huissen: Rijkelijkhuizen 2017; Van der Feijst, Verniers & Blom 2017; Greep & Rijkelijkhuizen 2019; Bemmel: pers, comm. Lourens van der Feijst.
571 Verhagen 1993, 343-345.
572 Greep & Rijkelijkhuizen 2019.
573 Prummel 1977.
574 Groot & Van Haasteren 2017, 712-713.
575 Miedema 1990, 167, Fig. 130.

An antler container from Deventer has been dated to the tenth, possibly eleventh century AD (Fig. 5.56).[576]

5.8.4 Horse gear

A somewhat enigmatic group of objects, the function of which is still a subject of debate, are sawn antler tine tips. The tine tips have a hole, bored obliquely from the top to just below, which corresponds to an obliquely sawn notch. Around the centre is a second straight notch. The surface of these tine tips is often smooth. They appear to be mostly from the Roman to Early Medieval period, although similar objects have been found from the Bronze Age onwards.[577] Several authors suggested an interpretation as horse gear, an interpretation which seems to be confirmed by use-wear analysis.[578] Use-wear analysis on examples from Feddersen Wierde refuted a function as a tool, because the tip does not show any wear. However, variations in shape and size occur and not all tine tips were necessarily used for the same purpose, as Roes already pointed out.[579]

5.8.5 Tau staffs

A tau staff from the terp Bernsterburen was found in the nineteenth century and described in detail by Knol and Looijenga (Fig. 5.57).[580] The staff is made of whale bone, is over 56 cm long and it is decorated with bands and blocks of *'Wolfszahnmuster'*. At its lower section is a lattice decoration, and the staff also bears a rhunic inscription. The staff's crown features two opposite animal heads. The staff has been interpreted as a symbol of authority, and an eighth-century date or later has been proposed by Knol and Looijenga.[581]

Fig. 5.57 Detail of the whale bone tau staff (Bensterburen, length >56 cm, inv. 44B-2). Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap.

5.8.6 Other objects

An unknown object featuring two animal heads was found at Winsum (Fig. 5.58). Roes described it as the head of a lion holding the head of another animal in its jaws.[582] The object is worn by use, but its function is unknown.

Fig. 5.58 Antler object with two animal heads (Winsum, length *c.* 8 cm, inv. 53-287). Collection and image Fries Museum, Leeuwarden - Koninklijk Fries Genootschap.

5.9 Osseous and keratinous artefacts (and raw material use) in daily life

5.9.1 Objects from Roman contexts

The Roman and Early Medieval periods were a tumultuous era which saw the rise and fall of the Roman empire, the stationing of Roman troops, possible trade, and the acculturation of populations. At the end of the Roman period troops were withdrawn and a new religion took hold. These major societal changes had their impact on the archaeological depositions, including bone and antler objects.

The Roman occupation led to the emergence of new types of objects with a specific military character, or luxury items which had been unknown in this region before. Typical

576 Rijkelijkhuizen 2011c.
577 Obmann 1997, 78, Tafel 255; Jung 2013, 100, Tafel 69; Crummy 1983, 105-106; Deschler-Erb 1998, Tafel 59; Grimm 2001; 2003; Prummel 2008a, 146-147; Prummel, Manuel & Post 2014, 218; Roes 1963, 43-45; Groot & Van Haasteren 2017, 1148; Riddler & Trzaska-Nartowski 2018.
578 Struckmeyer 2011, 65-69.
579 Roes 1963, 43-45.
580 Knol & Looijenga 1990.
581 Knol & Looijenga 1990; collection Fries Museum.
582 Roes 1963, p. 75, Plate LIX, 11.

military objects, such as scabbards, fasteners, and part of bows have been found only in Roman military contexts and disappear before the end of the Roman period. These specific objects can thus provide evidence for the presence of Roman soldiers. (Parts of) sword hilts have also been found in the terp area.

Roman luxury items, such as caskets (of which the bone hinges remain), possible parchment holders or ivory objects mainly come from villa and cemetery contexts and to a lesser extent settlements. However, these all occur in small number and do not display such luxury or diversity as the objects found in more Romanized cities/areas such as Xanten, Augst or Kärnten. These Roman luxury objects also disappear before the end of the Roman period.

Typical Roman objects such as hair and clothing pins, scabbard chapes and slides, gaming counters, pyxis, possible parchment holders, casket hinges, button and loop fasteners, are all made of bone and some of these objects were produced on a lathe. Most of these objects also occur in various other raw materials, such as metal, wood, glass or pottery. The status of osseous objects versus those of other raw material has often been discussed, but it cannot be said that osseous objects were inferior items.

The terp area in the Roman period

Not many typically Roman objects have been found in the terp area, which is not surprising because it was not part of the Roman empire. Roman hair or clothing pins and gaming counters are rare at terp sites. However, a few luxury ivory objects, otherwise only known from villa contexts, have been found in the terp area which indicates contact with the Roman empire. These are for example an ivory sword hilt and pommel, and ivory (folding) knives. The folding knives have not been found elsewhere in the Netherlands. Not all ivory objects have been identified as to species, but some can be identified as elephant ivory. These luxury imported items must have come via the Roman empire and testify to contacts between the terp area and the Roman empire, but Roman influences are limited. However, it is striking that specifically these few luxury items have been found in this region.

Imported objects

In contrast to the locally homemade artefacts, such as various tools, are other artefacts largely uniformly distributed throughout the whole Roman empire. Most of these artefacts, such as military items or caskets with bone hinges, were probably imported from other areas in the Roman empire, although their places of production are still uncertain. These objects were imported as finished items; there are no indications for the import of raw materials. However, not all objects that were common items for Romans and have been found in heavily Romanized places have also been found in the Netherlands (such as keys, parts of *klines*, elaborately decorated knives and other objects). Frequencies are low (e.g. spoons) and the artefacts are less decorated (for example the hair or clothing pins) compared to those from other areas. Furthermore, a difference in raw material can be observed; ivory artefacts are few in the Roman period in the Netherlands, at the edge of the Roman empire.

Therefore, imports of objects from osseous tissues from the Mediterranean to this region were limited in number and range, and the objects were less elaborately decorated and usually made of bone; ivory objects rarely came to this area. The objects mainly reached the Roman military and villa settlements, with the exception of the terp area. The import of these objects ceased before the end of the Roman period.

Ivory objects from the Roman period are rare and these were traded as finished objects via the Roman empire to the Netherlands. So far there is no evidence that walrus ivory objects reached this area in the Roman or Early Medieval periods. However, not all ivory objects from this period have been identified as to species yet.

Mutual influences

The arrival of the Romans changed the archaeological spectrum with the introduction of new types of objects and, albeit in small numbers, a new raw material: ivory. These typically Roman objects are restricted to Roman occupation phases and are probably imported products. Greep distinguishes 'romanized' objects, such as furniture hinges and military objects, and objects which show a 'cultural continuum' with the Iron Age, such as locally made tools.[583]

[583] Greep 1983a, 58.

Both acculturation and continuity can tentatively be observed in some artefacts and in raw material use. The introduction of the cubical die in this area is attributed to the Romans, and this type of die continued into the present day, although until the Late Medieval and Post-Medieval period their use was limited.
Other objects went out of fashion, such as one-piece long handled combs.

There were mutual influences, as in the case of for instance antler pendants or combs. Romans mainly used boxwood double-sided combs. Antler composite combs appeared at the end of the Roman period. Composite round-backed and triangular-backed combs could have been the same tradition as the one-piece single-sided combs that mainly occur in north-eastern Europe and Scandinavia, whereas the double-sided composite comb could be an imitation in a local material of Roman double-sided boxwood combs.[584] Decorative motifs can also be key in identifying mutual influences and regional traditions.[585] Antler bracelets can probably be considered imitations of ivory bracelets.[586]

Another example of mutual influences are the antler pendants. Undecorated antler discoid pendants had been used since the late Iron Age, although in small numbers.[587] In the Roman period pendants with different decoration motifs appeared, for example the phallus symbol.
In the Netherlands, antler pendants are in the Roman period restricted to Roman military contexts, but outside the Netherlands undecorated finds are known from settlement and grave contexts.[588] It has been suggested that the use of this symbol in combination with an antler burr could be a mixture of a Roman symbol with a local raw material.[589] The phallus symbol seems to be concentrated in the first and second century AD.[590] In later centuries undecorated examples occur, but these are probably fewer in numbers.[591] In the Netherlands the many undated finds are difficult to interpret.

Pendants made of an antler burr have also been found in early medieval contexts, but unlike the pendants from the Roman period they are decorated with elaborate geometric designs. Usually the coronet of the burr had been removed.[592] How these objects were used, was also different. In the Early Medieval period, they mainly functioned as pendants hanging from a belt. The question is whether these related types represent a continuation of the artefact type or the raw material. Antler burrs are a pre-eminent raw material to make a roundel. Antler also had a symbolic meaning to both the Romans and to other indigenous groups. A continuous development from the Roman until Early Medieval period is therefore still a subject of debate.[593]

Activities in the Roman period

Osseous objects also reflect the activities at a site and the techniques used in for example wool working and needlework. However, the interpretation of osseous objects must be combined with research on objects made of other materials, such as fired clay or wood.
The Romans probably introduced changes in these techniques. Changes in bone and antler tools may reflect technological changes in for example wool working and weaving. Although tablet weaving already existed in the Iron Age, it is questionable whether this technique was used in this area. The first evidence for tablet weaving dates to the Roman period. Another technological change is the introduction of the lathe. The lathe was used north of the Alps before the Roman period,[594] but in the Netherlands bone lathe-turned objects first appear in the Roman period. In the Early Medieval period no direct evidence exists in the Netherlands for lathe-turning of osseous objects on a large scale.

Many objects, such as plant and leather working tools need more research in order to reconstruct the activities on a site or in a period. The function of various bone points is debatable. Use-wear analysis could be an aid in defining the contact material of the individual objects. However, such tools were probably used for different activities depending on the person who handled it, and one tool may have been used in various activities as a multipurpose tool.
Such tools were probably locally manufactured with the bones at hand. Antler rakes and picks, which are usually interpreted as agricultural tools, mainly come from the terp area. Only one late Roman pick comes from Dorestad.[595]

Antler use

Both bone and antler were used to make knife handles. The ratios of both materials varied across different regions, but Dutch examples are too few to allow any conclusions. The main use of antler and ring-and-dot motifs in Magdalensberg is noticeable and has been

584 MacGregor 1985, 74, 77, 78, 82, 92; Deschler-Erb 1998, 157.
585 Greep 1983a, 403- 415; Gostenčnik 2005a, 204-207, Tafel 44-46.
586 Deschler-Erb 2005.
587 Dijkman & Ervynck 1998, 70; Gostenčnik 2005a, 272; Greep 1994.
588 Gostenčnik 2005a, 272; Deschler-Erb 1998, 170; Greep 1994.
589 Mikler 1997, 21, Karte 5; Deschler-Erb 1998, 170.
590 Greep 1994; Gostenčnik 2005a, 275-277; Hottentot & Van Lith 1990.
591 Greep 1994.
592 MacGregor 1985; Dijkman & Ervynck 1998.
593 Greep 1994.
594 Gostenčnik 2005a, 308.
595 Lauwerier & Thach 2021.

tentatively interpreted as the result of local influences.[596]

Antler working in general has often been regarded as a local tradition,[597] but antler was also used by the Romans, for example when flexibility was required for composite bow nocks, or for apotropaic objects, such as amulets. A few red deer and elk antler waste fragments have been found at Naaldwijk,[598] but antler working in this period has not yet been studied in detail. Many studies have observed an increase in the use of antler during the transition from the late Roman to the Early Medieval period.[599] This can also be observed in the Netherlands.

5.9.2 Early Medieval objects

Most Merovingian osseous artefacts come from grave contexts and give information about attire, burial rites, beliefs and contacts. These are mainly combs and amulets/pendants and are largely uniform across a wide area in north-western Europe. Finds from the Netherlands are not numerous.

Finds from the Carolingian period come from settlements or central places such as Dorestad, and the terp area. Only a small part of the osseous artefacts from Dorestad has been studied. Around the tenth century other cities took over this central role, such as Souburg, Tiel, Deventer and Zutphen.

A change in religion and burial rites are the main causes for the changes in the archaeological spectrum during the Early Medieval period. This was a gradual process and the most important observable change is the decline in the ritual deposition of grave goods with the deceased. Regarding specific artefacts, the disappearance of several types of amulets and pendants is noticeably at the end of the Carolingian period, a phenomenon which was connected to these changes in religion.

Many osseous artefacts reflect activities relating to textile working, such as spindle whorls, double-pointed rods, a few weaving swords, and three-pronged tools. These could indicate an increase in textile working in this period but this issue requires more and multidisciplinary research such as artefact studies of other materials, and zooarchaeological analysis. Specialized wood working in the terp area is demonstrated by the presence of antler planes. Other home-made tools of bone or antler indicate working with skin, pottery, leather and plants. Use-wear analysis could help in the interpretation of the function of these objects.

Terp area

A large corpus of early medieval osseous artefacts comes from terp sites. The importance of this area has already been mentioned, but the considerable numbers of osseous artefacts is striking. This can only be partially explained by their good preservation in the soil. The diversity of the objects is also somewhat greater than in other areas in the Netherlands. Some objects are restricted to the terp area or have been found in this region in considerably numbers.

Combs and contacts

The comb is one of the most common artefact types in archaeology and combs have been found all over the world throughout different time periods. Combs are not only hygienic objects but can also be used for display, as grave gifts or to express social identity.[600] Although their function is largely identical, many differences in shape, decoration, production and raw material do exist. Comb research can reveal changes through time but also regional differences and for example contact between regions.

The Late Roman and Early Medieval periods are characterized by changing trading areas and routes and the movement of social groups. The osseous objects can also reveal contacts with other regions; this applies particularly to combs, which are common finds throughout the Early Medieval period in various contexts. Combs from other regions do not necessarily indicate trade in combs but may also reflect movement of people,[601] or for example gift exchanges; thus contact in a broad sense. Trade in raw materials is another possibility. The combs are widely distributed, but regional differences in style and raw material occur and therefore show regional contact and influences. There are noticeable differences in comb types in different regions in north-western Europe and certain comb types have been identified as local types.

Another feature is the almost complete absence of horn composite combs, which occur

596 Gostenčnik 2005a, 206.
597 Deschler-Erb 2005, Gostenčnik 2005a.
598 Rijkelijkhuizen 2012a.
599 MacGregor 1985, 32; Greep 1994.
600 Ashby 2011b.
601 Riddler & Trzaska-Nartowski 2023.

in abundance in England. Only a few examples are known from the Netherlands. However, the longbone comb, which probably appears around the tenth or eleventh century and occurs in large numbers in the Late Medieval period, is a rare find in England.[602] Another type of comb shows contact with Scandinavia. Scandinavian plano-convex combs, also classified as Ambrosiani's A-combs, are often made of reindeer antler and have a lemniscate decoration. However, the occurrence of the various comb types could not be studied here in detail.

Whale bone and gaming pieces

Norse influences can probably also be seen in the early medieval gaming pieces, such as the large discoid and the dome-shaped gaming pieces. The use of whalebone artefacts could point to Scandinavian contacts. The Scandinavian exploitation of whale products and the trade in whale bone artefacts such as gaming pieces between Scandinavia and Europe already existed in the pre-Viking period.[603]

The use of whale bone artefacts starts in the Early Medieval period, which coincides with the Scandinavian exploitation of whale-species populations. Only a few finds are known from Dutch coastal sites, but since whale bone is often not recognized the exact number of whale bone artefacts in the Netherlands is unknown. Whale products were being used in the Netherlands already in the Early Medieval period, and it is possible that some whale species were hunted in Frisia or Flanders.[604] On typological grounds, the Dorestad gaming pieces and the whale bone weaving swords found in the Netherlands are thought to be of Scandinavian origin.

Furthermore, numbers in Scandinavia are high and only a few come from the Netherlands. No evidence exists thus far for the manufacture of whale bone artefacts in the Netherlands. Most whale bone artefacts have been recovered from the terp area. A unique whale bone artefact is a tau staff, dated around 800 AD and recovered from terp soil at Bernsterburen. Its origins are unknown but may be Frisian, because no parallels have been encountered yet.[605]

Ivory rings and exotic shells

A few ivory finds from the Early Medieval period might indicate that trade routes remained intact, or alternatively that different trade routes arose. An example are the ivory rings which were imported as finished artefacts.[606] Research on rings found in England proved these to be ivory from African elephants and probably contemporary to the graves in which they were found.[607]

Only a few ivory rings have been found in grave contexts in the Netherlands. The ring from Lent shows repairs and was obviously used for a long time.[608] Based on Renner's typology the disc dates to the seventh century, but the ivory ring could be older and re-used.[609] From the seventh century AD until the later medieval period elephant ivory objects no longer occur, suggesting that for a long period there was no regular import of ivory or ivory objects.

The use of shell is limited to rare finds of cowrie shells, which indicate import from the Red Sea region or the Indo-Pacific region. Trade via the port of Dorestad is suggested.[610]

Early medieval agricultural and craft tools

Agricultural and craft tools for activities related to basketry, pottery, and the working of textiles, leather and plants are likely locally made tools with little or no modification of the bones. Their use cannot be interpreted by referring to related bone objects with similar features or a similar raw material. Many variations occur, based on various factors such as individual choices, activities at the site and local habits. Furthermore, most of these tools may have been multifunctional and used for several different activities. Use-wear analysis proved to be valuable to identify these objects, their manufacturing process and their contact material, contributing to the identification of a possible function or functions and thus to the interpretation of the activities at a site.

5.10 Craft and trade in osseous and keratinous materials

5.10.1 Bone and home industry tools

Artefacts in the Roman and Early Medieval period were made of bone, antler, ivory or horn. It is difficult to pinpoint places of production, but many typically Roman objects, usually made of bone, were probably imported as finished artefacts, although evidence for local production

602 Only two unpublished examples are known; pers. comm. Ian Riddler.
603 Hennius *et al.* 2018.
604 Van den Hurk *et al.* 2020.
605 Knol & Looijenga 1990.
606 Riddler & Trzaska-Nartowski 2011; 2013; Hemer *et al.* 2023.
607 Hemer *et al.* 2023.
608 Van Es & Hulst 1991; repairs have also been noticed on English rings: MacGregor 1985, 110-112.
609 Re-use of bronze discs was already proposed by Renner 1970, 48-49.
610 Knol 1988, 2006; Prummel 1983.

of for example bone and antler military equipment has been forthcoming in for instance England and Germany.[611] The local manufacture of bone and antler objects can be detected through waste fragments, but no intensive study of bone and antler working in the Netherlands has yet been carried out.[612] However, the use of the lathe has only been observed in probably Roman import products. Otherwise most bone tools can be considered local or home-made. The shape of the individual bones was utilized and is often still visible in home-made artefacts, such as cattle rib bones or metapodials for polishers or scrapers, pig fibulae for needles, or long bones of birds for flutes. Home-made bone objects can be observed in all regions. Waste fragments of bone working have not been studied in detail and it is therefore difficult to provide any information on the scale and nature of bone working in the Roman and Early Medieval periods. Evidence for early medieval bone working has been found at for instance Wierum, but a general study and synthesis is lacking.[613]

5.10.2 Early Medieval antler working

A pronounced increase in antler use can be observed from the Late Roman onwards. Antler was primarily used for composite combs and discoid objects such as spindle whorls and pendants. It was chosen because of its properties; antler is a resilient material and therefore suitable for combs. The base of an antler provides a large area of solid osseous tissues suitable for spindle whorls and amulets. The symbolic meaning of antler could also be a reason for choosing this material. Availability was another consideration.

It has often been suggested that antler working was a local tradition, although the Romans also used antler. Antler was preferred when its elastic properties of antler were required, such as in bow splints or for artefacts which were supposed to protect from mischief or evil, such as amulets. Roman-period antler working has been observed in some places.[614] The increase in antler working in the Early Medieval period has often been connected to Germanic cultural groups.[615] Antler working in the Early Medieval period displayed a high standard of skill and expertise, as indicated by the manufacturing process and design of the composite combs, amulets and spindle whorls. Specialized tools were needed, such as a saw, a knife, a file, a drawknife, a centre-bit or a drill for ring-and-dot motifs. In the Early Medieval period a pair of compasses was used to make geometric designs.

A longstanding debate in the archaeological field concerns the question whether bone and antler workers were itinerant or sedentary and whether large production places existed. There is little evidence for antler working in the Merovingian period in the Netherlands thus far. Grave finds from the Merovingian period show many similarities with artefacts from the wider region, which could indicate a few centralized production places.

From the Carolingian period onwards production sites are identified by the presence of small quantities of waste material. However, waste fragments could also be secondary deposited and its presence and retrieval are dependent on depositional processes and excavation techniques. Sieving should be done in order to locate the small shavings and recognize production places.[616] More research is necessary before conclusions can be drawn on the number and size of the production sites. However, waste fragments have been found at several sites, but only in small numbers.[617] Riddler and Trzaska-Nartowski suggest that antler working was a sedentary but seasonal activity in several English settlements, rather than taking place in centralized production centres.[618] This seems probable for the production in the Netherlands as well. The supposed homogeneity of the combs in north-western Europe is dismissed by Ashby, which also speaks against central production places for antler working. The scale of antler working at a site can often not be identified due to variables such as excavation techniques (sieving), depositional processes (possible dumping areas outside the settlement) and research biases (antler waste stored in boxes with other archaeozoological material). Antler working in the Netherlands has not been a subject of extensive research. The alleged manufacture of combs in Frisia is supported by low numbers of waste fragments and a few semi-finished combs.

Antler was deliberately collected as a primary raw material and was not a by-product.[619] This also stresses the importance of antler

611 Greep 1983a, 85-88.
612 Antler waste fragments have been found for example in Heerlen: Groot 2020.
613 Prummel 2006, 36-37.
614 Groot 2006, 2009; 2020; Lauwerier 1988, 70-71.
615 Dijkman & Ervynck, 59, 79; Deschler-Erb 2005.
616 Greep 1983a, 37-40; Esser 2009.
617 E.g. Valkenburg-De Woerd, Leidsche Rijn, Dorestad, terp area.
618 Riddler & Trzaska-Nartowski 2023.
619 Van der Pal 1988.

working. Antler was probably retrieved from nearby regions, but trade as a raw material is also a possibility.[620] However, the use of red deer antler does not necessarily imply that this antler was gathered locally or regionally. Based on the dimensions of the burrs Riddler and Trzaska-Nartowski suggest a possible antler trade from the continent to Ipswich, for example from Dorestad.[621] Isotope analysis proves that new research methods can also change our point of view.[622] Analysis of antler found at Hedeby proved that red deer antler was probably being imported from the north.[623] Elk was indigenous in the Netherlands until the tenth century.[624]

In contrast with the Late Roman period when antler working was increasing, a decline in antler use can be observed at the end of the Early Medieval period, which progresses into the Late Medieval period, when bone objects are becoming more numerous compared to antler objects. This change can also be observed when looking at specific artefacts such as combs. Combs are present in all periods and their raw material can also reflect the availability of various raw materials, as well as cultural influences. From the fourth century AD combs were almost exclusively made of antler. The elastic properties of antler made this the ideal raw material for comb manufacture. During the Medieval period the raw material changed, and composite combs appeared in which antler and bone were combined. Around the tenth/eleventh century AD longbone combs appeared made of a single piece of bone, and the composite combs gradually disappeared.[625] A shortage of antler around this period has also been observed.[626]

5.10.3 Combs: general developments

Combs and the terp area

An interesting aspect of comb research is the geographical range within the Netherlands where the combs have been found. The comb typology in this volume is largely based on finds from the terp area. Furthermore, many more combs and waste fragments come from the terp area and the important trading town Dorestad than from other sites. This also stresses the importance of the terp area as a central region, but also probably as a centre of antler craft.

However, most objects form terp sites were not found in excavations but were collected in the past when the fertile terp soil was dug away and sold. Many objects and possibly also bone and antler waste may have been lost, and objects were collected out of context and therefore without a clear date.

The lack of a date for the bulk of the finds is an obstacle all studies of comb and antler manufacture have to face. Nevertheless, the large collection of the Fries Museum is of scientific value and was used to create a typology of combs found in the Netherlands. The Dutch combs, and especially combs from terp sites stand out because of the great variety in comb types. This also illustrates the contacts with various regions.

Transition from one-piece to composite combs and raw material use

Several general developments can be observed from the combs that have been found in the Netherlands. These developments reflect changing regional contacts and trade routes, a degradation in comb quality, and a change in raw material use.

From the third or fourth century onwards composite comb types replace the one-piece combs which had been in use in the Iron Age and Roman period. Composite combs dominated in the Netherlands at least until the tenth century AD. A transition from composite to one-piece combs must have occurred around the tenth or eleventh century AD. Tenth to twelfth-century combs, however, are underrepresented in the Netherlands, which make this period and this transition more difficult to interpret. The change was probably set in motion by a shortage of antler, and combs were made from other raw materials such as bone and wood.[627] In the Post-Medieval period ivory combs became a common feature, with the Dutch Republic importing large numbers of elephant's tusks.[628]

Continuous development from Iron Age combs into plano-convex types and the development of local types

The development from one-piece combs to composite combs is a continuous one. The rounded back of the one-piece single-sided combs was adopted by the composite round-backed combs, as suggested by the shape but also the decoration style. The composite

620 Dijkman & Ervynck 1998, 59.
621 Riddler & Trzaska-Nartowski 2023.
622 Ashyb 2009; Von Holstein *et al.* 2014.
623 Becker & Grupe 2012.
624 Clason *et.al.* 2000: 15; Walch, 2000, 108.
625 Rijkelijkhuizen 2011d.
626 Rijkelijkhuizen 2011d, 2011e, 2011f.
627 Rijkelijkhuizen 2011c.
628 Rijkelijkhuizen 2004, 2009.

bell-shaped, triangular-backed and barred zoomorphic combs are contemporaneous with the composite round-backed combs and seem to fit into a different tradition, although the barred subtypes can be a local influence.

Around the late fifth or early sixth century AD a development from broad types into more elongated comb types can be observed. Round-backed combs developed into elongated round-backed types. Both comb types have the same riveting method along the edges, but the combs become longer from this point onwards.

Finds of composite elongated round-backed combs in the terp area also refute the suggestion that these combs were only found in Scandinavia. Furthermore, probably local plano-convex combs have also been recognized. A continuous development is observable from elongated round-backed into plano-convex comb types. Local types occur in several regions, suggestive of local production rather than itinerant craftsmen, at least not those travelling between larger regions. For example, a Scandinavian plano-convex comb type differs from local plano-convex types in its shape, raw material use and ornamental style. Composite bowed combs, for instance, are also absent from Scandinavia.[629] Local plano-convex combs also occur in other regions.[630]

The plano-convex types developed seamlessly from the Merovingian into the Carolingian type, with a change of decoration style marking the transition from one to the other. A change in decoration style is observable in the Carolingian period, and so is the probable emergence of more local types. Composite Carolingian plano-convex comb forms a local type in the terp area, just as Scandinavian plano-convex combs are local versions of plano-convex comb types. The presence of the predecessors of the plano-convex combs at terp sites at the very least challenges the notion of a development of the plano-convex type solely in Scandinavia. Coped combs, which are rare at terp sites and seem to stand out as a different tradition, can probably also be regarded as a regional type coming from eastern Europe. Composite bowed combs have a different shape than the plano-convex types, but have barred and winged subtypes and decoration style in common with the local plano-convex types which means this type is related or at least contemporaneous to these types as well. The development of the bowed comb type probably continues in the composite irregular combs. (Partially) contemporaneous types such as the handled, asymmetrical and semi-double-sided combs can also be found in specific regions.

Barred and winged subtypes

Plano-convex barred combs are characterized by two connecting plates on each side of the comb. The top connecting plates are usually broad and the lower is a narrow bar. The occurrence of barred combs provides important information on the spread of combs, people and technology.

Barred combs seem to be restricted to certain parts of north-western Europe and do not occur in for example Scandinavia.[631] Dutch examples are not reliably dated, but in general barred combs date to between the third/fourth and the seventh/eighth century AD. In the typology presented in this volume, barred combs have been classified as subtypes of existing comb types which can date individual barred combs more precisely. The relatively large number of barred combs from the terp area is remarkable. This aspect requires further study, but it may indicate local or regional production.

Winged subtypes probably appear around the Late Merovingian period and occur in the local plano-convex and bowed types. Moreover, Merovingian and Carolingian straight combs and Scandinavian comb types lack winged subtypes, which suggests a different tradition. Winged combs survived into the eleventh or twelfth century AD, and their disappearance coincides with that of the composite one-sided combs.

Straight combs – a different tradition?

Merovingian and Carolingian straight combs seem to fit in another tradition than the planoconvex and bowed types. Whereas Merovingian straight combs occur in a larger region in north-western Europe, Carolingian straight types seem to be restricted to the terp area. Barred and winged subtypes are absent among the straight comb types.

General changes in decoration style

Changes in decoration style are also observable. Single or multiple ring-and-dot motifs and partial border lines decorate the earliest combs. Chiselled decoration only appears on composite round-backed combs and disappears somewhere before the fifth century AD. According to Roes this is an old decoration style.[632] Interlaced ring-

[629] Ashby 2011.
[630] Flyorova 2001.
[631] MacGregor 1985, 87, Ashby 2011.
[632] Roes 1963.

and-dot motifs are only present on composite elongated round-backed combs. Interconnected ring-and-dot motifs appear on the earliest composite combs, and this type of decoration persisted into the seventh/eighth century AD. Interconnected ring-and-dot decoration occurs on combs from a large area in the Merovingian period.[633] Intricate geometrical designs were popular in the sixth century and also occur in a large part of north-western Europe.[634] Interlaced and interconnected ring-and-dot motifs seems to occur for a longer period in Eastern Europe than in north-western Europe.[635]

A decline can be observed of ring-and-dot arrangements and designs, such as clustered ring-and-dot motifs on triangular and bell-shaped combs, although ring-and-dot motifs never disappear entirely. In the Carolingian period a more linear decoration replaces earlier decoration types and designs, and the border line decoration disappears. Decoration styles incorporating oblique and crossed lines and panelled decoration were now used more often. A lemniscate or T-pattern made up of ring-and-dot motifs and *Flechtband* decoration can be seen on Scandinavian combs from this period. A more linear decoration seems to start later in Scandinavia. Also the use of border lines continues in Scandinavia for a longer period than in the Netherlands. [636]

A transition from composite to one-piece combs, and the use of various raw materials
The small number of tenth to twelfth-century combs makes them harder to interpret. However, the decline of the specific craft of making composite combs and the transition towards one-piece combs started during this period. Usually studies remark upon the pronounced change from composite combs to so-called longbone combs. Shape and (the absence of) decoration contrast with the craftmanship of the composite combs. The function of longbone combs as hair comb is therefore often challenged. However, a change in craftmanship and raw material probably already started during the later phase of the composite comb types. This transition in raw material can also be seen in double-sided combs. Bone seemed to be used more often for the composite combs from this period, and bone was also used for the composite late medieval double-sided combs.[637]

Boxwood provided a new raw material in the Late Medieval period and marks the beginning of large-scale production of one-piece double-sided combs (see Section 6.5.2). The use of ivory eventually marked the end of the Medieval period and the starting point of an era in which global trade provided tons of elephant ivory for the local production of double-sided 'lice combs' (see Section 6.5.2).[638]

5.10.4 Hornworking

Only a few artefacts made of horn have been found that date to the Roman and Early Medieval periods, due to the poor preservation of this material in the soil. Evidence for horn working in the Netherlands during the Roman and Early Medieval periods is scarce and claims of zooarchaeological evidence for this craft should be done with caution.[639] However, it is likely that bone and antler workers also worked horn at some sites or periods.[640] At Dorestad, a horn working industry was suggested by the presence of cattle and goat horn cores.[641] However, horn cores are also associated with the leather trade, especially those of goat since the small size of goat horns limits their usefulness for artefact production. Sawn horn cores, evidence of horn working, have been found in Deventer in ninth to tenth-century contexts. Evidence for bone and antler working was also found at this site.[642]

633 According to Kind this pattern was widespread in antiquity in the Mediterranean area: Kind 2007.
634 Faider-Feytmans 1970, Plate 70, 91, 116, 130; Lambert 1987, 204; Theune-Großkopf 1996, 87-90; Brulet 1970, 82; Aufleger 1996, 641-642.
635 For example Kiev: Sergeeva 2011, 128. Sarkel: Flyorova 2001, Fig. 14.
636 See Ambrosiani 1981.
637 Prummel *et al.* 1999; Rijkelijkhuizen 2004, 2011d.
638 Rijkelijkhuizen 2004; 2009.
639 MacGregor 1985, 51-53.
640 Riddler & Trzaska-Nartowski 2023.
641 Prummel 1983.
642 Rijkelijkhuizen 2011e; 2013a.

6 Osseous and keratinous artefacts in the Late Medieval and Modern period (>1050 AD)

M.J. Rijkelijkhuizen

6.1 Introduction

Urban archaeology provides the bulk of the material in the Netherlands. Multiple occupation layers in often wet environments as well as cesspits provide good conditions for the conservation of organic remains. Most of this material dates from the thirteenth and fourteenth century onwards and is related to the expansion of the upcoming Dutch towns. Less material is available from the tenth to the twelfth century, and this is the research gap addressed in the present study.

With few exceptions the objects mentioned in this chapter date from the thirteenth and fourteenth century onwards, with many dating to the Post-Medieval period. Although most excavations produce a few osseous or keratinous objects, not many have been studied. Only a few are described or depicted in reports on development-led research. Many objects unearthed during excavations before 2007 are kept in archaeological depots. For most of these excavations no reports or records are available.

This chapter therefore largely concentrates on unpublished research data. This means that the objects can be hard to date because many older excavations with objects of animal material have not been studied and published. So far, all osseous and keratinous objects from a few cities have been studied by the author: Amsterdam, Haarlem, 's-Hertogenbosch, Alkmaar and Delft. These form the basis of this research (Fig. 6.1).[643] Furthermore objects from Helmond were studied. Objects in the municipal depot of Zutphen, Limburgs Museum, the provincial depot of Erfgoed Zeeland, the Provincial Depot of Zuid-Holland, the collection of Huis van Hilde/Provincial Depot of Noord-Holland, and the maritime collection of Batavialand have also been used but could not be studied in detail. Additionally reports, theses and articles of other researchers were consulted as well. Many more finds from other collections in other areas in the Netherlands still remain to be studied.

A research bias is therefore unavoidable. However, artefact types found in late and post-medieval cities are largely uniform and are typical of the types in different areas in the Netherlands. Nonetheless, it is impossible to study material use in the entire research area. The large amount of Roman and early medieval artefacts from the northern terp mounds, for example, contrast sharply with the low number of finds from the Late and Post-Medieval period which have been studied or published.

In this chapter less is referred to artefacts from other countries, for fewer publications of osseous and keratinous artefacts from this period are available. Nevertheless, this period is characterized by a pronounced uniformity which extends across borders. Trade in osseous and keratinous materials and finished artefacts contributed to this uniformity. However, more research for this period, specifically as regards the trade in finished objects, remains necessary.

6.2 Craft tools

6.2.1 Awls and marlin spikes

Post-medieval large awls vary in shape, size, material and function. Both one-piece and composite awls have been found, and the manufacturing techniques vary greatly.
One-piece awls made of bone were often made at household level rather than by artisans. An awl made from a metacarpal bone of a horse, found in Amsterdam, has an ownership mark.[644]
Awls made of antler have also been found.[645]
The properties of antler make this material very suitable for tools, but availability was probably an issue. Larger awls sometimes have an eye, possibly for suspension. The function of these awls is difficult to establish without use-wear analysis. Some of them have been interpreted as marlin spikes, especially those found in ship wreck contexts.

Composite awls could be made of a combination of for example metal, wood and bone. Three examples where the awl section was made of bone with a wooden handle come from wreck sites (Fig. 6.2).[646] A metal ring is present. The wood had been decoratively carved. Their exact function still eludes us, but their context suggests a specific use on a ship.

643 Ongoing research Rijkelijkhuizen; see reference list.
644 Rijkelijkhuizen 2004, dated 1575-1585.
645 E.g. Amsterdam: Rijkelijkhuizen 2004, Rijkelijkhuizen 2024; collection Maritiem Archeologisch Depot, Batavialand; 's-Hertogenbosch; Helmond.
646 Collection Maritiem Archeologisch Depot, Batavialand.

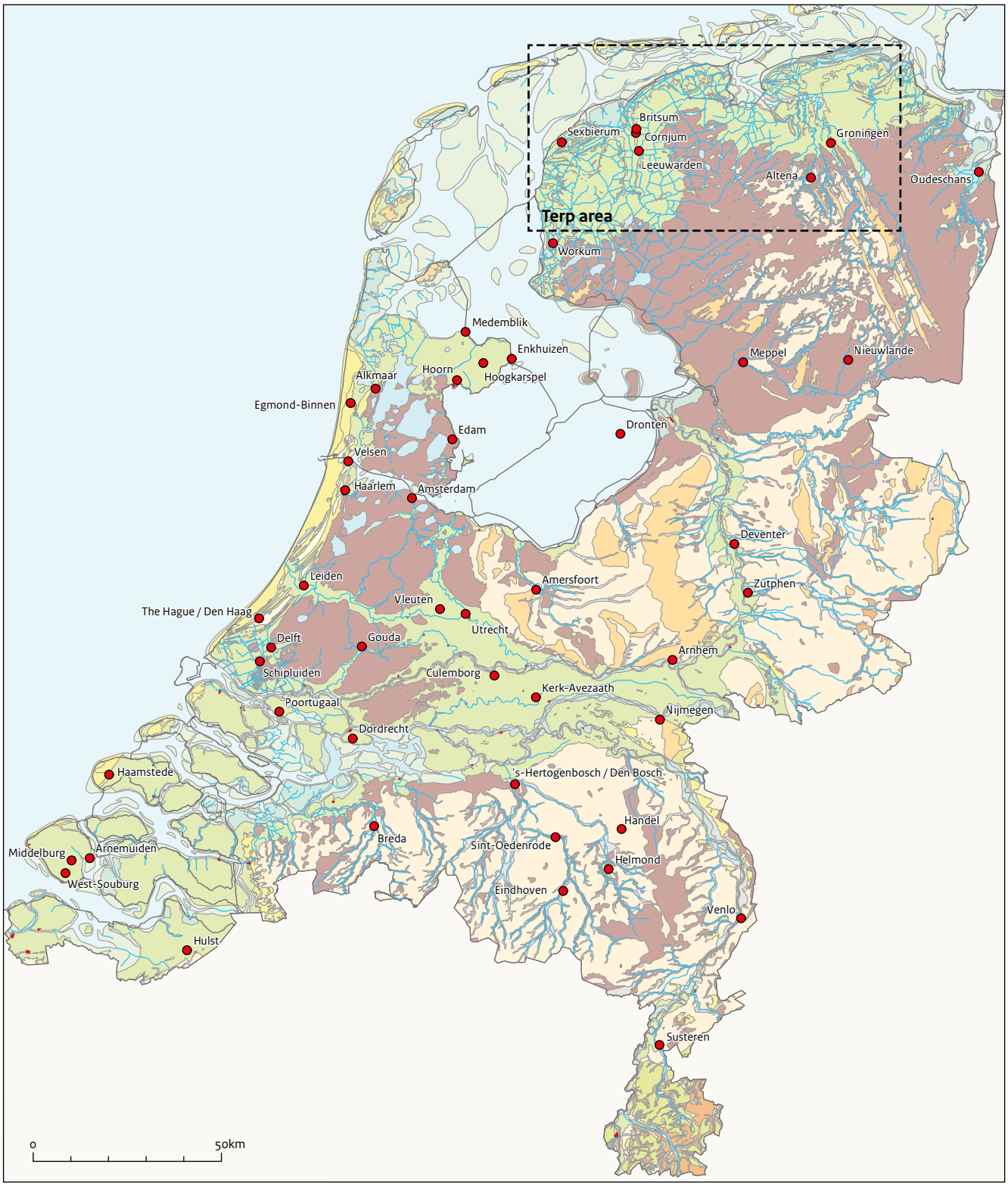


Fig. 6.1 Palaeogeographic map of the Netherlands (1500 AD) showing the terp area and locations mentioned in this chapter. After Vos *et al.* 2020. Province names are shown on a separate map (Fig. 2.1).

Fig. 6.2 Composite bone awl with wooden handle (Shipwreck Waddenzee, length 16 cm, inv. BZN8-297). Collection and image Maritiem Archeologisch Depot, Batavialand.

6.2.2 Rope adjustment buckles

Rope adjustment buckles are small bone objects with two or three holes of equal or different size. The holes show intensive use-wear traces in several directions, suggesting that a rope was probably pulled through. Several specimens from Amsterdam have a ring-and-dot decoration and were made of compact bone.[647]
The Amsterdam rope adjustment buckles are not dated, but an example from Huis Ter Kleef, Haarlem, is of post-medieval date.[648] Rope adjustment buckles found in the terp area are very different from the examples from Amsterdam and Haarlem. The northern specimens were made of cattle astragali or calcanea, and therefore larger. These examples are also undated.[649]

6.2.3 Pulley axles

Wooden pulley axles have been found in Enkhuizen; these were probably part of a ship's tackle.[650] Three similar objects made of metapodial bone have been found in Amsterdam. The bones show only little modification. The joints of the metapodial bones were removed and required little or no further modification. The shaft of the bones shows intensive use wear. Wood remains were present in one of these bone objects (Fig. 6.3).[651]

a

b

Fig. 6.3 Pulley axle, a. front; b. side (Amsterdam, North-South-Line, length 9.3 cm, Rijkelijkhuizen 2024). Collection Monumenten en Archeologie, gemeente Amsterdam. Image W. Krook.

6.2.4 Pottery decorating tools

A post-medieval tool that was used to decorate pottery is known in Dutch as a '*ringeloor*'. It was made of the keratin layer of a cattle horn where the tip was sawn off and a small wooden tube was put in.[652] The horn served as a reservoir for slip, while the small wooden tube was used to decrease the size of the opening in order to be able to control the flow. Two possible horn pottery decorating tools come from Amsterdam and 's-Hertogenbosch.[653]

647 Rijkelijkhuizen 2004; Rijkelijkhuizen 2024.
648 Bottelier & Rijkelijkhuizen in prep.
649 Roes 1963, 45-47, Plate XLII.
650 Den Ouden & Vermeeren 2008.
651 Rijkelijkhuizen 2024.
652 Van Vilsteren 1987, 29.
653 Amsterdam: seventeenth to nineteenth century, Rijkelijkhuizen 2004; 's-Hertogenbosch: seventeenth century, Rijkelijkhuizen 2018b.

6.2.5 Tallow horns

Two complete cattle horns (the keratin layer) have been found in ship wrecks. The tip was only sparsely worked and at the open end a suspension hole was present. These were interpreted as tallow horns (Fig. 6.4).[654] Tallow horns were filled with grease and used by sailmakers to store and grease their metal needles. One dates to the seventeenth century and the other to the late eighteenth or early nineteenth century.

Fig. 6.4 Tallow horn (shipwreck Lelystad, length 14 cm, inv. OB71-177). Collection and image Maritiem Archeologisch Depot, Batavialand.

6.2.6 Polishers

Bones could also be used as ad-hoc tools, for example as a wedge or a polisher.[655] Their exact use is difficult to establish without use-wear analysis. A polisher with a specific function was used in sail making. After pieces of sail canvas had been sewn together the seam was flattened with a polisher. These were made of a cattle metatarsal bone where one end was sawn of and wood was inserted into the marrow cavity. Both the bone and the wood show intensive use wear.[656]

6.2.7 Folding tools

Folding tools were used to make a sharp crease in materials such as paper or leather. They were used in different crafts, for example book binding or shoe making. There is usually a suspension hole at one end while the other has a sharp or rounded point. Several examples have been found in Amsterdam, made of the compact tissue of a large mammalian bone while one was made of ivory (Fig. 6.5). One bone folder is decorated with a geometric design.[657] An ivory example has been found at Keenenburg Castle (Schipluiden).[658]

a b

Fig. 6.5 Folder, a. front; b. back (Amsterdam, North-South-Line, length 14.2 cm, Rijkelijkhuizen 2024). Collection Monumenten en Archeologie, gemeente Amsterdam. Image H. Strak.

654 Collection Maritiem Archeologisch Depot, Batavialand.
655 E.g. De Jong 1994a; Van Wijngaarden-Bakker 1981.
656 Kleij 2005.
657 Rijkelijkhuizen 2004; Rijkelijkhuizen 2024.
658 Anthony & Bult in prep.

6.2.8 Paint palettes

Paint palettes are known from paintings and were usually made of wood. Occasionally shells were used as a paint palette, but only a few examples are known. One mussel shell (*Mytilus edulis*) from Venlo has traces of a red paint consisting of lead sulphate and vermillion.[659] It dates to the seventeenth century. A sixteenth century freshwater mussel shell (*Unio pictorum*) from Eindhoven was clearly used as paint palette as well.[660] Two late-sixteenth-century shells that have been found at Nova Zembla also show traces of red paint.[661] A mussel shell with red paint from Alkmaar dates to the second half of the seventeenth century.[662]

6.2.9 Needle cases

Most sewing needles in the Late- and Post-Medieval period were made of metal. These needles were stored in needle cases manufactured of various metals, but also of wood, bone and ivory.[663] Many bone and ivory examples have been excavated in Amsterdam and other cities.[664]

Sewing sets could also be kept in boxes of various materials such as ivory, mother-of-pearl and tortoiseshell.[665] Small boxes are rare finds in archaeological contexts anyway, but if they do occur the original contents are usually unknown (see Section 6.8.4).[666]

6.2.10 Thimbles

Thimbles were made in Holland from the sixteenth century onwards, and a large industry evolved in the seventeenth and eighteenth centuries.[667] Thimbles were used in sewing but also made suitable gift items, for example on the occasion of a marriage.[668] These small objects have been made from various metals; thimbles from animal or other natural tissues are rare, and only a few archaeological examples are known. These may or may not have been actually used; perhaps some or all of them were a wedding gift. An ivory thimble has been found in Amsterdam during the excavations preceding the construction of the new underground railway through the city centre, the North-South Line.[669] Another ivory example comes from Breda.[670] An ivory thimble was also found in 's-Hertogenbosch. In Alkmaar, a thimble from a cesspit dated to between 1600 and 1675[671] was made of bone and therefore a composite made in two sections, unlike the one-piece ivory thimbles. The thimble from Zutphen is a rare nineteenth century specimen made of mother-of-pearl (Fig. 6.6). It was probably made in France.[672]

Fig. 6.6 Mother-of-pearl thimble (Zutphen, St Walburgis Church, length *c.* 2.3 cm, Fermin 2020). Collection and image Team Archeologie, gemeente Zutphen.

6.2.11 Yardsticks

A yardstick, '*ellemaat*' in Dutch, was a measuring stick approximately 68-70 cm in length, with regional variations. The body was usually made of wood but the top and bottom ends or surface inlay could be made of other materials. The only archaeological remains of a yardstick are a bottom and top end made of bone. The top end is engraved with decorative motifs and the year '1596' (Fig. 6.7).[673]

6.2.12 Yarn and thread holders

In needlework, yarn and sewing thread could be stored on various kinds of holders or in different kind of containers, varying from yarn baskets and barrels to thread winders and other spools and reels (Fig. 6.8). Simple thread winders, such as spools and reels are often made of metal,

659 De Jong 1997, 27-30; De Jong & Van Son 1997.
660 De Jong 1994b.
661 Collection Rijksmuseum.
662 Bitter 2022, 722-723.
663 Sullivan 2004; Helfrich, Benders & Casparie 1995; Rijkelijkhuizen 2004; Rijkelijkhuizen 2020a.
664 Amsterdam: Rijkelijkhuizen 2004; Nijmegen: Van Vilsteren 1987, 65; Haarlem, Alkmaar, Zeeland, etc.
665 Sullivan 2004, 18-23.
666 Rijkelijkhuizen 2004.
667 Boon & Langedijk 2008.
668 Sullivan 2004.
669 Rijkelijkhuizen 2024.
670 Pers. comm. Theo de Jong.
671 Bitter 2022, 932-933.
672 Collection Team archeologie, gemeente Zutphen; Sint Walburgiskerk, Fermin 2020.
673 Collection Erfgoed 's-Hertogenbosch.

Fig. 6.7 End piece of a yardstick ('s-Hertogenbosch, length end piece 4.4 cm). Collection and image Erfgoed 's-Hertogenbosch.

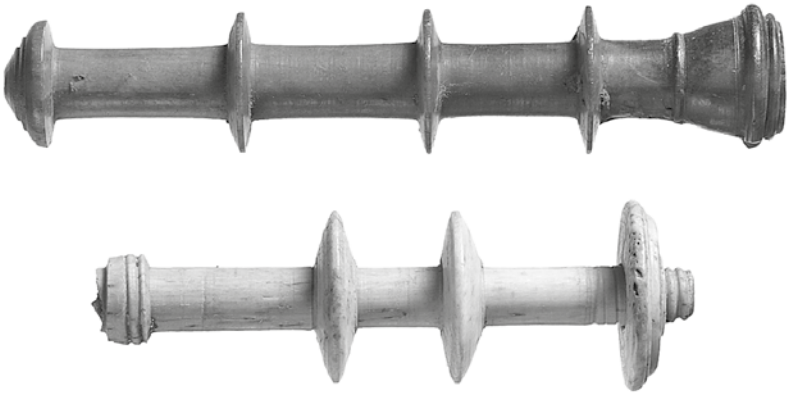


Fig. 6.8 Thread holders (Amsterdam, length of upper specimen 7.2 cm, Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image A. Dekker (UvA).

wood or bone or ivory. A few archaeological examples from osseous materials are known.[674] These could be subdivided into separate compartments for different types of thread and were usually made of bone.[675]

A unique example is an eighteenth-century thread holder with case from Enkhuizen. The thread holder, with five compartments was complete, and the bone case was decorated with open work design.[676] Fragments of cases with open work have been found in other towns as well, but these are difficult to identify because of their fragmentary state.

[674] E.g. Amsterdam: Rijkelijkhuizen 2004; Utrecht: Rijkelijkhuizen 2018c.
[675] Rijkelijkhuizen 2004.
[676] Schrickx & Duijn 2016.
[677] Alkmaar: 1650-1725, Bitter 2016, originally published as bone netting needle; Amsterdam: Rijkelijkhuizen 2004, Rijkelijkhuizen 2024; 's-Hertogenbosch; Haarlem.

6.2.13 Needles and bodkins

Sewing and stitching needles are made of metal, while osseous materials were used for a range of other needles and bodkins. Using pig fibulas as the material for needles has a long tradition, due to the natural shape of this bone which provides a perfect needle with only minimal modifications. These needles were rather blunt and had a wide head, suitable for coarse textiles or for example nålebinding. Pig fibula needles have been found abundantly in late and post-medieval contexts in cities and other contexts.

Another type of flat and blunt needle had an elongated eye and is usually made of ivory. These were probably used as bodkins, for example to thread laces through clothing. Small ivory bodkins have been found in post-medieval contexts in city centres.[677] A bone example comes from 's-Hertogenbosch.

A specific kind of bodkin has only been found in Amsterdam (Fig. 6.9). These large decorated bodkins are too thick for regular

Fig. 6.9 Bodkins (Amsterdam, length 9.1 to 12.2 cm, Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image A. Dekker (UvA).

needlework and may have been used for instance as a large bodkin. The decoration is similar to that found on feather curlers, used to curl the feathers of a fan (See Section 6.6.6). Their date is therefore probably also placed between the late sixteenth century until the first half of the seventeenth century. Four examples from Amsterdam confirm a late sixteenth-century date, but others are more broadly dated or undated. It is possible that the hole in the head is in fact a suspension hole, which would suggest a different function. Feather curlers also have a suspension hole.[678]

6.2.14 Lace tools

Lace was very popular in the seventeenth and eighteenth centuries (Fig. 6.10) and various methods existed to make open-work textiles, such as needle point lace, bobbin lace, knotting, and tatting (frivolité). Silver and bronze crochet hooks from the seventeenth and eighteenth centuries from private collections show that crochet existed in some form in this period as well.[679] So far only one archaeological crochet hook is known; it was found in Alkmaar and made of bone.[680]

Although lace bobbins were used in dozens of even several hundred pairs in a single project, excavated lace bobbins are often found as a single find. Lace bobbins were most often made of wood, but a few bone examples are known from archaeological contexts.[681] Finds of bone lace bobbins are however not numerous.[682] An ivory example has been found in 's-Hertogenbosch.

A small shuttle made of elephant ivory has been found in Amsterdam. It is made in three sections assembled by means of two small metal pins and probably dates from the seventeenth century (Fig. 6.11).[683] Shuttles were used for both knotting and tatting. The first references to knotting probably date to the seventeenth century and those of tatting to the late eighteenth century, but the development of both techniques is not as straightforward as has sometimes been suggested. Although according to some researchers larger shuttles were used for knotting and smaller for tatting. The differences between the shuttles of both techniques are not obvious,[684] and for which specific technique this shuttle from Amsterdam was used is therefore unknown.

Fig. 6.10 Drawing of a woman making lace with bobbins, 1600-1620 (artist unknown). Collection Rijksmuseum.

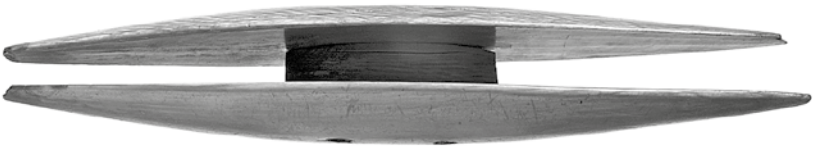


Fig. 6.11 Knotting or tatting shuttle (Amsterdam, length 9 cm, Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image A. Dekker (UvA).

6.2.15 Knitting needle sheaths

Written, iconographical and archaeological evidence for knitting exists from the Late Medieval period onwards. All kinds of clothing and other items were made by knitting. Osseous

678 Rijkelijkhuizen 2004.
679 Sullivan 2004, 152-153.
680 1589-1675, Bitter & van Zanten 2001, 131, originally published as ivory.
681 Wooden lace bobbins, see for example Baart *et al.* 1977, 149; Helfrich, Benders & Casparie 1995; Schrickx 2006, 147; Duijn 2011, 112; Rijkelijkhuizen & Jongma 2020.
682 Haarlem; Keenenburg: Anthony & Bult in prep.; Deventer: Van Vilsteren 1987, 66.
683 Rijkelijkhuizen 2004.
684 Karp 2021.

Fig. 6.12 Knitting needle sheaths (Amsterdam, length 15.3 to 18.6 cm, Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image A. Dekker (UvA).

artefacts clearly associated with knitting are knitting needle sheaths. These sheaths were used as an extension of the knitting needle and increased the knitting speed. Knitting needle sheaths are known from the seventeenth century onwards. Known knitting needle sheaths in private (non-archaeological) collections are mostly in metal and wood.[685] A few osseous examples are known from archaeological collections. Ten examples come from Amsterdam; these were made of a single piece or two pieces fixed together with screw thread. They were made of bone or elephant ivory and date to the eighteenth and eighteenth/nineteenth centuries (Fig. 6.12).[686] Other finds come from for example Alkmaar,[687] Helmond and Keenenburg.[688]

6.3 Weaponry

6.3.1 Crossbows

The late medieval crossbow was used as military weapon until the fifteenth century when firearms were increasingly used and became more effective. After that period, the crossbow was still used but only as a hunting weapon, until the seventeenth century. The bow itself was a composite of wood, horn and sinew to achieve both strength and flexibility. Easy to recognise and often found in archaeological contexts is a component called the crossbow nut (Fig. 6.13), which was made of antler. The crossbow nut is connected to the trigger and holds or releases the string. Antler was chosen for it because of this material's size and flexibility.[689] Crossbow nuts have been found at several excavations in the Netherlands.[690] One crossbow nut from Amsterdam is a semi-finished product, an indication that manufacture took place in Amsterdam.[691] The crossbow nut also has a large area of distribution in excavations in Europe.[692]

Less well known is that other components were also made of antler, the trigger for instance, although no examples are known from the Netherlands.[693] The recent discovery of the waste of a crossbow workshop in Aalst, Belgium, showed that the plates with the flight groove for the arrow as well as small protection pieces were also made of antler. In Aalst, imported elk antler was used for these parts.[694] An osseous mount found in Middelburg is very similar to the fifteenth-century plates from Aalst.[695] However, the Middelburg mount was initially dated to the seventeenth or eighteenth century and was found in the vicinity of a farm, which became a manor house in a later period. An osseous support plate for arrows has been found in Bunschoten (Fig. 6.13).[696] The support plates for arrows have parallels in Europe.[697] A previously unknown triangular mounting with a keyhole-shaped opening from Hoorn is comparable to the pieces from Aalst (fourteenth century).[698] These were the protection pieces for the cords.[699]

6.3.2 Firearm mountings

In the Dutch-Spanish war (Eighty Years' War; *c.* 1566/1568-1648) firearms played a crucial role. Firearms were made of metal and wood and could have decorative inlay or mountings of organic tissues (Fig. 6.14). Bone firearm mountings have been found in (late) sixteenth-century contexts and could often be related to the presence of (Spanish) soldiers.[700] The shape and size of the mountings depended on their position on the weapon. Flat, elongated plates were positioned to the side whereas semi-circular pieces were placed at the front below the barrel and below the ramrod. The plates were all engraved with decorative scenes. Firearm mountings come from archaeological contexts in Amsterdam, Zutphen, Haarlem, Venlo, Alkmaar and Haarlem.[701] Complete ivory firearm decorations are known from museums and private collections.

685 Van der Ley 1991; Sullivan 2004, 155-177.
686 Rijkelijkhuizen 2004.
687 Bitter *et al.* 1997, 171-172, dated 1625-1825, originally published as part of a toy spinning wheel.
688 Anthony & Bult in prep.
689 MacGregor 1975/1976, 1985, 159; Baart *et al.* 1997, 446-448; Van Vilsteren 1987, 33.
690 E.g. Amsterdam, dated fourteenth to sixteenth-century: Rijkelijkhuizen 2004; Deventer: Rijkelijkhuizen 2011e; 2011f; Utrecht, fifteenth/sixteenth century: Van Vilsteren 1987, 34; Utrecht: Médard 2017; Susteren: Rijkelijkhuizen 2023d; West-Souburg: Hendrikse & Goldschmitz-Wielinga 1998, 127, collection Erfgoed Zeeland; Hoogkarspel: Gerritsen 2014; collection Provinciaal Depot voor Archeologie Noord-Holland; Culemborg: Halici 2006a; 's-Hertogenbosch: Nijhof 2007b; Zutphen; Helmond.
691 Rijkelijkhuizen 2004.
692 E.g. MacGregor 1975, 1985, 158-159; Kovács 2005; Lang 2010; Konczewska 2011.
693 Röber 1996, 113; Goret 2017.
694 De Groote *et al.* 2018; De Groote, Ervynck & Moens 2019.
695 Rijkelijkhuizen 2012d, originally published as (furniture) mounting plate.
696 Huisman 2022, 80-81, 87.
697 Hall: Labner 2007; Vilnius, Lithuania: Luik, Piličiauskienė & Blaževičius 2019; Esztergom, Hungary: Gál 2020; Veliko Tarnovo, Bulgaria: Rabovyanov 2016.
698 Van Dijk & van der Walle-van der Woude 2004, originally published as mounting plates.
699 De Groote *et al.* 2018; De Groote, Ervynck & Moens 2019.
700 Rijkelijkhuizen 2013b.
701 Rijkelijkhuizen 2013b; Haarlem: Bottelier & Rijkelijkhuizen in prep.

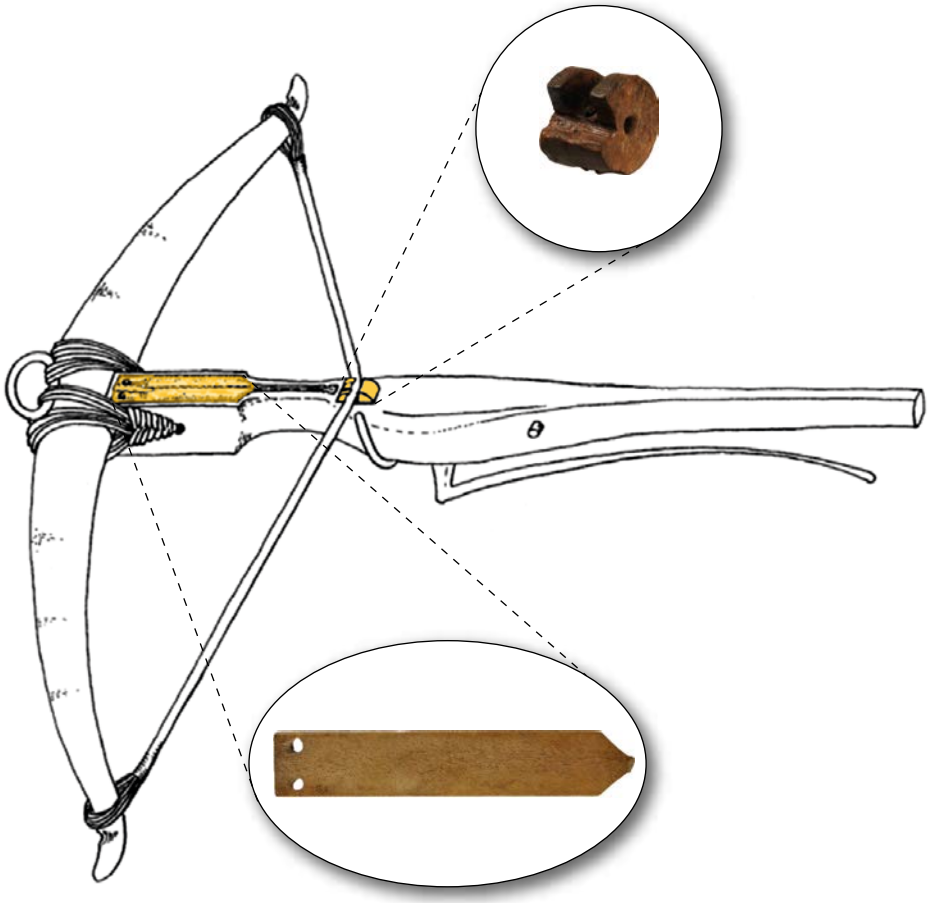


Fig. 6.13 Crossbow with the crossbow nut and support plate for arrows indicated. Drawing A. Korste (Centrum voor archeologie, Amersfoort).

Fig. 6.14 Firearm with bone mountings (1640-1650, length 148.7 cm, inv. NG-2002-23-6). Collection and image Rijksmuseum.

6.3.3 Cutlasses

In 1969 the partial cargo of an eighteenth-century shipwreck was dredged up from the IJsselmeer. Among the metal tools that were retrieved were files, draw knives, drills and saws, semi-finished copper barrels, and bundles of cutlasses. The iron of the cutlasses was largely corroded, but the bone handles were still present (Fig. 6.15).[702] The bone handles are large in size and most probably made of cattle metatarsal bones. Most handles are hexagonal or octagonal in cross section and one side bends slightly upwards on the side of the knuckle guard towards the tip of handle.

[702] Van der Heide 1969; identification as cutlasses by Jasper Boelsma.

Fig. 6.15 Cutlass handle (shipwreck IJsselmeer, length 13 cm, inv. YWV-31). Collection and image Maritiem Archeologisch Depot, Batavialand.

6.3.4 Daggers

The handles and grips of all sorts of objects were made of osseous and keratinous materials. Generally, it is possible to determine whether bone handles came from table knives, larger knives, or tools. A weapon with a specific handle shape is the ballock or kidney dagger. This type of dagger is fourteenth to sixteenth-century in date and was used as a personal weapon and a tool. The handle was distinctively shaped with two swellings at the guard. Ballock dagger handles are usually made of one piece of wood, sometimes decorated and with metal inlay.[703] Two ballock daggers with a bone handle are known from Amsterdam. These were made of cattle metatarsal bones.[704]

6.3.5 Powder horns

Powder horns to store gunpowder emerged in the Post-Medieval period with the increasing use of fire arms. Powder horns were made of the keratin layer of a horn, as the name suggests, but this material rarely survives in the soil. A small powder horn, made of the solid tip of a horn, has been found in 's-Hertogenbosch.

Archaeological examples of powder horns are usually made of antler and these were used by hunters. Some beautifully decorated examples have survived, often with biblical, mythological or amorous scenes.[705] These are present in museum and archaeological collections. From archaeological contexts antler

a

b

Fig. 6.16 Powder horn, a. decorated front; b. back. (Amsterdam, lenght 16 cm, Baart *et al.* 1977; Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image M.J. Rijkelijkhuizen.

powder horns have been found in for example Amsterdam (Fig. 6.16), 's-Hertogenbosch and Medemblik.[706] Antler powder horns date to the sixteenth and seventeenth centuries.

6.3.6 Priming powder flasks

Small circular powder flasks are known from the seventeenth century, and these are often made of ivory or of ivory and wood. These flasks only contained a small amount of powder and were used more specifically to store priming powder.[707] One composite powder flask made of wood and ivory has been found in Amsterdam. The sides are made of circular ivory discs held together by a wooden rim (Fig. 6.17).[708]

703 For example Baart *et al.* 1977, 431; Rijkelijkhuizen & Jongma 2020.
704 Rijkelijkhuizen 2004; Rijkelijkhuizen 2024.
705 Baart *et al.* 1977, 438.
706 Amsterdam: Baart *et al.* 1977, 438; Rijkelijkhuizen 2004; 's-Hertogenbosch: Nijhof 2007b; Medemblik: Van Vilsteren 1987, 34.
707 Van der Sloot 1978; Schlenker & Wahl 1996, 124.
708 Rijkelijkhuizen 2024.

Fig. 6.17 Powder flask made of wood and ivory, a. front; b. back; *c.* individual parts (Amsterdam, diameter 5.5 cm, North-South-Line, Rijkelijkhuizen 2024). Collection Monumenten en Archeologie, gemeente Amsterdam. Image H. Strak.

6.3.7 Bracers

Bracers or wrist guards were used by archers to protect the wrist from the bowstring. Leather bracers are known from the fifteenth until the seventeenth century.[709] In the English ship the Mary Rose, which sank in 1545, a large collection of bracers have been found, made of leather, horn and ivory.[710] Ivory bracers with engravings of St Sebastian are known from several museum collections.[711] Occasionally other materials were used, for example copper or tortoiseshell.[712] Leather and ivory bracers were only accessible for the higher ranks among the archers who could afford them.

Archaeological bracers are rare; so far two have been found in the Netherlands. A bone bracer has been found in a cesspit in Haarlem. The contents of this cesspit date to the thirteenth to sixteenth century. The bracer 11.3 cm long, curved, and undecorated. The leather strap still has its silver buckle for

[709] For example in the collection of the British Museum.
[710] Friend 2012.
[711] E.g. in the Noordbrabants Museum, the Metropolitan Museum, the Royal Armouries and the Pitt Rivers Museum.
[712] Copper: Metropolitan Museum of Art; tortoiseshell: Royal Armouries.

Fig. 6.18 Ivory bracer ('s-Hertogenbosch, length 11 cm, Rijkelijkhuizen 2023f.). Collection and image Erfgoed 's-Hertogenbosch.

attachment to the wrist.[713] A fragment of an ivory bracer has been found in 's-Hertogenbosch (Fig. 6.18). It is *c.* 11 cm long and is made of elephant ivory. It is curved and had two holes on each side for attachment, probably with a leather strap. It is undecorated but could have been originally painted.[714]

6.4 Household items

6.4.1 Knives

Knives can be used for various purposes: dining, hunting or butchering, wood working or other crafts or work-related purposes. The shape and size of the blade depend on the function of the knife. Sometimes the knife handle shape or its material can give a first, or the only, clue as to the knife's function, when the blade itself is corroded away. Delicate handles with fine decorations did not belong to working knives but probably to table knives, unlike robust antler handles which usually belonged to hunting knives.[715]

A specific kind of knife was the carving knife. In the Late and Post-Medieval period meat was carved by a carver in front of the important guests and then served out. The handles of these knives were usually extensively decorated and made of expensive materials.[716] A rare almost complete carving knife comes from 's-Hertogenbosch (Fig. 6.19). The osseous figural handle features a woman with a robe holding one or two items. It falls within a group of late medieval hair parters and knife handles (See Section 6.6.4).

Most excavated post-medieval knife handles, however, are from table knives. Wood, osseous and keratinous tissues, amber and metal were used to make knife handles.[717] These were made by other artisans than the blades, and the two components were afterwards assembled.[718] Knife typologies are based on the form of the blade and the method of attaching it to the handle. In general, there are two methods to do that. In the first method, the blades have an extended and narrow tang which is inserted into a natural or artificial hole in the single-piece knife handle. In the second method, the blade has an elongated but flat tang, called a scale tang, to attach the blade to the knife handle which in this case consists of two flat plates (scales), which are fixed with nails on both sides of the tang.[719] A more detailed description and typology of blades and blade fastenings can be found in Holtmann.[720]

Knife handles can be classified as to types based on the way the blade is attached, and the shape, size and decoration of the handle. Most knife handles are plain round, oval, square or angular without any decoration. Especially wooden knife handles are usually very simple and have little or no decoration. Shape and decoration of the handles can to some extent help to date the knives. The various methods of decoration are described elsewhere in detail.[721] Certain knife handles were popular in a specific period and could have been made of more than one material. Ivory figural knife handles, for example, were popular in seventeenth-century wealthier households (Fig. 6.20 and 6.21). A striking example are knife handles with horse-hoof decoration, which were made of ivory and featured inlays of several materials. These were manufactured and sold in Amsterdam in the seventeenth century.[722]

Fig. 6.19 Carving knife ('s-Hertogenbosch, osseous part length 8.8 cm). Collection and image Erfgoed 's-Hertogenbosch.

713 Van Greevenbroek 1980.
714 Rijkelijkhuizen 2023f.
715 Rijkelijkhuizen 2017d.
716 Marquardt 1997, 18-21.
717 Baart *et al.* 1977; Cowgill, De Neergaard & Griffiths 1987; Helfrich, Benders & Casparie 1995; Van Trigt 2003; Rijkelijkhuizen 2004, 2017d; Rijkelijkhuizen & Jongma 2020; Rijkelijkhuizen 2023e.
718 Rijkelijkhuizen 2017d.
719 Baart *et al.* 1977; Cowgill, De Neergaard & Griffiths 1987/2000.
720 Holtmann 1993.
721 Rijkelijkhuizen 2017d.
722 Rijkelijkhuizen 2004; 2023b; Rijkelijkhuizen 2024.

Fig. 6.20 Ivory figural knife handle ('s-Hertogenbosch, height *c.* 8 cm). Collection and image Erfgoed 's-Hertogenbosch.

Fig. 6.21 Ivory figural knife handle (shipwreck near Texel, length 8.2 cm, Vos 2012, 211, inv. BZN8-340). Collection and image Maritiem Archeologisch Depot, Batavialand.

A European trade in knife blades and knife handles or assembled knives did exist, but its volume as well as the trade routes need further study.

6.4.2 Butter knives

Butter knives were used to scrape butter curls off a cold, hard slab of butter.[723] These bone knives are made of the compact tissue of a large mammalian bone, usually a cattle metapodial. They are made in one piece but have a well-defined handle and blade section. The blade section features a ribbed surface on one side, and the tip usually curves slightly upwards. The handle is often decorated with a stepped gable, similar to the feather curlers. Butter knives also date from the late sixteenth century to the first half of the seventeenth century.[724] Butter knives are known from for instance Amsterdam (Fig. 6.22), Hoorn, Delft, 's-Hertogenbosch, Eindhoven and Zutphen.[725]

A rare type of butter knife comes from a castle site in Egmond. The blade section is much shorter, and unlike the more common type, the handle section is placed in the middle of the blade section. It was made of a cattle metapodial bone and is decorated with ring-and-dots.[726] A similar example comes from Handel.[727]

Larger butter pats were mostly made of wood and were used to divide the butter into smaller pieces.[728] These cutters had a rectangular blade with a ribbed surface on one side and an often T-shaped handle. A small ivory example is

723 Van Vilsteren 1987, 46.
724 Rijkelijkhuizen 2004.
725 Amsterdam: Rijkelijkhuizen 2004, Rijkelijkhuizen 2024; Hoorn: Van Vilsteren 1987, 46; Eindhoven.
726 Zeiler 2007, 8-9; collection Huis van Hilde.
727 De Jong 2004.
728 E.g. Baart *et al.* 1977, 350; Helfrich, Benders & Casparie 1995; Duijn 2010, 93; Duijn 2011, 112.

Fig. 6.22 Butter knife (Amsterdam, length *c.* 16 cm, Rijkelijkhuizen 2004) Collection Monumenten en Archeologie, gemeente Amsterdam. Image A. Dekker (UvA).

present in the collection of the Westfries Museum in Hoorn.[729]

6.4.3 Spoons

Most spoons in the Late and Post-Medieval period were made of tin or wood.[730] Small bone spoons were probably used as egg spoons.[731] These bone spoons were made of large mammalian bone and date to the eighteenth and nineteenth centuries.[732] Finds of bone spoons are not uncommon and these have been found in several cities.[733]

6.4.4 Pastry wheels

Pastry wheels are usually made of metal or a combination of metal and wood. The serrated wheel is attached to a wooden or metal handle and was used to cut dough. A single find of a bone pastry wheel comes from Amsterdam (Fig. 6.23). It was made of the compact tissue of a large mammalian bone and dates to the eighteenth century.[734]

Fig. 6.23 Pastry wheel (Amsterdam, diameter 3.8 cm, Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image M.J. Rijkelijkhuizen.

6.4.5 Sausage pins

Sausage pins were used to make sausages and are known in wood from late and post-medieval contexts in north-western Europe.[735] Possible sausage pins made of bone have been found in Amsterdam. These have a triangular cross section and are pointed at one end. They dated to the thirteenth to fourteenth centuries (Fig. 6.24).[736]

6.4.6 Furniture ornaments

Expensive wooden furniture could be decorated with different ornamentation techniques such as marquetry and inlaid work. Marquetry uses materials such as wood, ivory, tortoiseshell and mother-of-pearl as a veneer, organized in a decorative pattern. With inlaid work, different materials are embedded into the wood.
Not much evidence of these techniques survives in archaeological contexts, but examples can be found in museum collections.

A few furniture mountings from archaeological contexts are made of osseous materials, for example decorative plates of bone or ivory. The reverse side of bone mountings shows irregular scratches, deliberately made to roughen the surface in order to facilitate glueing. Decorative plates have been found in Amsterdam.[737] Another example are bone keyhole protectors, which have also been found in Amsterdam (Fig. 6.25). These could come from cabinets or caskets.[738] However, not all

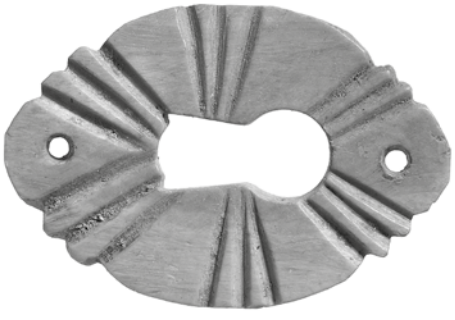


Fig. 6.25 Bone keyhole protector (Amsterdam, length 4.6 cm, Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image A. Dekker (UvA).

729 Van Vilsteren 1987, 46.
730 See for example Baart *et al.* 1977, 294-322; Gawronski & Kranendonk 2018; Rijkelijkhuizen & Jongma 2020.
731 Van Vilsteren 1987, 46.
732 Baart *et al.* 1977; Rijkelijkhuizen 2004.
733 E.g. Amsterdam: Baart *et al.* 1977, Rijkelijkhuizen 2004; Alkmaar: Bitter 2022, 913; Nijmegen: Van Vilsteren 1987, 46; Delft; 's-Hertogenbosch; Zutphen; Utrecht: Aal 2022.
734 Rijkelijkhuizen 2004.
735 See for example Hansen 2020; Rijkelijkhuizen & Jongma 2020.
736 Rijkelijkhuizen 2004.
737 Rijkelijkhuizen 2004.
738 Rijkelijkhuizen 2004.

Fig. 6.24 Possible sausage pin (Amsterdam, length 7.4 cm, Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image A. Dekker (UvA).

archaeological decorative plates can be identified as furniture mounts. Also weapons (see Section 6.3.2) or other objects (see Section 6.8.6) could have decorative mountings.

Certain decorative elements of furniture could also have been made of osseous or keratinous tissues, for example small knobs of drawers, or larger decorative knobs. A large ivory knob, probably part of furniture, was found in Amsterdam. It probably dates to the seventeenth or eighteenth century.[739] A similar ivory knob has been found in 's-Hertogenbosch.

6.5 Personal hygiene

6.5.1 Combs

The most important tool for personal hygiene, and one which has been used for millennia, is the comb. Although combs have existed since prehistoric times their appearance, material and use have changed through time. Typologies are based on these chronological and geographical variations. Grooming items can be personal possessions, but combs for instance are known on occasion to be shared among family members or children in an orphanage who did not possess their own comb. Combs could be made from various animal and natural tissues, such as bone, antler, ivory, horn, tortoiseshell, or wood. Eventually, from the nineteenth and twentieth century onwards, these materials were replaced by synthetic ones.

6.5.2 A typology of Dutch combs

For this publication a comb typology from the Iron Age until the Modern Period was constructed (See Section 5.5.1, Section 5.5.2 and Table 5.3). This section describes the late and post-medieval comb types.

Composite late medieval double-sided combs (Ashby type 13)
Twelfth to fifteenth century (Fig. 6.26)
Late medieval double-sided combs appear in north-western Europe from the twelfth until the fifteenth century. These combs are small,

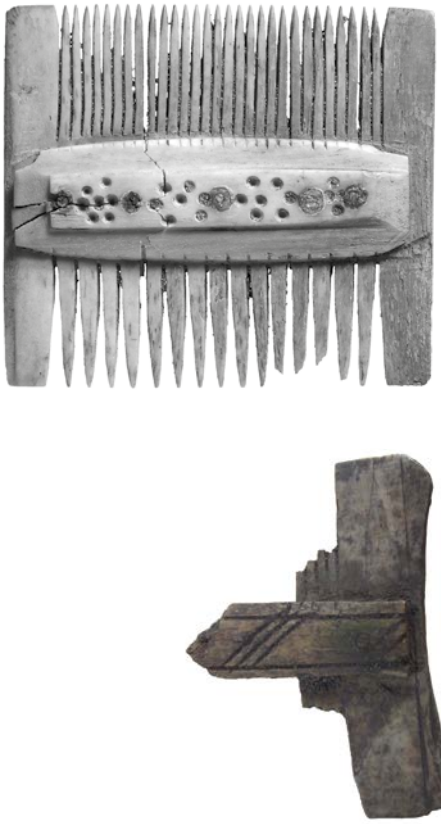


Fig. 6.26 Composite late medieval double-sided combs. (a. Amsterdam, length 6.5 cm, Rijkelijkhuizen 2004, 2011d; b. Deventer, width 4.5 cm, Rijkelijkhuizen 2011f). Collection a. Collection Monumenten en Archeologie, gemeente Amsterdam. Image a. A. Dekker (UvA). Collection b. Provinciaal Depot voor Bodemvondsten Overijssel. Image b. M.J. Rijkelijkhuizen.

sparsely decorated and have copper alloy rivets.[740] In the Netherlands only a few of these combs have been found, all with copper alloy rivets. An example from Amsterdam made of bone dates to between 1375 and 1425. It is decorated with dots which may originally have been filled with a pigment, or for example tin foil.[741] Another example found in Deventer was also made of bone and probably dates to the fifteenth century. It is decorated with diagonal lines.[742] In Leidsche Rijn, Utrecht, another example was excavated which dates to the twelfth century. The connecting plates of this specimen are made of antler and the tooth plates may be bone. The comb is decorated with bundles of short vertical lines.[743] In Leeuwarden, an undecorated composite double-sided comb with copper rivets from the Late Medieval period was found.[744] It was decorated with bundles of vertical or diagonal lines, and may originally have been inlaid.

739 Rijkelijkhuizen 2024.
740 Ashby 2011a; type 13; Luik 2001.
741 Rijkelijkhuizen 2004; 2011d.
742 Rijkelijkhuizen 2011f.
743 Rijkelijkhuizen 2020b.
744 Halici 2006b, 31.

One-piece longbone combs
Tenth/eleventh to fifteenth/sixteenth century (Fig. 6.27)

Longbone combs are made of cattle metapodials; they have long teeth and are usually undecorated, although some form of decoration can be present. The short handle section can have a natural or an artificial hole. Often diagnostic features of the bone are still present. They are very different in shape than the early medieval composite combs, and their function has therefore sparked intense debate. Longbone combs have been described as wool comb, wool carding comb, weaving comb, or hair dressing comb. However, a function as hair comb has also been suggested, as the longbone comb is not suitable as a textile implement.[745] The presence of lice between the teeth of longbone combs strengthens the theory of regular hair combs.[746]

The long teeth can be explained by the shape and properties of the material. When antler became less available, an alternative was sought in bone, but bone is less flexible than antler and therefore required a different type of comb with thicker and longer teeth; although making the teeth longer makes them again more vulnerable to breakage. The teeth were sawn obliquely from one side of the comb, which resulted in a larger connecting point. Furthermore the teeth were not of equal length, perhaps to avoid a weak point. Teeth were only sharpened at the tip and use wear is only present there. The small amount of use wear shows that their life span was short.[747]

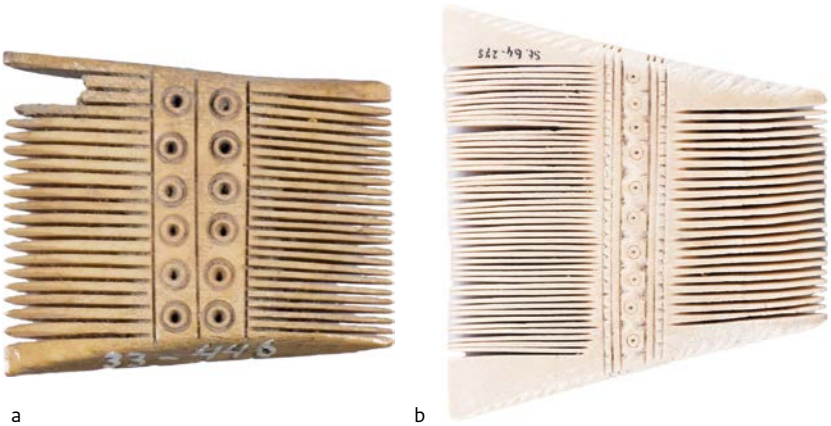
The starting date of the longbone comb is somewhat uncertain, but the type probably appeared around the tenth or eleventh century when antler as a material became scarcer and composite combs started to disappear. Most longbone combs from the Netherlands, however, date to the thirteenth to fifteenth century. They are common finds in cities and production probably took place in every city. Longbone combs are also widespread in late medieval Europe, with the exception of England where only a few have been found.[748]

Fig. 6.27 Longbone combs (Amsterdam, length 12.9 to 15.7 cm, Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image A. Dekker (UvA).

One-piece double-sided trapezoidal combs
Eleventh to fourteenth century (Fig. 6.28)

Alongside the composite late medieval double-sided combs and the longbone combs, one-piece doubled-sided combs with a trapezoidal shape and, often, a lozenge cross section were in use. More rectangular types also occur. The date of these combs is based on finds from Schleswig, Lund, Hedeby and Ribe.[749] Those from Schleswig were made of both bone and antler. Specimens are also known from Eastern Europe.[750] In the Netherlands, however, these combs are rare and the few finds are undated and their material not yet researched.

Decoration: ring-and-dot motifs; horizontal lines.



a b

Fig. 6.28 One-piece double-sided trapezoidal combs (a. Aalsum, height 4.7 cm, inv. 33-446; b. Stavoren, height 8 cm, inv. 2007-II-547). Collection and image a. Fries Museum, Leeuwarden - Collectie Koninklijk Fries Genootschap; collection and image b. Fries Museum, Leeuwarden.

745 Ulbricht 1984; Van Vilsteren 1987, 41.
746 Schelvis 1992.
747 Van Vilsteren 1987, 40; Rijkelijkhuizen 2011d.
748 For example Ulbricht 1984; Luik 1998, 2001; Sergeeva 2011; England: pers. comm. Ian Riddler.
749 MacGregor 1985, 80-81; Ulbricht 1984.
750 Sarkel, Russia: Flyorova 2001; Luik *et al.* 2018; Luik 2008, 93.

One-piece small double-sided combs
Sixteenth to eighteenth century (Fig. 6.29)
Only two small, rectangular combs have been found in Amsterdam. Both are double-sided, flat in cross-section and made of bone. The smallest is 27.5 mm long, 23.6 mm wide and 3.1 mm thick. The other is incomplete, but has a width of 37.5 mm and a thickness of 4.1 mm.
One specimen dates to the eighteenth century while the other is undated. Their exact use it not known, these could be beard or miniature (toy) combs. Both combs are undecorated.[751]

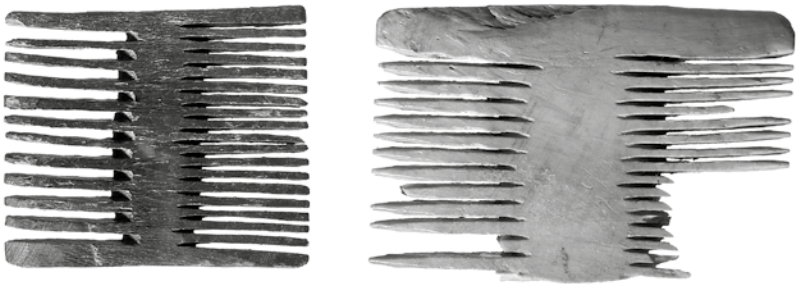


Fig. 6.29 One-piece small double-sided combs (Amsterdam, left length 2.4 cm, width 2.8 cm; right width 3.8 cm, Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image A. Dekker (UvA).

One-piece double-sided wooden combs
Fourteenth to seventeenth century (Fig. 6.30)
Besides osseous and keratinous materials, wood was an important material for comb manufacture and wooden double-sided combs are therefore included in this comb typology. Double-sided boxwood combs in part overlap with the longbone combs and largely date between the fourteenth and seventeenth century.[752] Boxwood was imported at this time; the material is highly suitable for fine carvings and comb making. Most combs are double-sided; single-sided combs are rare. Most examples are undecorated, but punctured decoration or inlay are known.[753] Simple line decorations could have been made by the owner of the comb.

Fig. 6.30 One-piece double-sided wooden comb (Delft, 1350-1450, length c. 8 cm, Rijkelijkhuizen & Jongma 2020). Collection and image Erfgoed Delft, Archeologie.

One-piece ornate double-sided combs (Ashby type 14c)
Tenth to fifteenth century (Fig. 6.31)
One-piece ornate double-sided combs are usually made of ivory and occur in much of north-western Europe between the tenth and the fifteenth century. These combs are often found in the collection of churches, monasteries or museums, but Dutch example are rare. One comb formerly kept at the church of St Oedenrode was believed to have belonged to St Oda (c. 680-726). However, later studies have dated this comb on stylistic ground to probably the twelfth century.[754] The St Oedenrode comb shows a later repair.

Fig. 6.31 Comb of St Oda (length 9.2 cm). Collection Museum Catharijneconvent, Utrecht. Image R. de Heer.

An archaeological example comes from Velsen. This double-sided comb is made of an osseous tissue and is decorated on both sides with a different animal figure. It probably dates to the eleventh century.[755]

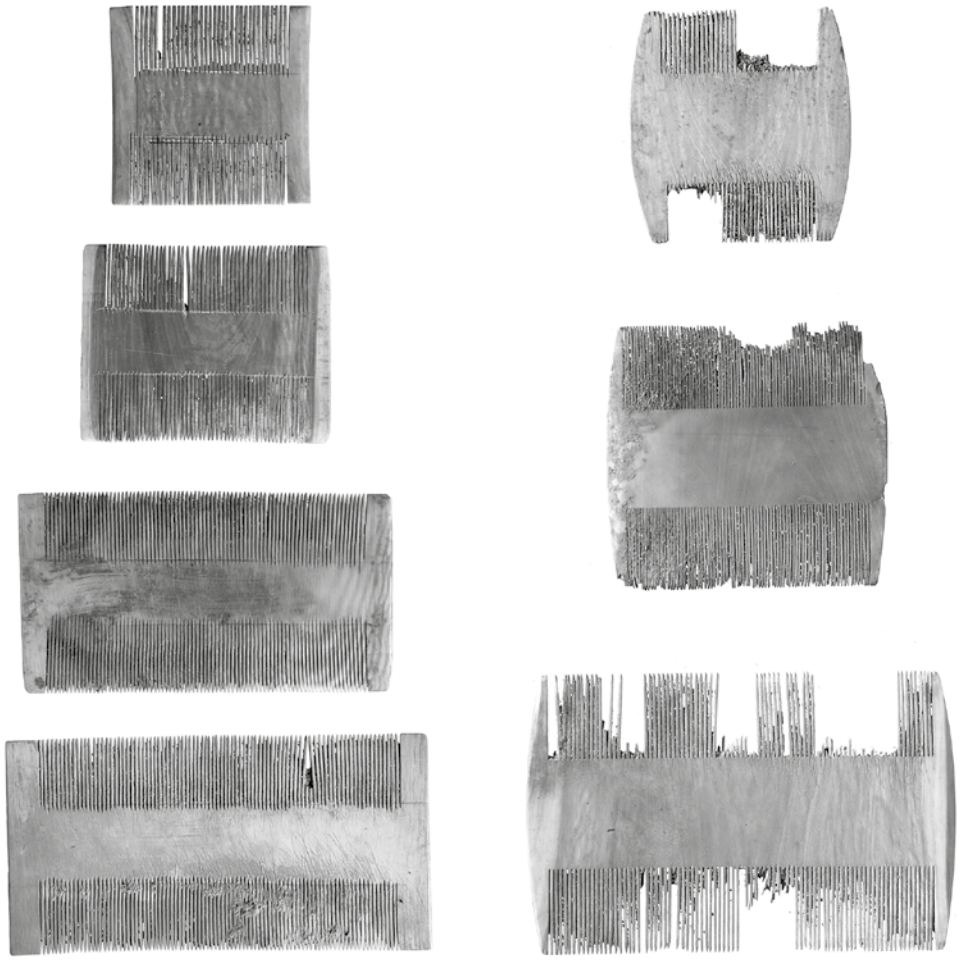
One-piece large double-sided ivory combs
Late fourteenth to fifteenth century (Fig. 6.32)
Alongside the rare one-piece ornate double-sided combs, which are most often part of ecclesiastical or museum collections, undecorated one-piece large double-sided combs have been found in archaeological contexts. These can be considered the predecessors of the post-medieval one-piece ivory lice combs. These earlier double-sided ivory combs can be recognized by their size and length-width ratio. Their shape is often more

751 Rijkelijkhuizen 2004; 2011d.
752 Baart 1982; Helfrich, Benders & Casparie 1995; Rijkelijkhuizen 2020a.
753 E.g. Barwasser & Goubitz 1990; London: Egan 2005, 64-65.
754 Bijsterveld 1996.
755 Calkoen 1967, 37; Collection Huis van Hilde.

Fig. 6.32 One-piece large double-sided ivory comb with leather case (Dordrecht, height comb 6.4 cm, leather case 8 cm, inv. 8601.008.025). Collection and image Archeologie, Dordrechts Museum

square than the later rectangular lice combs, and they are much larger. Combs with rounded sides also occur. Finds are known from larger cities such as Amsterdam, Rotterdam, Dordrecht and 's-Hertogenbosch, and from high-status contexts, such as the castle of Souburg and the castle Huis ter Kleef, Haarlem.[756] The comb from Dordrecht was found in a leather case and shows repairs.[757]

In Dordrecht, a large double-sided comb with rounded sides had been identified as being made of antler or ivory, was in fact made of elephant ivory. This comb was found together with bead production waste in a layer that predated the foundation of the monastery on the site in 1246.[758] However, the finds fit better with a monastery context, and a later date for them is proposed. A large ivory comb with rounded sides has been found in a shipwreck in Dronten. It dates to the first half of the sixteenth century.[759]



[756] Amsterdam: fifteenth century, Rijkelijkhuizen 2004; three combs from Rotterdam: second half of the fifteenth century, ?x74.9x4.2 mm, 53x44.6x3.5 mm, 96.1x86.3x4.2 mm, Esser, Rijkelijkhuizen & Beerenhout 2013; two combs from the castle of Souburg, 1425/1450-1525; Hendrikse & Goldschmitz-Wielinga 1998, the combs are identified as bone and walrus ivory, but probably are both elephant ivory, 93x93x3.5 mm, 80x75x3.5 mm; Huis Ter Kleef, 98 x 95 x 3 mm; Bottelier & Rijkelijkhuizen in prep.

[757] Sarfatij 1990, 111; Goubitz 2009, 106; Collection Archeologie, Dordrechts Museum.

[758] Dorst 2018, length 6.4 cm.

[759] Collection Maritiem Archeologisch Depot, Batavialand.

One-piece ivory lice combs
Late sixteenth to early nineteenth century
(Fig. 6.33)

From the late sixteenth century to the eighteenth-century elephant tusks were imported in huge numbers from West Africa to the Dutch Republic.[760] As a result, ivory became abundantly available and was used by artisans for the production of combs and knife handles. Archaeological, historical, and iconographical sources show that the production of ivory combs was located in Amsterdam. Large amounts of combs, production waste, unfinished combs and apprentice pieces have been found.[761]

The specialized nature of comb making is indicated by the large number of combs that were all made in the same way, and their manufacturing process could be reconstructed in detail.[762] The rare large double-sided combs evolved into smaller and much thinner rectangular ones. The presence of ivory combs coincides with the Dutch ivory trade, and most of the finds date to the seventeenth and eighteenth centuries.

These so-called 'lice combs' are rectangular and two-sided, mostly with fine teeth on each side. Some of the combs have a fine and a coarse side, sometimes with a simple line decoration. Only a few combs have a different shape or are single-sided. The fine-toothed sides were used to remove lice and nits.[763] Scratches often running from the base of the teeth to the middle section of the comb are the result of cleaning the teeth of the comb.[764] One ivory comb from a seventeenth century shipwreck has been found in a luxury textile case. The comb possibly shows (painted) decoration.[765]

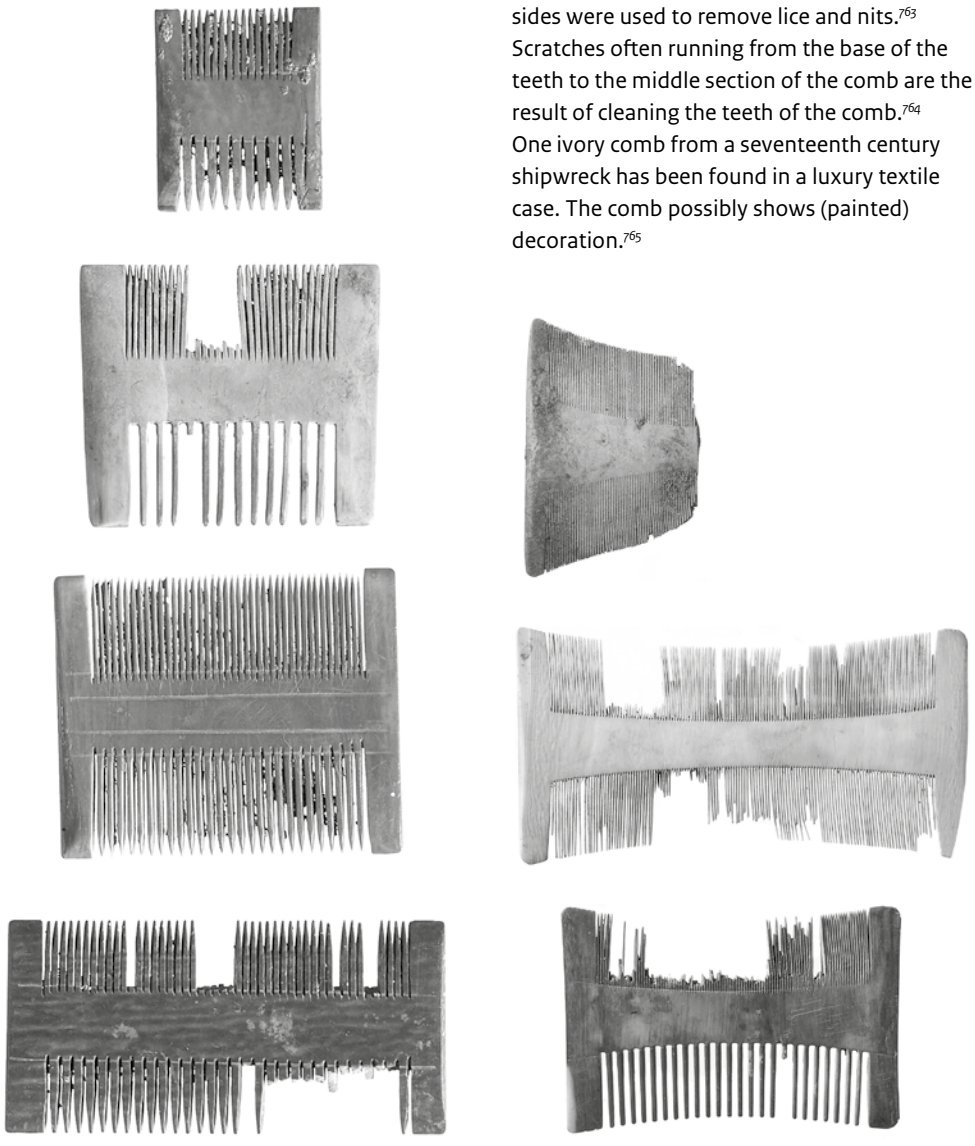


Fig. 6.33 One-piece ivory lice combs, (Amsterdam, length *c.* 5 to 10 cm, Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image A. Dekker (UvA).

760 Den Heijer 1997.
761 Rijkelijkhuizen 2004; 2009; 2017d.
762 Rijkelijkhuizen 2004; 2009.
763 Rijkelijkhuizen 2004, 2009.
764 Schelvis 1992.
765 Thanks to Martin Veen; Vos *et al*. 2019, 91; collection Provinciaal Depot voor Archeologie Noord-Holland; textile case: Savelli 2019.

Ivory lice combs are found throughout Europe, but not enough research has been done to locate other production centres or to identify trade routes for finished objects.[766]

One-piece elongated single-sided combs Post-Medieval period (Fig. 6.34)
In the seventeenth or eighteenth century a different type of comb developed. Elongated single-sided combs were usually made of horn or occasionally of tortoiseshell. Horn had been used before the Modern Period as well, but because horn decays much faster in the soil than for example bone, the scale of horn manufacture in the late medieval period is unknown. It is likely that more horn became available through trade in the seventeenth and eighteenth centuries, and more specialised crafts evolved that used the material, such as comb making.[767] Horn could be cut and flattened by using heat. The shape of these combs is the same as that of modern combs made of synthetic materials.

Fig. 6.34 One-piece elongated single-sided comb (Amsterdam, length *c.* 16 cm, Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image M.J. Rijkelijkhuizen.

One-piece large single-sided ornamental combs Post-Medieval period (Fig. 6.35)
Large single-sided combs were made of horn, tortoiseshell or synthetic materials. These were used as an ornamental items but can also be used for combing. Tortoiseshell was an expensive material and imported only in small quantities from the Caribbean. Tortoiseshell combs were luxury items, available only to the wealthy.[768] Imitations in synthetic materials can be difficult to distinguish from the real tortoiseshell combs. Such imitations are also known from archaeological contexts.[769]

Fig. 6.35 One-piece large single-sided ornamental comb made of tortoiseshell (Amsterdam, North-South-Line, length > 12.5 cm, Rijkelijkhuizen 2024). Collection Monumenten en Archeologie, gemeente Amsterdam. Image H. Strak.

6.5.3 Toothbrushes

The earliest European historical sources mentioning French toothbrushes stem from the seventeenth century. The oldest archaeological toothbrushes from the Netherlands date to the late seventeenth or eighteenth century. Eighteenth-century toothbrushes were small and almost always made of ivory. The handle could be straight or undulating. Toothbrushes with an undulating handle had a toothpick or ear spoon at the other end. The bristles were fixated into drilled holes in the brush head with copper wire. The holes were drilled all the way through the brush head. The front holes are a little wider than those at the rear. Bundles of hair were attached with metal wires partially looped into the holes from the back side of the brush (method 1a; Fig. 6.36).[770] These early toothbrushes appear only in small numbers in high-status residences, such as Huis te Vleuten, Huis Keenenburg or from cesspits associated with wealthy households in 's-Hertogenbosch and Alkmaar.[771] Most excavated examples come from Amsterdam.[772] A few examples are known from other European countries.[773]

From the late eighteenth century onwards large-scale production of bone toothbrushes developed, mainly in England and France. Many bone toothbrushes found at excavations in the Netherlands were made in these countries. Inscriptions on the handle reveal the place of manufacture and remarks on the quality of the toothbrush. From the late nineteenth century onwards inscriptions were also used as advertisements for the retailer.[774] Cattle leg

766 Trade in ivory combs from the Netherlands to Lithuania has been proposed by Luik, Blaževičius & Piličiauskienė 2018.
767 Rijkelijkhuizen 2009, 2013a.
768 Rijkelijkhuizen 2010a.
769 Rijkelijkhuizen 2011b.
770 Rijkelijkhuizen 2004, 2021a.
771 Rijkelijkhuizen 2021a.
772 Rijkelijkhuizen 2004, 2021a.
773 E.g. Buda: Kovács 2005.
774 Rijkelijkhuizen 2004, 2021a.

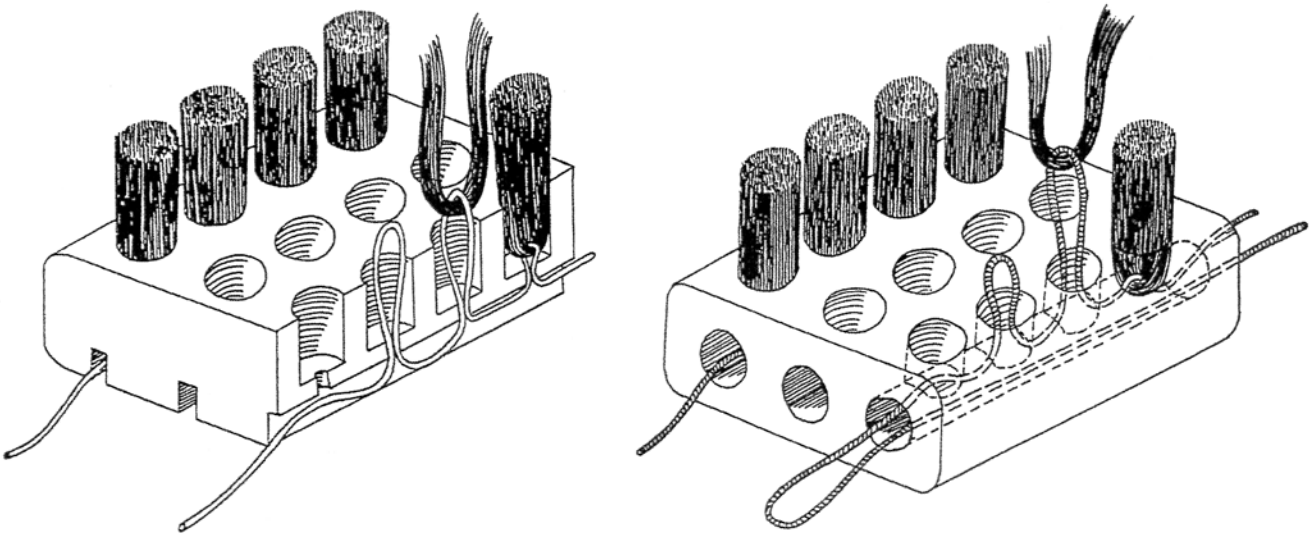


Fig. 6.36 Fixating methods of the bristles: left method 1, right method 2. Image B. Mattick (Mattick 2010).

bones such as metapodials and radii were used to make these toothbrushes.[775]

The method of fixating the bristles was improved in the nineteenth century, as the wires at the back of the brush must have been very inconvenient. The first improvement involved shallow grooves made at the back of the brush head to contain the copper wires (method 1b).[776] The grooves were then covered with a coloured substance. The composition of that substance could vary and was the subject of many new inventions and patents.

A second method was invented in order that no metal was needed at all and the wires became completely invisible. The holes in the brush head were drilled only halfway through and longitudinal 'channels' were drilled from the top end of the brush head which connected to the holes. Linen or silk thread was used to fixate the bristle tufts. The ends of the tunnels at the top end were carefully closed off and made almost invisible (method 2) (Fig. 6.36).[777] In the late nineteenth century the first machines were introduced to saw the bone and drill the holes in the brush heads.

Bone toothbrushes have a large distribution area and were shipped all over the world.

6.5.4 Brushes

Large cleaning brushes were made of wood,[778] but smaller brushes were made of osseous materials. The same methods to fixate the bristles in toothbrushes were used for these small bone and ivory brushes. Eighteenth century straight ivory brushes from Amsterdam are very similar to the small eighteenth-century toothbrushes with straight handle.[779] From the late eighteenth century onwards various bone brushes replaced the ivory ones, following the development of the toothbrushes. Bone brushes have been found at several nineteenth and twentieth-century sites (Fig. 6.37). A type of bone brush that is only known from Utrecht has a separate bone brush head attached to a handle. The handles have not been found and may have been made of a more perishable material, such as wood.[780] The function of these ivory and bone brushes is not completely certain but they can be used for hair, clothing, shoes or hats. Toothbrushes were also used to create different hair styles.

A small composite ivory brush found in Alkmaar has parallels with small wooden brushes from for example Alkmaar, Groningen and Delft.[781] The Alkmaar brush was made in two separate pieces, a round brush head and a separate handle, which is now missing. This brush dates to the seventeenth century, just as the wooden brushes. A bone example comes from 's-Hertogenbosch. The function of these brushes with separate handles is not clear, but the separate handle makes it more fragile than other brush types.

775 Rijkelijkhuizen 2004, 2008a, 2021a.
776 Rijkelijkhuizen 2004, 2021a.
777 Rijkelijkhuizen 2004, 2021a; Mattick 2010.
778 E.g. Helfrich, Benders & Casparie 1995; Rijkelijkhuizen & Jongma 2020.
779 Rijkelijkhuizen 2004.
780 Van Hees, Dütting & Rijkelijkhuizen 2020.
781 Alkmaar: Bitter 2022, 908; Groningen: Helfrich, Benders & Casparie 1995; Delft: Rijkelijkhuizen & Jongma 2020.

a

b

Fig. 6.37 Bone brush head, a. front; b. back (Utrecht, *c.* 11 cm, Van Hees, Dütting & Rijkelijkhuizen 2020) Image M.J. Rijkelijkhuizen.

Fig. 6.38 Bone toiletry set (Amsterdam, length *c.* 8.1 cm Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image A. Dekker (UvA).

6.5.5 Ear spoons, toothpicks, and toiletry sets

Eighteenth-century toothbrushes feature an ear spoon or toothpick on the other end, but ear spoons are also encountered as separate tools or in combination with a toothpick. These were often made of metal.[782] Ear spoons of osseous materials have been found in several places.[783] Ear spoons with integrated tooth pick appear in the late sixteenth century and continue into the eighteenth century.[784] A specific ear spoon with a unicorn's head was found in several places in north-western Europe.[785] The horn of the unicorn served as a toothpick. Evidence for the production of this type comes from Antwerp and from Amsterdam.[786]

Most of these ear spoons are made in one piece, but an ivory specimen made in two sections was found in Amsterdam. One end could be opened with a screw thread and a small item could be stored inside.[787]

Toiletry sets comprise various implements which were held together by a metal pivot. A complete bone toiletry set from Amsterdam has four implements, including an ear spoon and a toothpick (Fig. 6.38). It dates to the fourteenth century.[788] A second comes from The Hague. It is made of an osseous tissue and has four implements and dates to between 1590 and 1613.[789]

Remnants of a possible tortoiseshell toiletry set comes from Haarlem.

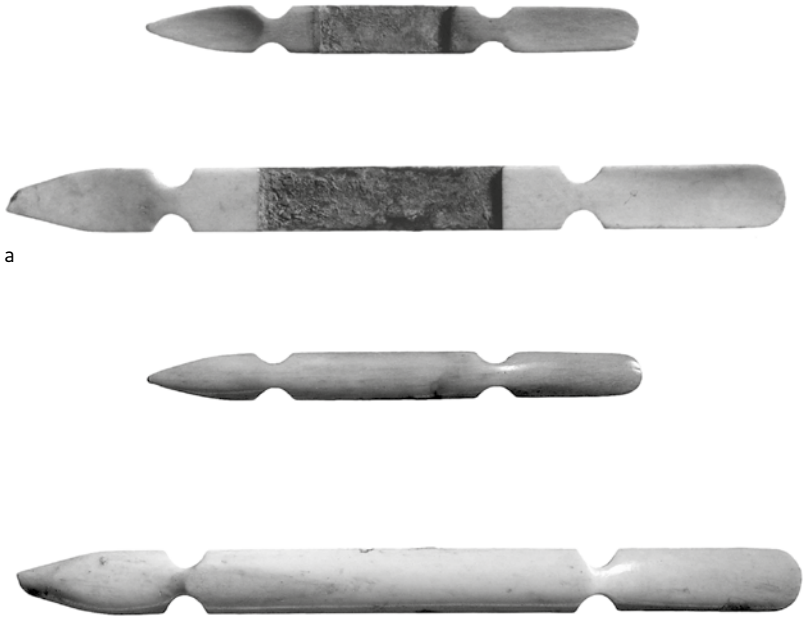
6.5.6 Manicure sets

Two manicure sets have been found in Amsterdam, one eighteenth or nineteenth-century and the other twentieth-century. They are single-piece implements made of bone with a manicure tool at each end, a probable nail cleaner and a cuticle pusher. Originally a metal file was probably attached to the centre. (Fig. 6.39).[790]

6.5.7 Syringes

Hypodermic syringes with a hollow metal needle were introduced in the nineteenth century. Earlier syringes had other functions, for example to remove blood or pus, and the larger ones were used to give enemas. Syringes were usually made of metal or glass, but wood or osseous materials were used as well. An almost complete syringe was excavated in Amsterdam and from a second example the bone plunger was found

782 E.g. Nijhof & Janssen 2007.
783 E.g. Deventer: Van Vilsteren 1987, 43; Amsterdam: Rijkelijkhuizen 2004; Vleuten: Van Dijk *et al.* 2005.
784 Rijkelijkhuizen 2004.
785 Antwerpen: Ervynck & Veeckman 1992; London: MacGregor 1985, 100; Amsterdam: 1592-1597, Rijkelijkhuizen 2004; Eindhoven.
786 Ervynck & Veeckman 1992; Sarfatij 1990, 156; Rijkelijkhuizen 2004.
787 Rijkelijkhuizen 2004.
788 Rijkelijkhuizen 2004.
789 Sarfatij 1990, 150.
790 Rijkelijkhuizen 2004.

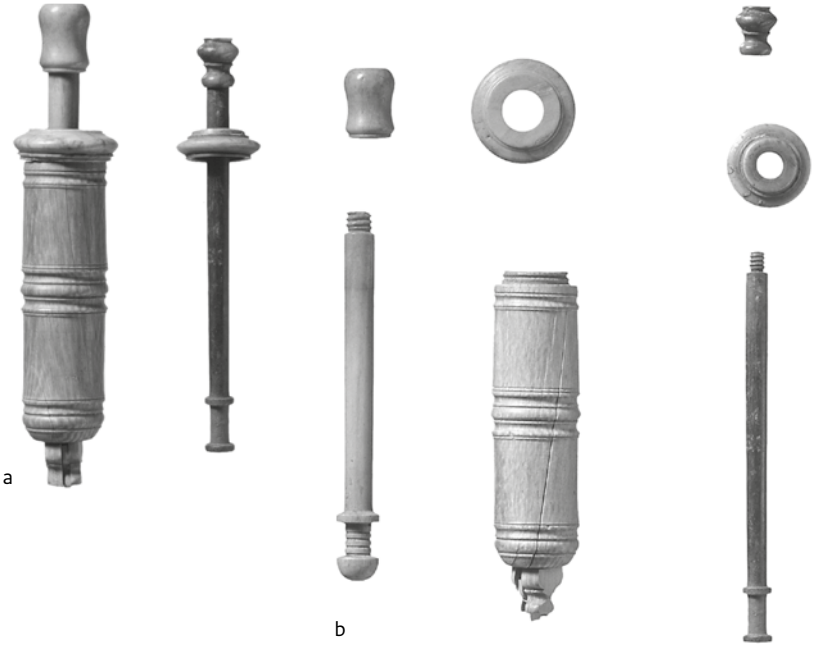


a

b

Fig. 6.39 Bone manicure sets, a. front; b. back (Amsterdam, length 6.4 to 10.1 cm, Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image A. Dekker (UvA).

(Fig. 6.40). Both date to the eighteenth century. The barrel of the complete syringe was made of elephant ivory. The separate tip was also made of ivory. The barrel was closed on the other end with a bone disc with a central hole through which the plunger (or piston) could be moved. The plunger was made of bone and had a separate knob connected by a screw thread.[791] A complete ivory syringe has been found in Middelburg and a complete bone syringe comes



a

b

Fig. 6.40 Syringes, a. complete syringe and bone plunger; b. the complete syringe and plunger in parts (Amsterdam, length > 7 cm, Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image A. Dekker (UvA).

[791] Rijkelijkhuizen 2004.

a

b

Fig. 6.41 Two syringe nozzles, a. with screwthread, b. consisting of several parts (Amsterdam, length a. en b. 7.5 cm, Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image M.J. Rijkelijkhuizen.

from 's-Hertogenbosch.[792] Besides a complete syringe and a single plunger, separate bone syringe nozzles have also been found in Amsterdam (Fig. 6.41).[793] The exact use of these archaeological syringes is difficult to establish. The date these syringes probably lies between the seventeenth and nineteenth century.

6.5.8 Razors

Foldable straight razors (open razors) used by barbers in the Post-Medieval period have a distinctive shape. The long handle consists of two handle plates and is often slightly bent. At one side the razor blade is fixed with a pivot. The handle plates can be made of wood, bone, ivory or synthetic materials. A razor with bone handle plates comes from Amsterdam.[794] Another razor with more straight bone handle plates was found in 's-Hertogenbosch.[795]

6.5.9 Pomanders

Pomanders are round pierced boxes which once contained fragrant substances to create a pleasant smell or for protection against contagious diseases. The word derives from the French *pomme d'ambre*, apple of amber, named after one of the ingredients of the perfume inside the pomanders. Pomanders could be filled with the expensive ambergris, or with for example herbs, such as lavender or cloves or with vinegar. Liquid perfumes could be sprinkled onto a sponge inside the pomander. These objects existed from the Late Medieval period onwards and various designs developed in the Post-Medieval period. The pomanders in the Post-Medieval period were often suspended from a chatelaine. In this period other variations came into use, such as the pouncet box (pierced box), also known as essence box. From the late eighteenth century onwards pomanders were also known as vinaigrettes, after the vinegar they could contain.

Pomanders were usually made of precious metals, such as gold or silver, and were often richly decorated. These were expensive luxury items. From archaeological contexts a few bone and ivory pomanders are known. A seventeenth or eighteenth-century bone pomander has been found in Amsterdam and two identical bone examples are known from Haarlem. These bone pomanders are made in two separate sections: a pierced convex top section which could contain a small amount of scented material, and a detachable partially hollow support. The cylindrical support was attached with a screw thread and closed the filling opening of the top and at the same time could be placed on a spike or pin or act as a handle (Fig. 6.42). This variant was not suspended and probably placed upright. The Amsterdam bone pomander still contained a remnant of what was probably a clove bud.[796]

Ivory pomanders are known from Amsterdam and Alkmaar. Ellipsoidal ivory pomanders were made in two separate pierced section which could unscrewed to fill the pomander. The ivory pomander from Amsterdam still contained a little sponge for liquid perfume (Fig. 6.43).[797] Of the Alkmaar ivory pomander only one half was present; it dates to the late eighteenth century.[798]

6.5.10 Dentures

Dentures or false teeth were in the past only accessible for the wealthy. Prior to the discovery of vulcanised rubber these dentures were made of osseous tissues, sometimes in combination with human teeth gathered from battlefields. Dentures from archaeological contexts have

792 Middelburg: collection Erfgoed Zeeland. For comparable bone and ivory piston-action syringes see for example the collection of Museum Boerhaave, Leiden or the Science Museum London.
793 Rijkelijkhuizen 2004.
794 Rijkelijkhuizen 2004. For a razor with boxwood handle, see for example Rijkelijkhuizen & Jongma 2020, 108.
795 Nijhof & Janssen 2007.
796 Rijkelijkhuizen 2004.
797 Rijkelijkhuizen 2004.
798 Bitter 2022, 938, originally published as bone.

a

b

Fig. 6.42 Composite bone pomander, a. side view; b. front view (Haarlem, diameter *c.* 2.3 cm). Collection and image Team Erfgoed, Vakgroep Archeologie gemeente Haarlem.

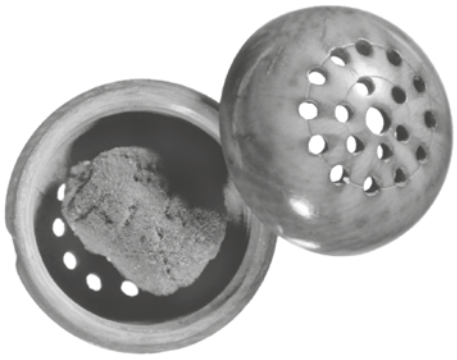


Fig. 6.43 Ivory pomander with sponge inside (Amsterdam, diameter *c.* 3 cm, Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image A. Dekker (UvA).

been found in Amsterdam, 's-Hertogenbosch, Arnhem and Alkmaar (Fig. 6.44).[799] The oldest archaeological dentures date from the seventeenth century, and ivory was probably used for dentures into the nineteenth century. Studies of dentures from archaeological and museum collections show that hippopotamus (*Hippopotamus amphibius*) was the primary material for them and that it was imported specifically for this purpose.[800]

Fig. 6.44 Hippopotamus ivory denture (Alkmaar, total width of the three teeth 1.9 cm, Rijkelijkhuizen 2006b). Collection: Erfgoed Alkmaar, Archeologie. Image M.J. Rijkelijkhuizen.

6.6 Personal adornment and possessions and religious items

6.6.1 Buttons

Buttons were made from various materials, such as metal, wood, bone, mother-of-pearl, ivory, horn, nut, or a combination of some of these materials. Bone and nut were preferred for buttons but ivory was occasionally used. Some horn and mother-of-pearl buttons have been excavated. Shape, decoration, size and material largely depended on fashion. Osseous buttons from archaeological contexts all date to the Post-Medieval period. Depending on how they could be attached to cloth, three types of buttons made of osseous tissues can be recognized:[801]

Button moulds for cloth or yarn-covered buttons were made of wood or bone.[802] These are flat, sometime slightly domed, discs with a single hole. Their cloth or yarn covers rarely survive archaeologically. Bone button cores were usually made of split rib bones.[803] This type of button mainly dates to the eighteenth century, but probably occurred from the late sixteenth to the beginning of the nineteenth century. Archaeological finds are

799 Rijkelijkhuizen & De Raat 2015; Amsterdam: Rijkelijkhuizen 2004; Rijkelijkhuizen, Van Wijngaarden-Bakker & Gawronski 2006; 's-Hertogenbosch: Van den Brand 2012; Alkmaar: Rijkelijkhuizen 2006b; An English example: Anderson, O'Connor & Ogden 2015.

800 Rijkelijkhuizen & De Raat 2015.

801 Rijkelijkhuizen 2004.

802 Wood: e.g. Rijkelijkhuizen & Jongma 2020.

803 Rijkelijkhuizen 2004, 2008a; Spitzers 2012.

Fig. 6.45 Buttons made of the endocarp of *Attalea* cf. *funifera* (Amsterdam, diameter *c.* 2 cm, Rijkelijkhuizen 2004; Rijkelijkhuizen & Van Wijngaarden 2006). Collection Monumenten en Archeologie, gemeente Amsterdam. Image A. Dekker (UvA).

Fig. 6.46 Ivory buckle (Zutphen, length unknown, Groothedde 2003). Collection and image Erfgoedcentrum Zutphen, Team Archeologie.

numerous and have been found in cities but also in graves and military contexts.[804]

Loop buttons are usually made of a single piece of material. Occasionally, the button is composite and the loop is of a different material than the button itself. For example, a button made of nut tissue but with a bone loop, or a bone button with a metal loop, both found in Amsterdam.[805] Loop buttons were mainly used in the eighteenth century, but the late seventeenth or early nineteenth century cannot be excluded. Loop buttons were made of bone, but more often of a nut identified as the endocarp of *Attalea* cf. *funifera*., a palm species from Brazil. The hard brown endocarp was suitable for making buttons and small objects (Fig. 6.45).[806]

Two and four-holed buttons are the most recent types and are still in use today. Buttons with four holes are usually made of bone. Archaeological bone four-holed buttons date to the nineteenth century onwards and are common finds.[807] Two-holed buttons are found less often and can be made of mother-of-pearl.[808]

Double-headed buttons from the nineteenth/twentieth century were not permanently fixed and were used for example pillows or aprons. One-piece and composite examples made of bone, bone and metal and ivory come from Amsterdam.[809]

6.6.2 Belt buckles

A unique ivory belt buckle was found in a cesspit in Zutphen (Fig. 6.46). It probably belonged to a church warden who lived here between 1555 and 1578. The buckle was made in one piece, the frame is decorated with leaves and the plate with the frontal face of Christ; there is no pin. The buckle was originally published as a possible bone book clasp.[810] However, the material is in fact elephant ivory, and the Zutphen buckle has an almost exact parallel in the Musée de Cluny, the Paris national museum of the Medieval period. Its collection contains a complete woollen belt with ivory belt buckle, strap end and belt stops (as there is no pin to adjust the length), probably late fifteenth century in date. The Paris belt buckle also shows leaves and the plate is again decorated with a frontal face of Christ. The similarities with the belt buckle from Zutphen are so striking that both must have come from the same workshop. A similar ivory buckle in the Metropolitan Museum of Art, New York, dates to the early sixteenth century.

A buckle from Dordrecht probably dates to the Late or Post-Medieval period. The plate and frame of this buckle are integrated and made of one piece of osseous tissue. There is a separate bone pin. The belt was inserted through a slot in the plate and held in place with rivets.[811]
A fourteenth century bone buckle comes from Amsterdam.[812]

6.6.3 Shoehorns

An object still in use today is the shoehorn; a tool to facilitate putting on one's shoes.
Most shoehorns today are made of synthetic materials, but originally they were made of horn. Cattle horn has a good shape to make these objects. Some private and museum collections include decorated shoehorns, but the only archaeological example is undecorated and has a suspension hole. It was found in Amsterdam and dates to the seventeenth or eighteenth century.[813]

804 Rijkelijkhuizen 2004, 2022; 's-Hertogenbosch: Spitzers 2012. Waste of manufacture has been found all over the world: e.g. Klippel & Price 2007; Bikić & Vitezović 2016; Luik 2016.
805 Rijkelijkhuizen 2004.
806 Rijkelijkhuizen 2004; Rijkelijkhuizen & Van Wijngaarden-Bakker 2006.
807 Rijkelijkhuizen 2004, 2022.
808 E.g. Rijkelijkhuizen 2023c.
809 Rijkelijkhuizen 2004.
810 Groothedde 2003.
811 Collection Archeologie, Dordrechts Museum.
812 Rijkelijkhuizen 2004.

6.6.4 Hairpins and hair parters

A unique find is a possible hair parter (gravoir) from 's-Hertogenbosch (Fig. 6.47). It was found on the loam floor of a late medieval house and can be dated to between 1275 and 1350.[814] Hair parters generally date from the late thirteenth and fourteenth century. Several interpretations of these large decorated pins have been suggested through time, but the current interpretation is that they are hair parters, used to part the hair while preparing certain hair styles. The parters were probably used in combination with a comb and mirror.[815] It is also possible that these objects have various functions, such as a hair parter and a hairpin, or that they were secondarily reused as such. So far only a few excavated examples in north-western Europe are known; most come from museum collections.[816] Several types and styles of hair parters exist; they were made of bone or ivory.

The hair parter from 's-Hertogenbosch is similar to a small group of bone and ivory hair parters and knife handles which are shaped like a woman with an intricate hair style and holding an animal (dog or falcon) or an object (possibly a book or box). A late medieval handle of a carving knife (see Fig. 6.19) from 's-Hertogenbosch also falls into this category. Many hair parters of this group are made of bone. Examples can be found in museums in France, Germany and Belgium, and excavated examples come from Angers and Bruges.[817] The style of each of these bone hair parters is very different and they cannot be assigned to a specific workshop or place of production.

The hair parter from 's-Hertogenbosch deviates from the overall style of this group in that it is less detailed. Furthermore, the other specimens show a complete female figure with a robe while the 's-Hertogenbosch hair parter shows only the head and upper arms, and three dice instead of a robe. The numbering on the dice seems random. It looks like the lady is holding something in her arms, but because the carving is not very detailed it is impossible to see what she is holding.

The parters from 's-Hertogenbosch and Angers both came from a normal, late medieval house. How they ended up there is a mystery, and several interpretations have been suggested, such as a wedding gift or the presence of a hairdresser.[818]

Flat double-eyed hair pins have been found in Alkmaar and Amsterdam (Fig. 6.48).[819] These have been identified as hair pins because a silver and an ivory example were found in grave contexts near the head or hair.[820] The ivory double-eyed hair pin from Alkmaar dates to the eighteenth century. Two ivory double-eyed hair pins from Amsterdam are dated to the eighteenth century, one bone example to the seventeenth or eighteenth century.[821]

Fig. 6.47 Bone hair parter ('s-Hertogenbosch, length 15 cm, Janssen 2002). Collection and image Erfgoed 's-Hertogenbosch.

813 Rijkelijkhuizen 2004.
814 Janssen 2002; identified as walrus ivory, but it is made of bone.
815 Comte & Gaborit-Chopin 1987; Camille 2000.
816 Comte & Gaborit-Chopin 1987; Vandenberghe 2010.
817 Comte & Gaborit-Chopin 1987; Vandenberghe 2010.
818 Comte & Gaborit-Chopin 1987.
819 Alkmaar: Bitter 2002; Amsterdam: Rijkelijkhuizen 2004.
820 Bitter 2002, 241, 300, 309, 332.
821 Rijkelijkhuizen 2004.

Fig. 6.48 Flat double-eyed hair pin (Amsterdam, length 5.8 cm, Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image M.J. Rijkelijkhuizen.

6.6.5 Finger rings

Finger rings are usually made of metal, sometimes set with other materials. Not much jewellery was made of bone, the only find so far being one finger ring from Amsterdam (Fig. 6.49). This has originally been identified as a thumb ring and dates to the fifteenth or sixteenth century.[822] However this is not a thumb ring, but its owner had large hands. The ring is shaped like a signet ring and is made of the compact tissue of a large mammalian bone.[823]

Fig. 6.49 Bone finger ring (Amsterdam, diameter 2.3 cm, Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image M.J. Rijkelijkhuizen.

6.6.6 Feather fans and feather curlers

Feather fans were probably already used in the Dutch Republic in the late sixteenth century, but this cannot be confirmed by archaeological evidence.[824] Feather fans became very popular among the elite in the seventeenth century and many high-ranking persons were portrayed holding a (feather) fan. The feathers of these fans were artificially curled, probably with single-piece knives made of bone. Earlier these were described as 'butter knives', until Van Vilsteren recognized them as feather curlers, based mainly on the date of the objects (late sixteenth century until the first half of the seventeenth century), the presence of feather fans in The Netherlands around that time, and the identification of feather curlers in the Museum of London.[825]

Many feather curlers were found in Amsterdam.[826] They are very similar in shape, decoration and material use. All feather curlers are made of long bones of large mammals, such as cattle metapodials. The blade is usually pointed and the decoration of the handle mostly consists of several transverse and diagonal incised lines with black and red colouring; sometimes these diagonal lines were made deeper, resulting in a spiral-shaped handle. The end of the handle has a suspension hole and is triangular or shaped like the stepped gable popular for houses in the seventeenth century.[827] These feather curlers were also produced in Amsterdam as is evident from waste fragments found in previous excavations.[828] Feather curlers have been found in many other cities and were quite common. Different decoration styles do occur.[829]

6.6.7 Foldable fans

The foldable fan probably made its first appearance in the late sixteenth century and became more popular from the mid-seventeenth century onwards (Fig. 6.50). Most excavated fans in Amsterdam date to the eighteenth century, a time when the fan became a fashionable item in Europe.[830] Fans were only used by the wealthy, and their appearance was largely dictated by changing fashions. When not in use, fans could be folded and stored away in a box or suspended from a person's clothing.

Fans were luxury items. They were used as cooling devices but even more to show social or marital status and even political preferences. Apparently a fan etiquette existed and the position of the fan could speak for itself. Eventually the images on the fan leaves were also used for propaganda. The production process of a foldable fan was highly specialized and the sticks and leaves were often made at different locations. The leaves were mostly manufactured in France. From the mid-eighteenth century onwards leaves could also be printed rather than painted, and mass production began.[831]

A foldable fan consists of several sticks

822 Baart *et al.* 1977, 213.
823 Rijkelijkhuizen 2004.
824 Catalani 1973; Mayor 1980.
825 Van Vilsteren 1988.
826 Baart *et al.* 1977, 336; Rijkelijkhuizen 2004.
827 Rijkelijkhuizen 2004.
828 Sarfatij 1990, 156; Rijkelijkhuizen 2004.
829 E.g. Van Vilsteren 1988; Haarlem; Alkmaar; Delft; Sittard: Van Vilsteren 1987, 42; Eindhoven; Purmerend: collection Provinciaal Depot voor Archeologie Noord-Holland; Utrecht: Rijkelijkhuizen 2018c; 's-Hertogenbosch.
830 Rijkelijkhuizen 2004.
831 Catalani 1973; Mayor 1980; Payen-Appenzeller 2000.

Fig. 6.50 Portret van Maria Overrijn van Schoterbosch (1599/1600-38) holding a foldable fan in her hand, Cornelis van der Voort, 1622. Collection Rijksmuseum.

(in Dutch: *benen*), often made of wood or osseous or keratinous materials, and a guard stick (in Dutch: *buitenbeen*) at both ends. Guard sticks can be recognized because they are usually thicker and have a different shape, are wider at the top, and have a different decoration or surface structure. They can also be made of a different material than the other sticks.
The sticks and guard sticks were fixed at the lower end with a pivot, allowing the fan sticks to be folded together. At both sides of the metal rivet was a small protective disc. The sticks usually become wider from the rivet towards the 'shoulder' section, the widest part.
From the shoulder section towards end, sticks narrow again. This is the place where the leaf was attached. This could be made of materials like paper, fabric, or leather. Sticks without a narrower section, whereby the wide sticks themselves form the fan leaf, are called brisé fans. These sticks were held together by a ribbon and are usually decorated.

Complete fans are considered collector's items and many are present in several museum and private collections. Elements of foldable fans are not rare in archaeological contexts, but due to their fragile nature often only as small fragments. Fragments of fans have been found in most cities, but most come from Amsterdam.[832] Foldable fan fragments also come from high-status contexts, such as Huis te Vleuten or Huis Keenenburg.[833] Larger fan components are rarely encountered.

Archaeological foldable fans sticks can be made of wood, bone, ivory, tortoiseshell or a combination of two materials. A foldable fan from Amsterdam has ivory sticks and tortoiseshell guard sticks.[834] Tortoiseshell sticks are seldom found, partially due to the poor preservation of tortoiseshell in the soil but also due to the rarity and expensive nature of tortoiseshell.[835] Mother-of-pearl was also used for fans, but no archaeological examples are known from the Netherlands. Most archaeological fragments are made of bone or ivory.[836]

6.6.8 Glove stretchers

Glove stretchers were used to stretch and reshape the fingers of goat leather gloves, for example after washing.[837] Glove stretchers consist of two segments connected by a metal pivot in the middle. The tip of the glove stretcher was inserted into the glove fingers, and when the handle was squeezed the glove stretcher would open and stretch the fingers. Glove stretchers were made of wood, bone, ivory or celluloid. The only known excavated glove stretcher comes from Amsterdam (Fig. 6.51). It probably dates to the nineteenth or early twentieth century and is made of bone.[838]

6.6.9 Powder boxes

A round powder box excavated in Amsterdam is made of tortoiseshell and decorated with metal floral rims. Some textile has been preserved on the inside. There are no known archaeological parallels. The box probably dates to the late nineteenth or early twentieth century (Fig. 6.52).[839]

6.6.10 Smoking implements

Clay pipes have been found in large numbers from the late sixteenth century onwards. A pipe stopper was used to push the tobacco into the pipe, and a pipe cleaner to clean the pipe after smoking. A combination of both tools into one object is also possible.[840] These smoking implements were often made of metal, but bone

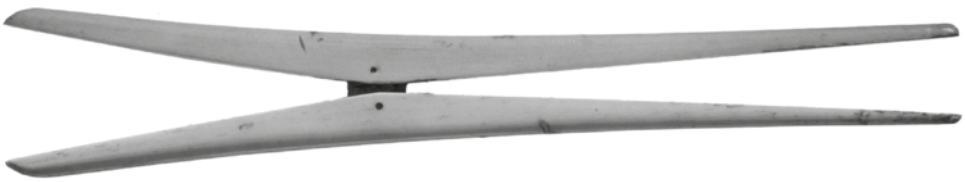


Fig. 6.51 Bone glove stretcher (Amsterdam, length 18.1 cm Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image A. Dekker (UvA).

832 Rijkelijkhuizen 2004.
833 Huis te Vleuten: Van Dijk *et al*. 2005; Huis Keenenburg: Anthony & Bult in prep.
834 Rijkelijkhuizen 2004, 2010a.
835 Rijkelijkhuizen 2010a.
836 Rijkelijkhuizen 2004.
837 Beaujot 2012, 44.
838 Rijkelijkhuizen 2004.
839 Rijkelijkhuizen 2024.
840 Baart *et al*. 1977, 362-367.

Fig. 6.52 Powder box, a. front; b. back (Amsterdam, diameter 8.5 cm, North-South-Line, Rijkelijkhuizen 2024) Collection Monumenten en Archeologie, gemeente Amsterdam. Image R. Tousain.

pipe cleaners are also known. For example, a hare bone (*Lepus europaeus*) was often used for this purpose, sometimes partially set in silver.[841] Other pipe cleaners are made of compact bone and can be decorated or have a figural head. It is not always easy to identify such an object as a pipe cleaner as they can resemble other pins, such as hair or clothing pins or other objects. A date and context are therefore necessary to identify a possible function. Pipe cleaners have been found in several cities[842] and also come from ship wrecks. A brass tobacco box with a bone pipe cleaner from a ship wreck dates to the seventeenth century. The pipe cleaner shows a hand with suspension hole and remnants of red paint (Fig. 6.53).[843] Tobacco boxes could also be made from for instance tortoiseshell, but the function of archaeological boxes is difficult to establish (see Section 6.8.4).

Examples of composite pipes are those which have a porcelain bowl, usually a porcelain expansion chamber and porcelain, wooden, horn, bone and/or ivory stem sections.[844] A horn mouth piece of a composite pipe was found in Middelburg and a complete composite pipe comes from a nineteenth-century shipwreck (Fig. 6.54).[845] A bone and ivory section of a composite pipe was found in Amsterdam. It dates to the eighteenth century.[846]

Cigar and cigarette holders were made from the second half of the nineteenth century onwards. In Middelburg, several cigar or cigarette holders were found made of bone, nut (*Attalea* cf. *funifera*) or meerschaum.[847] Three cigar or

Fig. 6.53 Metal tobacco box with bone pipe cleaner (shipwreck Waddenzee, length pipe cleaner 7 cm, Vos 2012, 130, inv. BZN2-259). Collection and image Maritiem Archeologisch Depot, Batavialand.

841 Van Vilsteren 1987, 71.
842 Eindhoven; Zutphen; 's-Hertogenbosch.
843 Vos 2012, 130, Collection Maritiem Archeologisch Depot, Batavialand.
844 Duco 1998.
845 Middelburg: Esser *et al.* 2006; Lelystad: collection Maritiem Archeologisch Depot, Batavialand.
846 Rijkelijkhuizen 2004.
847 Esser *et al.* 2006.

Fig. 6.54 Composite pipe of porcelain and horn (shipwreck Lelystad, height bowl 9.2 cm, inv. OF3-52). Collection and image Maritiem Archeologisch Depot, Batavialand.

cigarette holders were excavated in Amsterdam; these were made of bone or of bone and brass.[848] A cigarette holder of bone and wood was found in Delft, dating to the second half of the nineteenth century. These objects were also made of synthetic materials and were used into the twentieth century.[849]

6.6.11 Portable diptych sundials

Portable diptych sundials were small sundials made of two panels that could be opened when in use and closed when travelling. These were horizontal sundials and it was therefore necessary to point the sundial towards north. To achieve this, a small compass was built into the lower panel. A string between the two panels served as a gnomon. The sundials needed to be set to a certain latitude.[850] Elaborately decorated diptych sundials were made in Nuremberg and Dieppe[851] and are present in museum collections, but less decorated diptych sundials have been found in archaeological contexts. These were made of wood or ivory.[852] Excavated ivory diptych sundial panels have been found in Amsterdam, Delft and Nijmegen.[853] The archaeological diptych sundials date to the sixteenth and seventeenth centuries.

6.6.12 Telescopes

The telescope was invented in the seventeenth century.[854] Three almost complete telescopes and two fragments were found in excavations in Amsterdam. Four of the telescopes have one single tube made of a cattle metatarsal. The fifth telescope has two sections that can be screwed together (Fig. 6.55). In one of the telescopes one of the lenses is still present while both lenses are preserved in the composite telescope.
The telescopes date to the eighteenth century.[855]

The small telescopes found in Amsterdam probably had a low magnification and were 'Dutch' or 'Galilean' telescopes with an optical system consisting of a convex objective and a concave ocular. These small telescopes were probably personal items for terrestrial use. The Dutch system is more convenient for telescopes for terrestrial use because of the upright view. For navigational purposes a different type of telescope was used, one with a higher magnification. In the case of the composite telescope, the marrow cavity had been narrowed with a bone insert with a small opening, closing off the aperture[856] so as to block out the outer light rays, resulting in a sharper image by reducing the spherical aberration. These telescopes were a luxury item not everyone could afford. Different specialized artisans were involved in the manufacturing process, but it is probable that merchants from Amsterdam played an important role in the manufacture and distribution of these little telescopes.[857]

Only a few similar finds, made of wood, are known. These wooden telescopes come from shipwrecks and can be precisely dated.

Fig. 6.55 Bone telescope (Amsterdam, length *c.* 14 cm, Rijkelijkhuizen 2004, 2011g). Collection Monumenten en Archeologie, gemeente Amsterdam. Image W. Krook.

848 Rijkelijkhuizen 2004; Rijkelijkhuizen 2024.
849 Rijkelijkhuizen 2023c.
850 Gouk 1988; Higton 2001.
851 Gouk 1988; Ickowicz, Abraham & Hébert 2004.
852 Wooden examples, see for example Groningen: Helfrich, Benders & Casparie 1995; Middelburg: Esser *et al.* 2006; Delft: Rijkelijkhuizen & Jongma 2020.
853 Amsterdam: three panels, Rijkelijkhuizen 2004; Delft: both panels of one diptych sundial, Rijkelijkhuizen 2020a, 55; Nijmegen: one panel, Van Vilsteren 1987, 70.
854 Van Helden 1977; Ernst 1985; Degenaar 1988; Van Berkel 2002.
855 Rijkelijkhuizen 2004; 2011g.
856 Van Helden, pers. comm.
857 Zuidervaart 2004; Rijkelijkhuizen 2011g.

A small ebony telescope with copper lens caps was found on the ship The Amsterdam.[858] Another wooden telescope was found in the ship The Kronan.[859]

A different type of telescope which has no parallels comes from the castle of Haamstede. It is an extendible telescope made of brass and ivory but combined with a portable sundial. The lenses were still present and it is also a 'Dutch' or 'Galilean' telescope with a low magnification. This was probably also a personal item of one of the residents of the castle.[860]

6.6.13 Seal stamps

In the Medieval and Post-Medieval period seal stamps were used to seal and documents or letters with seal wax or seal lac and to authenticate the sender. Seal stamps are usually made of metal, but post-medieval examples could have a wooden or osseous handle.[861] A sixteenth-century seal stamp from Amsterdam has a metal stamp with initials of the owner. The handle is made of elephant ivory.[862] A second seal stamp also has a metal stamp with initials, but a bone handle. It came from a moat of Vreedenburg Castle (Fig. 6.56).[863]

Fig. 6.56 Ivory seal stamp (Amsterdam, length 4.7 cm, Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image A. Dekker (UvA).

6.6.14 Spectacles

The development of spectacles started in the Late Medieval period. At first 'reading stones' made of glass were used, but the first framed spectacles probably appeared in the thirteenth century. These consisted of two round eye pieces put together with a pivot so the spectacles could be folded when not in use. The round frames had a small opening on one side and a groove along the inner rim to hold the glasses. After the glasses had been inserted the opening was bound closed.

Spectacles from the Late Medieval period are rare, and archaeological finds come from fourteenth or fifteenth-century religious or high-status contexts. The spectacle frames can be wood, leather, horn or bone. Several late medieval spectacles with wooden frames were found at the monastery of Wienhausen, Germany.[864] One spectacle frame was found at Huis ter Kleef, Haarlem; this frame was made of willow wood and dates to between 1375 and 1425.[865] A single-piece spectacle frame made of leather was also found at the monastery of Wienhausen. A hinged spectacle frame was found at the monastery of Windesheim, but its material has not yet been identified.

Osseous hinged spectacles have been found in Bergen op Zoom, the castle of Souburg (1425/1450-1525) and in the moat of castle Huis ter Kleef (made of bone, 1225-1575).[866] Other finds from north-western Europe come from

Fig. 6.57 Spectacles with horn frame (Amsterdam, length *c.* 7.5 cm, Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image M.J. Rijkelijkhuizen.

858 Jansma 1986.
859 www.kalmarlansmuseum.se
860 Bazelmans *et al.* 2021.
861 Baart *et al.* 1977, 422-423; Hendrikse 2003; Nijhof & Janssen 2007.
862 Rijkelijkhuizen 2004.
863 Rijkelijkhuizen 2017b.
864 Steuer 1985.
865 Maûl & Schmidt 1995, 89.
866 Bergen op Zoom: Vermunt 2001; collection Markiezenhof; Souburg: Hendrikse & Goldschmitz-Wielinga 1998, collection Erfgoed Zeeland; Castle Huis ter Kleef: Bottelier & Rijkelijkhuizen in prep.

Fig. 6.58 Bone parasol handle, b. and c. details (Utrecht, length fragment 23.5 cm, Rijkelijkhuizen 2017c). Image M.J. Rijkelijkhuizen.

places like Oostende, Belgium and London (fifteenth century).[867]

A post-medieval hinged spectacle frame was found in Amsterdam (Fig. 6.57). The frame was made of horn and the glasses were partially preserved. The two sections of the frame could hinge on the nose section, similar to the late medieval spectacles. When not in use, the object could be folded and stored. Post-medieval hinged spectacles were often made of metal. The horn hinged spectacles from Amsterdam probably date to the eighteenth or nineteenth century.[868]

6.6.15 Parasols

Parasols were used in the eighteenth until the twentieth century by rich women to protect their skin from the sun, but also as a fashion accessory.[869] Complete parasols are present in museum collections, but occasionally part of a parasol handle is found in excavations. A composite parasol handle made of bone has been found in Utrecht. The end of the handle is curved and features a head of a greyhound (Fig. 6.58).[870] A similar handle was found in Meppel.[871] An incomplete composite bone parasol handle comes from 's-Hertogenbosch.

6.6.16 Walking canes

Walking canes are usually made of wood but could have a protecting ferrule of a different material at the lower tip of the shaft to protect the cane from wear caused by frequent contact with the ground surface. Handles may also be of a different material. Ferrules and handles could be made of metal or osseous tissues. Separate ferrules can be difficult to identify and decorative knobs may also come from furniture. One bone handle from Amsterdam with a distinctive shape definitely came from a walking cane. It is of post-medieval date (Fig. 6.59).[872] A possible ivory handle comes from Venlo.[873]

867 Oostende: Pieters 2013; London: Rhodes 1980; MacGregor 1985, 122.
868 Rijkelijkhuizen 2004; 2013a.
869 Beaujot 2012.
870 Utrecht: Rijkelijkhuizen 2017c.
871 Originally published by Hullegie on www.wbrg.net as ivory walking cane, but it is in fact a bone parasol handle.
872 Rijkelijkhuizen 2024.
873 De Jong 1997.

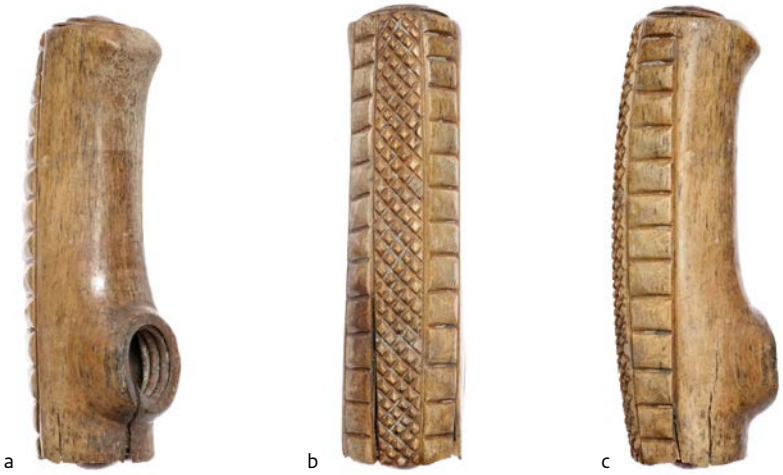


Fig. 6.59 Bone walking cane handle, a. bottom view; b. top view; c. side view. (Amsterdam, length *c.* 7 cm, Rijkelijkhuizen 2024). Collection Monumenten en Archeologie, gemeente Amsterdam. Image H. Strak.

6.6.17 Pocket knives

Post-medieval pocket knives resemble the pocket knives that are still used today, but the cover plates were made for example of bone, antler ivory or horn.[874]

6.6.18 Beads and rosaries

Beads from late and post-medieval contexts are usually prayer beads. Prayer beads were used in the Roman Catholic church as an aid to count the number of prayers recited. A late medieval rosary could vary in length and in number of beads and other pendants.[875]

Excavation sites usually yield loose beads, although sometimes in fairly large numbers.[876] The metal loops or threads that held the beads together are often decayed in the soil. The beads could be made of various materials such as wood, bone, jet, amber or ivory.[877] The most affordable beads were made of bone or wood and these were produced on a large scale. More expensive beads were made of jet, coral or amber. Prayer beads mainly date to the fourteenth to sixteenth century.

Only a few more or less complete rosaries are known from excavations. At a vicarage site in Bergum, province of Friesland, eight ivory beads and a *memento mori* bead were found, dating to the mid-fourteenth century. The *memento mori* bead has two faces: a skull and a woman's head.[878] From 's-Hertogenbosch come two exceptional rosaries from the start of the sixteenth century. The first is a short rosary with bone beads and a lead or tin pendant,[879] while the second has coral and amber beads.[880] At Delft several bone beads have been found in combination with amber beads.[881] A small cross found in 's-Hertogenbosch together with a 41 bone beads were part of a rosary.

A complete rosary of bone beads was found in Amsterdam and dates to between 1592 and 1597 (Fig. 6.60). It had the standard number of beads of modern-day rosaries. This type of

Fig. 6.60 Rosary with bone beads (Amsterdam, total cord length *c.* 45 cm, Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image A. Dekker (UvA).

874 Rijkelijkhuizen 2004.
875 Koldeweij 2006, 251-253.
876 Spitzers 1997, 2006, 2012, 2013; Rijkelijkhuizen 2004, 2018b.
877 E.g. Janssen 1983; Spitzers 1997, 2006, 2012, 2013; Rijkelijkhuizen 2004, 2018b, 2020a, 61; Rijkelijkhuizen & Jongma 2020, 150; Van Genabeek 2022.
878 De Jong 1980, 184; Koldeweij 2006; collection Fries Museum.
879 Janssen 2007a; Van Genabeek 2022.
880 Van Genabeek 2022.
881 Rijkelijkhuizen 2020a, 61.

rosary probably existed from the late fifteenth or sixteenth century onwards. A complete rosary has five series of eleven beads. Each large bead is followed by ten smaller beads. For each large bead an 'Our Father' must be recited, for each small bead an 'Hail Mary' (Ave Maria), and the entire rosary must be said three times. These prayers are usually preceded by a recitation of the Crede, along with *an Our Father and an Hail Mary,* and these separate prayers are marked by separate beads hanging from the prayer chain. The cross which was probably hanging from the rosary is now missing. The beads were linked to each other with small metal loops which were still present.[882]

Besides rounded and oval beads of various materials, small ex-voto beads were also found in 's-Hertogenbosch (Fig. 6.61). An ex-voto is a votive offering representing for example a diseased body part or other symbol, placed near the statue of a religious figure in a church or chapel. Ex-votos have been found together with other beads and could be part of a chain.

Although bone beads were manufactured on a small scale in for example monasteries, large production centres existed in the Late and Post-Medieval period.[883] In Konstanz, Germany, huge numbers of waste fragments have been found. These have been thoroughly studied and the production process has been described in detail by Thomas Spitzers. The material chiefly used in Konstanz were cattle metapodia and mandibulae. From these bones, flat bone strips were cut and the beads were made by drilling into these strips from both sides with a drill with a centre bit with a curved profile and an extended central point.[884] This final last stage of the manufacturing process is very easy to recognise and consists of bone strips with several holes.[885] Regional variation existed in beads and in the production process.[886]

In the Netherlands, numerous waste fragments from bead production have been found in 's-Hertogenbosch. This waste material mainly dates to the sixteenth century. Pilgrimage to the statue of 'Our Lady of Den Bosch' probably initiated this production.[887] Waste fragments from a thirteenth-century ditch in Utrecht also reveal several stages of bone bead production. Additional information on the production process is provided by the bone waste fragments that were found. At this location, two bead sizes of beads were produced, which could indicate that prayer chains subdivided into smaller and larger beads already existed at this time.[888] Waste material of dice making was also found at this site. The connection between bead and dice making has been noticed before.[889] Waste fragments from bone bead production has been found in other cities as well, such as Deventer and Zutphen.[890]

882 Rijkelijkhuizen 2004.
883 E.g. Spitzers 1997, 2006, 2012, 2013; Rijkelijkhuizen 2004, 2018b, 2018c.
884 MacGregor 1985, 101; Spitzers 1997, 2006, 2012, 2013.
885 Spitzers 1997, 2006, 2012, 2013.
886 Spitzers 1997, 2006, 2012, 2013; Rijkelijkhuizen 2018b; 2018c.
887 Janssen 1983, Spitzers, 2012; Nijhof 2007a; Rijkelijkhuizen 2018b.
888 Rijkelijkhuizen 2018c.
889 Erath 1996; Spitzers 2006; Bungeneers, Ervynck & Van Neer 1993.
890 Deventer: Mittendorff & Vermeulen 2004; Spitzers 2012.
891 Van Heeringen, Koldeweij & Gaalman 1987, 59-60; Van Beuningen, Koldeweij & Kicken 2001, 266; Koldeweij 2006; Van Beuningen *et al.* 2012, 127-133.
892 E.g. Nieuwlande: Van Heeringen, Koldeweij & Gaalman 1987, 59-60; Amsterdam: Baart *et al.* 1977, 396; Koldeweij 2007; Monster: Rijkelijkhuizen 2019b; Delft; 's-Hertogenbosch: Koldeweij 2007; Alkmaar: Bitter 2016, 123; Enkhuizen: Duijn 2010; Medemblik: collection Huis van Hilde; collections: Van Beuningen, Koldeweij & Kicken 2001, 266; Van Beuningen *et al.* 2012, 127; Helmond, Eindhoven: De Jong 2002, 76-77.
893 E.g. Spencer 2010, 244-248; Koldeweij 2006, 74, 224.

Fig. 6.61 Jet beads and bone ex-voto beads (total cord length *c.* 15 cm, length largest ex-voto bead *c.* 2.5 cm, 's-Hertogenbosch). Collection and image Erfgoed 's-Hertogenbosch.

6.6.19 Pilgrim badges

Pilgrimages to Santiago de Compostela to visit the alleged grave of St James started in the Late Medieval period. Scallop shells (*Pecten maximus*), referred to as shells of St James (*St. Jacobsschelp* in Dutch) were brought home by the pilgrims, worn as a visible badge on their clothing or hat. The shells usually have two artificial holes for attachment. Metal imitations of these shells were made in miniature or in combination with other symbols. Scallops became a symbol for pilgrimage in general.[891] Archaeological finds are present in museum and private collections and have been found in funerary and other archaeological contexts.[892] Scallop shells and metal scallop pilgrim badges have also been found in other countries in north-western Europe.[893]

Fig. 6.62 Miniature pilgrims staff or *bordoncillo*. (Enkhuizen, length 2 cm, Duijn 2010, inv. 6200 32). Collection and image Provinciaal Depot voor Archeologie Noord-Holland.

Another pilgrim badge from Santiago de Compostela is a miniature pilgrims staff or *bordoncillo*. These badges also attached to the hat or clothing as a sign of a pilgrimage. Bone *bordoncillos* have been found at Nieuwlande and Enkhuizen (Fig. 6.62).[894]

6.6.20 Crucifixes

Osseous materials played an important role in Christian art, and images of the crucifixion of Christ were common in the Late and Post-Medieval period. Large wooden statues or ivory diptychs stood in churches or monasteries. For personal devotion, 'paper saints' or figurines made of terracotta or white clay were used in de Late Medieval period until the reformation in the northern Netherlands. From the second half of the nineteenth century onwards freedom of religion and separation of state and church were embedded in the law and Catholics could openly express their religion. Two osseous figures of Christ probably date from this period.

The first of these figures was excavated from a cesspit in Arnhem. The cesspit probably dates to the late nineteenth or early twentieth century. The Christ figure is a little over 3 cm tall; its material has not been identified.[895] The second figure was also found in a cesspit, in The Hague. This Christ figure is *c.* 5 cm tall, and its material, too, was not further analysed. It dates from the Post-Medieval period.[896] Both figures represent the suffering Christ and were originally attached to a wooden cross as part of a crucifix.

6.7 Games, toys and musical instruments

6.7.1 Skates and sledges

Skates (in Dutch: *glissen*), made of the long bones of mostly horse and cattle, have been found from the Roman period onwards (see Section 5.7.1). Occasionally bones of other animal species were used, such as red deer.[897] Their use continued in the Post-Medieval period and finds are numerous. These bone runners were tied under the feet as the predecessor of skates, or attached to a small wooden sledge. Sledge runners can be recognized by the large holes which run from the front to the back of the bone.

6.7.2 Jaw sledges

Another type of small sledge is the jaw sledge. These were made out of one or a pair of lower horse mandibles. A wooden seat was placed on the teeth of the mandibles. Horse mandible fragments can be identified as part of a jaw sledge by the use wear one the underside of the mandibles, and there may be an irregular hole through the vertical ramus. For a double mandible sledge, the inner vertical rami of both mandibles were removed.[898] Jaw sledges are less common than skates, but some have been found in Dordrecht, Eindhoven, Hulst and 's-Hertogenbosch.[899]

894 Nieuwlande: Van Beuningen & Koldeweij 1993, Koldeweij 2006; Enkhuizen: Duijn 2010.
895 Verduin 2019, 42.
896 Magendans & Schulten 1987, 21; De Hingh & Van Ginkel 2009, 161.
897 E.g. Amsterdam: Rijkelijkhuizen 2004; Egmond: Zeiler 2007.
898 IJzereef 1974.
899 Dordrecht: IJzereef 1974; Eindhoven: De Jong 1994a; 1992a, 2001; Hulst: Rijkelijkhuizen 2021b.

6.7.3 Dice

Dice were made of osseous tissues, such as bone or ivory.[900] When or where they first appeared is unknown; they occur in different regions and in different shapes and appearances. Cubical dice were probably introduced in north-western Europe by the Romans. Dice were used in different games, but also for dividing the work and gambling. Gambling became such a huge problem that playing dice was repeatedly prohibited. Cheating with dice was also punished. But punishments and prohibitions could not prevent such games or cheating;[901] a dice weighted with lead was found in Amsterdam.[902]

An attempt to introduce a tax on dice failed in the Dutch Republic but was successful in England, where between 1760 and 1862 dice were marked with a crown and the letters G R (Georgius Rex) or V R (Victoria Regina).[903] Two of such English marked dice were found in Amsterdam (Fig. 6.63).[904]

The place and the position of the eyes vary until this became standardized. The distribution and placement of the eyes may help to date the dice. Today the position of the eyes is equal in all dice. But when the 5 is positioned opposite the 6, the dice dates to the thirteenth to fifteenth century. After the fifteenth century the 5 was positioned next to the 6.[905] The positions of the 3 and the 4 are interchangeable and the 2 and the 3 can be turned in different ways. Perhaps such small differences dependent on the maker producing the dice. Finds of dice are numerous from various contexts.[906]

Fig. 6.63 English marked dice (marked with a crown, Amsterdam, length and height 1.2 cm, Rijkelijkhuizen 2004, 2008b). Collection Monumenten en Archeologie, gemeente Amsterdam. Image A. Dekker (UvA).

6.7.4 Dominoes

Dominoes was played for centuries in China, but the game first reached north-west-Europe in the eighteenth century where it became popular in the eighteenth and nineteenth century. It is still being played today. Domino tiles are based on dice, both having eyes representing numbers.[907] Domino tiles are rectangular flat pieces divided into two parts by a vertical line across the middle. Each section has zero to six eyes. A complete set of dominoes contains 28 tiles, each different from the rest. Each player received a number of tiles invisible to the other players. Those whose turn it was would position their dominoes next to the others in a long chain whereby sections with an equal number of eyes would face each other. The game is finished when one player has played all his dominoes.

Domino tiles probably evolved through time. It is likely, though not yet proven, that tiles made entirely of bone are older than the composite tiles consisting of a strip of bone attached to a layer of wood, either with two rivets, one at each end, or with one rivet through the centre. In modern domino tiles of wood or synthetic materials the dividing line has a dot in the middle, perhaps an atavistic remnant of the original rivet. The double-rivet technique is therefore probably older than the single-rivet one.[908] The eyes are always shallow holes filled with a black substance, similar to the eyes of most dice.

The material which was used to make dominoes is always bone or bone with wood. No examples of dominoes exist which are made of ivory. The wood for the bottom layer of the composite dominoes is usually ebony. Of two of dominoes from Amsterdam the wood was identified as ebony.[909] The wood of three domino pieces from Delft were also identified as ebony.[910] The dark ebony was used to avoid staining of the pieces. Stains would make them recognisable for the opponent.[911] It is uncertain where dominoes were manufactured and if dominoes were made in the Netherlands, or by professional dice makers. Finds of domino pieces are numerous.[912]

900 Rare wooden dice: Helfrich, Benders & Casparie 1995.
901 Ter Gouw 1870; Van der Heijdt 1990; Botermans, Visser & Burrett 1991.
902 Rijkelijkhuizen 2004; 2008b.
903 Van der Heijdt 1990.
904 Rijkelijkhuizen 2004; 2008b.
905 Van der Heijdt 1990.
906 E.g. Amsterdam: Rijkelijkhuizen 2004, 2008b; 's-Hertogenbosch; Haarlem; Huis ter Kleef: Botterlier & Rijkelijkhuizen in prep.; Zutphen; Susteren: Rijkelijkhuizen 2023d; Alkmaar; Huis Breda: pers. Comm. Theo de Jong; Oude Huys Helmond: Arts 2001; Eindhoven; Hulst: Rijkelijkhuizen 2021b; Utrecht: Rijkelijkhuizen 2018c.
907 Van Vilsteren 1987; Botermans, Visser & Burrett 1991; Braun 2016.
908 Rijkelijkhuizen 2004.
909 Identification by P. van Rijn, see Rijkelijkhuizen 2004.
910 Identification by C. Vermeeren, see Rijkelijkhuizen 2023c.
911 Braun 2016.
912 E.g. Delft: Rijkelijkhuizen 2023a, 2023c; Amsterdam: Rijkelijkhuizen 2004; 's-Hertogenbosch; Haarlem; Helmond; Zutphen; Eindhoven: De Jong 1994a; Arnhem: Verduin 2019; Alkmaar: Bitter *et al.* 1997, 171-172.

6.7.5 Gaming tops (teetotums)

From the Late Medieval period spinning tops used by children were made of wood.[913] The much smaller spinning tops, however, were made of osseous materials. These gaming tops, or teetotums, could have been used by children, but more often adults used them in games of chance. A teetotum has six sides with letters or numbers on them. The numbers are represented by dots, comparable to the sides of a die. The letters on the six sides represent an action which must be performed. The lettering in the Netherlands is: A: *allen trekken* (all take one); B: *bijbetalen* (pay extra); D: *dubbel inzetten* (stake double); N: *niets trekken* (take nothing); S: *inzetten* (stake); T: *trekken* (take one).[914]

All excavated teetotums date to the Post-Medieval period, sixteenth to eighteenth century, and were made of bone, antler or ivory.[915] These teetotums have been found in several cities and variations do occur (Fig. 6.64).[916]

Fig. 6.64 Bone teetotum (length 5.4 cm, Alkmaar). Collection and image Erfgoed Alkmaar, Archeologie.

6.7.6 Gaming pieces

Gaming pieces were used in different games, for example chess, checkers, or backgammon. Many were made of wood, but osseous tissues were also used. Exactly which game was played with them is not always clear.

a b

Fig. 6.65 Discoid gaming piece made of whale bone, a. decorated front; b. back (Arnemuiden, eleventh/twelfth century, diameter 10 cm, Rijkelijkhuizen 2018a). Image M.J. Rijkelijkhuizen.

Large discoid gaming pieces occur in north-western Europe from the eleventh until the thirteenth century. Several materials were used for them, such as bone, antler, whale bone and ivory.[917] Some of these discoid gaming pieces have a central hole, but they can be distinguished from spindle whorls by their decoration, the position of the decoration, and the material. In discoid gaming pieces, the decorating is found on one side of the object and is often a ring-and-dot motif or one with concentric circles.[918] Discoid playing pieces are rare in the Netherlands; one piece is known from Arnemuiden. It is made of whale bone and one side is decorated with concentric circles and ring-and-dot motif. This object dates to the eleventh or twelfth century (Fig. 6.65).[919]

Chess was played in Europe from the Late Medieval period onwards and chess pieces found in north-western Europe can be made of several materials.[920] Early chess pieces from the Netherlands are known from Utrecht (twelfth or thirteenth century) and the town of Portugaal (ninth-twelfth century).[921] Two burnt bone chess pieces from Haarlem, a rook and a king, date to the thirteenth century (Fig. 6.66).[922] An osseous playing piece from Amsterdam has been interpreted as a stylized knight. It dates to between 1375 and 1425.[923] It was originally published as being made of bone, but its actual material is antler.[924] Another late medieval stylized osseous chess piece was found in Valkenburg.[925]

A second chess piece from Amsterdam is of post-medieval date. It is a composite rook piece, made of bone.[926] Another composite bone rook piece comes from Venlo. Traces of red paint are still visible.[927]

913 E.g. Helfrich, Benders & Casparie 1995; Gawronski & Kranendonk 2018; Rijkelijkhuizen & Jongma 2020.
914 Van der Heijdt 1990, 83-85, 107, 120, 130; Van Vilsteren 1987, 47; Ter Gouw 1870, 287.
915 Rijkelijkhuizen 2004.
916 E.g. Amsterdam: Rijkelijkhuizen 2004; Leiden: Van Vilsteren 1987, 47; Haarlem; Keenenburg: Anthony & Bult in prep.; Zutphen; Alkmaar: Bitter 2022, 929-930.
917 MacGregor 1985, 135-137; Röber 1996, 115; Riddler 1995; Chaoui-Derieux 2010.
918 Riddler 1995.
919 Rijkelijkhuizen 2018a.
920 Osseous European examples e.g. MacGregor 1985, 137-141; Röber 1996, 115; Chaoui-Derieux 2010.
921 Van Vilsteren 1987, 50-51.
922 Van Regteren Altena & Numan 1980, 35-37.
923 Baart & Van Wijngaarden-Bakker 1972; Baart *et al.* 1977; De Jong 1980; Sarfatij 1990, 156.
924 Rijkelijkhuizen 2004.
925 Collection Limburgs Museum.
926 Rijkelijkhuizen 2004.
927 Kloprogge & Kloprogge 2007; collection Limburgs Museum.

Fig. 6.66 Bone chess pieces, a. and b. tower (front and back view); c and d. king (front and back view), (Haarlem, thirteenth century, height both 3.5 cm, Van Regteren Altena & Numan 1980, 35-37). Collection and image Team Erfgoed, Vakgroep Archeologie gemeente Haarlem.

A chess piece from Leeuwarden features a seated king (Fig. 6.67).[928] The seating position shows similarities with the king from the twelfth-century Lewis chess set. The king from Leeuwarden also originally held a sword, just like the king from the isle of Lewis. The pommel is still visible in one of his hands. However, the Leeuwarden king is less detailed, and it is possible that a different material was used. Most of the Lewis chessmen were made of walrus ivory. The material of the Leeuwarden king may be antler or whale bone, but this is not yet confirmed. Another osseous chess piece, of a queen, in the collection of the Fries Museum,

Fig. 6.67 Chess piece (Leeuwarden, height 6 cm, inv. 1941-032). Collection and image Fries Museum, Leeuwarden - Collectie Koninklijk Fries Genootschap.

is probably of a later date.[929]

Several chess pieces were found during the excavation of the Oude Huys site in Helmond. A twelfth-century chess piece with foliage decoration is made of walrus ivory and has runic inscriptions on the bottom side. Also found at this site were a pawn and a stylized knight. The material of these two pieces could not been confirmed in this study. A fourth chess piece, a rook, is made of bone. The latter three chess pieces probably all date to the eleventh or twelfth century.[930]

Five ivory, almost identical gaming pieces were found in a cesspit in Leiden. These date to the late fourteenth to fifteenth century and could have been pawns in chess or another game.[931]

6.7.7 Gaming counters

Gaming counters were used in several games. These flat counters were made of bone or ivory and could be circular or rectangular in shape. Gaming counters are often confused with piano keys (see Section 6.7.16). However, rectangular gaming counters are often made of bone and the corners are chipped. Both sides of gaming

928 Kloprogge & Kloprogge 2007; collection Fries Museum.
929 De Jong 1980.
930 Stoklund 1987; Verwers 1988; Kluge-Pinsker 1991, 133-134; Arts 2001; Kloprogge & Kloprogge 2007; De Jong, Peters & Vossen 2015.
931 Esser, Beerenhout & Kootker 2010.

Fig. 6.68 Gaming counters (Haarlem, length *c.* 6 cm). Collection and image Team Erfgoed, Vakgroep Archeologie gemeente Haarlem.

counters are polished. On the gaming counters could be painted cloves, hearts, spades, diamonds or letters (Fig. 6.68).[932] Excavated gaming counters date to the Post-Medieval period.[933]

6.7.8 Billiard balls

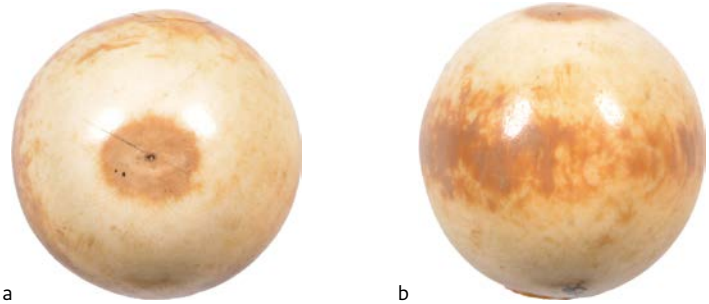
The history of billiards is not quite clear, but apparently the game of billiards was already played at the French court in the late fifteenth century. Later, elephant ivory became the main material for billiard balls until the nineteenth century. Not many archaeological finds are known; one has been excavated in Delft (Fig. 6.69). This dates to the seventeenth or eighteenth century and comes from a high-status context. A second billiard ball comes from Eindhoven.[934]

6.7.9 Phalangeal bones

Children's toys of bone were not made by professional craftsmen but at home, from butchering waste. The simplicity with which the objects were made and their great variety testify to their household production. Such toys were easily made and the shape of the bone can still be recognized. Children's toys are difficult to date, because they were used for centuries and the few modifications of the bone remain the same during this entire period.

A typical children's game, the *kootspel*, was played with modified cattle phalanges. The phalanges used for this popular game were leaded and/or decorated and occur from the Medieval period onwards far into the eighteenth century. We can see how this game was played on the painting '*De Kinderspelen*' (the children's games) from Pieter Breughel de Oude. A row of phalanges was positioned against a wall. With another phalange the children tried to knock over this row of phalanges. The exact rules of the game varied depending on the region, time period or the individual players.[935]

Usually cattle phalanges were used for this game. Phalanges of other animals were used only occasionally. Cattle were one of the most important meat sources in the past, and the primary butchering waste largely consisted of foot bones. Cattle metacarpal and metatarsal bones were used by specialized bone workers while the phalanges could be made into children's toys at home.



a b

Fig. 6.69 Ivory billiard ball, a. and b. different views (Delft, diameter *c.* 4.5 cm). Collection and image Erfgoed Delft, Archeologie.

[932] Amsterdam: Rijkelijkhuizen 2004; Haarlem; 's-Hertogenbosch.
[933] E.g. Amsterdam: Rijkelijkhuizen 2004; 's-Hertogenbosch; Haarlem; Keenenburg: Anthony & Bult in prep.; Alkmaar; Zutphen; Middelburg: Esser *et al.* 2006.
[934] Pers. comm. Theo de Jong.
[935] Drost 1914; Baart & Van Wijngaarden-Bakker 1972; Van Vilsteren 1987; Botermans, Visser & Burret 1991, Willemsen 1996, 1998.

Because these toys were not made professionally the bone modifications are very simple. The bones were made heavier to make it easier to place them upright or throw them. In general, there were two ways to weight the phalanges. The first was to fill the marrow cavity with lead. One or more holes were drilled to access the marrow cavity and pour the lead into the hollow bone. Lead is easy to work with at home because of its low melting point. Experiments show that it takes only a few minutes to fill a phalange with lead. Lead also has a high mass density, which added substantially to the weight of the toys. Another way to make the bone heavier is to hammer in one or more iron nails. Because these toys were home-made, various techniques were used.

A second modification is to decorate the bones. This decoration was also very simple and could vary. One interpretation of these decorations is that they represent property marks, but this seems only part of the explanation, because horizontal short stripes occur in little over half of all the decorated bones. These marks could play a role in the points system. More individual marks such as crosses or stars could be property marks. Only one playing bone seems to have a written name on it. Three letters, I, A and N were placed on the bone, but N was written in reverse. This playing piece for example, could be owned by a boy named Jan, because I and J were used interchangeably in the past.

Sometimes the bones were flattened with tool like a draw-knife, axe or plane. This modification is not the result of the slaughtering process but was done in order to make the toy, although the precise reason behind it is unknown. It is possible that some sides were flattened make the phalanges steadier or to make them fall on a particular side. The side on which the phalanges fell could play a role in the points system.

The bones were part of a throwing game in which the phalanges should be knocked over with another phalange. This particular game results in characteristic use wear on the bones, such as breakage from throwing, but also a smooth, polished surface from frequent handling of the bone. Fractures often occurs at the protruding end. Some of the bones were used for a very long time, and sharp edges from the bones have disappeared. Bones which were not decorated or weighted can still be identified as phalanges used to play this children's game by looking at their specific use wear. When a phalange was only used for a short period of time, identification could be more problematic.

An unknown percentage of the drilled phalanges with holes were filled with lead; the lead from discarded phalanges was often removed for re-use. Some phalanges with holes still contained traces of the original filling. Another interpretation is that the holes were drilled in order to clean the bones and empty the marrow cavity easier. Marrow was a delicacy and be easier sucked out of the bone when two holes were made.

Usually the holes were positioned at the same place. Most phalanges have one hole at the proximal end; in other cases additional holes were drilled in several places. Only a few bones had no hole at the proximal end, only in other places. Drilling a hole at the proximal end is easier to reach the marrow cavity and the hole is not visible when the phalanges are standing upright for the game.

6.7.10 Knucklebones

Playing knucklebones ('*bikkelspel*') is known from various sources. A few historical prohibitions imply that this game was sometimes played on grave stones. We also know the game from paintings. '*De Kinderspelen*' (The children's games) by Pieter Breughel de Oude (1525-1569) and '*Bikkelende meisjes*' (Girls playing at knucklebones) by Willem van Mieris (1662-1747) both show children playing this game. Besides historical and iconographical sources, archaeological finds are quite numerous.

The exact origin of the game is unknown, but astragali of sheep or goat were used in the Medieval and Post-Medieval period for a game of skill. For this game, in Dutch called *bikkelspel* or *bikkelen*, four knucklebones (*bikkels*) and a ball or a marble were needed. When the four knucklebones were thrown on the ground, the ball should be thrown in the air as well. Before the ball bounced on the flour a second time, one should have performed different actions with the knucklebones lying on the floor, such as turning them around or picking them up. Several rules could make the game even more

difficult, such as playing the game with one hand or handling only one knucklebone at a time. Instead of a ball, another knucklebone could be used, in which case the actions should be performed before the knucklebone hit the ground. The rules varied between regions and periods.[936]

This game was played with bones in the Medieval period until at least the eighteenth century. From the late sixteenth century onwards metal knucklebones appear, made of tin, lead, copper, bronze or brass.[937] The metal 'knucklebones' imitate the shape of the original astragali. Twentieth-century knucklebones are usually made of synthetic materials.

Astragali show fewer modifications than the phalanges that were used for children's games. Some of the knucklebones may originally have been coloured. Recent examples are often coloured, but so far no archaeological examples of medieval or early modern coloured knucklebones have been found. The sides of knucklebones can have markings, but this practice is not archaeologically attested. Occasionally the sides were flattened.[938]

Many knucklebones are unmodified or undecorated, making them easy to miss in an excavation and not recognized as an object. Undecorated astragali can be identified as children's toys by the use wear. A frequent form of wear on the astragali is polishing by handling. Astragali usually do not show as many fractures as phalanges because knucklebones were not thrown as often and as hard as phalanges. Furthermore, astragali are more compact and less easy to break. Use wear from contact with the pavement usually appears at the edges. Knucklebone are common finds, but not as common as phalangeal bones.

6.7.11 Buzz bones

Making sounds or music can be done with various instruments but also by using materials at hand. A leaf or acorn can be used to whistle when you blow on it the right way, but materials can also make sounds when hitting them or rotating them through the air. The names buzz bones or bull-roarers refer to the sound these objects make when rotated through the air (in Dutch: *snorrebotten*).[939]

Buzz bones are children's toys made of animal bones with only a few modifications. In practice, a bull-roarer can be made from various materials, such as wood or even a button, but only buzz bones made of bone are discussed here. Making a buzz bone is very simple and requires only a few materials, only a bone and a small piece of rope. Dating such children's toys is difficult. These kinds of toys were made and used for centuries, at least from the Late to Post-Medieval period.

Overall, two types of bone buzz bones were used. The first method to prepare a buzz bone is to take a small bone and make one or two holes in the middle of the diaphysis. Through these hole(s) a rope was pulled and the ends of the ropes were tied together. In each hand a loop of the tied rope was held. When the hands were moved fast towards and from each other, the rope twisted and untwisted and the bone in the middle of the rope began to rotate back and forth. The rotation movement of the bone results in a low buzzing noise. Metapodials of piglets were most often used to make this type of buzz bones of young piglets.[940] Only a few modifications were necessary to make a buzz bone. One or two holes were drilled and sometimes some protruding ends of the bones were cut off. Metapodials of pigs are consumption waste and therefore easily obtained. The use of unfused metapodials is not based on selection of the bones. Young pigs were eaten more often and therefore the metapodials of young animals were available to make buzz bones. Children's toys were made at home from whatever bones you could get.

The second type of buzz bone is made from long flat bones with a rope attached to one end. With one hand the bone on its rope was rotated in the air. The bone also rotated around its own axis, creating a buzzing sound. This type of buzz bone can be seen in the painting '*Kinderspelen*' by Pieter Bruegel de Oude.[941] Buzz bones of the second type were usually made from cattle ribs and required only a few modifications. The thick articular end was removed and the thinnest part of the rib as well. The hole was drilled in the thicker end of the rib. Sometimes the sides were trimmed as well.[942]

936 Ter Gouw 1870; Drost 1914; Grunfeld *et al.* 1975; De Jong 1986; Van Vilsteren 1987; Willemsen 1996, 1998.
937 Baart *et al.* 1977, 453; Baart & Van Wijngaarden-Bakker 1972, 29; De Jong 1986.
938 Rijkelijkhuizen 2004.
939 Baart & Van Wijngaarden-Bakker 1972; Lehmkuhl 1983; Willemsen 1998; Tamboer 1999.
940 Lehmkuhl 1983; MacGregor 1985, 102-103; Van Vilsteren 1987, 52; Rijkelijkhuizen 2004.
941 Van Vilsteren 1987; the objects shown are however not buzz bones, but folding tools.
942 Rijkelijkhuizen 2004.

6.7.12 Rattles and *rinkelbellen*

For the smallest children in the Post-Medieval period, rattles were made of various materials, such as clay or wood.[943] A bone rattle has been found in Haarlem (Fig. 6.70). It consists of a perforated barrel-shaped box, which probably originally contained a small bell. This small barrel was connected to a bone handle. A similar find has been found in 's-Hertogenbosch and is also made of bone.

A more common type is known in the Netherlands as a *rinkelbel*. It has a whistle combined with a biting piece and bells, which were used as rattle.[944] They occur as three overall types. The first is a composite *rinkelbel*, often made of silver or gold and with a separate biting piece made of different materials, such as gemstones, coral or animal teeth. Most of the luxury *rinkelbellen* now reside in museum and private collections and some are depicted in paintings (Fig. 6.71).[945] Osseous biting pieces of composite *rinkelbellen* have also been found in excavations. The biting parts were tooth-shaped but actually made of bone.[946] Archaeological examples come from Amsterdam, Delft and Oudeschans.[947] The Amsterdam *rinkelbellen* of this type date to the late sixteenth to seventeenth century.[948]

The second type of *rinkelbel* is made of one piece of bone and has an integrated whistle and biting piece. There is one suspension hole and two other holes for attachment of the bells. Line decorations are common. This type is more common in excavations than the previous type and has been found in several cities.[949] Finds of this type from Amsterdam date from the sixteenth until the eighteenth century.[950]

A third type has different variations. A flat bone biting piece can be combined with a whistle or little bells. Flat bone biting pieces without whistle have been found in Amsterdam, Middelburg, Medemblik, Helmond and 's-Hertogenbosch.[951] One of the biting pieces from Amsterdam still has metal bells.[952] Finds from Amsterdam date from the sixteenth to seventeenth century.[953] Wide biting pieces with an integrated whistle come from Britsum, Cornjum and Sexbierum.[954] An example from Utrecht dates to between the eighteenth and twentieth century.[955]

An ivory *rinkelbel* without parallels was found in Amsterdam (Fig. 6.72). This composite *rinkelbel* is made in two pieces. Its metal bells and a textile ribbon are still present. It dates to the eighteenth or nineteenth century.[956]

Fig. 6.70 Bone composite rattle (Haarlem, length 11.5 cm). Collection and image Team Erfgoed, Vakgroep Archeologie gemeente Haarlem.

Fig. 6.72 An ivory *rinkelbel* (Amsterdam, length *c.* 5.5 cm, Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image A. Dekker (UvA).

943 Tamboer 1999.
944 Van Vilsteren 1981.
945 Knotter & Meiboom 2021.
946 Rijkelijkhuizen 2004.
947 Amsterdam: Rijkelijkhuizen 2004; Oudeschans: Lauwerier, Lenting & Meijers 1995, originally published as pendant.
948 Rijkelijkhuizen 2004.
949 E.g. Papendrecht and Dalfsen: Van Vilsteren 1987, 53; Amsterdam: Rijkelijkhuizen 2004; Haarlem; 's-Hertogenbosch; Alkmaar: Bitter 2016, 150; 2022, 936; Wijk bij Duurstede: Van Vilsteren 1981; Delft; Arnhem: Aal 2020.
950 Rijkelijkhuizen 2004.
951 Amsterdam: Van Vilsteren 1981; Rijkelijkhuizen 2004; Middelburg and Medemblik: Van Vilsteren 1987, 53.
952 Van Vilsteren 1981; Rijkelijkhuizen 2004.
953 Rijkelijkhuizen 2004.
954 Tamboer 1999, 14-15; for comparable English finds, see MacGregor 1985, 149.
955 Aal 2022.
956 Rijkelijkhuizen 2004.

Fig. 6.71 Jacoba Bontemantel (born 1643), daughter of Amsterdam merchant Frederik Bontemantel and of Agatha Hasselaer holding a *rinkelbel* in her hand. Anonymous painter, 1644. Collection Rijksmuseum.

6.7.13 Pacifiers

Early pacifiers may have been made of an animal bladder equipped with for instance a bone handle.[957] Modern-looking pacifiers with a ring and disc have been found in Amsterdam, Nijmegen, Helmond, Utrecht and 's-Hertogenbosch.[958] These were made of a bone disc with central hole, a bone ring with a small opening, and a connecting piece.[959] One of the pacifiers from Amsterdam still had the rubber part attached (Fig. 6.73). The pacifier from Nijmegen dates to the eighteenth century.[960] The pacifiers from Amsterdam date to the nineteenth or twentieth century.[961]

Fig. 6.73 Composite bone and rubber pacifiers (Amsterdam, diameter ring, *c.* 2 cm, Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image A. Dekker (UvA).

6.7.14 Dolls and miniatures

In the Late and Post-Medieval period dolls were made of wood, textile and clay.[962] Miniatures for playing were made of ceramics or metal.[963] Only a few osseous doll fragments and miniatures have been found. A bone doll's hand was found in Amsterdam (Fig. 6.74), dating to the eighteenth or nineteenth century.[964] A miniature skate of elephant ivory, also from Amsterdam, dates to the sixteenth or seventeenth century.[965] A miniature lace bobbin of bone was found in 's-Hertogenbosch (Fig. 6.75). A miniature knife comes from a grave context in Gouda. It dates between 1470 and 1572.[966]

6.7.15 Flutes

Making music and musical instruments are part of human history throughout the world. Buzz bones for children and flutes with one finger hole do produce some sort of sound, but real musical instruments are usually made for more experienced musicians or other adults. Musical instruments can be divided into certain categories such as flutes, or percussion instruments such as tambourines.[967] Different musical instruments are (in part) made of animal or natural tissues. Soft animal tissues such as parchment were used for drums but rapidly

Fig. 6.74 Bone doll's hand. (Amsterdam, length *c.* 6 cm, Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image A. Dekker (UvA).

Fig. 6.75 Miniature bone lace bobbin (length *c.* 2.3 cm, 's-Hertogenbosch). Collection and image Erfgoed 's-Hertogenbosch.

957 Van Vilsteren 1987, 52-54.
958 Amsterdam: Rijkelijkhuizen 2004; Nijmegen: Van Vilsteren 1987, 53; Utrecht: Aal 2022.
959 Rijkelijkhuizen 2004.
960 Van Vilsteren 1987, 55.
961 Rijkelijkhuizen 2004.
962 Helfrich, Benders & Casparie 1995; Rijkelijkhuizen & Jongma 2020; Willemsen 1998, 85-91.
963 Willemsen 1998, 91-95.
964 Rijkelijkhuizen 2004.
965 Rijkelijkhuizen 2004.
966 Rijkelijkhuizen 2018d.
967 Tamboer 1999.

decay in the soil. Bone, wood or ivory were other important materials to make musical instruments. In favourable soil conditions such instruments or fragments of them can survive.

Common musical instruments first introduced in Prehistory are flutes. Flutes and whistles are often found in excavations and in numerous contexts and cities.[968] They were often made of bird bones or sheep tibia. The long bones of large birds and sheep tibia both have the proper shape and size to make flutes and whistles. The long bones form a natural tube and only a few modifications are necessary to make a flute or whistle out of them.[969]

A post-medieval composite flute has been found in Amsterdam. It is made of a combination of wood and bone, but is unfortunately undated.[970] A small decorated whistle comes from Vleuten.[971]

6.7.16 Piano keys

Ivory was used for piano keys until it was replaced by synthetic materials. Ivory piano keys were made in two parts; the front is wide and short while the back part, between the darker wooden keys, is narrower and longer. The short, broad piano keys are sometimes confused with rectangular gaming counters (See Section 6.7.7).[972] Piano keys were always made of elephant ivory and can be distinguished from gaming counters by the grooves on the reverse side of the keys. These were made in order to provide a better adhesion for the glue. Gaming counters can be made of bone or ivory and are polished on both sides. Rectangular gaming counters furthermore have small chipped corners.[973]

6.7.17 Stringed instruments

Several stringed instruments were popular in the Late and Post-Medieval period. They were entirely or largely made of wood, and osseous components are seldom found in excavations. So far two tail pieces have been found.

Fig. 6.76 Bone tail piece from a stringed instrument (Arnemuiden, length *c.* 8 cm, Rijkelijkhuizen 2012c). Image M.J. Rijkelijkhuizen.

One undated tail piece has ring-and-dot decoration and comes from the terp area. It is undated, but probably (early?) medieval. It has two holes to attach the tail piece to the instrument, and five string holes. It is interpreted as a tail piece of a lyre.[974]

A second tail piece was found in Arnemuiden. It dates to between 1525 and 1573 and is made of a large mammalian bone. On one side it has two attachment holes and on the broader side three string holes. It has been interpreted as a tail piece of a rebec (Fig. 6.76).[975]

Tuning pegs of stringed instruments are usually made of wood, but bone tuning pegs were also used. Bone tuning pegs have been found in the terp area; these are undated but probably (early?) medieval.[976] They were of different sizes and the heads were rather irregularly cut. Post-medieval tuning pegs have been found in Amsterdam (Fig. 6.77) and Haarlem (sixteenth century).[977] These are more uniformly made than the medieval tuning pegs.

Fig. 6.77 Bone tuning peg (Amsterdam, length 7.6 cm, Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image A. Dekker (UvA).

968 Tamboer 1999; Janssen 2007b.
969 Van Vilsteren 1987, 55.
970 Rijkelijkhuizen 2004.
971 Van Dijk *et al.* 2005.
972 In Van Vilsteren 1987, 57, for example, a bone gaming counter is reported as a piano key.
973 Rijkelijkhuizen 2004.
974 Teerns: Van Vilsteren 1987, 56; collection Fries Museum.
975 Rijkelijkhuizen 2012c.
976 Van Vilsteren 1987, 56; collection Fries Museum.
977 Amsterdam: undated; originally published as unidentified, Rijkelijkhuizen 2004; Haarlem: Tamboer 1999, 61.; English finds, see MacGregor 1985, 146-148.

6.8 Other objects

6.8.1 Writing implements

Styli are large pins used to write on wax tablets. They have a widened flat end used for erasing the writing from the wax.[978] Styli were often made of metal.[979] A stylus from Amsterdam is made from the compact bone of a large mammalian long bone. The eraser was decorated on one side with a dot-and-circle.[980] Late and post-medieval styli have been found at Kerk-Avezaath and other finds come from for example Zutphen, Haarlem and 's-Hertogenbosch.[981]

Fig. 6.78 Quill knife made of elephant ivory (Amsterdam, North-South-Line, length 12.4 cm, Rijkelijkhuizen 2024). Collection Monumenten en Archeologie, gemeente Amsterdam. Image H. Strak.

Inkwells had to be made of materials that were ink-resistant, such as metal, glass, ceramics or horn. Horn inkwells are known from Middelburg, Groningen, Alkmaar, 's-Hertogenbosch and Amsterdam.[982]

Quill pens were used for writing in the Medieval and Post-Medieval period. To make a quill pen out of a feather, a quill knife was used. A certain type of quill knife has a long and slim ivory handle which tapers towards the end and dates to the seventeenth century.[983] Ivory quill knife handles of this type have been found in Amsterdam (Fig. 6.78).[984] Parallels are for example present in the collection of the Klingen-museum in Solingen.

Quill pens were replaced in the nineteenth century by dip pens. The metal nibs of dip pens were attached to a pen holder, which could be made of various materials. Popular in the second half of the nineteenth century were dip pens with a Stanhope lens. A bone pen holder, which could be opened with screw thread, held the metal nib. Somewhere on the pen, almost unnoticeable, was a small lens. When looking through this lens a microphotographic image could be seen. These Stanhope lenses were hidden in all sorts of small objects and revealed various microphotographic images, some erotic, others photos of touristic attractions. A dip pen possibly originally equipped with a Stanhope lens was found in Amsterdam (Fig. 6.79).[985] Another dip pen with a Stanhope lens is present in the collection of the Fries Museum.

6.8.2 Panels

A small ivory panel (2.2 x 4.0 cm) found at a late medieval castle site in Egmond has been interpreted as a possible travelling altar, but different uses are here proposed (Fig. 6.80).[986] A second panel was found in the same context

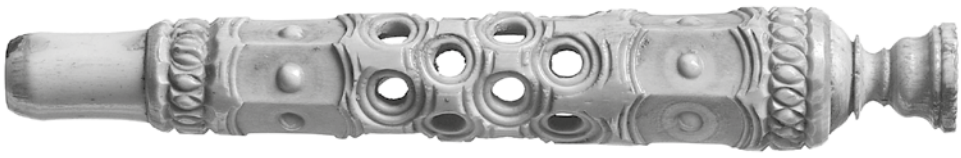


Fig. 6.79 Bone pen holder (Amsterdam, length *c.* 10 cm, Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image A. Dekker (UvA).

978 A typology of styli is currently being made by Lena Strid: Parchment: Supply and demand in Medieval Scandinavia. PhD thesis, Lund University.
979 E.g. Nijhof & Janssen 2007.
980 Rijkelijkhuizen 2024.
981 Kerk-Avezaath: Verhagen & Esser 2001; 's-Hertogenbosch: Nijhof & Janssen 2007.
982 Amsterdam: Rijkelijkhuizen 2004; Middelburg: Esser *et al.* 2006; Groningen: Prummel 2000; Alkmaar: Bitter 2022, 923.
983 Finlay 1990.
984 Rijkelijkhuizen 2024.
985 Rijkelijkhuizen 2004; originally published as unknown.
986 Zeiler 2007, 9-10.

Fig. 6.80 Elephant ivory panel (Egmond, height 4 cm, Zeiler 2007, inv. 6019-03). Collection and image Provinciaal Depot voor Archeologie Noord-Holland.

during the 1935 excavations but is now unfortunately missing. Both are very small in comparison to other panels in museum collections. There are no hinges or traces of hinges which could have identified the object with certainty as a diptych, or booklet. In theory, they could have a frame to which the hinges were attached, but frames were not common on small diptychs. Another option is that the hinge traces were removed for possible re-use. The reverse side is not completely flat but has raised borders. The raised borders could indicate a function as a writing tablet or booklet but the panel seems too small for this; writing tablets are usually at least twice this size. The panel could also have been used (secondarily) on a leather binding or a casket. Leather book bindings could feature one or more ivory panels on the front side. Caskets could be decorated with several ivory panels.[987]

The first panel is of elephant ivory and was made in low relief, showing not a canon with a tonsure, as proposed in earlier studies, but an individual with a cap. On top of the cap are two attributes, probably a feather and another unknown item. The person is situated underneath an arch and wears a cloak with a long robe underneath, perhaps with decorated sleeves. In each hand the person holds a closed book. Above the arches is (an imitation of) foliage decoration. The arches and foliage decoration are a clear imitation of the fourteenth-century ivory panels. The panel is less detailed than other ivory panels in museum collections, making it difficult to identify the person on the panel. However, a drawing of the second panel, made immediately after the panels were excavated, shows a person holding a large key who thus symbolizes the apostle Peter. The other figure is therefore probably also an apostle. A book is a common attribute in images of (some) apostles. Caskets with panels of the apostles are known from museum collections, but such panels are more detailed and the carving is of better quality.

6.8.3 Coin balances (tumbrels)

An enigmatic object found in 's-Hertogenbosch was identified by Van Vilsteren as arm of a coin balance.[988] It dates to the thirteenth or early fourteenth century and is decorated with double ring-and-dots. The object has a small platform on one end on which the coin could be weighed. In the stem is a small hole with a metal pivot was present.[989] This makes it likely to be an arm of a tumbrel-type coin balance. Tumbrel coin balances are often made of metal, but a few osseous parallels are known in Europe.[990]

6.8.4 Boxes

Small boxes could be made of metal, wood, ivory or tortoiseshell, or they could have inlay or mounting plates of for example bone or ivory. Such items could snuff boxes or contain a sewing or toiletry set. The original content of excavated boxes is usually unknown. Bone mounting plates of boxes have been found in for example Zweins, Friesland.[991] (Parts of) small boxes made of ivory and tortoiseshell have been found in for example Amsterdam.[992]

987 E.g. Ritchie 1975; Gaborit-Chopin 1987; Williamson 1986; Koekkoek 1987; Caubet & Gaborit-Chopin 2004; Vandenberghe 2010.
988 Van Vilsteren 1987, 68-69.
989 Janssen 1983; Van Vilsteren 1987, 68-69.
990 MacGregor 1985, 128-129.
991 Van Vilsteren 1987, 60.
992 Rijkelijkhuizen 2004, 2010a.

6.8.5 Pegs

A specific kind of implement is a two-pronged bone peg with a decorated head and a suspension hole. The decoration is similar to the feather curlers, suggesting a date in the late sixteenth to mid-seventeenth century. This is confirmed by two dated examples. One peg from Alkmaar dates between 1575 and 1625.[993] Two of these implements from Amsterdam were described as possible clothes pegs; one dates to between 1592 and 1597, the other is undated (Fig. 6.81).[994] A function as clothes peg is not confirmed, as no similar objects are known elsewhere in north-western Europe. A fourteenth century wooden two-pronged undecorated peg from London was also interpreted as a peg to hold textiles in place.[995] A patent for wooden two-pronged clothes pegs was issued in the early nineteenth century AD.

[993] Bitter & Van den Berg 2014, 140, originally published as unknown object.
[994] Rijkelijkhuizen 2004.
[995] Egan 1998/2010, 255-256.
[996] Van Dijk & Van der Walle-Van der Woude 2004.
[997] 's-Hertogenbosch: Rijkelijkhuizen 2018b; Eindhoven: De Jong 1994a.
[998] Rijkelijkhuizen 2018b; De Jong 1994a.
[999] Sarfatij 1990, 177; Van der Walle-Van der Woude 1999.
[1000] Van der Walle-Van der Woude 1999; Van Dijk & Van der Walle-Van der Woude 2004.
[1001] Armitage 1989.
[1002] Devriese 2012.

Fig. 6.81 Bone peg (Amsterdam, length 15.2 cm, Rijkelijkhuizen 2004). Collection Monumenten en Archeologie, gemeente Amsterdam. Image A. Dekker (UvA).

Fig. 6.82 Bone decorative mounting plate (Delft, diameter *c.* 10 cm). Collection Erfgoed Delft, Archeologie. Image M.J. Rijkelijkhuizen.

6.8.6 Mounting plates

Some archaeological mounting plates can be assigned to certain objects, for example weapons (see Section 6.3.2) or furniture (see Section 6.4.6), but others are more difficult to interpret. Usually bone was used for their manufacture. Different skeletal elements were used, such as long mammal bones but also flat bones.

Two large mounting plates made from a mandible of a large mammal, found in the vicinity of a smithy, have been interpreted as saddle mountings. These have been dated to the fourteenth century AD.[996] Decorative mounting plates also come from Eindhoven and 's-Hertogenbosch, for example.[997] One of the mounting plates from 's-Hertogenbosch and the mounting plate from Eindhoven, for example, were made from a scapula.[998] A circular mounting plate found in Delft was also made from a scapula (Fig. 6.82). The decorated circular plate has small holes where the plate was fixed with small bone pins. One of the bone pins is still present in one of the holes.

6.8.7 Bone floors

In the province of Noord-Holland, a few bone floors are known. In Hoorn, a bone floor made of broken cattle metapodials was found in situ. The bones were placed with the proximal and distal ends facing upwards. The floor dates to between 1450 and 1525.[999] Cattle bones with use wear interpreted as having resulted from their incorporation into bone floors were found at two other fifteenth-century locations in Hoorn. Bone floors are also known from Edam and Enkhuizen and are considered a regional feature.[1000] Post-medieval bone floors are also known from England, particularly Oxfordshire.[1001] In Maalte, Belgium, an eighteenth-century artificial cave ('folly'), later used for devotional purposes, also has a bone floor. Here, the distal articular ends of cattle metapodial bones are all pointing upwards.[1002]

6.9 Osseous and keratinous artefacts and raw material use in daily life

6.9.1 Research gap

Fewer objects of osseous and keratinous tissues date from the tenth to the twelfth century, and a research gap is acknowledged. Most objects date to the thirteenth or fourteenth century AD and later, the period of urbanization and increasing trade and craft production. The large quantity of osseous objects from the terp area also declined rapidly, for terp construction, which had provided favourable conditions for the conservation of osseous and keratinous objects, ended during this period.

6.9.2 Cultural changes and artefact development

Cultural changes and developments in for example weaponry, games and musical instruments occurred rapidly and are reflected by the osseous objects. In the Late Medieval period, the development of the crossbow is reflected by finds of crossbow nuts and waste from crossbow manufacture. In the Post-Medieval period, crossbows were replaced by fire arms, the osseous mountings of which have been found in archaeological contexts. Games such as chess or children's games such as phalangeal bones and buzz bones appeared in the Late Medieval period. In the Post-Medieval period, other games such as dominoes, teetotums or billiards were introduced. Whilst flutes and whistles have been found from prehistory onwards and the appearance of simple whistles did not change much, musical instruments such as composite flutes and stringed instruments did change over time. In the Post-Medieval period other instruments were developed, such as keyboard instruments like the clavichord and the piano. Several musical instruments were made (partially) of osseous or keratinous tissues.

A continuation is observable in objects like combs and gaming pieces, but changes in types and raw material did occur.

Changes in the perception of religion and the embedding of religion in daily life are also reflected in material culture. Huge amounts of late medieval and post-medieval prayer beads and bead production waste have been found. Furthermore, in the Late and Post-Medieval period pilgrimage badges appeared.

6.9.3 Post-medieval standardization and trade items

The Medieval period was followed by an increase in trade, craft production and standardization. Artefacts of osseous and keratinous tissues became more diverse. Osseous and keratinous objects were used in all facets of daily life, and objects are largely identical in cities throughout the Netherlands, and probably in the rest of north-western Europe as well.

Intra-European trade of (semi-)finished objects did occur, for example trade in knife blades, knives or knife handles. Assembled knives are known to have been shipped from the Netherlands to other countries, and possibly the same could be said for ivory combs.[1003] The import of French tooth brushes to the Dutch Republic is evident from the finds.[1004] But also other objects, for example fans, were (in part) imported. However, intra-European trade in objects has not been well studied.

Objects from the Dutch Republic, such as knives and combs, also reached further, going to the Americas, Asia and Africa as trade goods.[1005]

6.9.4 Post-medieval leisure, luxury and appearance

An increase in items for leisure and luxury can be observed as well. In the Late Medieval period, spectacles were rare and only accessible for members of religious orders or the upper classes. In the Post-Medieval period, the merchant class in the cities became more powerful and could afford new inventions such as telescopes or sundials. Hunting was a pastime, and elaborately decorated powder horns were taken along on the hunt. Needlework and lacework were not only a means of providing an income but also an activity for the wealthy to

[1003] Moore 1999; Van Genabeek 2012; Papin & Soulat 2017; Rijkelijkhuizen 2017d; Luik, Blaževičius & Piličiauskienė 2018.
[1004] Rijkelijkhuizen 2021a.
[1005] Knives, for example: Lemasson 2022.

spend the time at home. Fans were not only functional but even more an object of display and communication. A set of table knives could show off the host's wealth and status to dinner guests. For the youngest members of society, expensive rattles or '*rinkelbellen*' were made of precious materials, but also of bone. Pacifiers are a late invention and were made of a combination of bone and bladder, and later of bone and rubber.

Appearance became more important for the upper classes. Parasols protected the skin from acquiring a tan, and textile or leather gloves had to preserve delicate hands. Parasol handles were made of osseous tissues, and osseous glove stretchers stretched the fingers of leather gloves. Pomanders were used by the well-to-do to disguise or add a certain smell. Smoking and sugar caused tooth discolouration and decay; the newly invented tooth brush and dentures were initially only accessible for the rich. Both were made of osseous tissues until the invention of new materials such as vulcanized rubber and synthetics in the nineteenth century.

6.10 Craft production and trade in osseous and keratinous materials

6.10.1 Artisans, household production, and selection of locally available raw materials

Bone working was practised by different artisans and in individual households. Bones worked at household level are little modified and easy to identify as to species and skeletal element. A good example of home-made objects are children's toys. Bones used in this manner, such as phalanges, were easy to obtain and useless for other artisans. Home-made bone objects leave little or no waste fragments, because the bones were often used entire with only a few modifications.[1006] Continuation of the same object types is particularly observable in home-made objects, which persisted for a long time. For example, flutes/whistles or skates were already used in the Early Medieval period but continued into the Post-Medieval period. In the Late and Post-Medieval period, phalangeal bones and buzz bones were used as children's toys.

Professional craftsmen selected bones based on criteria such as shape and size. Artisans chose different skeletal elements than those that were used for children's toys. Professional artisans preferred the long bones of large mammals, such as cattle metapodials and radii. Objects could be made from the compact tissue, or from a part of the diaphysis, which forms a natural tube.[1007] The waste of professional bone working is therefore usually easily identified by the represented elements and manufacturing traces, such as saw and file marks (Fig. 6.83). A lathe, which was only used by artisans, also leaves characteristic traces. Bone working probably existed in all cities, but so far no extensive research has yet been undertaken. Waste fragments from older excavations were not reported and remain hidden among the rest of the zooarchaeological material, but evidence thus far indicates small-scale production of for instance long-bone combs in the Late Medieval period.[1008]

Some modest evidence for horn and antler working in the Late Medieval period has also been found but not yet extensively studied.[1009] The end of the Early Medieval period saw a decline in the local availability of antler which continued into the Late Medieval period. Horn working is often difficult to identify, since horn degrades much more quickly in the soil.

Fig. 6.83 Sawn pieces of horncore: evidence for horn working. (Deventer, 900-925 AD, length c. 7 cm, Rijkelijkhuizen 2011e, 2013a). Collection Provinciaal Depot voor Bodemvondsten Overijssel. Image M.J. Rijkelijkhuizen.

[1006] Rijkelijkhuizen 2004.
[1007] Rijkelijkhuizen 2004, 2008a.
[1008] Rijkelijkhuizen 2011e.
[1009] E.g. Deventer, Rijkelijkhuizen 2011e.

Fig. 6.84 Waste of bone bead production (Utrecht, length of the rightmost specimen *c.* 10 cm, Rijkelijkhuizen 2018c). Image M.J. Rijkelijkhuizen.

6.10.2 Centres of bead production

Late medieval bone working probably took place on a small scale in every city. An exception is the production of rosaries (Fig. 6.84), which according to evidence for production took place on a small scale in religious centres such as monasteries. Besides this small-scale production at religious centres, waste pieces of bead production have been found in considerable numbers in 's-Hertogenbosch and also in Utrecht. 's-Hertogenbosch and Utrecht were therefore important centres of bead production in the Late and Post-Medieval period.[1010]

6.10.3 Combs and antler shortage

Although combs were used from the late Prehistoric period to the present day, a transition in raw material and construction occurred in the Late Medieval period. A shortage in the availability of antler was probably one of the main reasons behind the development of a different comb type.

Composite late medieval double-sided combs are rare in the Netherlands, but the few extant examples also show a shift in raw material use from antler to bone. Composite combs slowly disappeared due to the antler shortage, and longbone combs appeared. Alongside longbone combs, double-sided combs became dominant. One-piece double-sided trapezoidal combs were probably imports rather than locally made. Furthermore, new materials were used, such as imported boxwood, followed by imported elephant ivory. Boxwood and ivory combs were made in one piece, and with a few exceptions all were double sided.

In the Post-Medieval period, some combs were made of more perishable materials such as horn or tortoiseshell, used for new comb styles, the large single-sided combs and single-sided elongated combs.

6.10.4 Import of raw materials

An increase in imported raw materials is observable in the Post-Medieval period. Imported raw materials were only available to

[1010] 's-Hertogenbosch: Janssen 1983; Nijhof 2007a; Spitzers 2012; Rijkelijkhuizen 2018b; Utrecht: Rijkelijkhuizen 2018c.

artisans, not incidental household production. The availability of a certain material was one of the selection criteria for artisans, but it was also an impetus for trade in raw materials. This growing import had an impact on urban craft activities and daily life.

The trade in bone and horn cannot always be demonstrated by the archaeological material, and a combination of both historical and archaeological sources must be used. Trade in bone existed in the nineteenth century for the production of for instance bone tooth brushes, but for earlier periods, short-distance trade in suitable bones as a primary or secondary product for craft activities is likely.

Horn could be obtained as a secondary product from butchers or tanneries, but intra-European and long-distance trade in horn as a primary product did exist.[1011] Furthermore, intra-European trade in flattened horn plates in the Post-Medieval period also existed.[1012]

Although there was a noticeable decline in the use of antler as a raw material, antler was still used when size and flexibility were needed, such as in crossbow manufacture. In the Post-Medieval period, antler also played a role in hunting items, such as hunting knives and powder horns, where the shape and size of the antler were used, but the material also played a symbolic role. Hunting and therefore antler was only accessible for the rich.

There is archaeological evidence for the import of elk antler (Fig. 6.85) from northern Europe for the manufacture of crossbows and knife handles.[1013] Elk antler was imported either as a primary trade item or perhaps together with other materials, such as hides. Elk antler was probably imported due to a shortage of local antler, and also because of its size. By this time, elk was already extinct in western Europe and red deer was declining. Elk antler is especially suitable for object manufacture due to its great size. This trade in elk antler is largely unknown, and more research is needed to learn more about this particular trade. Based on the archaeological material found so far, this was not a large-scale import.[1014]

With the increasing import of raw materials, 'exotic materials' also became available, such as ivory, tortoiseshell, mother-of-pearl and coral. From the late sixteenth century onwards, large amounts of elephant tusks were imported to the Dutch Republic.[1015] The import of walrus ivory (*Odobenus rosmarus*) was of minor importance, and this material was not often used.[1016] The import of hippopotamus ivory was also restricted, and this material was used exclusively for the manufacture of dentures.[1017] Tortoiseshell was imported to the Dutch Republic in small amounts from the Caribbean. Unlike elephant ivory, it therefore remained an expensive material.[1018]

Shell was used from Prehistory to the present. In more recent periods, small plaques were made by specialized mother-of-pearl engravers. The most common archaeological finds are eighteenth/nineteenth century mother-of-pearl buttons. Scallop shells were brought home by the pilgrims.

Fig. 6.85 Elk antler semi-fabricate of a knife handle (Gouda, 1325-1375, length *c.* 8 cm, Esser *et al.* 2010). Image M.J. Rijkelijkhuizen.

6.10.5 Post-medieval production standardization and specialization

In the Post-Medieval period, standardization and specialization of the manufacturing process of osseous and keratinous objects can be observed. Increasing import provided urban artisans with sufficient raw materials for object manufacture. Artisans such as comb makers and knife-handle makers used organic materials, such as wood, horn and ivory. The production process of ivory lice combs in Amsterdam (Fig. 6.86) showed a high degree of standardization; almost all combs were made in the same manner.[1019]

Studies of makers of combs and knife handles in post-medieval Amsterdam show that these artisans were specialized but only to a

[1011] Mohr & Hayen 1967; Rijkelijkhuizen 2013a; Kootker & Rijkelijkhuizen 2010.
[1012] Van Nierop 1915; Rijkelijkhuizen 2013a.
[1013] Crossbows: De Groote *et al.* 2018; De Groote, Ervynck & Moens 2019; knife handles: Rijkelijkhuizen 2017d; Rijkelijkhuizen 2024.
[1014] Rijkelijkhuizen 2017d; Rijkelijkhuizen 2024; Esser *et al.* 2010; De Groote *et al.* 2018.
[1015] Den Heijer 1997; Rijkelijkhuizen 2004, 2009.
[1016] Rijkelijkhuizen 2004, 2009.
[1017] Rijkelijkhuizen 2004; Rijkelijkhuizen & De Raat 2015.
[1018] Rijkelijkhuizen 2010a.
[1019] Rijkelijkhuizen 2004, 2009.

Fig. 6.86 Apprentice piece for sawing the teeth of an ivory lice comb (Amsterdam, length *c.* 2.5 cm, Rijkelijkhuizen 2004, 2009). Collection Monumenten en Archeologie, gemeente Amsterdam. Image A. Dekker (UvA).

certain degree, and much variation existed. Comb makers specialized in a few or more raw materials, but this probably depended not only on supply but also on the preference of the artisan. Furthermore, all sorts of other small objects were sold in comb-makers' shops and these could have been made by the same artisan.[1020] This also applies to knife-handle makers who worked with several materials, such as bone, ivory and wood. Artisans often specialized up to a point, and several natural materials were worked alongside each other.[1021]

In some cases the artisan made only part of an object. This is the case for the knife-handle makers in Amsterdam; the blades were imported from other Dutch towns or even other European countries, for example Germany.[1022] The manufacture of fans was also a specialized production process, divided into steps which did not necessarily take place in the same location or even the same country. The so-called 'horn breakers' specialized in making horn leaves for lamps. On the other hand, specialized production could occur entirely in other countries, such as tooth brushes which were mainly produced in France and England and imported to the Netherlands.

Knife-handle makers and comb makers were active in the city of Amsterdam. Not only historical documents prove their existence, but also archaeological evidence such as waste fragments and apprentice pieces show that many knife-handle makers and comb makers worked in this city.[1023] Waste fragments indicate the manufacturing methods and the location of the workshops. The price of the knife handles was dependent not only on the raw material but also on the amount of work necessary to produce a handle.[1024] Post-medieval ivory comb and knife-handle production has been studied for Amsterdam but also existed in other large cities; evidence for Rotterdam, 's-Hertogenbosch, Zutphen is present in small numbers.[1025]

[1020] Rijkelijkhuizen 2004, 2009.
[1021] Rijkelijkhuizen 2004, 2017d; Van Genabeek 2012.
[1022] Rijkelijkhuizen 2017d.
[1023] Rijkelijkhuizen 2004, 2009, 2017d.
[1024] Rijkelijkhuizen 2009.
[1025] 's-Hertogenbosch: Rijkelijkhuizen 2010b, Van Genabeek 2012. Zutphen: Fermin, Groothedde & Krijnen 2005.

7 Recommendations: suggestions for general research questions and further research

7.1 Cultural and zooarchaeological approach

The study of these artefacts is a highly specialized field. Because osseous and keratinous finds often only account for a small percentage of all the material from a site, specialist researchers are not always consulted, thus risking misidentification of the raw material as well as incorrect functional analysis. Correct identification of these materials needs to be based on an understanding of animal hard-tissue development and the characteristics of their macro-structures when exposed on the surface of objects that have been worked in different ways and are decorated to various extents.

This particular speciality straddles the boundaries of several research areas. Knowledge of cultural aspects is crucial, but equally necessary are zooarchaeological expertise and an understanding of use-wear analysis. Osseous and keratinous objects and their production waste are often included in zooarchaeological reports, but these accounts can be very limited in scope. Information can be gathered from these artefacts that goes beyond the standard practice of archaeozoological data collection. Not all zooarchaeologists are familiar with the many osseous and keratinous raw materials used in artefact production, or are able to identify them when heavily modified. Likewise, zooarchaeologists may not be equipped to discuss the function or cultural aspects of such objects. Separated from a report's cultural chapters as they usually are, the potential of these objects and their production waste as sources of information on trade, crafts and daily activities is being neglected. However, archaeozoological data are incomplete without the identification of osseous and keratinous artefacts, just as the artefact data would be incomplete without the identification of the production waste hidden amongst the archaeozoological material.

7.2 Use-wear analysis

Tool interpretation is not always straightforward, for many tools were multifunctional. Use-wear analysis was originally developed for the study of flint tools but is now more widely applied to other archaeologically visible processes, such as the production and use of bone tools from Prehistoric, Roman and Early Medieval periods.[1026] Material identification is important to these use-wear studies as the physical characteristics of the different osseous tissues may have implications for the correct interpretation of observed details. A selection of osseous and keratinous objects from Prehistory to the Early Medieval period should be subjected to use-wear analysis.

7.3 Conservation and storage

It is important that osseous and keratinous objects are recognized as such in the field and kept separate from the zooarchaeological material, as they may be more vulnerable to damage and require specific conservation treatments or protective packaging. Even bone and antler retain varying amounts of organic material that respond to changes in moisture content and so must be dried slowly and kept in stable storage conditions similar to those of textile and leather. Worked ivory and keratinous tissues such as horn and tortoiseshell can be very fragile and require immediate conservationist intervention, as they will warp, crack and delaminate when drying out, thus compromising their information potential and future survival. Specialist identification of these objects and their function, and immediate assessment of their conservation requirements are therefore essential.

[1026] E.g. Louwe Kooijmans *et al.* 2001; Louwe Kooijmans, Oversteegen & van Gijn 2001; Van Gijn 2006; Struckmeyer 2011; Prummel, Halici & Verbaas 2011.

7.4 National research questions

Osseous and keratinous artefacts can provide information on socio-economic positions, daily life, on-site activities, crafts and trade, but only if correctly identified. Artefacts of osseous and keratinous tissues were used in all time periods and almost all spheres of life, making them relevant to most of the national research themes instead of only those related to material culture (Theme 22 of the Dutch National Research Agenda, NOaA). These objects can provide information, sometimes crucial and unique, on nearly all themes that relate to daily life, trade or crafts. The artefacts can also shed some light on important environmental issues, food distribution, or large structures such as housing.

Some examples of themes to which the artefacts can contribute are: the usage of animal products through time, but also local products and (long-distance) trade; cultural aspects and socio-economic differentiation; the presence of children; activities at a site such as (textile) production, working of bone, antler, or ivory; acculturation or the presence of people who originated elsewhere; shifting cultural traditions or religion; modification techniques; identity; burial rites; hunting techniques; military presence; medical and personal care; amusement; legislation; clothing, hair styles; wood working; reading and writing – the list is long.

This translates into the following National Research Themes:[1027]

- Theme 5 - Social and economic differentiation. Raw material use and technological choices provide information not only on crafts and trade, but also on socio-economic differences in society. Furthermore, the use of certain objects or even tools provides information about daily life and activities, and about personal interests or socio-economic status.
- Theme 6 - Emigration, immigration and acculturation. Local and imported osseous objects in the Roman and Early Medieval periods can give a better understanding of acculturation and the movements of people.
- Theme 7 - Archaeology of ritual. For example, the (recently discovered) use of human bone for projectile points during the Mesolithic, and of bone pendants as possible amulets from Prehistory to the Early Medieval period reflects certain beliefs and rituals.
- Theme 8 - Archaeology of conflict. Osseous weaponry, from prehistoric barbed points to the Roman weapons finds and post-medieval firearm mountings can reflect on specific conflicts and the presence of warriors.
- Theme 9 - Death and burial. Osseous artefacts are often present in cremation and inhumation burials and may therefore contribute to the archaeology of death and burial.
- Themes 10 and 11 - The earliest occupation of the Netherlands; and Late Palaeolithic to Early Mesolithic transition. Not many osseous finds from the Palaeolithic period are known, but future research may contribute to this theme, as for example the current research project 'Resurfacing Doggerland'.
- Theme 12 - The Neolithization process. Technological changes such as the disappearance of barbed points for fishing after the Mesolithic are relevant to understanding the Neolithization process.
- Theme 13 - Consolidation of an agricultural lifestyle. Changes in the osseous tool kit from the Neolithic up to the Iron Age are clearly visible and can be markers for the agricultural lifestyle that was established.
- Theme 14 - The role of natural food sources after the introduction of agriculture. Changes in hunting and fishing can be evident from (the appearance and disappearance of) osseous artefacts.
- Theme 15 - The Limes: organization and interaction. Osseous finds from the Roman period are highly characteristic and may indicate the presence of soldiers and the import of objects. Local and imported products are very distinct.
- Theme 16 - Transition from the Roman period to the Early Middle Ages. Osseous artefacts from this period show both continuity and change in artefacts and trading routes. Combs can contribute to research of the movement of people and social groups, and identity.
- Theme 17 - 'Franconization' and Christianization. Religious changes are also visible in osseous artefacts, for example the disappearance of amulets. Osseous objects can also reflect changing trade routes. Combs can contribute to the study of movement of people and social groups, and identity.

[1027] For the national research themes, see De Groot *et al.* 2020.

- Theme 19 - Urban development. The development of cities is reflected in a uniformity of osseous and keratinous objects in the Late and Post-Medieval periods and in the development of crafts and global trade.
- Theme 22 - Human material-culture relationships. Research of osseous and keratinous objects can contribute to this theme from various perspectives. However, further study of osseous and keratinous objects is necessary to shed some light on these relationships.
- Theme 23 - Networks and infrastructure. The use of animal resources and the import of raw material for artefact manufacture relied on infrastructure and trade networks. Study of osseous and keratinous tissues and their waste fragments can provide information on these routes and networks.

8 Database

As part of this systematic inventory and basic analysis, an Access database was built for entering information on osseous and keratinous objects from archaeological contexts in the Netherlands: 'BoneArt, Osseous and keratinous objects in the Netherlands'. Figure 8.1 shows the database's structure and criteria. Fields in the database include find location, date, archaeological context, raw material (species, skeletal element), object type, (possible) function, parts of the object, measurements, decorative techniques, the researcher, publication(s), and use wear traces. Reference lists for the database are in Dutch and English; the comment fields are all English. The database, including metadata, can be accessed through the Data Station Archaeology DANS.[1028] DANS (Data Archiving and Networked Services) is the Dutch national expertise centre and repository for all archaeological research data, making it available for new research projects and ensuring that already published research is verifiable and repeatable.

Basic research information on find locations and objects was obtained from research reports, articles, theses, unpublished datasets, archaeological museum archives, and archaeological depots. All collected data was entered into the database 'as is', without modifications.

The database now contains nearly 14,500 records with information on over 21,000 (semi) finished objects and production waste fragments. About 40% of the objects could not be dated (Fig. 8.2). Of those that were, about half come from late medieval to (early) modern contexts. The objects include a wide variety of artefact types, ranging from palaeo- and mesolithic bone and antler projectile points from the North Sea to an eighteenth-century artificial denture made of hippopotamus ivory, found in the city of Amsterdam.

The geographical distribution of the artefacts in the database is influenced by preservation conditions and research bias and thus uneven. This means that the database does not present a representative picture for the whole of the Netherlands.

It should be noted that identifications of the objects' raw materials or their functional assessments were not always carried out by a specialist. Within the framework of the project it was not possible to verify all the data in the database. To complicate matters further,

[1028] https://dans.knaw.nl/en/

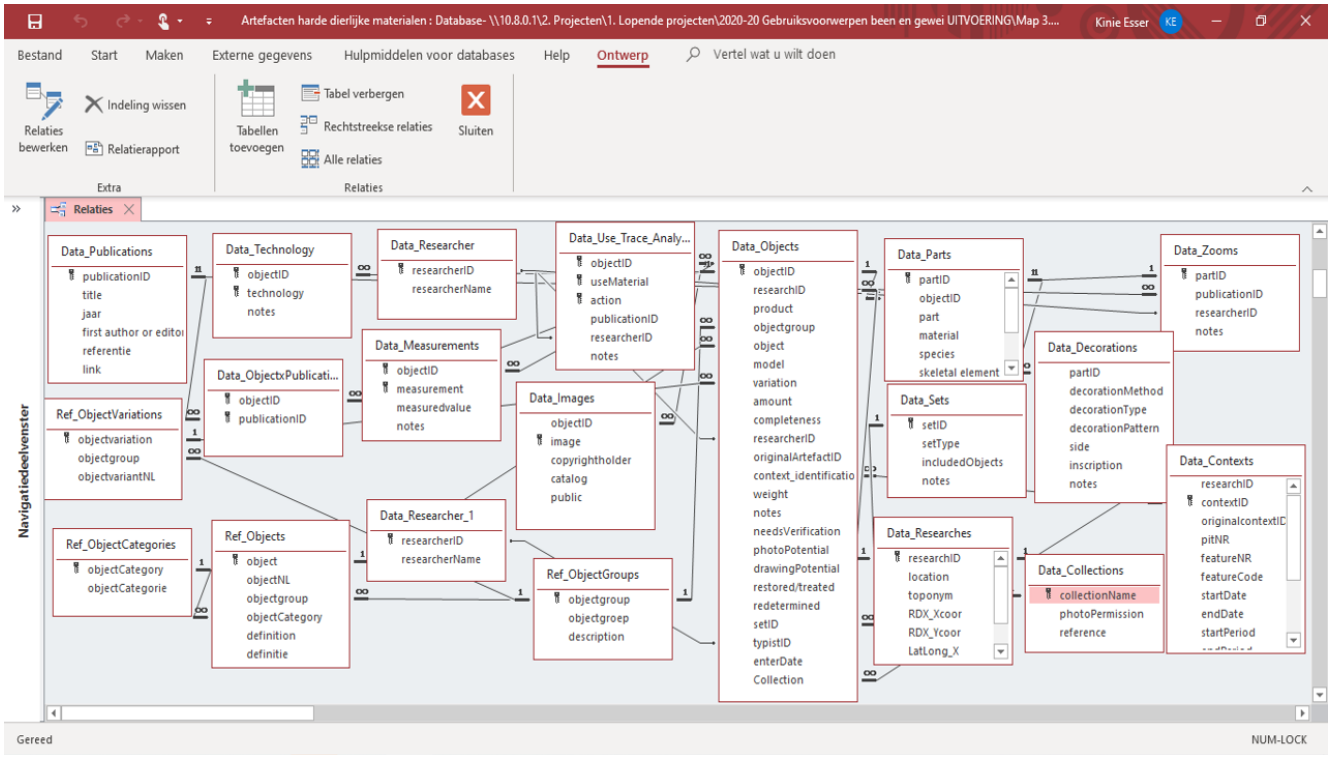


Fig. 8.1 Structure and criteria of the database of osseous and keratinous objects from the Netherlands.

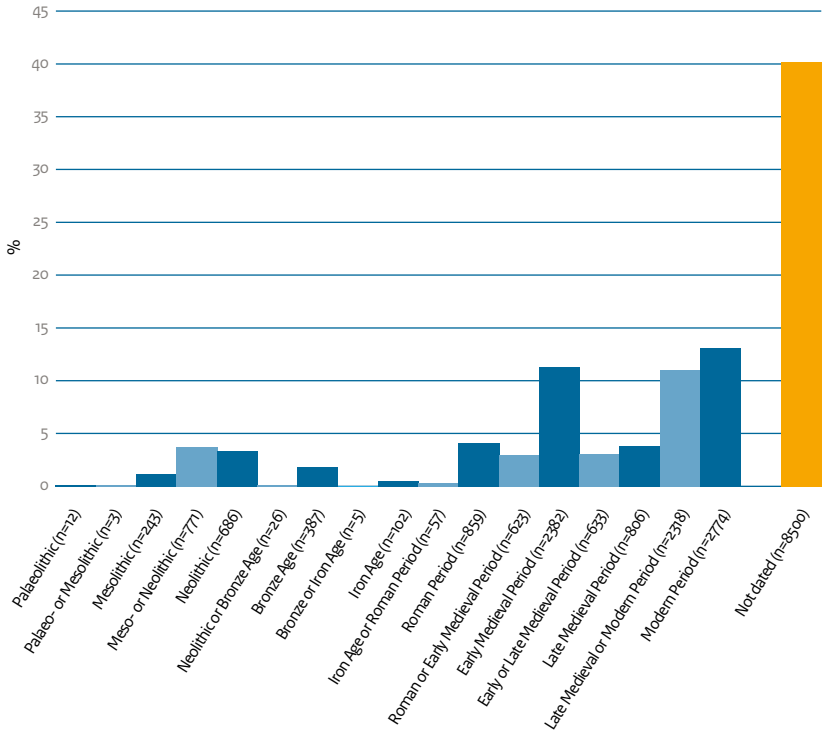


Fig. 8.2 The relative presence of dated and undated finds in the database. Blue represents dated finds and orange represents undated finds.

different researchers sometimes used different terminologies. We therefore recommend using the database as a reference tool, and viewing information on an individual object's material and function with caution. Since the database provides ample room for future expansion and modifications, its function as an instrument for gaining more insight into the use of osseous and keratinous materials in the past will constantly improve.

An enthusiastic response of our colleagues in the archaeological field and museum world enabled us to fill the database. This extensive data set is meant to be a reference collection. Although far from complete, it may be a useful starting point and inspire future research.

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Part III - Catalogues

Catalogue setup

The catalogue is divided into three sections (I, II and III) corresponding to Part II (Research results and synthesis), Chapters 4, 5 and 6:

- I Catalogue of osseous and keratinous artefacts from the prehistoric period (<12 BC), corresponding to Chapter 4
- II Catalogue of osseous and keratinous artefacts from the Roman and Early Medieval period (12 BC-1050 AD), corresponding to Chapter 5
- III Catalogue of osseous and keratinous artefacts from the Late Medieval and Modern period (>1050 AD), corresponding to Chapter 6

Catalogue numbers correspond to the paragraph numbering in these chapters.

The examples are illustrated with a photograph, a drawing, or both, and are accompanied by key data:

Catalogue number - Object name – ***Dutch name***

1. Site name
2. Toponym
3. Context
4. Start period - end period (start date - end date, if more precise)
5. Material (animal species, skeletal element)
6. Measurements in millimeters (mm): length (l), width (w), height (h), depth (d) and diameter (ø). In the case of incomplete objects with the addition 'greater than' (>). Description
7. Publication references
8. References to collection and copyright photograph
9. Unique ID-number in database
10. Reference to other section(s) of the text (Part II) or catalogue (Part III). T-numbers only refer to the text

The periodization is based on the Dutch archaeological chronological classification and is presented in Table III.1.[1029] Start and end dates are listed, if these are more precise.

Since the focus is not on the individual depicted object but on the type it represents, it was decided not to use a fixed scale for object images but to maximize the images' information value by selecting an optimal scale for each specific object. Dimensions are indicated by a scale bar and also in the description under No. 6 of the key data. However, in some cases dimensions could not be determined.

Table III.1 Periodization, based on the Dutch archaeological chronological classification.

Period	Start date	End date
Early Palaeolithic	-1000000	-300000
Middle Palaeolithic	-300000	-35000
Late Palaeolithic	-35000	-8800
Early Mesolithic	-8800	-7100
Middle Mesolithic	-7100	-6450
Late Mesolithic	-6450	-5300
Early Neolithic	-5300	-4200
Middle Neolithic	-4200	-2850
Late Neolithic	-2850	-2000
Early Bronze Age	-2000	-1800
Middle Bronze Age	-1800	-1100
Late Bronze Age	-1100	-800
Early Iron Age	-800	-500
Middle Iron Age	-500	-250
Late Iron Age	-250	-12
Early Roman period	-12	70
Middle Roman period	70	270
Late Roman period	270	450
Early Medieval period	450	1050
Late Medieval period	1050	1500
Early Modern period A	1500	1650
Early Modern period B	1650	1850
Late Modern period	1850	1945

[1029] Groenewoudt, B.J. & B.I. Smit 2017: Four-period system of archaeology, in: R.C.G.M. Lauwerier, M.E. Eerden, B.J. Groenewoudt, M.A. Lascaris, E. Rensink, B.I. Smit, B.P. Speleers & J. van Doesburg, *Knowledge for informed choices. Tools for more effective and efficient selection of valuable archaeology in the* Netherlands, Amersfoort (Nederlandse Archeologische Rapporten 55), 25-31.

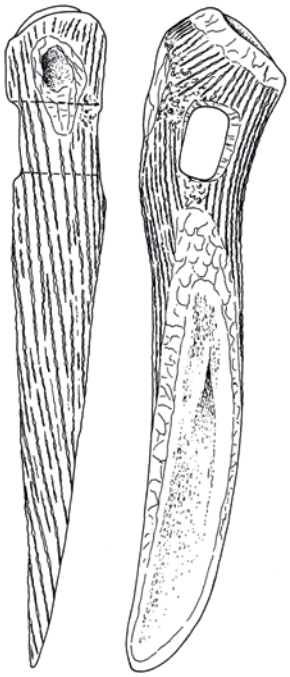
I Catalogue of osseous and keratinous artefacts in Prehistory (<12 BC)

4.2 Agricultural and craft tools

4.2.1 Adzes, axes, chisels and gouges

4.2.1.C1 Adze – *dissel*

1. Westmaas
2. Hoeksche Waard
3. -
4. Early Iron Age
5. Antler (red deer)
6. 350 (l)
7. Adze made from the beam of a red deer antler. The cutting edge was created by a number of blows with a chopping tool, perpendicular to the rectangular shaft hole at the proximal end. The burr is rounded, the brow tine chopped off.
8. Van Heeringen, R.M., R.C.G.M. Lauwerier & H.M. van der Velde 1998: *Sporen uit de IJzertijd en de Romeinse tijd in de Hoekse Waard; een aanvullend archeologisch onderzoek te Westmaas-Maaszicht, gem. Binnenmaas*, Amersfoort (Rapportage Archeologische Monumentenzorg 56).
9. Collection Provinciaal Archeologisch Depot Zuid-Holland, image Rijksdienst voor het Cultureel Erfgoed
10. 5024
11. 4.2.3



4.2.1.C2 Double adze – *dubbele dissel*

1. Heiloo
2. Zuiderloo
3. Waterhole
4. Middle Bronze Age
5. Bone (right whale)
6. 330 x 60 (l x w)
7. A double adze made of the bone of a right whale (*Eubalaena glacialis*). The handle is made of oak wood and a willow wedge had been used to fixate the adze onto the handle.
8. Verbaas, A. & J.J. Brattinga 2023: Een bijzonder werktuig van walvisbot, in: J.J. Brattinga (red.), *Opgraving Heiloo – Zuiderloo; Deelplan 3 en Middenduin. Bewoningsresten uit de late prehistorie en sporen uit de Romeinse tijd tot en met Nieuwe Tijd op de oostelijke flank van de strandwal in Heiloo, gemeente Heiloo*, Leiden (Archol-Rapport 715), 86-92.
9. Collection Provinciaal Depot voor Archeologie Noord-Holland, image M.E. Hemminga
10. 14652
11. -

4.2.1.C3 T-axe – *T-bijl*

1. Helmond
2. Rietbeemden
3. Stray find
4. Bronze Age
5. Antler (red deer)
6. 240 (l)
7. T-axe made from the central section of the beam of a red deer antler. The round shaft hole corresponds to the location of the removed brow tine. An oblique cut created a cutting edge.
8. De Jong, T.P.J., 2012: Holocene fauna from brook valleys in the southern Netherlands, in: D.C.M. Raemaekers, E. Esser, R.C.G.M. Lauwerier & J.T. Zeiler (eds.), *A bouquet of archaeozoological studies. Essays in honour of Wietske Prummel*, Groningen, 47-59.
9. Collection Archeologisch Centrum Eindhoven en Helmond, image L. Mulkens (ArcheoFoto, Eindhoven)
10. 14652
11. -

4.2.1.C4 J-axe – *J-bijl*

1. Tiel Medel
2. De Roeskamp
3. -
4. Early Neolithic
5. Antler (red deer)
6. 162 x 33 x 25 (l x w x ø)
7. J-axe with round shaft hole, made from a tine of a red deer antler. An oblique cut created a cutting edge.
8. Zeiler, J.T., A. Verbaas, E. Esser & T.J. ten Anscher 2023: Artefacten van been, gewei, tand en schelp uit de Swifterbant-periode, in: T.J. ten Anscher, S. Knippenberg, C.M. van der Linde, W. Roessingh & N.W. Willemse (red.), *Doorbraken aan de Rijn. Een Swifterbant-gehucht, een Hazendonk-nederzetting en erven en graven uit de bronstijd in Medel-De Roeskamp*, Weesp/Leiden/Amersfoort/'s-Hertogenbosch (RAAP-rapport 6519, Archol rapport 742, ADC rapport 6150, BAAC Rapport A-16.0207), 751-780.
9. Collection Archeologisch Depot Gelderland, image ADC ArcheoProjecten
10. -
11. 4.2.3

4.2.1.C5 Base axe – *basisbijl*

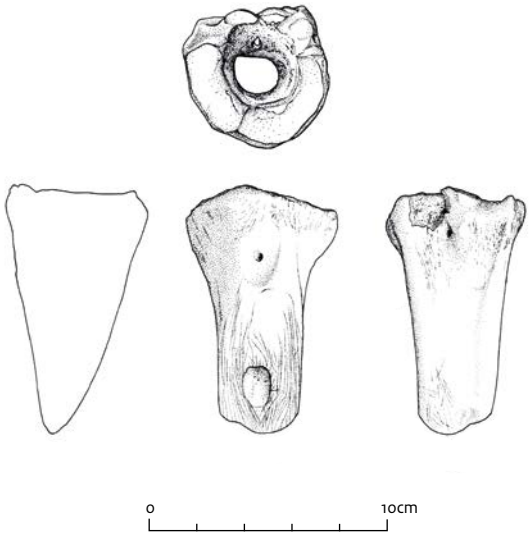
1. Sittard
2. De Dominicaan
3. -
4. Late Bronze Age - Early Iron Age
5. Antler (red deer)
6. 176 x 57 (l x w)
7. Base axe made from a shed red deer antler (a: side view; b: bottom view). The round shaft hole was cut and shows traces of wear. The brow and bez tines have been cut off. The cutting edge is slightly chipped.
8. Zeiler, J.T., 2014: *Geweibijlen en slachtvee. Archeozoölogisch onderzoek van botmateriaal uit Sittard (Neolithicum, IJzertijd en Romeinse tijd)*, Haren (ArchaeoBone Rapport 123).
9. Collection De Vondst (Archeologisch Depot Limburg), image Restaura
10. 4419
11. 4.2.3

4.2.1.C6 Base axe – *basisbijl*

1. North Sea, southern part
2. De Stekels
3. Stray find
4. Late Palaeolithic - Late Mesolithic (9000-6000 BC)
5. Antler (red deer)
6. 182 (l)
7. Base axe made from a shed red deer antler. It is special that part of the wooden handle is still present in the round shaft hole. The brow tine has been cut off. An oblique cut created a cutting edge on the distal end.
8. Amkreutz, L. & S. van der Vaart-Verschoof (red.) 2021: *Doggerland. Verdwenen wereld in de Noordzee*, Leiden.
9. Collection (inv. U 2014/12.14) and image Rijksmuseum van Oudheden
10. -
11. -

4.2.1.C7 Socketed axe – *kokerbijl*

1. Hardinxveld-Giessendam
2. Polderweg
3. -
4. Late Mesolithic - Early Neolithic (5500-5000 BC)
5. Bone (aurochs, metatarsal)
6. -
7. Socketed axe made from the proximal half of an aurochs metatarsal bone. A shaft hole has been drilled through the proximal epiphysis while an oblique cut created a cutting edge.
8. Louwe Kooijmans, L.P., J.F.S. Oversteegen & A.L. van Gijn 2001: Artefacten van been, gewei en tand, in: L.P. Louwe Kooijmans (red.), *Hardinxveld- Giessendam Polderweg: Een mesolithisch jachtkamp in het rivierengebied (5500-5000 v.Chr.)*, Amersfoort (Rapportage Archeologische Monumentenzorg 83), 285-324.
9. Collection Provinciaal Archeologisch Depot Zuid-Holland, drawing J. Pauptit/NS Rail-infrabeheer B.V.
10. 136
11. -

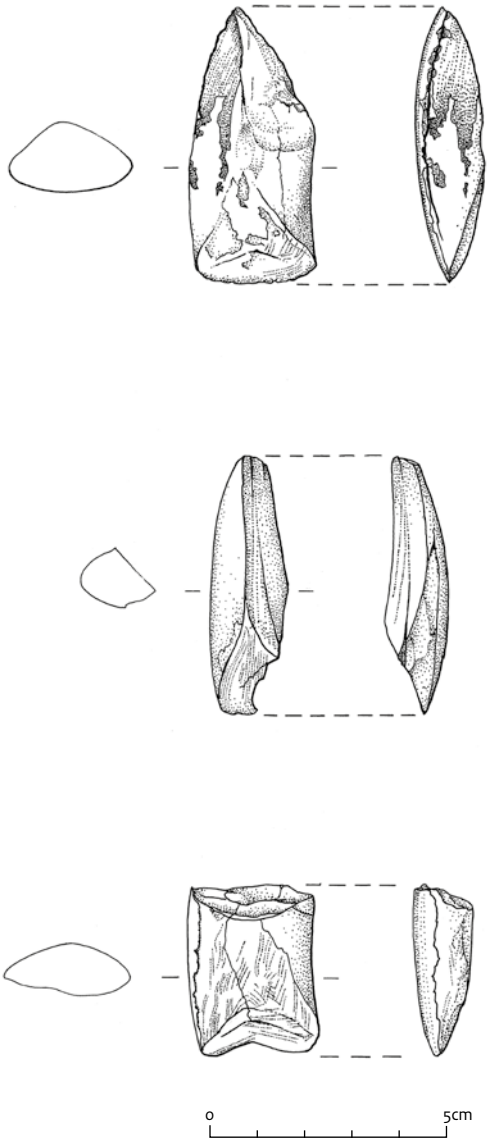


4.2.1.C8 Chisel – *beitel*

1. Hoek van Holland
2. 's-Gravenzande, beach
3. Stray find
4. Late Palaeolithic - Late Mesolithic (9000-6000 BC)
5. Tooth (wild boar, canine)
6. 63 x 20 (l x w)
7. Chisel made from a wild boar canine. An oblique cut on the inner face of the tooth created a cutting edge.
8. Van Steijn, N., 2012: Twee bijzondere vondsten van Hoek van Holland: das en beitel zwijnenslagtand, *Cranium* 29 (2), 60-61.
9. Collection and image N. van Steijn
10. -
11. -

4.2.1.C9 Chisel – *beitel*

1. Hardinxveld-Giessendam
2. De Bruin
3. -
4. Late Mesolithic - Early Neolithic
5. Tooth (wild boar, canine)
6. 35-57 x 22-25 (l x w)
7. Wild-boar canines cut so as to create small chisels, with broad triangular cross-sections and a wide or tapered top to allow mounting.
8. Louwe Kooijmans, L.P., A.L. van Gijn, J.F.S. Oversteegen & M. Bruineberg 2001: Artefacten van been, gewei en tand, in: L.P. Louwe Kooijmans (red.), *Archeologie in de Betuweroute: Hardinxveld-Giessendam De Bruin: Een kampplaats uit het Laat-Mesolithicum en het begin van de Swifterbantcultuur (5500-4450 v.Chr.)*, Amersfoort (Rapportage Archeologische Monumentenzorg 88), 327-367.
9. Collection Provinciaal Archeologisch Depot Zuid-Holland, drawing J. Pauptit/NS Rail-infrabeheer B.V.
10. -
11. -



4.2.1.C10 Chisel – *beitel*

1. Hardinxveld-Giessendam
2. Polderweg
3. -
4. Late Mesolithic - Early Neolithic (5500-5000 BC)
5. Bone (aurochs, metacarpal)
6. 98 x 60 x 32 (l x w x d)
7. Chisel made from the proximal section of an aurochs metatarsal bone (a: front; b: back). The bone is split lengthwise and obliquely cut at the distal end.
8. Louwe Kooijmans, L.P., J.F.S. Oversteegen & A.L. van Gijn 2001a: Artefacten van been, gewei en tand, in: L.P. Louwe Kooijmans (red.), *Hardinxveld- Giessendam Polderweg: Een mesolithisch jachtkamp in het rivierengebied (5500-5000 v.Chr.)*, Amersfoort (Rapportage Archeologische Monumentenzorg 83), 285-324.
9. Collection (inv. 11915) and image Provinciaal Archeologisch Depot Zuid-Holland
10. -
11. -

4.2.1.C11 Gouge – *guts*

1. Velsen
2. Stationsweg, Noordzeekanaal
3. -
4. Middle Bronze Age (1800-1500 BC)
5. Bone (cattle, femur)
6. 82.8 x 18 x 7 (l x w x d)
7. Small gouge with two rounded ends (a: front; b: back). The bone was split lengthwise and the edges have polish transversely on the surface. The outer face is smooth and shiny. The obliquely cut working edge is sharp.
8. Clason, A.T., 1974: The antler, bone, and tooth objects from Velzen: a short description, *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 24, The Hague, 119-131.
9. Collection (inv. 6243-20) and image Provinciaal Depot voor Archeologie Noord-Holland
10. -
11. -

4.2.2 Awls, points and needles

4.2.2.C1 Antler awl with faceted tip – *gefacetteerde geweipunt*

1. Tiel Medel
2. De Roeskamp
3. -
4. Early Neolithic
5. Antler (red deer)
6. 101 x 21 x 23 (l x w x ø)
7. Awl with faceted tip, made from an antler tine.
8. Zeiler, J.T., A. Verbaas, E. Esser & T.J. ten Anscher 2023: Artefacten van been, gewei, tand en schelp uit de Swifterbant-periode, in: T.J. ten Anscher, S. Knippenberg, C.M. van der Linde, W. Roessingh & N.W. Willemse (red.), *Doorbraken aan de Rijn. Een Swifterbant-gehucht, een Hazendonk-nederzetting en erven en graven uit de bronstijd in Medel-De Roeskamp*, Weesp/Leiden/Amersfoort/'s-Hertogenbosch (RAAP-rapport 6519, Archol rapport 742, ADC rapport 6150, BAAC Rapport A-16.0207), 751-780.
9. Collection Provinciaal Archeologisch Depot Zuid-Holland, image ADC ArcheoProjecten
10. 19671
11. 5.2.6, 6.2.1

4.2.2.C2 Awl – *priem*

1. Aartswoud
2. Drie Bunders
3. -
4. Late Neolithic
5. Bone (mammal, long bone)
6. 109 x 18 (l x w)
7. Awl made from a lengthwise split long bone.
8. Theunissen, E.M., 2020: Aartswoud, een topsite van de overtreffende trap, in: J. Bazelmans, E. Beukers, O. Brinkkemper, I.M.M. van der Jagt, E. Rensink, B.I. Smit & M. Walrecht (red.), *Tot op het bot onderzocht, Essays ter ere van archeozoöloog Roel Lauwerier*, Amersfoort (Nederlandse Archeologische Rapporten 70), 333-344.
9. Collection (inv. 6150-09) and image Provinciaal Depot voor Archeologie Noord-Holland
10. -
11. 5.2.6, 6.2.1

4.2.2.C3 Awl (broad) – *brede priem*

1. Barendrecht
2. Carnisselande, site 1-4
3. -
4. Late Neolithic - Early Bronze Age (2450-1800 BC)
5. Bone (cattle, metatarsal)
6. 119 x 38 x 15 (l x w x d)
7. Awl made from the proximal section of a lengthwise split cattle metatarsal, showing polish or use wear and visible scratches.
8. Moree, J.M., C.C. Bakels, S.B.C. Bloo, D.C. Brinkhuizen, R.A Houkes, P.F.B. Jongste, M.C. van Trierum, A. Verbaas & J.T. Zeiler 2011: Barendrecht-Carnisselande: bewoning van een oeverwal vanaf het Laat Neolithicum tot in de Midden-Bronstijd, in: A. Carmiggelt, M.C. van Trierum & D.A. Wesselingh (red.), *Archeologisch onderzoek in de gemeente Barendrecht. Prehistorische bewoning op een oeverwal en middeleeuwse bedijking en bewoning*, Rotterdam (BOOR Balans 7), 15-154.
9. Collection Archeologie Rotterdam, image BOOR/T. van Pinxsteren (Rotterdam)
10. 4515
11. 5.2.6, 6.2.1

4.2.2.C4 Needle – *naald*

1. Barendrecht
2. Carnisselande, site 1-4
3. -
4. Late Neolithic - Early Bronze Age (2450-1800 BC)
5. Bone (mammal, long bone)
6. 75 x 6 (l x w)
7. Needle with eye, made from a lengthwise split long bone. Polish or use wear and long scratches are visible along the entire length.
8. Moree, J.M., C.C. Bakels, S.B.C. Bloo, D.C. Brinkhuizen, R.A Houkes, P.F.B. Jongste, M.C. van Trierum, A. Verbaas & J.T. Zeiler 2011: Barendrecht-Carnisselande: bewoning van een oeverwal vanaf het Laat Neolithicum tot in de Midden-Bronstijd, in: A. Carmiggelt, M.C. van Trierum & D.A. Wesselingh (red.), *Archeologisch onderzoek in de gemeente Barendrecht. Prehistorische bewoning op een oeverwal en middeleeuwse bedijking en bewoning*, Rotterdam (BOOR Balans 7), 15-154.
9. Collection Archeologie Rotterdam, image BOOR/T. van Pinxsteren (Rotterdam)
10. 4515
11. 5.2.6, 5.2.7, 6.2.13, 6.2.14

4.2.2.C5 Double-pointed awl – *dubbelgepunte priem*

1. Tiel Medel
2. De Roeskamp
3. -
4. Early Neolithic
5. Bone (large mammal, long bone)
6. 86 x 9 x 6 (l x w x d)
7. Double-pointed awl made from a lengthwise split long bone of a large mammal, showing polish or use wear on the entire outer surface and scratches on the inside.
8. Zeiler, J.T., A. Verbaas, E. Esser & T.J. ten Anscher 2023: Artefacten van been, gewei, tand en schelp uit de Swifterbant-periode, in: T.J. ten Anscher, S. Knippenberg, C.M. van der Linde, W. Roessingh & N.W. Willemse (red.), *Doorbraken aan de Rijn. Een Swifterbant-gehucht, een Hazendonk-nederzetting en erven en graven uit de bronstijd in Medel-De Roeskamp*, Weesp/Leiden/Amersfoort/'s-Hertogenbosch, (RAAP-rapport 6519, Archol rapport 742, ADC rapport 6150, BAAC Rapport A-16.0207), 751-780.
9. Collection Archeologisch Depot Gelderland, image ADC ArcheoProjecten
10. 19681
11. 5.2.6, 5.2.7, 6.2.1, 6.2.13

4.2.3 Hammers

4.2.3.C1 Hammer – *hamer*

1. Kolhorn
2. Waardpolder
3. -
4. Late Neolithic
5. Antler (red deer)
6. 248 x 96 (l x w)
7. Hammer made from the beam of a shed antler, with a round shaft hole. The brow tine was cut off and the base (pedicle) became a working end. Both working end and beam show heavy polish.
8. Van Heeringen, R.M. & E.M. Theunissen (red.) 2001: *Kwaliteitsbepalend onderzoek ten behoeve van duurzaam behoud van Neolithische terreinen in West-Friesland en de Kop van Noord-Holland, Deel 1 Waardestelling*, Amersfoort (Nederlandse Archeologische Rapporten 21).
9. Collection (inv. 6316 - 02) and image Provinciaal Depot voor Archeologie Noord-Holland
10. 5097
11. -

4.2.4 Picks

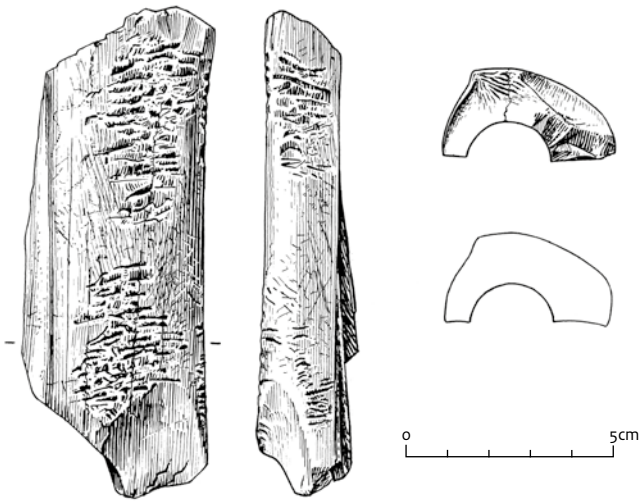
4.2.4.C1 Pick – *hak* or *houweel*

1. Molenaarsgraaf
2. Molenwaard, grave 2
3. -
4. Early Bronze Age
5. Antler (red deer)
6. 450 (l)
7. Shed red-deer antler of which the second and third tine were removed. The brow tine was used as a pick; its surface shows polish.
8. Louwe Kooijmans, L.P., 1974: *The Rhine/Meuse Delta*, Leiden 1974.
9. Collection (inv. H 1967/1.200) and image Rijksmuseum van Oudheden
10. 5097
11. 5.2.1

4.2.5 Retouchoirs

4.2.5.C1 Retouchoir – *retouchoir*

1. Empel
2. Near Gewande along the river Meuse
3. Sand suction find
4. (Middle) Palaeolithic
5. Bone (horse, tibia)
6. 112 x 41 (l x w)
7. Retouchoir made from a lengthwise split long bone. Characteristic are the four groups of elongated, approximately parallel impressions formed when the tool was used to work flint. Two groups can be seen on the large convex face and two smaller ones on one of the sides.
8. Stapert, D., 1977: Een paleolithische benen retouchoir van Empel (N. Br.), *Museologia* 7 (1), 3853.
9. -, drawing H. R. Roelink
10. -
11. -



4.2.6 Ripples

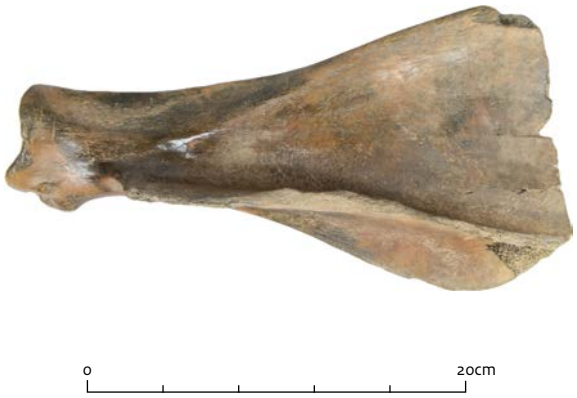
4.2.6.C1 Ripple – *bobbelkam*

1. Zeewijk
2. Zeewijk
3. -
4. Late Neolithic
5. Bone (cattle, rib)
6. 95 x 26/160 x 30 (l x w)
7. Ripples (a and b) made from cattle ribs, each with one blunt serrated edge used for scraping and polishing.
8. García-Díaz, V., 2014: Flint, stones and bones: raw material selection, typology, technology and use-wear analysis, in: E.M. Theunissen, O. Brinkkemper, R.C.G.M. Lauwerier, B.I. Smit & I.M.M. van der Jagt (eds.), *A mosaic of habitation at Zeewijk (the Netherlands): Late Neolithic behavioural variability in a dynamic landscape*, Amersfoort (Nederlandse Archeologische Rapporten 47), 85-118.
9. Collection and image Provinciaal Depot voor Archeologie Noord-Holland
10. 4863 and 4864
11. 5.2.4

4.2.7 Scapula scoops

4.2.7.C1 Scapula scoop – *schouderbladschep* or *schouderbladspade*

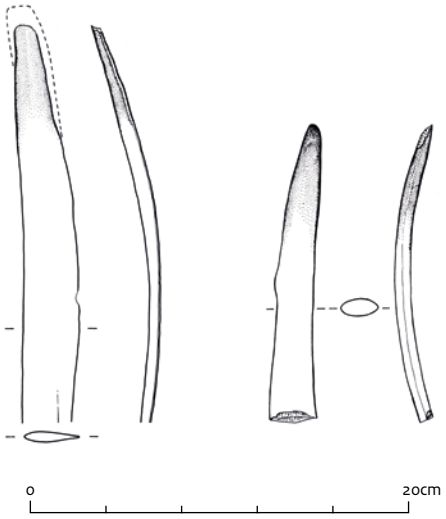
1. Bovenkarspel
2. Het Valkje
3. -
4. Middle Bronze Age - Late Bronze Age
5. Bone (cattle, scapula)
6. 300 x 155 (l x w)
7. Scapula scoop with polish around the neck caused by regular use.
8. IJzereef, G.F., 1981: *Bronze Age animal bones from Bovenkarspel. The excavation at Het Valkje*, Amersfoort (Nederlandse Oudheden 10).
9. Collection (inv. 6161-03) and image Provinciaal Depot voor Archeologie Noord-Holland
10. -
11. 5.4.5



4.2.8 Smoothers, polishers or scrapers

4.2.8.C1 Smoother or polisher – *polijster*

1. Bovenkarspel
2. Het Valkje
3. -
4. Middle Bronze Age - Late Bronze Age
5. Bone (cattle, rib)
6. -
7. Worked cattle ribs, probably used to dress skins in combination with ashes or fine sand; a zone at one end shows polish.
8. IJzereef, G.F., 1981: *Bronze Age animal bones from Bovenkarspel. The excavation at Het Valkje*, Amersfoort (Nederlandse Oudheden 10).
9. Collection Provinciaal Depot voor Archeologie Noord-Holland, drawing Rijksdienst voor het Oudheidkundig Bodemonderzoek
10. -
11. 5.2.4, 6.2.6



4.2.9 Spatulas

4.2.9.C1 Spatula – *spatel*

1. Barendrecht
2. Carnisselande, site 1-4
3. Late Neolithic - Early Bronze Age (2200-1800 BC)
4. Antler (red deer)
5. 149 x 17 (l x w)
6. Double-edged spatula, made from a lengthwise split beam, both ends rounded and showing polish or use wear; small cutmarks are visible on one end.
7. Moree, J.M., C.C. Bakels, S.B.C. Bloo, D.C. Brinkhuizen, R.A Houkes, P.F.B. Jongste, M.C. van Trierum, A. Verbaas & J.T. Zeiler 2011: Barendrecht-Carnisselande: bewoning van een oeverwal vanaf het Laat Neolithicum tot in de Midden-Bronstijd, in: A. Carmiggelt, M.C. van Trierum & D.A. Wesselingh (red.), *Archeologisch onderzoek in de gemeente Barendrecht. Prehistorische bewoning op een oeverwal en middeleeuwse bedijking en bewoning*, Rotterdam (BOOR Balans 7), 15-154.
8. Collection Archeologie Rotterdam, image BOOR/T. van Pinxsteren (Rotterdam)
9. 4519
10. -
11. -

4.2.10 Spindle whorls

4.2.10.C1 Spindle whorl – *spinsteen* or *spinklos*

1. Houten
2. Houten Castellum
3. -
4. Late Iron Age - Early Roman Period (250 BC - AD 70)
5. Bone (cattle, femur)
6. 36 (ø)
7. Spindle whorl made from the perforated caput (head) of a cattle femur.
8. Groot, M. & M. van Haasteren 2017: Dierlijk bot, in: J. van Renswoude & D. Habermehl (red.), *Opgravingen te Houten-Castellum. Bewoning langs een restgeul in de IJzertijd, Romeinse tijd en Vroege Middeleeuwen*, Amsterdam (Zuidnederlandse Archeologische Rapporten 65), 687-734; 1148.
9. Collection Provinciaal Archeologisch Depot Utrecht, image D.S. Habermehl
10. 12824
11. 5.2.9

4.2.11 Bobbins

4.2.11.C1 Bobbin or reel – *klos*

1. Houten
2. Houten Castellum
3. -
4. Late Iron Age (250-100 BC)
5. Bone (horse, radius)
6. 133 x 32 (l x w)
7. Central part of a horse radius, heavily worn, with a V-shaped notch at each end. The object was probably used as a bobbin or reel. Although weathered, this specimen is very similar to one from Geldermalsen-Hondsgemet (Groot 2009, Fig. 14.3, 360) where traces of wear suggest that a rope-like item had been wrapped around the bone.
8. Groot, M. & M. van Haasteren 2017: Dierlijk bot, in: J. van Renswoude & D. Habermehl (red.), *Opgravingen te Houten-Castellum. Bewoning langs een restgeul in de IJzertijd, Romeinse tijd en Vroege Middeleeuwen*, Amsterdam (Zuidnederlandse Archeologische Rapporten 65), 687734; 1149.
Groot, M., 2009: Dierlijk bot en speciale deposities met dierlijk bot, in: J. van Renswoude & J. van Kerckhove (red.). Opgravingen in Geldermalsen-Hondsgemet. Een inheemse nederzeting uit de late ijzertijd en Romeinse tijd, Amsterdam (Zuidnederlandse Archeologische Rapporten 35), 355-409.
9. Collection Provinciaal Archeologisch Depot Utrecht, image D.S. Habermehl
10. 12826
11. 5.2.14, 6.2.12

4.2.12 Knives

4.2.12.C1 Knife – *mes*

1. Swifterbant
2. Site S4
3. -
4. Early Neolithic
5. Tooth (wild boar, canine)
6. 70 x 23 (l x w)
7. Knife made from the lamella of a lower canine of a male wild boar. The wider section is the handle; at the other end the object narrows to a point which serves as a blade. The blade's smooth, rounded and glossy appearance points to frequent use.
8. Prummel, W. & H. Kranenburg 2020: The use of domestic and wild animals, in: Raemaekers & De Roever (eds), *Swifterbant S4 (the Netherlands). Occupation and exploitation of a Neolithic levee site (c. 4300-4000 cal. BC)*, Groningen (Groningen Archaeological Studies 36), 76-94.
9. Collection Provinciaal Archeologisch Depot Flevoland (Batavialand), image H. Kranenburg
10. -
11. 5.6.8, 6.4.1

4.3 Weapons (hunting, fishing and warfare)

4.3.1 Projectile points

4.3.1.C1 Projectile or barbed point – *spits*

1. North Sea
2. Doggerland
3. Stray find
4. Mesolithic
5. Bone (-)
6. 61 (l)
7. Small projectile point made from a lengthwise split bone. One edge is barbed.
8. Amkreutz, L. & M. Spithoven 2019: Hunting beneath the waves. Bone and antler points from North Sea Doggerland off the Dutch coast, in: D. Gross, H. Lübke, J. Meadows & D. Jantzen (eds), *Working at the sharp end: from bone and antler to Early Mesolithic life in Northern Europe*, Schleswig (Untersuchungen und Materialien zur Steinzeit in Schleswig-Holstein und Ostseeraum 10), 383-404.
9. Collection and image Rijksmuseum van Oudheden
10. 14680
11. -

4.3.2 Fishhooks

4.3.2.C1 Hook without barb – *vishaak zonder weerhaak*

1. Hoek van Holland
2. Hoek van Holland, beach
3. Stray find
4. Mesolithic
5. Bone (large mammal, long bone)
6. 51 x 38 x 7 mm (l x w x d)
7. Fishhook without barb, made from a fragment of a long-bone shaft.
8. Zeiler, J.T., 2021: Aangespoeld en opgeraapt. Archeozoölogisch onderzoek van bewerkt bot en gewei van Maasvlakte 1 en 2 en Hoek van Holland: een eerste inventarisatie, in: A. Carmiggelt & D.E.A. Schiltmans (red.), *Doggerland en Rotterdam. Een inventarisatie van opgespoten paleolithische en mesolithische artefacten van (vuur)steen, bot en gewei van Maasvlakte (1 en 2) en Hoek van Holland (gemeente Rotterdam); een aanzet voor vervolgonderzoek*, Rotterdam (BOORnotitie 41), 125-149.
9. Collection (inv. h 2017/11.4) and image Rijksmuseum van Oudheden
10. 14680
11. T5.2.11

4.3.2.C2 Barbed fishhook – *vishaak met weerhaak*

1. Olst
2. Olst-Wijhe, river IJssel
3. Stray find
4. Middle Neolithic - Late Neolithic (4000-2000 BC)
5. Bone (mammal)
6. 70 (l)
7. Barbed fishhook.
8. -
9. Collection (inv. d 1928/12.1) and image Rijksmuseum van Oudheden
10. 494
11. T5.2.11

4.3.3 Daggers

4.3.3.C1 Dagger – *dolk*

1. Emmen
2. Barger Oosterveld
3. Stray find
4. Late Neolithic - Middle Bronze Age (1900-1575 BC)
5. Various materials
6. 156 (l)
7. Bronze dagger with antler handle decorated with tin studs.
8. Glasbergen, W., 1956: De Dolk van Bargeroosterveld, *Nieuwe Drentse Volksalmanak* 74, 191-198.
9. Collection Drents Museum, image JAV Studio's
10. 494
11. T5.3.1, 6.3.3, 6.3.4

4.4 Personal hygiene

4.4.1.C1 Comb – *kam*

1. Ezinge
2. Ezinge, terp mound
3. -
4. Middle Iron Age - Late Iron Age (500-200 BC)
5. Horn (cattle)
6. -
7. Single comb made from cattle horn, decorated on both sides with dot-and-circle motifs.
8. Prummel, W., Manuel, S. & M. Post 2014: De dieren uit de opgravingen van Van Giffen in Ezinge, in: A. Nieuwhof (red.), *En dan in hun geheel: De vondsten uit de opgravingen in de wierde Ezinge*, Groningen (Jaarverslagen van de Vereniging voor Terpenonderzoek 96), 207-237.
9. Collection Noordelijk Archeologisch Depot, image S. Manuel, from Prummel, Manuel & Post 2014, Fig. 1
10. 13117
11. 5.5.1, T5.5.2, 6.5.1, T6.5.2

4.4.1.C2 Long-handled comb – *kam met lang handvat*

1. Houten
2. Houten Castellum
3. -
4. Middle Iron Age (400-250 BC)
5. Antler (red (?) deer)
6. 145 x 28 (l x w)
7. Comb made from a lengthwise split antler section, flat on one side and slightly convex on the other. One end has seven teeth while the other tapers to a rounded tip.
8. Renswoude, J. van & D. Habermehl (red.) 2017: *Opgravingen te Houten-Castellum. Bewoning langs een restgeul in de IJzertijd, Romeinse tijd en Vroege Middeleeuwen*, Amsterdam (Zuidnederlandse Archeologische Rapporten 65).
9. Collection Provinciaal Archeologisch Depot Zuid-Holland, image D.S. Habermehl
10. 12817
11. 5.5.1, T5.5.2, 6.5.1, T6.5.2

4.5 Personal adornment and clothing

4.5.1 Beads

4.5.1.C1 Bead – *kraal*

1. Velsen
2. Stationsweg, Noordzeekanaal
3. -
4. Early Bronze Age
5. Bone (medium-sized mammal, tibia)
6. 31 x 15 (l x w)
7. Bead made from a tibia shaft fragment, carved in and worked at both ends.
8. -
9. Collection (inv. 6243-26) and image Provinciaal Depot voor Archeologie Noord-Holland
10. -
11. 5.6.6, 5.7.6, 6.6.18

4.5.2 Pendants or amulets

4.5.2.C1 Pendant or amulet – *hanger* of *amulet*

1. Kolhorn
2. Waardpolder
3. Excavation
4. Late Neolithic (2850-2450 BC)
5. Tooth (brown bear, canine)
6. 78 x 30 (l x w)
7. Pendant or amulet, made from a canine. A hole has been drilled through the root.
8. -
9. Collection (inv. 4424-08) and image Provinciaal Depot voor Archeologie Noord-Holland
10. 22144
11. 5.6.5

4.5.2.C2 Pendant or amulet – *hanger* of *amulet*

1. Hekelingen
2. Nissewaard
3. Excavation
4. Middle Neolithic - Late Neolithic (3600-2500 BC)
5. Tooth (otter, canine)
6. 24 (l)
7. Pendant or amulet, made from a canine. A hole has been drilled through the root.
8. Zeiler, J., 2022: Van jachtbuit tot ambassadeur van schoon water. Otters en mensen vanaf de prehistorie, *Zoogdier* 33 (3), 28-30.
9. Collection (inv. h 1980/7.16G-295) and image Rijksmuseum van Oudheden
10. 6876
11. 5.6.5

4.5.2.C3 Pendant or amulet – *hanger of amulet*

1. Kolhorn
2. Waardpolder
3. Excavation
4. Late Neolithic (2850-2450 BC)
5. Bone (fox, metapodial)
6. 42 x 7 (l x w)
7. Pendant or amulet. A hole has been drilled from the anterior to the posterior side of the proximal end of the shaft.
8. -
9. Collection (inv. 4424-32) and image Provinciaal Depot voor Archeologie Noord-Holland
10. -
11. 5.6.5

4.5.3 Toggle buttons

4.5.3.C1 Toggle button – *houtje-touwtje knoop*

1. Sittard
2. De Dominicaan
3. -
4. Late Bronze Age - Early Iron Age
5. Bone (sheep or goat, tibia)
6. 55 (l)
7. Toggle button made from the shaft of a sheep or goat tibia, with a round hole at the centre and decorative carvings across each of the long edges.
8. Zeiler, J.T., 2014: *Geweibijlen en slachtvee. Archeozoölogisch onderzoek van botmateriaal uit Sittard (Neolithicum, IJzertijd en Romeinse tijd)*, Haren (ArchaeoBone Rapport 123).
9. Collection De Vondst (Archeologisch Depot Limburg), image Restaura
10. 6702
11. 6.7.11

4.6 Games, toys and musical instruments

4.6.1 Gaming counters

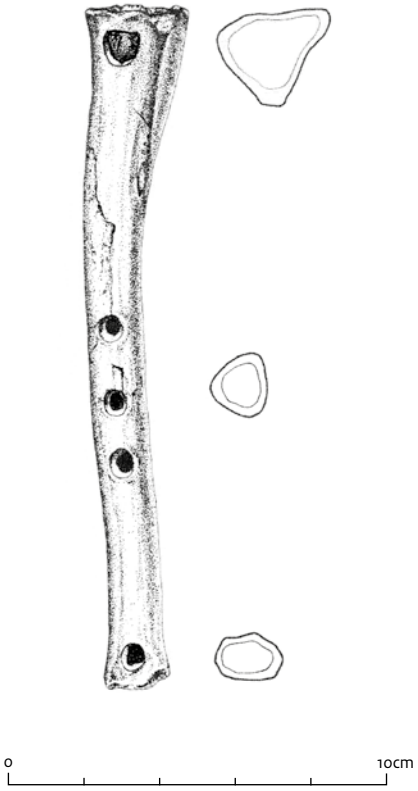
4.6.1.C1 Gaming counter – *speelschijfje*

1. Barendrecht
2. Carnisselande, site 1-4
3. -
4. Late Neolithic - Early Bronze Age (2450-1800 BC)
5. Bone (mammal)
6. 9 x 3 (ø x d)
7. Biconvex gaming counter, showing polish on the entire surface.
8. Moree, J.M., C.C. Bakels, S.B.C. Bloo, D.C. Brinkhuizen, R.A Houkes, P.F.B. Jongste, M.C. van Trierum, A. Verbaas & J.T. Zeiler 2011: Barendrecht-Carnisselande: bewoning van een oeverwal vanaf het Laat Neolithicum tot in de Midden-Bronstijd, in: A. Carmiggelt, M.C. van Trierum & D.A. Wesselingh (red.), *Archeologisch onderzoek in de gemeente Barendrecht. Prehistorische bewoning op een oeverwal en middeleeuwse bedijking en bewoning*, Rotterdam (BOOR Balans 7), 15-154.
9. Collection Archeologie Rotterdam, image BOOR/T. van Pinxsteren (Rotterdam)
10. -
11. 5.7.2, 6.7.7, 6.7.16

4.6.2 Flutes

4.6.2.C1 Flute – *fluit*

1. Kimswerd
2. Kimswerd, terp mound
3. -
4. Iron Age
5. Bone (sheep or goat, tibia)
6. 177 (l)
7. Flute made from a tibia of sheep or goat. Both ends were removed to allow airflow and use of the top opening as a windway. The plantar side carries a row of five irregularly spaced holes.
8. Milojković, J. & D.C. Brinkhuizen 1984: Bones from a *terp* remnant near Kimswerd, *Helinium* 24, 240-246.
9. Collection Fries Museum, drawing J. Milojković
10. 19997
11. 5.4.1, 5.7.7, 4.7.12, 6.7.15

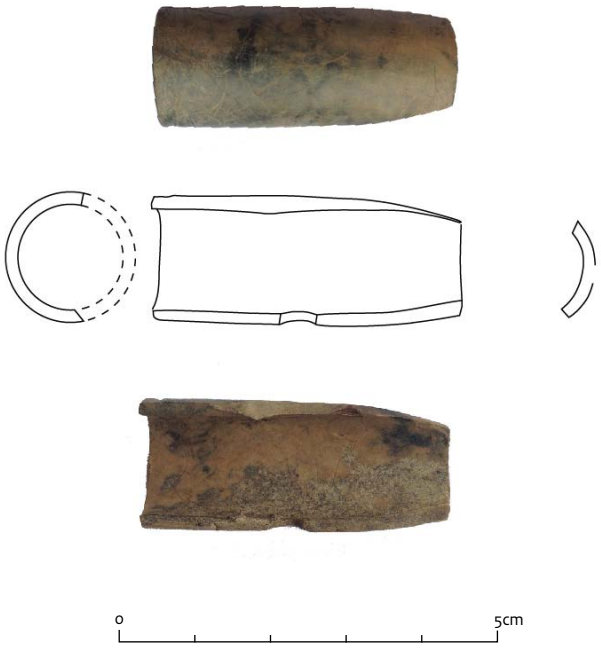


4.7 Other objects

4.7.1 Tubes

4.7.1.C1 Tube – *buis*

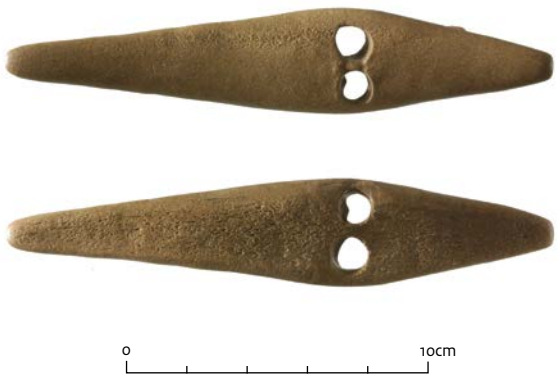
1. Heiloo
2. Krommelaan
3. -
4. Bronze Age
5. Bone (medium-sized mammal, long bone)
6. 17 x 42 (ø x l)
7. Fragment of tube, now broken lengthwise, made from a long-bone shaft of a medium-sized mammal. Some scratches are visible on the outside; at the centre is a small artificial hole.
8. De Vries, L.S., 2019: Het dierlijk botmateriaal, in: J. de Koning & N.C. Tuinman, *Heiloo Zuiderloo, Rioolsleuf. Sporen uit de Romeinse tijd, midden en late bronstijd*, Zaandijk (Hollandia Reeks 781), 109-140.
9. Collection Provinciaal Depot voor Archeologie Noord-Holland, image Hollandia Archeologen
10. 5259
11. -



4.7.2 (Fragments of) objects with unknown function

4.7.2.C1 Weaving shuttle (?) – *weefspoel* (?)

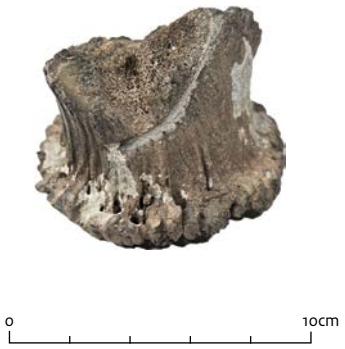
1. Sittard
2. De Dominicaan
3. -
4. Late Bronze Age - Early Iron Age
5. Antler (red deer)
6. 88 x 17 x 5 (l x w x d)
7. Object of unknown function, probably a weaving shuttle, with two tapered ends and at the centre two drilled holes, vertically aligned. Both holes show use wear around the edges.
8. Zeiler, J.T., 2014: *Geweibijlen en slachtvee. Archeozoölogisch onderzoek van botmateriaal uit Sittard (Neolithicum, IJzertijd en Romeinse tijd)*, Haren (ArchaeoBone Rapport 123).
9. Collection De Vondst (Archeologisch Depot Limburg), image Restaura
10. 4424
11. 6.2.12



4.8 Production waste

4.8.1.C1 Worked antler base – *bewerkte geweibasis*

1. Hoek van Holland
2. Hoek van Holland, beach
3. Stray find
4. Mesolithic
5. Antler (red deer)
6. 75 x 65 x 48 (l x w x ø)
7. Base of a shed red-deer antler (beam), carved and broken off.
8. -
9. Collection and image Rijksmuseum van Oudheden
10. -
11. -



II Catalogue of osseous and keratinous artefacts in the Roman and Early Medieval period (12 BC-1050 AD)

5.2 Agricultural and craft tools

5.2.1 Rakes and picks

5.2.1.C1 Rake (type 1) – *kluitenbreker*

1. Ezinge
2. Terp
3. -
4. Late Roman Period - Early Medieval Period
5. Antler (red deer)
6. -
7. Rake made from the base of an antler, cut off above the bez tine. The brow and bez tine form the actual tool.
8. Prummel, W., Manuel S.C.J. & M. Post 2014: De dieren uit de opgravingen van Van Giffen in Ezinge, in: A. Nieuwhof (red.), *En dan in hun geheel. De vondsten uit de opgravingen in de wierde Ezinge,* Groningen (Jaarverslagen van de Vereniging voor Terpenonderzoek 96), 207-237.
9. Collection Noordelijk Archeologisch Depot, image S. Manuel, from Prummel, Manuel & Post 2014, Fig. 9
10. 13017
11. -

5.2.1.C2 Rake (Type 2) – *kluitenbreker*

1. Hallum
2. Terp
3. -
4. Iron Age - Roman Period (?)
5. Antler (-)
6. 20.0 (l)
7. Rake made from the upper end of the antler whereby two tine tips together form a forked tool. A hole in the base of the tool allows hafting.
8. -
9. Collection and image Fries Museum, Leeuwarden - Collectie Koninklijk Fries Genootschap (Inv. no. 111-126)
10. -
11. -

5.2.1.C3 Pick – *hak*

1. Wijk bij Duurstede
2. De Geer
3. Pit S269
4. Middle Roman Period - Late Roman Period (243-393)
5. Antler (red deer)
6. 400 (l)
7. Pick made from part of the beam and the brow tine of a shed antler. The longer section, the handle, was formed by removing two other tines and smoothening and slightly flattening the end for a better grip. The tip of the brow tine has been sharpened.
8. Lauwerier, R.C.G.M. & S. Thach 2021: Voorwerpen van bot en gewei, in: S. Heeren (red.), *Graven naar de wortels van Dorestad. Wijk bij Duurstede-De Geer in de Romeinse tijd en Middeleeuwen*, Amersfoort (Rapportage Archeologische Monumentenzorg 260), 263-274.
9. -, Lauwerier & Thach 2021, Afb. 11.10.
10. -
11. 4.2.4

5.2.2 Planes

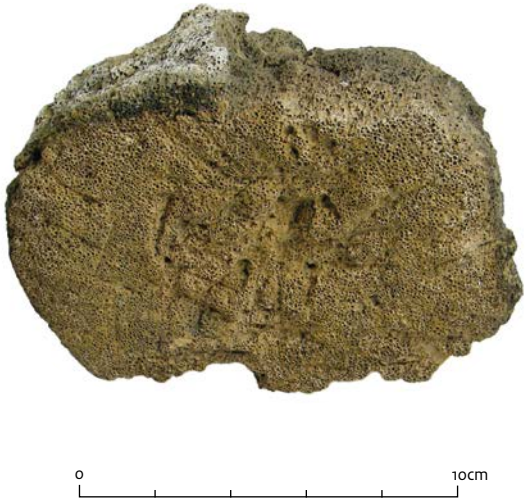
5.2.2.C1 Plane – *schaaf*

1. Friesland
2. -
3. -
4. Early Medieval Period (?)
5. Antler (-)
6. 140 x 37 x 40 (l x w x h)
7. Elongated, rectangular plane made from antler; one end is straight, the other bevelled.
8. -
9. Collection and image Fries Museum, Leeuwarden - Collectie Provincie Fryslân (Inv. no. 1983-V-227)
10. 21464
11. -

5.2.3 Chopping blocks

5.2.3.C1 Chopping block – *hakblok*

1. Wijk bij Duurstede
2. Veilingterrein
3. Pit
4. Early Medieval Period (725-800)
5. Bone (cetacean, vertebra)
6. -
7. The body of a whale vertebra, probably used as a chopping block. The removal of the various protruding parts makes it impossible to identify the species. The vertebra is weathered and fragmented, but chop marks are still clearly visible.
8. Esser, E., B. Beerenhout & M.J. Rijkelijkhuizen 2012: Dierlijke resten van het Veilingterrein, in: J. Dijkstra (red.), *Het domein van de boer en de ambachtsman. Een opgraving op het terrein van de voormalige fruitveiling te Wijk bij Duurstede: een deel van Dorestad en de villa Wijk archeologisch onderzocht*, Amersfoort (ADC Monografie 12), 479-558.
9. -, image Archeoplan
10. 4231
11. -



5.2.4 Scrapers, smoothers and polishers

5.2.4.C1 Scraper – *schraper*

1. Uitgeest
2. Assum Waldijk
3. -
4. Roman Period
5. Bone (cattle, rib)
6. 100 (l)
7. Rib fragment showing a series of notches along one edge.
8. De Vries, L.S., 2008: Het zoöarcheologisch onderzoek, in: J. de Koning (red.), *3000 jaar bewoning bij Assum*, Batenburg Zaandijk, 204-249.
9. Collection Provinciaal Depot voor Archeologie Noord-Holland Collection (Inv. no. 4479-02), image from de Koning 2008
10. 5310
11. 4.2.6

5.2.4.C2 Smoother or polisher – *polijster*

1. Serooskerke
2. Rijksweg 57
3. -
4. Early Medieval Period
5. Bone (sheep/goat, radius)
6. -
7. The protruding parts on the ventral side of this sheep/goat radius, near the proximal and distal joint surface, have been cut off straight, and frequent use has left one face smooth.
8. Van Dijk, J., 2011: Archeozoölogisch onderzoek, in: J. Dijkstra & F.S. Zuidhoff (red.), *Kansen op de kwelder. Archeologisch onderzoek op negen vindplaatsen in het nieuwe trace van de Rijksweg N57 en de nieuwe rondweg ter hoogte van Serooskerke (Walcheren)*, Amersfoort (ADC Monografie 10), 381-384.
9. Collection Zeeuws Archeologisch Depot, image M.J. Rijkelijkhuizen
10. 4135
11. 4.2.8, 6.2.6

5.2.4.C3 Smoother or polisher – *polijster*

1. Susteren
2. Salvatorplein
3. -
4. Early Medieval Period
5. Bone (cattle, humerus)
6. 68 (ø)
7. Smoother or polisher made from the removed head of a cattle humerus. The lower face has retained the dome-shape of the natural joint while the upper face shows a level cut surface.
8. Rijkelijkhuizen, M.J., 2023: Artefacten van bot, gewei, schildpad, git en ivoor, in: H. Stoepker (red.) *Sporen van Susteren. Archeologische vondsten uit een Karolingische abdij en een adellijk vrouwenstift. De basispublicatie*, Venlo, 861-888.
9. Collection Archeologisch Depot Limburg, image H. Stoepker
10. -
11. -

5.2.5 Pottery decoration tools

5.2.5.C1 Pottery decoration tool – *aardewerk decoratiewerktuig*

1. Littenseradiel, Wieuwerd
2. Terp Bessens
3. -
4. Early Medieval Period (?)
5. Osseous (-)
6. 102 x 28 (l x w)
7. Spatula used to shape and/or finish pottery. A serrated edge on the wider end was used to make decorative impressions; frequent use has worn it down.
8. Willemsen, A., 2014: *Gouden middeleeuwen. Nederland in de merovingische wereld, 400-700 na Chr.*, Zutphen.
9. Collection and image Rijksmuseum van Oudheden (Inv. no. BnW 60)
10. -
11. -

5.2.6 Awls and points

5.2.6.C1 Awl or point – *priem*

1. Friesland
2. -
3. -
4. Early Medieval Period (?)
5. Bone (sheep/goat, tibia)
6. 79.5 x 16 x 15 (l x w x ø)
7. Awl made from an obliquely cut tibia segment.
8. Rijkelijkhuizen, M., 2003: *Middeleeuwse vondsten uit de Friese terpen uit de collectie Van der Toorn aanwezig in het Rijksmuseum van Oudheden in Leiden*, Leiden/Amsterdam (Stageverslag Rijksmuseum van Oudheden/Universiteit van Amsterdam).
9. Collection and image Rijksmuseum van Oudheden (Inv. no. vdT zn 204)
10. -
11. 4.2.2, 6.2.1

5.2.6.C2 Socketed point – *geschachte punt*

1. Friesland
2. -
3. -
4. Early Medieval Period (?)
5. Bone (sheep/goat (?), metapodial)
6. 75.5 (l)
7. Pointed long bone fragment with a hole in the proximal joint surface below which a carved line encircles the diaphysis.
8. Rijkelijkhuizen, M., 2003: *Middeleeuwse vondsten uit de Friese terpen uit de collectie Van der Toorn aanwezig in het Rijksmuseum van Oudheden in Leiden*, Leiden/Amsterdam (Stageverslag Rijksmuseum van Oudheden/Universiteit van Amsterdam).
9. Collection and image Rijksmuseum van Oudheden (Inv. no. vdT zn 205)
10. -
11. 4.2.2, 6.2.1

5.2.6.C3 Point – *punt*

1. Friesland
2. -
3. -
4. Early Medieval Period (?)
5. Bone (large mammal, -)
6. 114 x 42 x 44 (l x w x ø)
7. Obliquely cut, pointed long bone fragment.
8. Rijkelijkhuizen, M., 2003: *Middeleeuwse vondsten uit de Friese terpen uit de collectie Van der Toorn aanwezig in het Rijksmuseum van Oudheden in Leiden*, Leiden/Amsterdam (Stageverslag Rijksmuseum van Oudheden/Universiteit van Amsterdam).
9. Collection and image Rijksmuseum van Oudheden (Inv. no. vdT zn 201)
10. -
11. 4.2.2, 6.2.1

5.2.6.C4 Awl – *priem*

1. Oegstgeest
2. Nieuw Rhijngeest-Zuid
3. -
4. Early Medieval Period
5. Bone (horse, metacarpal II or IV)
6. 132 x 24 x 19 (l x w x ø)
7. Worked medial or lateral splint bone of a horse. Pointed distal end, broad proximal end with natural protrusions still present.
8. Kromotaroeno, C.L.S., 2015: *Osseous objects of Oegstgeest. A functional analysis of the bone and antler objects of the Early Medieval settlement of Oegstgeest (Nieuw Rhijngeest-Zuid)*, Leiden (Thesis Leiden University).
9. Collection Provinciaal Archeologisch Depot Zuid-Holland, image C.L.S. Kromotaroeno
10. 895
11. 4.2.2, 5.2.7, 6.2.1, 6.2.13

5.2.7 Needles

5.2.7.C1 Needle – *naald*

1. Oegstgeest
2. Nieuw Rhijngeest-Zuid
3. -
4. Early Medieval Period
5. Bone (pig, fibula)
6. 113.0 x 8.2 x 4.6 (l x w x ø)
7. Pin, tapering towards the tip. On the other end there is a round hole (diam. 3 mm) in a flattened top.
8. Kromotaroeno, C.L.S., 2015: *Osseous objects of Oegstgeest. A functional analysis of the bone and antler objects of the Early Medieval settlement of Oegstgeest (Nieuw Rhijngeest-Zuid)*, Leiden (Thesis Leiden University).
9. Collection Provinciaal Archeologisch Depot Zuid-Holland, image C.L.S. Kromotaroeno
10. 878
11. 4.2.2, T5.2.6, 6.2.13, 6.2.14

5.2.8 Unidentified and other craft tools

5.2.8.C1 Reel (possible) – *klos*

1. Utrecht
2. Sportpark Terweide 3
3. - (V178)
4. Roman Period
5. Bone (horse, metacarpal)
6. >173 (l)
7. The object, possibly a reel, was first shaped with an axe by hollowing out a section just off-centre towards the distal end, and then finished further with a knife. The hollow section shows a broad zone of use wear caused by plant fibres, probably rope. The object is covered in a black residue, possibly tar.
8. Van Dijk, J., M.J Rijkelijkhuizen & A. Verbaas 2016: Dierlijk botmateriaal, in: C.M.W. den Hartog (red.), *Sportpark Terweide 3 - Definitief Archeologisch Onderzoek LR75 Hogeweide/Verlengde Vleutenseweg in Utrecht*, Utrecht (Basisrapportage 84), 89-98.
9. Collectie Erfgoed gemeente Utrecht, image M.J. Rijkelijkhuizen
10. 4575
11. 4.2.11, 5.2.14, 6.2.12

5.2.9 Spindles and spindle whorls

5.2.9.C1 Spindle whorl – *spinsteen*

1. Oost-Souburg
2. Circular Fortress
3. - (V495, 45)
4. Early Medieval Period (900-975)
5. Antler (deer)
6. Left 37 x 16 (ø x h); right: 36 x 12 (ø x h)
7. Round spindle whorls made of antler. The objects are disc-shaped and flat. The left one is decorated with ring-and-dot decoration, the right one with groups of lines.
8. Lauwerier, R.C.G.M. & R.M. van Heeringen 1995: Objects of bone, antler and horn from the circular fortress of Oost-Souburg, the Netherlands (A.D. 900-975), *Medieval Archaeology* 39, 71-90.
9. Collection Zeeuws Archeologisch Depot, image M. Chars (Rijksdienst voor het Oudheidkundig Bodemonderzoek, currently RCE)
10. -
11. 4.2.10

5.2.9.C2 Spindle whorl – *spinsteen*

1. Oost-Souburg
2. Circular Fortress
3. - (V527)
4. Early Medieval Period (900-975)
5. Antler (deer)
6. Left 37 x 16 (ø x h); right: 36 x 12 (ø x h)
7. Round spindle whorl made of antler. The object is dome-shaped. It is decorated with groups of lines and ring-and-dots.
8. Lauwerier, R.C.G.M. & R.M. van Heeringen 1995: Objects of bone, antler and horn from the circular fortress of Oost-Souburg, the Netherlands (A.D. 900-975), *Medieval Archaeology* 39, 71-90.
9. Collection Zeeuws Archeologisch Depot, image M. Chars (Rijksdienst voor het Oudheidkundig Bodemonderzoek, currently RCE)
10. -
11. 4.2.10, T5.2.9

5.2.10 Weaving swords

5.2.10.C1 Weaving sword – *weefzwaard*

1. Rottum
2. Terp
3. -
4. Early Medieval Period - Late medieval period (600 - 1200)
5. Bone (grey whale, mandible)
6. 420 x 50 (l x w)
7. Weaving sword of whale bone. On both edges there is a row of tiny notches, on the handle a long vertical line with four oblique shorter lines leading from it.
8. Boeles, P.C.J.A., 1927: *Friesland tot de elfde eeuw. Zijn oudste beschaving en geschiedenis*, Leeuwarden.
   Van den Hurk, Y., L. Spindler, K. McGrath & C. Speller 2020: Medieval whalers in the Netherlands and Flanders: Zooarchaeological analysis of medieval cetacean remains, *Environmental Archaeology* 27 (3), 243-257.
9. Collection Noordelijk Archeologisch Depot, image from Van den Hurk, Spindler, McGrath & C. Speller 2020
10. 15339
11. -

5.2.11 Single and double-pointed rods

5.2.11.C1 Single-pointed rod – *eenzijdig aangepunte staaf*

1. Susteren
2. Salvatorplein
3. -
4. Early Medieval Period
5. Bone (-)
6. 83.1 x 12.2 x 5.7 (l x w x d)
7. Decorated rod, possibly a weaving tool; on the front a decoration of zigzag lines.
8. Rijkelijkhuizen, M.J., 2023: Artefacten van bot, gewei, schildpad, git en ivoor, in: H. Stoepker (red.), *Sporen van Susteren. Archeologische vondsten uit een Karolingische abdij en een adellijk vrouwenstift. De basispublicatie*, Venlo, 861-888.
9. Collection Archeologisch Depot Limburg, image H. Stoepker
10. 6767
11. -

5.2.11.C2 Double-pointed rod – *dubbelzijdig aangepunte pin*

1. Wijk bij Duurstede
2. Dorestad
3. -
4. Medieval period
5. Osseous (-)
6. 163 x 11 (l x ø)
7. Pin, both ends pointed; decorated with zigzag lines.
8. -
9. Collection and image Rijksmuseum van Oudheden (Inv. no. WD 614)
10. 16188
11. -

5.2.12 Weaving tablets

5.2.12.C1 Weaving tablet – *weefkaart*

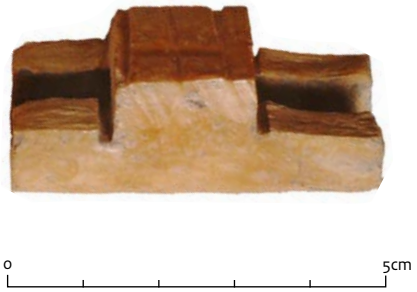
1. Leiderdorp
2. Plantage
3. -
4. Early Medieval Period (680-750)
5. Osseous (-)
6. 35 x 36 (l x w)
7. Weaving tablet; square osseous tablet, pierced in each corner to allow warp threads to pass through.
8. Verhoeven, A.A.A., 2016: Voorwerpen van been en gewei, in: M.F.P. Dijkstra , A.A.A. Verhoeven & K.C.J. van Straten (red.), *Nieuw licht op Leithon: Archeologisch onderzoek naar de vroeg-middeleeuwse bewoning in plangebied Leiderdorp-Plantage*, Amsterdam (Themata 8), 333-358.
9. Collection Provinciaal Archeologisch Depot Zuid-Holland, image Universiteit van Amsterdam/Diachron UvA bv
10. 15431
11. -

5.2.13 Three-pronged tools

5.2.13.C1 Three-pronged tool – *drietand*

1. Oost-Souburg
2. Circular fortress
3. -
4. Early Medieval Period (900-975)
5. Bone (cattle, metatarsal)
6. 470 (l)
7. Sawing and scouring of a metatarsal of cattle resulted in this hollow object, with a rounded front and an almost flat back. There are three teeth in the top which have been completely polished through use. The rounded front is decorated.
8. Lauwerier, R.C.G.M. & H.W. van Klaveren 1995: Bewerkt bot, in: R.M. van Heeringen, P.A. Henderikx & A. Mars (red.), *Vroeg-Middeleeuwse ringwalburgen in Zeeland*, Goes & Amersfoort, 192-206.
9. Collection Zeeuws Archeologisch Depot, image from Lauwerier & Van Klaveren 1995
10. -
11. -

5.2.13.C2 Three-pronged tool production waste – *afval van de productie van drietanden*

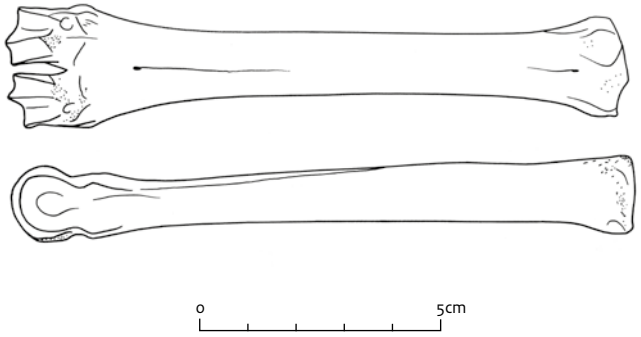


1. Oost-Souburg
2. Circular fortress
3. -
4. Early Medieval Period (900-975)
5. Bone (cattle, metatarsal)
6. 49 (l)
7. Three-pronged tool manufacture waste of cattle metatarsal. A three-pronged tool has been sawn from both sides of the bone.
8. Lauwerier, R.C.G.M. & H.W. van Klaveren 1995: Bewerkt bot, in: R.M. van Heeringen, P.A. Henderikx & A. Mars (red.), *Vroeg-Middeleeuwse ringwalburgen in Zeeland*, Goes & Amersfoort, 192-206.
9. Collection Zeeuws Archeologisch Depot, image from Lauwerier & Van Klaveren 1995
10. -
11. -

5.2.14 Thread holders

5.2.14.C1 Thread holder – *draadhouder* or *klos*

1. Valkenburg
2. Marktveld
3. Gully (Cat. no. 23)
4. Roman Period
5. Bone (sheep/goat, metacarpal)
6. 129 (l)
7. A metacarpal of a sheep or goat, the shaft of which has been heavily polished by use and with a hole with a diameter of 6.6 mm in the proximal end.
8. Verhagen, M., 1993: Bone and antler artefacts, in: R.M. van Dierendonck, D.P. Hallewas & K.E. Waugh (eds), *The Valkenburg excavations 1985-1988. Introduction and detail studies*, Amersfoort (Nederlandse Oudheden 15), 339-416.
9. -, image from Verhagen 1993
10. -
11. 4.2.11, 5.2.8, 6.2.12



5.3 Weaponry

5.3.1 Swords and daggers

5.3.1.C1 Sword handle – *zwaardgreep*

1. Hallum
2. Terp
3. -
4. Roman Period
5. Bone (large mammal, metapodial)
6. 90 (l)
7. Handle of a Roman sword (*gladius*), with four preformed depressions to accommodate the fingers.
8. Spiekhout, D., J.A. Nijdam & C. van Dijk 2023: 'Mith egge and mith orde.' Tweesnijdende zwaarden uit Friesland en Groningen vanaf de prehistorie tot in de late middeleeuwen, in: A. Nieuwhof & A. Buursma (red.), *Van Drenthe tot aan 't Wad. Over landschap, archeologie en geschiedenis van Noord-Nederland. Essays ter ere van Egge Knol*, Groningen (Jaarverslagen van de Vereniging voor Terpenonderzoek 104), 77-92.
9. Collection and image Fries Museum, Leeuwarden - Collectie Koninklijk Fries Genootschap (Inv. no. 27A-12)
10. 21910
11. -

5.3.1.C2 Sword guard – *zwaardpareerstang*

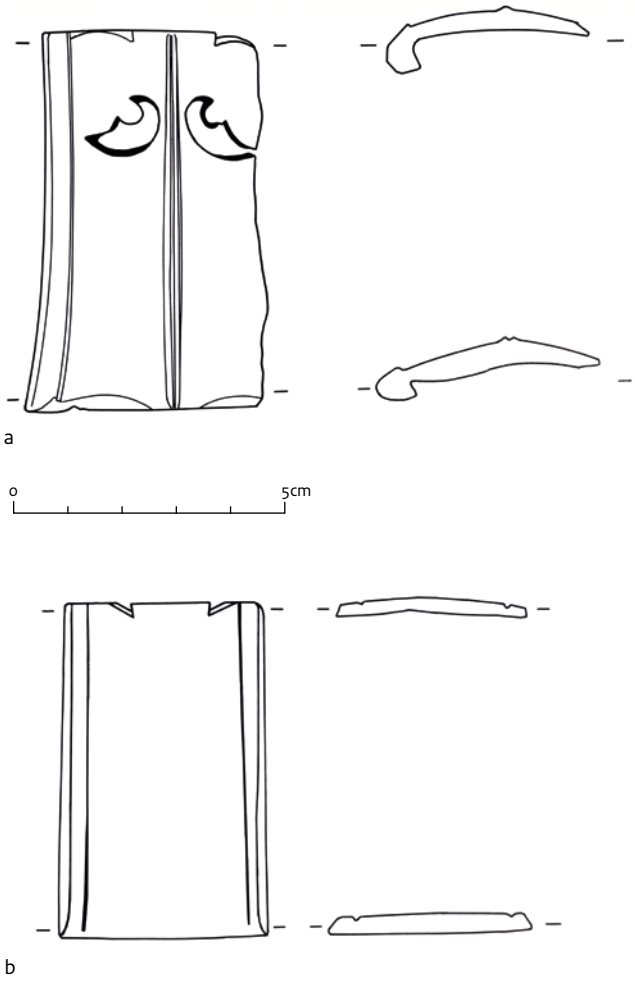
1. Dronrijp
2. Menameradiel
3. -
4. Roman Period - Early Medieval Period
5. Osseous (-)
6. 58 x 24 (l x w)
7. Sword guard made of osseous material. The object is rounded on all sides and has a square hole for the passage of the metal from blade to handle.
8. -
9. Collection and image Rijksmuseum van Oudheden (Inv. no. a1931/2.68)
10. 15963
11. -

5.3.1.C3 Scabbard chape – *zwaardpuntbeschermer*

1. Bunnik
2. Houtense Vlakte
3. -
4. Early Roman Period - Middle Roman Period (15-250)
5. Osseous (-)
6. 52 (l)
7. The scabbard chape, protects the tip of a leather scabbard from damage; it is decorated with a pair of opposed pelta-shaped openings.
8. Van Vilsteren, V.T., 1987: *Het Benen Tijdperk. Gebruiksvoorwerpen van been, gewei, hoorn en ivoor 10.000 jaar geleden tot heden*, Assen.
9. Collection and image Rijksmuseum van Oudheden (Inv. no. VF* 552)
10. 500
11. -

5.3.1.C4 Scabbard chape – *zwaardpuntbeschermer*

1. Valkenburg
2. a: Marktveld/b: Woerd
3. a: settlement (74: 032.0242)/b: gully (76: 502.0143)
4. Middle Roman Period - Late Roman Period (100-300)
5. Bone (large mammal, -)
6. a: 70.0 (l); b: 62.6 (l)
7. The scabbard chape, composed of a front and a rear plate, protects the tip of a leather scabbard from damage. The two parts shown here originate from two different scabbard shapes. The front part (a) has a polished surface; it is decorated with lines and a pair of opposed pelta-shaped openings. The rear plate (b), that fits in a front plate, has a polished surface.
8. Verhagen, M., 1993: Bone and antler artefacts, in: R.M. van Dierendonck, D.P. Hallewas & K.E. Waugh (eds), *The Valkenburg Excavations 1985-1988. Introduction and Detail Studies*, Amersfoort (Nederlandse Oudheden 15), 341-416.
9. -, image from Verhagen 1993 (Inv. no. 12654)
10. -
11. -



5.3.1.C5 Scabbard slide – *zwaardriembeugel*

1. Stiens
2. Terp
3. -
4. Roman Period
5. Osseous (-)
6. 90 x 15 (l x w)
7. Part of a scabbard slide; curved osseous plate with a horizontal piercing at the back. The front is decorated with three parallel horizontal lines.
8. Van Vilsteren, V.T., 1987: *Het Benen Tijdperk. Gebruiksvoorwerpen van been, gewei, hoorn en ivoor 10.000 jaar geleden tot heden*, Assen.
9. Collection and image Fries Museum, Leeuwarden - Collectie Koninklijk Fries Genootschap (Inv. no. 21A-80)
10. 502
11. -

5.3.2 Composite bows

5.3.2.C1 Bow splint with incorporated nock – *boognok*

1. De Meern
2. Hoge Woerd
3. - (DM 1973-109)
4. Roman Period
5. Antler (-)
6. 145 (l)
7. Composite bow splint with incorporated nock, made from an antler tine split lengthwise. Many scratches are visible on the surface.
8. Kalee, C.A & C. Isings 1980: Beknopt verslag van een opgraving in De Meern, *Jaarboek Oud-Utrecht 1980*, 5-25.
9. Collectie Erfgoed gemeente Utrecht, image C.A. Kalee
10. -
11. -

5.3.3 Leather belt mounts

5.3.3.C1 Belt mount – *riembeslag*

1. Velsen
2. Velsen I
3. -
4. Early Roman Period (15-30)
5. Osseous (-)
6. 28 x 25 x 1 (l x w x d)
7. Small square osseous plate, possibly part of a *cingulum* (military belt), pierced in each corner and through the centre. Three of the corners are now incomplete.
8. Bosman, A.V.A.J., 1997: *Het culturele vondstmateriaal van de vroeg-Romeinse versterking Velsen 1*, Amsterdam (PhD thesis Universiteit van Amsterdam).
9. Collection and image Rijksmuseum van Oudheden (Inv. no. g 2008/6.19??-zn44)
10. -
11. 6.3.2, 6.8.6

5.4 Household items

5.4.1 Hinges

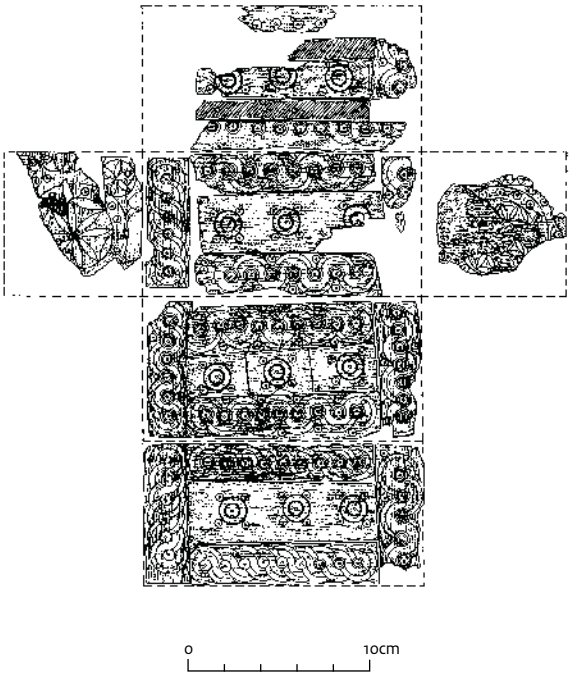
5.4.1.C1 Hinge – *scharnier*

1. Venlo
2. Maasboulevard
3. Pit K1
4. Roman Period
5. Bone (cattle, metapodial)
6. 21.2 (l)
7. Short hinge, lathe-turned, with a hole through the middle. Undecorated.
8. Esser, E., B. Beerenhout & M.J. Rijkelijkhuizen 2009: Paleoecologie: archeozoölogisch onderzoek aan dierlijke resten uit de Romeinse tijd, in: H. van der Velde, S. Ostkamp, H. Veldman & S. Wyns (red.), *Venlo aan de Maas: van vicus tot stad - Sporen van een Romeinse nederzetting en de stadsontwikkeling uit de Middeleeuwen en Nieuwe tijd in het plangebied Maasboulevard*, Amersfoort (ADC Monografie 7), 249-270.
9. Collection Archeologisch Depot Limburg, image M.J. Rijkelijkhuizen
10. 4086
11. 4.6.2, 5.7.7, 6.7.12, 6.7.15

5.4.2 Furniture and casket mounts

5.4.2.C1 Casket mount – *kistbeslag*

1. Maastricht
2. Sint Servaaskerk
3. -
4. Roman Period - Early Medieval Period
5. Bone (-)
6. 150 x 80 (l x w)
7. Thin strips of bone used as decorative mountings on a wooden casket. The decoration on the outer top and frontal strips consists of interconnected ring-and-dot motifs. Four of these strips surround a central panel decorated with a triple ornament of double ring-and-dot motifs surrounded by four smaller ring-and-dots. One of the side panels carries a central eight-petal flower motif, surrounded by a double ring filled with a circle of single ring-and-dot motifs with four smaller six-petal flower motifs in the corners.
8. Dijkman, W. & A. Ervynck 1998: *Antler, bone, horn, ivory and teeth: the use of animal skeletal materials in Roman and Early Medieval Maastricht*, Maastricht (Archaeologica Mosana I).
9. Collection Collectie Archeologie Maastricht, drawing G. Veldman (gemeente Maastricht)
10. 449
11. T6.4.6



5.4.3 Spoons

5.4.3.C1 Spoon – *lepel*

1. Wijnaldum
2. Tjitsma terp site
3. -
4. Early Medieval Period (650 - 750)
5. Antler (red deer)
6. 77.6 x 22.4 x 2.8 (l x w x d)
7. Spoon cut out of the beam or tine of a red deer antler; the dorsal side is worn.
8. Prummel, W., H. Halici & A. Verbaas 2011: The bone and antler tools from the Wijnaldum-Tjitsma terp, *Journal of Archaeology in the Low Countries* 3 (1/2).
9. Collection Noordelijk Archeologisch Depot, image from Prummel, Halici & Verbaas 2011
10. 6079
11. 6.4.3

5.4.4 Sieves

5.4.4.C1 Sieve – *zeef*

1. Wijnaldum
2. Tjitsma terp site
3. -
4. Late Roman Period (300 - 350)
5. Bone (cattle, scapula)
6. 78.9 x 79.9 x 3.1 (l x w x d)
7. Sieve made of the flat part of a cattle scapula.
8. Prummel, W., H. Halici & A. Verbaas 2011: The bone and antler tools from the Wijnaldum-Tjitsma terp, *Journal of Archaeology in the Low Countries* 3 (1/2).
9. Collection Noordelijk Archeologisch Depot, image from Prummel, Halici & Verbaas 2011
10. 6080
11. -

5.4.5 Scapula scoops

5.4.5.C1 Scapula scoop – *schouderbladschep*

1. Bodegraven
2. Oud-Bodegraafseweg
3. -
4. Early Roman Period - Middle Roman Period (50-100)
5. Bone (cattle, scapula)
6. -
7. Scapula, showing traces of wear suggesting a function as a scoop.
8. Lauwerier, R.C.G.M., C. Wouda & L. de Groot 2005: Bot uit Romeins Bodegraven, *Westerheem* 54 (6), 300-306.
9. Collection Provinciaal Archeologisch Depot Utrecht, image from Lauwerier, Wouda & de Groot 2005
10. 5113
11. 4.2.7

5.5 Personal hygiene

5.5.1 Combs

For a more detailed typology of combs, see section 5.5.2 of Part II: A typology of Dutch combs.

5.5.1.C1 One-piece long-handled comb – *enkelvoudige kam met lang handvat*

1. Hartwerd
2. Terp
3. -
4. Iron Age - Early Roman Period
5. Antler (-)
6. 195 (I)
7. Comb made from a lengthwise split antler section. The object consists of a long narrow handle ending in (originally) six short teeth.
8. Roes, A., 1983: *Bone and antler objects from the Frisian terp-mounds*, Haarlem.
9. Roes 1983 (Inv. no. XXXIII-1), Collection and image Fries Museum, Leeuwarden - Collectie Koninklijk Fries Genootschap
10. -
11. 4.4.1, T5.5.2, 6.5.1, T6.5.2

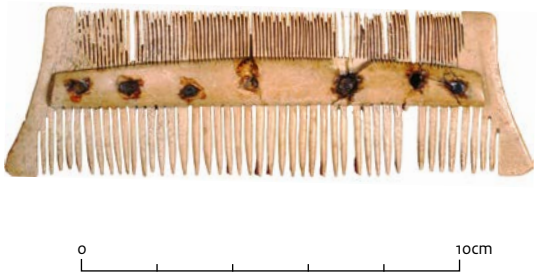
5.5.1.C2 One-piece single-sided comb – *enkelvoudige eenzijdige kam*

1. Hegebeintum
2. Terp
3. -
4. Early Medieval Period
5. Antler (-)
6. 78 x 31 x 9 (l x w x d)
7. Comb, made out of a single piece of antler (a: front; b: back). The two sides are bevelled, and the broad triangular handle has a decoration of thin horizontal lines along the upper edge and a rounded ridge just above the teeth.
8. Knol, E., 2019: Het vroegmiddeleeuws grafveld van Hogebeintum (400-730 na Chr.), in: A. Nieuwhof, E. Knol & J. Nicolay (red.), *De hoogste terp van Friesland. Nieuw en oud onderzoek in Hogebeintum*, Groningen (Jaarverslagen van de Vereniging voor Terpenonderzoek 101), 159-180.
   Knol, E., M.P.L. Hoogland, H.T. Uytterschaut & W.A. Casparie 2019: Catalogus van het grafveld Hogebeintum (400-730 na Chr.), in: A. Nieuwhof, E. Knol & J. Nicolay (red.), *De hoogste terp van Friesland. Nieuw en oud onderzoek in Hogebeintum*, Groningen (Jaarverslagen van de Vereniging voor Terpenonderzoek 101), 181-231.
9. Collection and image Fries Museum, Leeuwarden - Collectie Koninklijk Fries Genootschap (Inv. no. 28-339A)
10. 20654
11. 4.4.1, T5.5.2, 6.5.1, T6.5.2

5.5.1.C3 One-piece double-sided comb – *enkelvoudige dubbelzijdige kam*

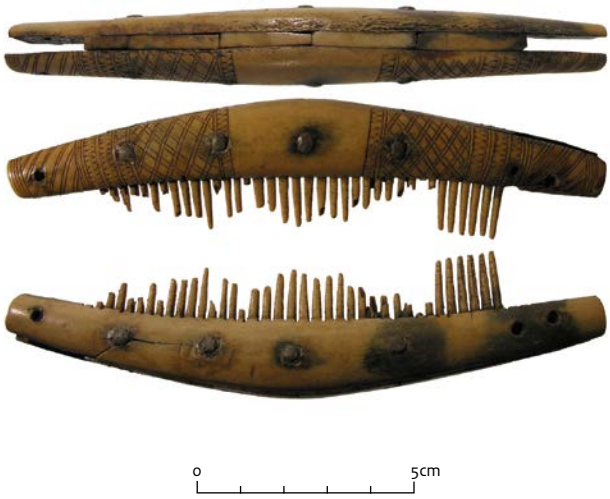
1. Friesland
2. Terp
3. -
4. Roman Period
5. Osseous (-)
6. 4.9 x 5.9 (l x w)
7. Comb, made out of a single piece of osseous material. The teeth were sawn on both sides of the comb. It is decorated with a ring-and-dot motif; on the left is a hanging hole.
8. Roes, A., 1963: *Bone and antler objects from the Frisian terp-mounds*, Haarlem, 78.
9. Roes 1963 (Inv. no. I-2), Collection and image Fries Museum, Leeuwarden - Collectie Koninklijk Fries Genootschap
10. -
11. 4.4.1, T5.5.2, 6.5.1, T6.5.2

5.5.1.C4 Composite double-sided comb – *samengestelde dubbelzijdige kam*



1. Oost-Souburg
2. Circular Fortress
3. - (V16)
4. Early Medieval Period (900-975)
5. Bone (-) and antler (-)
6. 140 (l)
7. Comb, composed of six 1.5 to 2-cm-wide narrow tooth plates held together with two connecting plates with iron rivets. The teeth were sawn and the comb finished after the different components had been assembled.
8. Lauwerier, R.C.G.M. & R.M. van Heeringen 1995: Objects of bone, antler and horn from the circular fortress of Oost-Souburg, the Netherlands (A.D. 900-975), *Medieval Archaeology* 39, 71-90.
9. Collection Zeeuws Archeologisch Depot, image M. Chars (Rijksdienst voor het Oudheidkundig Bodemonderzoek, currently RCE)
10. -
11. 4.4.1, T5.5.2, 6.5.1, T6.5.2

5.5.1.C5 Composite one-sided comb – *samengestelde enkelzijdige kam*



1. Oegstgeest
2. Nieuw Rhijngeest-Zuid
3. -
4. Early Medieval Period
5. Antler (-)
6. 135 (l)
7. Comb, composed of several different tooth plates held together on both sides by connecting plates and metal rivets, in this case seven, five of them connecting the edges of two tooth plates while the two outer rivets each run through the middle of a tooth plate. Originally this comb probably had seven tooth plates only five of which are preserved. One side carries decoration.
8. Rijkelijkhuizen, M.J., 2011: Artefacten, in: W. Jezeer (red.), *Een Merovingische nederzetting aan de monding van de Rijn. Een archeologische opgraving te Oegstgeest Nieuw Rhijngeest-Zuid*. Amersfoort (ADC ArcheoProjecten rapport 2054), 108-109.
9. Collection Provinciaal Archeologisch Depot Zuid-Holland, image ADC ArcheoProjecten
10. 4620
11. 4.4.1, T5.5.2, 6.5.1, T6.5.2

5.5.1.C6 Comb case – *kamfoedraal*

1. Leiderdorp
2. -
3. - (V352.001)
4. Early Medieval Period
5. Bone (cattle, metapodial)
6. -
7. Of the comb case, two cover plates and one side plate survive. The comb case plates feature only two rivet holes, one at each end. The side plate has two holes one above the other making it likely that each side of this comb case originally had two parallel cover plates, i.e. four in total.
8. Van Riel, S., 2014: *Vroegmiddeleeuwse kammen uit Leiderdorp. Lokale producten of objecten van handel?*, Amsterdam (BA thesis Universiteit van Amsterdam).
Verhoeven, A.A.A., 2016: Voorwerpen van been en gewei, in: M.F.P. Dijkstra, A.A.A. Verhoeven & K.C.J. van Straten (red.), *Nieuw licht op Leithon: Archeologisch onderzoek naar de vroegmiddeleeuwse bewoning in plangebied Leiderdorp-Plantage*, Amsterdam (Themata 8), 333-358.
9. Collection Provinciaal Archeologisch Depot Zuid-Holland, image S. van Riel
10. 13859
11. 4.4.1, T5.5.2, 6.5.1, T6.5.2

5.5.3 Pyxides

5.5.3.C1 Pyxide – *pyxis*

1. Left to right: Ubbergen, unknown, unknown
2. -
3. -
4. Roman Period
5. Bone (-)
6. Left to right: 27 (l), 34 (l), 50 (l)
7. Three composite bone containers for cosmetics.
8. Van Vilsteren, V.T., 1987: *Het Benen Tijdperk. Gebruiksvoorwerpen van been, gewei, hoorn en ivoor. 10.000 jaar geleden tot heden*, Assen.
9. Collection and image Valkhof Museum, Archeologisch Depot Gelderland (Inv. no. GN B.D.II.14, XXI.e63c, XXI.e.63b)
10. -
11. 6.8.1

5.6 Personal adornment

5.6.1 Clothing and hair pins

5.6.1.C1 Pin – *pin*

1. Venlo
2. Maasboulevard
3. Pit K4
4. Roman Period
5. Bone (large mammal, long bone)
6. 102.5 (l, top pin)
7. Pins, hand-made from the compacta of the long bones of large mammals.
8. Esser, E., B. Beerenhout, & M.J. Rijkelijkhuizen 2009: Paleoecologie: archeozoölogisch onderzoek aan dierlijke resten uit de Romeinse tijd, in: H. van der Velde, S. Ostkamp, H. Veldman & S. Wyns (red.), *Venlo aan de Maas: van vicus tot stad - Sporen van een Romeinse nederzetting en de stadsontwikkeling uit de Middeleeuwen en Nieuwe tijd in het plangebied Maasboulevard*, Amersfoort (ADC Monografie 7), 249-270.
9. Collection Archeologisch Depot Limburg, image M.J. Rijkelijkhuizen
10. 6614, 6615, 6616, 6617, 6618
11. 5.2.6, 5.8.1, 6.5.5, 6.8.1

5.6.1.C2 Pin – *pin*

1. Ferwert
2. Burmania terp site
3. -
4. Roman Period - Early Roman Period (?)
5. Osseous (-)
6. 110 (l)
7. (Ornamental) pin with a shaped top; the shaft shows a deep polish.
8. -
9. Collection and image Fries Museum, Leeuwarden - Collectie Koninklijk Fries Genootschap (Inv. no. 101-1356)
10. 20109
11. -

5.6.1.C3 Pin – *pin*

1. Friesland
2. -
3. -
4. Iron Age - Early Medieval Period (?)
5. Osseous (-)
6. 70 (l)
7. (Ornamental) pin with a flat rectangular top with ring-and-dot decoration.
8. -
9. Collection and image Fries Museum, Leeuwarden - Collectie Koninklijk Fries Genootschap (Inv. no. 67-4)
10. 20135
11. -

5.6.2 Fasteners

5.6.2.C1 Button-and-loop fastener – *knoop-en-lussluiting*

1. Bunnik
2. Houtense Vlakte
3. -
4. Roman Period
5. Bone (-)
6. 30 (l)
7. Button-and-loop fastener, consisting of a head and a triangular shank.
8. Bosman, A.V.A.J., 1997: *Het culturele vondstmateriaal van de vroeg-Romeinse versterking Velsen* 1, Amsterdam (PhD thesis Universiteit van Amsterdam).
9. Collection and image Rijksmuseum van Oudheden (Inv. no. VF* 557)
10. -
11. -

5.6.2.C2 Double-headed fastener – *tweekoppige sluiting*

1. Huissen
2. Loovelden
3. Burial
4. Roman Period
5. Bone (-)
6. Left to right: 16.4 x 9 x ?; 15.5 x 9.8 x ?; 15 x 3.5 x 7; 12.4 x 2.5 x 7.5 (ø x t x stalk length)
7. A two double-headed fastener consisted of two thick, mushroom-shaped heads and two thinner flat specimens with the stubb of a short shaft, now broken off. Found together with sixteen small or slightly larger, curving rods which originally could form (partial) rings
8. Rijkelijkhuizen, M.J., 2017: Artefacten van bot en gewei, in: L.M.B. van der Feijst, L.P. Verniers & E. Blom (red.), *De grafkamer van Huissen*, Amersfoort (ADC ArcheoProjecten Monografie 23).
9. Collection Valkhof Museum, Archeologisch Depot Gelderland, image ADC ArcheoProjecten
10. 4660
11. -

5.6.3 Belt buckles

5.6.3.C1 Belt buckle – *gesp*

1. Dordrecht
2. Gezondheidspark
3. Grave (S229, V182)
4. Early Medieval Period (416-540)
5. Osseous (large mammal, -)
6. 48 x 17 x 6 (l x w x d)
7. A rectangular buckle, tapering towards the belt end, with a T-shaped hole for an iron pin. A groove sawn into the narrower side allows for its attachment to a belt. The front of the buckle is decorated with ring-and-dot motifs as well as twelve short lines perpendicular to the broader end.
8. Hos, T.H.L. & M.C. Dorst 2010: *Zonnen op Gods akker. Archeologisch onderzoek van een laatmiddeleeuws nederzettingsterrein. Plangebied Gezondheidspark*, Dordrecht.
9. Collection and image Archeologie, Dordrechts Museum (Inv. no. 0604.182.001)
10. 5830
11. 6.6.2

5.6.3.C2 Belt buckle – *gesp*

1. Velsen
2. Westerwijk
3. -
4. Early Roman Period - Middle Roman Period (0-100)
5. Osseous (-)
6. 43 x 37 (l x w)
7. D-shaped buckle, pierced at both ends and detail of one of the ends.
8. -
9. Collection and image Provinciaal Depot voor Archeologie Noord-Holland (Inv. no. 6244-12)
10. 15286
11. -

5.6.4 Brooches

5.6.4.C1 Brooche – *broche*

1. Oost-Souburg
2. Circular Fortress
3. -
4. Early Medieval Period (900-975)
5. Bone (large mammal, long bone)
6. 20 (ø)
7. Brooch or fibula with an unusual decoration of four half ring-and dot motifs. Originally, two eyelets at the back would have held a pin; one of them is still intact (diam. 2.9 mm).
8. Lauwerier, R.C.G.M. & R.M. van Heeringen 1995: Objects of bone, antler and horn from the circular fortress of Oost-Souburg, the Netherlands (A.D. 900-975), *Medieval Archaeology* 39, 71-90.
9. Collection Zeeuws Archeologisch Depot, image M. Chars (Rijksdienst voor het Oudheidkundig Bodemonderzoek, currently RCE)
10. 6713
11. -

5.6.5 Amulets and pendants

5.6.5.C1 Pendant – *hanger*

1. Nijmegen
2. Lentseveld
3. Grave
4. Early Medieval Period
5. Tooth (brown bear, canine)
6. 57 (l)
7. Pendant made from a bear canine, probably from the upper jaw. The root has been pierced to create a suspension hole.
8. Rijkelijkhuizen, M., 2021 (2023): Objecten van gewei en tand, in: J. Hendriks (red.), *Het Merovingische grafveld in het Lentseveld. Archeologisch onderzoek in het plangebied Lent-Laauwik, Nijmegen-Noord (project Nla14/20)*, Nijmegen (Archeologische Berichten Nijmegen – Rapport 73).
9. Collection Depot voor Bodemvondsten van de gemeente Nijmegen, image R. Mols (gemeente Nijmegen)
10. -
11. 4.5.2

5.6.5.C2 Discoid pendant – *schijfvormige hanger*

1. Wijk bij Duurstede
2. -
3. -
4. Early Medieval Period
5. Antler (-)
6. 61 x 58 (l x w)
7. Disc made of the burr of an antler; on each side a ring-and-dot decoration. The object has a suspension hole.
8. -
9. Collection and image Rijksmuseum van Oudheden (Inv. no. B+P2)
10. 15986
11. 4.5.2

5.6.5.C3 Pendant – *hanger*

1. Leiderdorp
2. Plantage
3. Midden deposit in a gully
4. Early Medieval Period (675-725)
5. Antler (-)
6. 62 x 10 (l x w)
7. Trapezoid pendant with a wide square base narrowing to a point, which has been pierced just below the top to create a suspension hole. On the lower body is a decoration of crosses and parallel lines.
8. Verhoeven, A.A.A., 2016: Voorwerpen van been en gewei, in: M.F.P. Dijkstra, A.A.A. Verhoeven & K.C.J. van Straten (red.), *Nieuw licht op Leithon: Archeologisch onderzoek naar de vroeg-middeleeuwse bewoning in plangebied Leiderdorp-Plantage*, Amsterdam (Themata 8), 333-358.
9. Collection Provinciaal Archeologisch Depot Zuid-Holland, image UvA/Diachron UvA bv
10. 16501
11. -

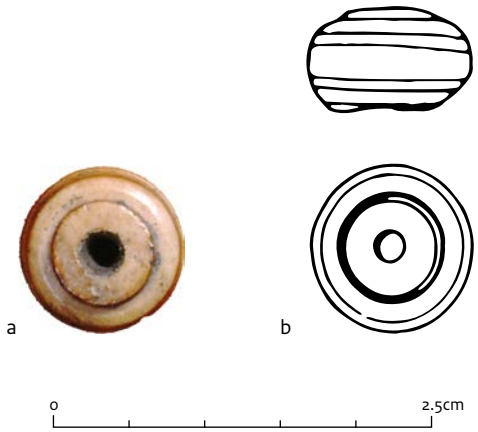
5.6.5.C4 Pendant – *hanger*

1. Holwerd
2. Terp site
3. -
4. Early Medieval Period
5. Shell (panther cowry)
6. -
7. Fragment of a pendant made from the lower section of a cowry shell. The fragment has been pierced to create a suspension hole or allow it to be otherwise attached. Prolonged contact with textile has worn the fracture edge parallel to what would have been the mouth of the shell. The lower part of the pendant is broken off.
8. Prummel, W. & L. Olivier 2008: Uitwerkingsonderzoek, *Mededelingen van de Vereniging voor Terpenonderzoek* 11, 5.
9. Collection Noordelijk Archeologisch Depot, image L. Olivier
10. 13212
11. -

5.6.6 Beads

5.6.6.C1 Bead – *kraal*

1. Oost-Souburg
2. Circular fortress
3. - (V161)
4. Early Medieval Period (900-975)
5. Bone (-)
6. 11.5 x 6.8 (ø x d)
7. Bone bead decorated with carved concentric rings.
8. Lauwerier, R.C.G.M. & R.M. van Heeringen 1995: Objects of bone, antler and horn from the circular fortress of Oost-Souburg, the Netherlands (A.D. 900-975), *Medieval Archaeology* 39, 71-90.
9. Collection Zeeuws Archeologisch Depot, image (a) and drawing (b) M. Chars and F. F. Hoedeman (Rijksdienst voor het Oudheidkundig Bodemonderzoek, currently RCE)
10. 4905
11. 4.5.1, 5.7.6, 6.6.18



5.6.7 Rings

5.6.7.C1 Ring and disc – *ring met schijf*

1. Nijmegen
2. Lent
3. Grave
4. Early Medieval Period
5. Ivory (-) and bronze
6. *c.* 120 (ø)
7. Ivory ring surrounding a bronze disc. The ring shows signs of intensive use as well as several repairs.
8. Van Es, W.A. & R.S. Hulst 1991: *Das Merowingische Gräberfeld von Lent*, Amersfoort (Nederlandse Oudheden 14), 89; 269.
9. Collection and image Valkhof Museum, Archeologisch Depot Gelderland (inv. no. PDB.1991.22.1972.22.D)
10. -
11. -

5.6.7.C2 Ring – *ring*

1. Borgharen
2. Pasestraat
3. Grave, Feature 47 (V1554 and V1706)
4. Early Medieval Period
5. Ivory (elephant)
6. 100 x 7-9 (ø inside x d)
7. Sixteen fragments of one or two ivory rings.
8. Van der Jagt, I.M.M., F.J. Laarman, W.J. Kuijper, A.M. Nieman, B.J.H. van Os & J.C. Zwaan 2014: Dierlijk materiaal, in: R.C.G.M. Lauwerier & J.W. de Kort (red.), *Merovingers in een villa 2. Romeinse villa en Merovingisch grafveld Borgharen - Pasestraat. Onderzoek 2012*, Amersfoort (Rapportage Archeologische Monumentenzorg 222), 157-189.
9. Collection Archeologisch Depot Limburg, image from Van der Jagt, Laarman, Kuijper, Nieman, van Os & Zwaan 2014
10. 913, 914
11. 6.6.5

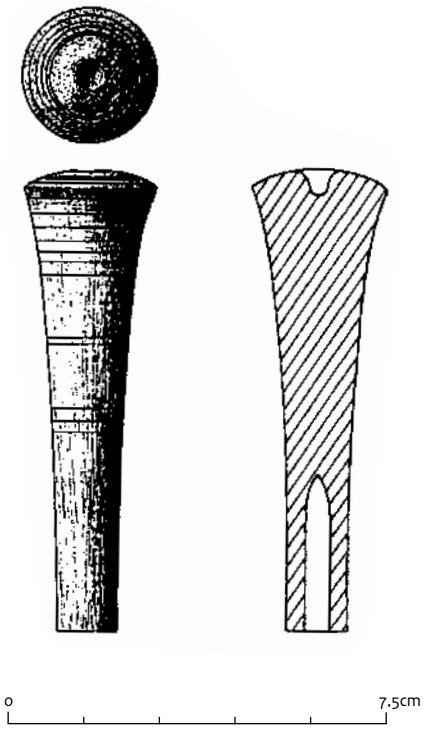
5.6.8 Knives

5.6.8.C1 Knife – *mes*

1. Helmond
2. Kranenbroek
3. Cremation grave 47
4. Roman Period
5. Bone (-)
6. -
7. Iron knife with bone plates covering the handle. The plates are decorated with a double herringbone motif and show signs of burning.
8. Van As, S. & C.M van der Linde 2018: *Helmond-Brandevoort II Kranenbroek Archeologische opgraving. Catalogus grafstructuren*, 's-Hertogenbosch (BAAC-rapport A-17.0063), 73.
9. Collection Archeologisch Centrum Eindhoven en Helmond, image Restaura
10. 7010
11. 4.2.12, 6.4.1

5.6.8.C2 Knife handle – *mesheft*

1. Maastricht
2. Churchyard of Our Lady
3. -
4. Roman Period - Early Medieval Period
5. Antler (-)
6. 92 (l)
7. Round knife handle decorated with series of parallel concentric rings.
8. Dijkman, W. & A. Ervynck 1998: *Antler, bone, horn, ivory and teeth: the use of animal skeletal materials in Roman and Early Medieval Maastricht*, Maastricht (Archaeologica Mosana I).
9. Collection Collectie Archeologie Maastricht, drawing G. Veldman (gemeente Maastricht)
10. 475
11. 4.2.12, 6.4.1



5.6.8.C3 Folding knife – *vouwmes*

1. Friesland
2. Terp site
3. -
4. Roman Period
5. Ivory (-)
6. 63 (l)
7. Folding or clasp knife with a figural handle made of ivory.
8. Rijkelijkhuizen, M., 2003: *Middeleeuwse vondsten uit de Friese terpen uit de collectie Van der Toorn aanwezig in het Rijksmuseum van Oudheden in Leiden*, Leiden/Amsterdam (Stageverslag Rijksmuseum van Oudheden/Universiteit van Amsterdam).
9. Collection and image Rijksmuseum van Oudheden (Inv. no. vdT zn 83)
10. -
11. -

5.7 Games, toys and musical instruments

5.7.1 Skates and sledges

5.7.1.C1 Skate – *glis*

1. Oegstgeest
2. Nieuw Rhijngeest-Zuid
3. -
4. Early Medieval Period
5. Bone (horse, metapodial)
6. 212 x 30 x 26 (l x w x d)
7. Horse metapodial of which all protruding sections have been removed. The anterior side is worn smooth by frequent use. Both ends are pierced sideways to allow the skate to be tied to the foot.
8. Kromotaroeno, C.L.S., 2015: *Osseous objects of Oegstgeest. A functional analysis of the bone and antler objects of the Early Medieval settlement of Oegstgeest (Nieuw Rhijngeest-Zuid)*, Leiden (Thesis Leiden University).
9. Collection Provinciaal Archeologisch Depot Zuid-Holland, image C.L.S. Kromotaroeno
10. 907
11. 6.7.1

5.7.2 Gaming counters

5.7.2.C1 Gaming counter – *speelschijfje*

1. Venlo
2. Maasboulevard
3. Pit
4. Roman Period
5. Bone (-)
6. 20; 22.6 (ø)
7. Circular bone discs with a countersunk obverse surface.
8. Esser, E., B. Beerenhout & M. J. Rijkelijkhuizen 2009: Paleoecologie: archeozoölogisch onderzoek aan dierlijke resten uit de Romeinse tijd, in: H. van der Velde, S. Ostkamp, H. Veldman & S. Wyns (red.), *Venlo aan de Maas: van vicus tot stad - Sporen van een Romeinse nederzetting en de stadsontwikkeling uit de Middeleeuwen en Nieuwe tijd in het plangebied Maasboulevard*, Amersfoort (ADC Monografie 7), 249-270.
9. Collection Archeologisch Depot Limburg, image M.J. Rijkelijkhuizen
10. 4087 and 4087
11. 4.6.1, 6.7.7, 6.7.16

5.7.3 Astragali

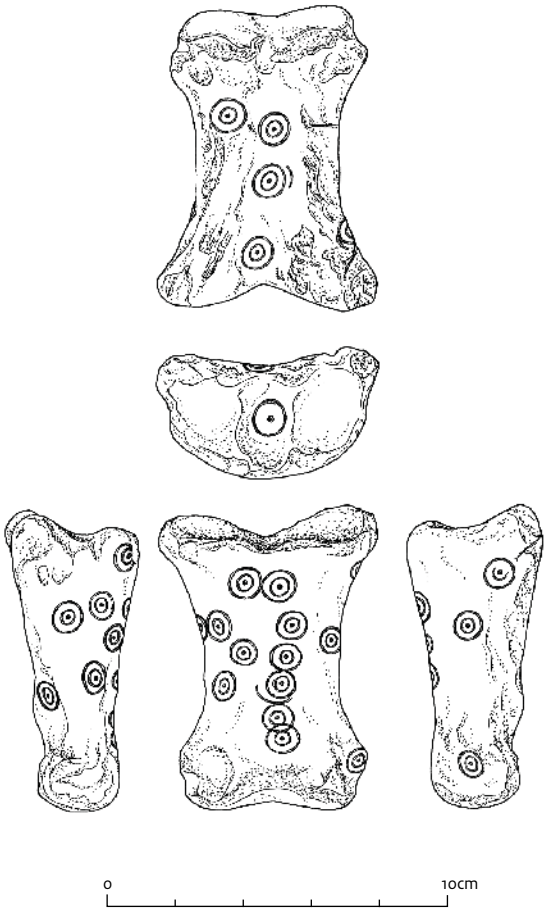
5.7.3.C1 Astragalus – *sprongbeen*

1. Beetgum
2. Terp
3. -
4. Early Medieval Period (?)
5. Bone (sheep/goat/roe deer, astragalus)
6. 25 x 17 (l x w)
7. Astragalus with sixteen pinprick holes on one side.
8. -
9. Collection and image Rijksmuseum van Oudheden (Inv. no. FT 111)
10. 15990
11. 6.7.10

5.7.4 Gaming pieces with ring-and-dot motifs

5.7.4.C1 Gaming piece with ring-and-dot motifs – *speelstuk met puntcirkelversiering*

1. Marssum
2. It Aldlân
3. - (V866)
4. Early Medieval Period
5. Bone (horse, phalanx I)
6. -
7. First phalanx of a horse, covered with a total of nineteen ring-and-dot motifs.
8. Van Gent, J.T., 2015: Pathologieën en werktuigen: het dierlijk botmateriaal, in: J.B. Hielkema (red.), *Nederzettingssporen op de kwelder Haak Noord, vindplaats 1: Marssum-It Aldlân. Gemeente Menaldumadeel Archeologisch onderzoek: een opgraving. Deel 1: hoofdstukken 1 t/m 10*, Amsterdam (RAAP-Rapport 2997), 145-176.
9. Collection Noordelijk Archeologisch Depot, drawing G. Berkenbosch (RAAP)
10. 14419
11. 5.7.5, 6.7.6



5.7.5 Planoconvex, conical and dome-shaped gaming pieces

5.7.5.C1 Gaming piece – *speelstuk*

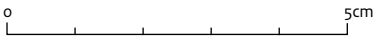
1. Friesland
2. -
3. -
4. Iron Age - Early Medieval Period (?)
5. Osseous (-)
6. 15 (ø)
7. Plano-convex bone gaming piece decorated with five ring-and-dot motifs.
8. -
9. Collection and image Fries Museum, Leeuwarden - Collectie Koninklijk Fries Genootschap (Inv. no. 33-19)
10. 21548
11. 5.7.4, 6.7.6

5.7.6 Dice

5.7.6.C1 Cubical dice – *kubusvormige dobbelsteen*

1. Heemskerk
2. Broekpolder
3. - (V3096)
4. Early Medieval Period (550-700)
5. Bone (-, long bone)
6. 19 x 19 (l x w)
7. Cubical die cut from a long bone. Originally the marrow cavity was possibly plugged on two sides with a bone insert which carried the numbers 1 and 2, which are now lacking.
8. Therkorn, L.L., E. Besselsen, M. Diepenveen-Jansen, S. Gerritsen, J. Kaarsemaker, L. Kubiak-Martens, J. Slopsma & P. Vos 2009: *Landscapes in the Broekpolder, Excavations around a monument with aspects of the Bronze Age to the Modern (Beverwijk & Heemskerk, N-H) Part 1*, Amsterdam (Themata 2).
9. Collection and image Provinciaal Depot voor Archeologie Noord-Holland (Inv. no. 6139-03)
10. 15263
11. 6.7.3

5.7.6.C2 Rectangular dice – *rechthoekige dobbelsteen*



1. Wijk bij Duurstede
2. Dorestad
3. -
4. Early Medieval Period
5. Osseous (-)
6. 31 x 19 x 19 (l x w x d)
7. Rectangular dice; the values are indicated with double ring-and-dots within a rectangular frame of double parallel lines.
8. Clason, A.T., 1978: Voorwerpen uit been en gewei, *Spiegel Historiael* 13-14, 294-297.
   Clason, A.T., 1980, Worked bone and antler objects from Dorestad, Hoogstraat I, in: W.A. van Es & W.J.H. Verwers, *Excavations at Dorestad I, The harbour: Hoogstraat I*, Amersfoort (Nederlandse Oudheden 9), 238-247.
9. Collection and image Rijksmuseum van Oudheden (Inv. no. WD 371.3.1b)
10. 16040
11. 6.7.3

5.7.6.C3 Cuboid dice – *afgeronde kubusvormige dobbelsteen*

1. Friesland
2. -
3. -
4. Roman Period - Early Medieval Period (?)
5. Osseous (-)
6. 18 x 14 x 13 (l x w x d)
7. Slightly elongated dice, square in cross section, with strongly rounded corners and almost spherical ends. On the four faces are five, three, two, and four 'eyes', respectively.
8. -
9. Collection and image Fries Museum, Leeuwarden - Collectie Koninklijk Fries Genootschap (Inv. no. 21A-319)
10. 19921
11. 6.7.3

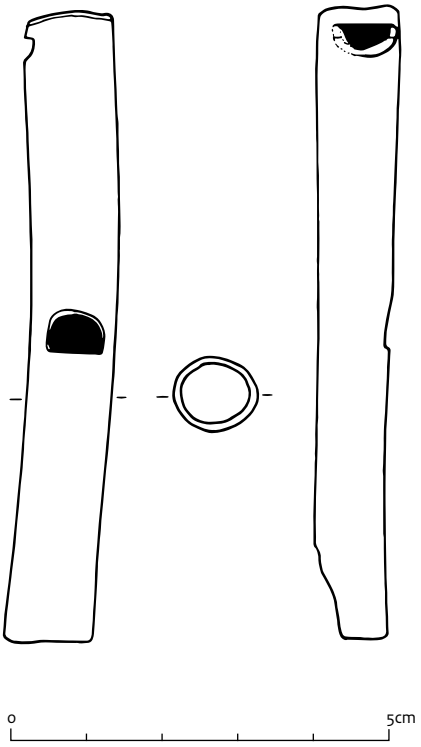
5.7.7 Flutes and whistles

5.7.7.C1 Flute – *fluit*

1. Wijnaldum
2. Tjitsma terp site
3. -
4. Early Medieval Period (800-850)
5. Bone (whooper swan, ulna)
6. 206 x 14.9 x 91 (l x w x ø)
7. Both ends of the bone have been removed and three finger holes and a windway hole were added.
8. Prummel, W., H. Halici & A. Verbaas 2011: The bone and antler tools from the Wijnaldum-Tjitsma terp, *Journal of Archaeology in the Low Countries* 3 (1/2).
9. Collection Noordelijk Archeologisch Depot, image from Prummel, Halici & Verbaas 2011
10. 6073
11. 4.6.2, 5.4.1, 6.7.12, 6.7.15

5.7.7.C2 Whistle – *(lok)fluitje*

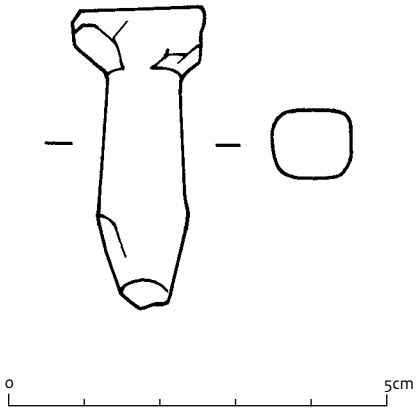
1. Valkenburg (Katwijk)
2. Marktveld & de Woerd
3. Gully
4. Roman Period
5. Bone (goose, humerus)
6. 84 x 12 (l x ø)
7. Polish on the surface. Both ends of the long bone have been cut off and one hole was cut mid-shaft. Circular scratches are visible on the front. At the top is a small broken hole.
8. Verhagen, M., 1993: Bone and antler artefacts, in: R.M. van Dierendonck, D.P. Hallewas & K.E. Waugh (eds), *The Valkenburg Excavations 1985-1988. Introduction and Detail Studies*, Amersfoort (Nederlandse Oudheden 15), 341-418.
9. -, Verhagen 1993 (Inv. no. 62)
10. 677
11. 4.6.2, 5.4.1, 6.7.12, 6.7.15



5.7.8 Stringed instruments: tuning pegs, tailpieces and bridges

5.7.8.C1 Tuning peg – *stemsleutel*

1. Wijnaldum
2. Tjitsma terp site
3. -
4. Early Medieval Period (500-850)
5. Antler (red deer)
6. 39 x 18 x 9 (l x w x ø)
7. Tuning peg roughly cut from a part of a red deer antler.
8. Prummel, W., H. Halici & A. Verbaas 2011: The bone and antler tools from the Wijnaldum-Tjitsma terp, *Journal of Archaeology in the Low Countries* 3 (1/2).
9. Collection Noordelijk Archeologisch Depot, drawing from Prummel, W., H. Halici & A. Verbaas 2011, drawing J.M. Smit
10. 6076
11. 6.7.17



5.7.8.C2 Tailpiece – *snaarhouder*

1. Teerns
2. -
3. -
4. Early Medial period (?)
5. Osseous (-)
6. 150 x 30 (l x w)
7. Elongated rectangular osseous strip. Two large holes, at one end and five smaller holes at the other. Decorated with ring-and-dot motifs.
8. Van Vilsteren, V.T., 1987, *Het Benen Tijdperk. Gebruiksvoorwerpen van been, gewei, hoorn en ivoor. 10.000 jaar geleden tot heden*, Assen.
9. Collection and image Fries Museum, Leeuwarden - Collectie Koninklijk Fries Genootschap (Inv. no. 16D-234)
10. 21521
11. 6.7.17

5.7.9 Dolls and miniatures

5.7.9.C1 Doll – *pop*

1. Voorburg
2. Arentsburg
3. -
4. Middle Roman Period (150-175)
5. Ivory (-)
6. 80 x 25 (l x ø)
7. Torso with head of a small female figure; the arms and legs are missing. This is the upper section of a doll, originally with hinged limbs; small holes mark the points of attachment. The female anatomy and coiffure are rendered in great detail. Made out of a cylindrical piece of ivory, with a small inserted fragment in the head. Dated by the hair style.
8. -
9. Collection and image Rijksmuseum van Oudheden (Inv. no. h 1929/3.24)
10. 21916
11. 6.7.14

5.8 Other

5.8.1 Reading and writing

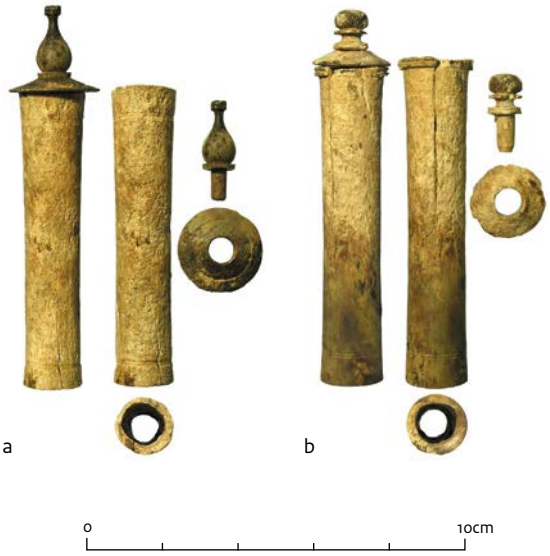
5.8.1.C1 Stylus – *stylus*

1. Bunnik
2. A12
3. Gully
4. Roman Period
5. Bone (-)
6. 170 x 10 (l x w)
7. One end is pointed, the other spatula-shaped with a rounded edge. Possible stylus.
8. -
9. Collection and image Rijksmuseum van Oudheden (Inv. no. f 2019/12.1145)
10. -
11. 5.2.6, 5.2.7, 5.6.1, 6.5.5, 6.8.1

5.8.2 Objects made of bone cylinders, discs and terminals

5.8.2.C1 Object made of cylinders, discs and terminals – *object gemaakt van cilinders, schijven en knoppen*

1. Huissen
2. Loovelden
3. Cremation grave
4. Roman Period
5. Bone (-)
6. Part A: cylinder 970 x 18-22 (l x ø), disc 30 x 5 (ø x d), terminal 35 x 12 (l x ø); part B: 1000 x 18-23 (l x ø), disc 24 x 6 (ø x d), terminal 25 x 11 (l x ø).
7. Two cylindrical segments, together forming a long rod-like object. Both ends are closed off by a disc with a central hole through which a terminal has been inserted. Of the two terminals, one is baluster shaped and the other round.
8. Rijkelijkhuizen, M.J., 2017: Artefacten van bot en gewei, in: L.M.B. van der Feijst, L.P. Verniers & E. Blom (red.), *De grafkamer van Huissen. Opgravingen in het kader van de aanleg van nieuwbouwlocatie Loovelden*, Amersfoort (ADC Monografie 23), bijlage 3.
Greep S. & M. Rijkelijkhuizen 2019: Bone cylinders, discs and terminals – Scroll holders from Roman funerary deposits?, *Cuadernos de Prehistoria y Arqueologia de la Universidad de Granada* 29, 219-235.
9. Collection Valkhof Museum, Archeologisch Depot Gelderland, image ADC ArcheoProjecten,
10. 4651
11. -



5.8.3 Containers

5.8.3.C1 Container – *container*

1. Houten
2. Castellum
3. -
4. Roman Period
5. Bone (sheep/goat, femur)
6. 72 x 16 (l x w)
7. The proximal and distal ends of the femur are missing. No toolmarks and few traces of wear are visible on the surface of the fractures on each end. The distal end of the shaft was closed off with a wad of an unidentified, hard, black substance. The shaft was filled with tiny seeds of henbane (*Hyoscyamus niger*).
8. Groot, M. & M. van Haasteren 2017: Dierlijk bot, in: J. van Renswoude & D. Habermehl (red.), *Opgravingen te Houten-Castellum. Bewoning langs een restgeul in de IJzertijd, Romeinse tijd en Vroege Middeleeuwen*, Amsterdam (Zuidnederlandse Archeologische Rapporten 65), 687-734.
9. Collection Provinciaal Archeologisch Depot Utrecht, image D.S. Habermehl
10. 12851
11. -

5.8.4 Horse gear

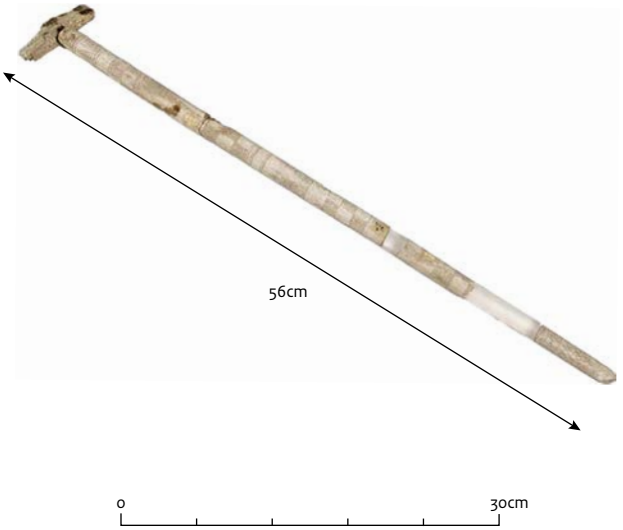
5.8.4.C1 Horse gear (bit) – *paardentuig (wangbit)*

1. Dongeradeel
2. Bornwird
3. -
4. Early Medieval Period (?)
5. Antler (-)
6. 119 x 23.4 x 21.3 (l x w x ø)
7. Worked antler tine with a flat depression and a hole through the base. The surface shows heavy polish.
8. Rijkelijkhuizen, M., 2003: *Middeleeuwse vondsten uit de Friese terpen uit de collectie Van der Toorn aanwezig in het Rijksmuseum van Oudheden in Leiden*, Leiden/Amsterdam (Stageverslag Rijksmuseum van Oudheden/Universiteit van Amsterdam).
9. Collection and image Rijksmuseum van Oudheden (Inv. no. vdT zn 172)
10. -
11. T5.2.9

5.8.5 Tau staffs

5.8.5.C1 Tau staff – *taustaf*

1. Bernsterburen
2. Terp
3. Terp soil
4. Early Medieval Period (700-800)
5. Bone (whale, -)
6. 578 (l); knob: 96 x 24 (l x w)
7. Long rod, roundish in cross section, now broken into four pieces and incomplete. The shaft caries a runic inscription, the elongated knob on top, perpendicular to the shaft, features animal heads on both ends and visible traces of iron. The rod itself is decorated with lozenges and high isosceles triangles in alternating panels that are either smooth or covered in carved diaper motifs. The different decorative zones alternate with rings of variable width which are either plain or filled with a zigzag pattern. The lower section of the rod is thinner and slightly flattened, the lower tip is rounded and carries a lozenge ornament.
8. Knol, E. & T. Looijenga 1990: A tau staff with runic inscriptions from Bernsterburen (Friesland), in: R.H. Bremmer, G. van der Meer & O. Vries (eds), Aspects of old Frisian philology, *Amsterdamer Beiträge zur älteren Germanistik* 31/32 (= Estrikken 69), 226-241.
9. Collection and image Fries Museum, Leeuwarden - Collectie Koninklijk Fries Genootschap (Inv. no. 44B-2)
10. 21463
11. -



III Catalogue of osseous and keratinous artefacts in the Late Medieval and Modern period (>1050 AD)

6.2 Craft tools

6.2.1 Awls and marlin spikes

6.2.1.C1 Awl or marlin spike – *priem* or *marlpriem*

1. Almere, Flevoland
2. W13ZFL/ZW13('Almere wijk 13', ZW13-48)
3. Shipwreck (cog)
4. Late Medieval Period (1425-1450)
5. Antler (red deer)
6. 180 (l)
7. Awl or marlin spike made from a sawn red-deer tine. The tip has been sharpened. The tine was carved in close to the beam before being broken off. At the broad end near the cut is a small hole.
8. Blok, K., 2014: *De verdwenen kogge van Modderman. Een kogge-achtig scheepswrak in de bodem van Flevoland*, Groningen (Grondsporen: Opgravings- en onderzoeksrapporten van het Groninger Instituut voor Archeologie 20).
9. Collection and image Maritiem Archeologisch Depot Batavialand (inv. no. ZW13-48)
10. 16511
11. 4.2.2, 5.2.6, 5.2.7

6.2.1.C2 Composite awl – *samengestelde priem*

1. Wadden Sea, Texel
2. Scheurrak SO1 (SO1-23013-10)
3. Shipwreck (merchant marine, early fluyt type)
4. Early Modern Period A (1593)
5. Bone (-) and wood
6. 125 (l), wooden nob 33 (ø)
7. Bone awl with a worked wooden handle.
8. Vos, A., 2013: Hoe Maria Tesselschade aan haar opmerkelijke naam kwam, in: Y. Molenaar & M. Smits-Veldt, *Tesselschade: een ramp met een gouden randje*, Muiden, 6-16.
9. Collection and image Maritiem Archeologisch Depot Batavialand (inv. no Z1954-XII18)
10. -
11. -

6.2.2 Rope adjustment buckles

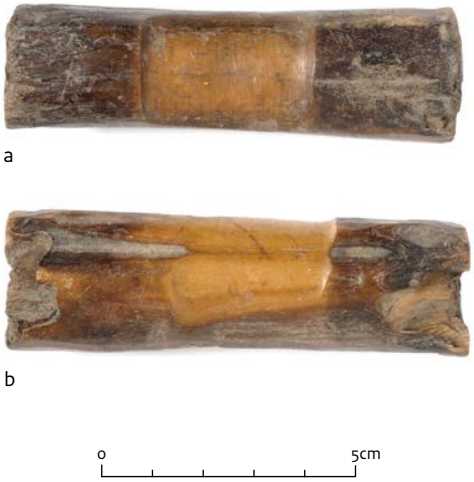
6.2.2.C1 Rope adjustment buckle – *touwspanner*

1. Amsterdam
2. Keizersstraat/Dijkdwarsstraat
3. - (MZ3-435)
4. -
5. Bone (-)
6. 35 (l)
7. Rope adjustment buckle with three holes, ring-and-dot decoration. Usewear in the holes suggests a function as rope adjuster.
8. Rijkelijkhuizen, M., 2004: *Dierlijke materialen in Amsterdam*, Amsterdam (MA thesis).
9. Collection Monumenten en Archeologie Amsterdam, image M.J. Rijkelijkhuizen
10. 18711
11. -

6.2.3 Pulley axles

6.2.3.C1 Pulley axle – *katrol as*

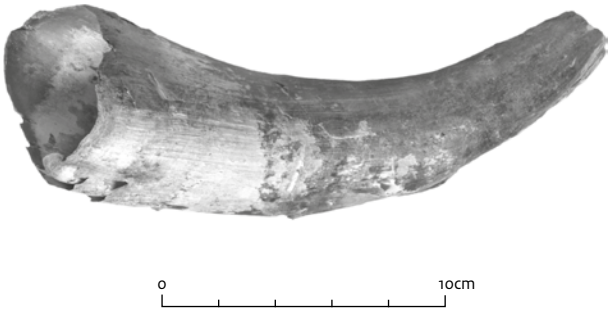
1. Amsterdam
2. NoordZuidLijn
3. Damrak (NZD1.00072FAU055)
4. -
5. Bone (cattle, metatarsus)
6. 93.1 x 28.0 x 26.5 (l x w x h)
7. The shaft of a cattle metatarsus; both joint surfaces have been removed. Visible traces of intensive use on the middle section (a: front, b: side).
8. Rijkelijkhuizen, M.J., 2023: *Verzonken in de Amstel, Archeologisch onderzoek Noord/Zuidlijn (2005-2021). Deel IVb: Artefacten van bot, gewei, ivoor, schildpad, parelmoer en noot*, Amsterdam (Amsterdamse Archeologische Rapporten 115).
9. Collection Monumenten en Archeologie Amsterdam, image W. Krook
10. 12028
11. -



6.2.4 Pottery decorating tools

6.2.4.C1 Pottery decorating tool – *ringeloor*

1. Amsterdam
2. Nieuwendijk 154-158
3. - (NDK-547-1)
4. Modern Period (1600-1900)
5. Keratine (cattle, horn)
6. 219 x 75.5 (l x w)
7. The tip of the horn was sawn off to allow the insertion of a tube (now missing).
8. Rijkelijkhuizen, M., 2004: *Dierlijke materialen in Amsterdam*, Amsterdam (MA thesis).
9. Collection Monumenten en Archeologie Amsterdam, image A. Dekker (University of Amsterdam)
10. 18548
11. -



6.2.5 Tallow horns

6.2.5.C1 Tallow horn – *talghoorn*

1. Nagele, Flevoland
2. E165NOP/NE165 (Z1954-XII18)
3. Shipwreck (freighter, pram type)
4. Early Modern Period B (1775)
5. Keratine (cattle, horn)
6. 132 x 40 (l x ø)
7. Cattle horn, probably used as a tallow container. Two carved decorative parallel lines encircle the opening and the tip. A small round hole near the opening is likely a suspension hole.
8. -
9. Collection and image Maritiem Archeologisch Depot Batavialand
10. 16689
11. -

6.2.6 Polishers

6.2.6.C1 Polisher or smoother – *polijster*

1. Rotterdam
2. Timmerhuis
3. Raised surface
4. Early Modern Period (1600-1700)
5. Bone (cattle, metatarsus)
6. -
7. Unworked cattle metatarsus (right foot), greatly worn on all sides by use which has left the bone rounded and glossy.
8. Ploegaert, P.H.J.I., 2015: *Rotterdam Timmerhuis. Archeologisch onderzoek tussen Rodezand en Haagseveer. Een dijk uit de 13e eeuw en de stedelijke ontwikkeling vanaf de 14e eeuw*, Rotterdam (BOORrapporten 541).
9. Collection Archeologie Rotterdam, image BOOR/T. van Pinxsteren (Rotterdam)
10. -
11. -

6.2.7 Folding tools

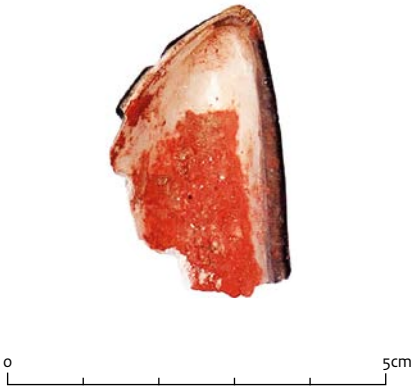
6.2.7.C1 Folding tool – *vouwbeen*

1. Amsterdam
2. Koningsstraat/Lange Keizersdwarsstraat
3. - (MZ1-164)
4. Modern Period
5. Bone (large mammal, -)
6. 154.2 x 24.7 x 4.5 (l x w x d)
7. Flat elongated folding tool, slightly tapering. The wider end is somewhat flatter than the narrow end; the corners at both ends are rounded
8. Rijkelijkhuizen, M., 2004: *Dierlijke materialen in Amsterdam*, Amsterdam (MA thesis).
9. Collection Monumenten en Archeologie Amsterdam, image M.J. Rijkelijkhuizen
10. 18738
11. -

6.2.8 Paint palettes

6.2.8.C1 Paint palette – *verfbakje*

1. Venlo
2. Peperstraat
3. Cesspit (Laag 1-1-6B)
4. Early Modern Period (1600-1700)
5. Shell (*Mytilus edulis*)
6. Fragment: 3.9 (l)
7. Mussel valve with traces of red paint.
8. De Jong, Th., 1997: *Kadavers in de put. Laat-middeleeuwse dierresten uit de Peperstraat te Venlo*, Eindhoven (ArcheoService Rapport 30).
9. Collection Limburgs Museum, image Th. de Jong
10. 14651
11. -



6.2.9 Needle cases

6.2.9.C1 Needle case – *naaldenkoker*

1. Beemster
2. Draaioordermolen, Exit N244
3. Outlet of water mill (S11, V40)
4. Modern Period (1632/1635-1880)
5. Bone (large mammal, -)
6. 63 x 13 (l x ø)
7. Small tube with screw thread on the inside of the wider end and on the outside of the narrower end. On one face a decorative pattern of seven ring-and-dot motifs. Both ends are decorated with finely carved parallel lines, while the tip of the wider end also carries a ring-and-dot pattern.
8. Van Gent, J., 2019: Dierlijk bot en mollusken, in: M. Schabbink, *Een Draaioorder watermolen, Archeologische opgraving verdubbeling N244-afrit Beemster, Zuidoostbeemster, gemeente Beemster/Purmerend*, Weesp (RAAP-Rapport 3783), 116-126.
9. Collection and image Provinciaal Depot voor Archeologie Noord-Holland, image RAAP
10. 14535
11. 6.2.14

6.2.10 Thimbles

6.2.10.C1 Thimble – *vingerhoed*

1. Amsterdam
2. NoordZuidLijn
3. Rokin (NZR2.00027FAU001)
4. Early Modern Period (1600-1700 or 1700-1800)
5. Ivory (elephant)
6. 30.4 x 19.9 (l x ø)
7. Thimble decorated with a basketweave pattern between rings above and below.
8. Rijkelijkhuizen, M.J., 2023: *Verzonken in de Amstel, Archeologisch onderzoek Noord/Zuidlijn (2005-2021). Deel IVb: Artefacten van bot, gewei, ivoor, schildpad, parelmoer en noot*, Amsterdam (Amsterdamse Archeologische Rapporten 115).
9. Collection Monumenten en Archeologie Amsterdam, image H. Strak
10. 11995
11. -

6.2.11 Yardsticks

6.2.11.C1 Yardstick – *ellemaat*

1. 's-Hertogenbosch (Den Bosch)
2. Jan Heinsstraat, terrein Brandweerkazerne (HTBW)
3. -
4. Early Modern Period A (1596)
5. Bone (-)
6. 43.8 x 18.1 x 17.0 (l x w x d)
7. The bone tip of a yardstick; the stick itself was probably made of wood. The four sides have engraved decorative motifs and the date '1596'.
8. -
9. Collection and image Erfgoed 's-Hertogenbosch
10. -
11. -

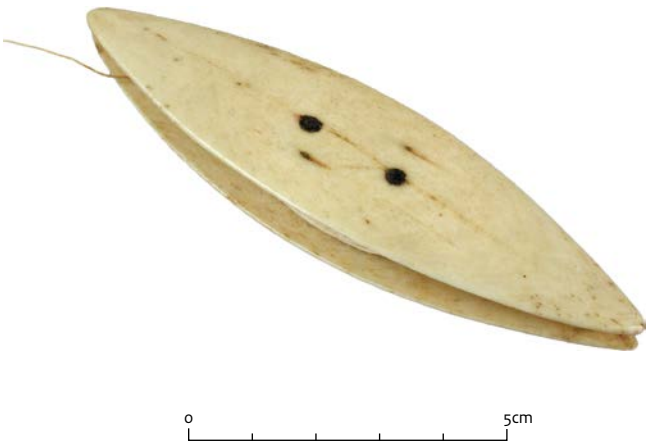
6.2.12 Yarn and thread holders

6.2.12.C1 Thread holder – *draadhouder* or *klos*

1. Enkhuizen
2. Paktuinen Kwartier Fase II
3. Cistern (69-B07)
4. Early Modern Period (1618-1800)
5. Bone (-)
6. 107 (l)
7. The complete object is a thread holder (left) and its container (right). The thread holder has five yarn compartments separated by six flat disks. The container is decorated with open work. The original screwtop lid is now missing.
8. Schrickx, C.P. & D.M. Duijn 2016: *Nouveau Riche aan de Nieuwe Haven, Archeologisch onderzoek naar woon- en pakhuizen en het kantoor van de WIC tussen de Paktuinen en Nieuwe Haven in Enkhuizen*, Hoorn (West-Friese archeologische rapporten 87).
9. Collection and image Provinciaal Depot voor Archeologie Noord-Holland (inv. no. 6219-02)
10. 15282
11. 4.2.11, 5.2.8, 5.2.14

6.2.12.C2 Shuttle – *spoel*

1. Rotterdam
2. St. Historisch Kostuummuseum
3. -
4. Early Modern Period B - Late Modern Period (1800-1900)
5. Osseous (-)
6. 100 x 25 x 10 (l x w x d)
7. Osseous shuttle made in three sections. The two oval bone plates are held together with metal rivets.
8. -
9. Collection and image Museum Rotterdam (inv. no. 24613)
10. -
11. 4.7.2



6.2.13 Needles and bodkins

6.2.13.C1 Bodkin – *rijgnaald*

1. Alkmaar
2. Canadaplein
3. Urban canal (Feature 10F, 98CAN208)
4. Early Modern Period B (1650-1700)
5. Ivory (elephant)
6. 93 (l)
7. Short, blunt bodkin with a long eyelet.
8. Bitter, P., 2016: *Schaven aan Alkmaar. 25 jaar archeologisch onderzoek in beeld*, Alkmaar, 97.
9. Collection Erfgoed Alkmaar, Archeologisch Centrum, image P. Bitter/R. Roedema
10. 15731
11. 4.2.2, T5.2.6, 5.2.7

6.2.13.C2 Decorated bodkin – *gedecoreerde rijgnaald*

1. Amsterdam
2. Haarlemmerplein (HAP), Nieuwe Herengracht 47-49 (MH5), Weesperstraat (MWE), Prins Hendrikkade t/o 59-72 (PH7)
3. - (left to right: HAP-65-30, MH5-86, MWE5-43 and PH7-1-3)
4. Late Medieval Period - Modern Period (1400-1900)
5. Bone (large mammal, -)
6. Varying dimensions: 90.6-121.6 x 6.1-10.7 x 4.5-8.0 (l x w x d)
7. Broad bodkins, cut out of the compact outer tissue of a longbone, and decorated with straight and oblique carving.
8. Rijkelijkhuizen, M., 2004: *Dierlijke materialen in Amsterdam*, Amsterdam (MA thesis).
9. Collection Monumenten en Archeologie Amsterdam, image A. Dekker (University of Amsterdam)
10. -
11. 4.2.2, T52.6, 5.2.6

6.2.14 Lace tools

6.2.14.C1 Lace bobbin – *kantklosje*

1. Beverwijk
2. Breestraat, Peperstraat
3. -
4. Early Modern Period
5. Osseous (-)
6. 88 x 6 (l x ø)
7. Lace bobbin, one end section swelling and terminating in a small tip, the other narrow and ending in a small hemisphere. Midway the shaft is a small disk.
8. Vaars, J.P.L., 2006: *Archeologische opgravingen aan de Breestraat/ Peperstraat te Beverwijk*, Zaandijk (Hollandia Reeks 100).
9. Collection and image Provinciaal Depot voor Archeologie Noord-Holland (inv. no. 6089-07)
10. -
11. -

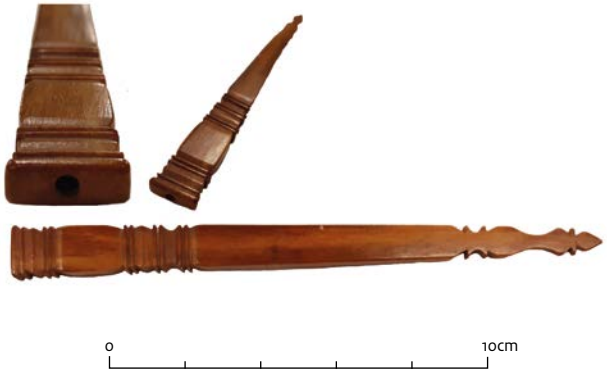
6.2.14.C2 Crochet hook – *haaknaald*

1. Alkmaar
2. Canadaplein
3. Cess cellar (Feature 9C, 99CAN99-RAQ)
4. Early Modern Period (1589-1675)
5. Bone (-)
6. >125 (l)
7. Pointed shaft terminating at the other end in a hook.
8. Bitter, P., 2013: Materiële cultuur van het klooster en de gasthuizen, in: P. Bitter & S. van Zanten (red.), *Voor De Vest. Vestingwerken, een klooster, een gasthuis en andere resten uit de Canadaplein-opgravingen (1998-2000)*, Alkmaar (Rapporten over de Alkmaarse Monumentenzorg en Archeologie 17), 110-165.
9. Collection Erfgoed Alkmaar, Archeologisch Centrum, image P. Bitter/R. Roedema
10. 15675
11. 5.2.6, 5.2.7, 6.2.13

6.2.15 Knitting needle sheaths

6.2.15.C1 Knitting needle sheath – *breinaaldhouder* or *breischede*

1. Helmond
2. Helmond Castle
3. Well (HM-KA-04-1-16)
4. Early Modern Period B (1700-1750)
5. Ivory (-)
6. 172 x 15 x 7 (l x w x d)
7. Elongated, decorated ivory knitting sheath. A hole, 30 mm deep and 3 mm across, through the centre of the rectangular wide end allows for a knitting needle to be inserted.
8. -
9. Collection Archeologisch Centrum Eindhoven en Helmond, image Th. De Jong
10. -
11. 6.2.9

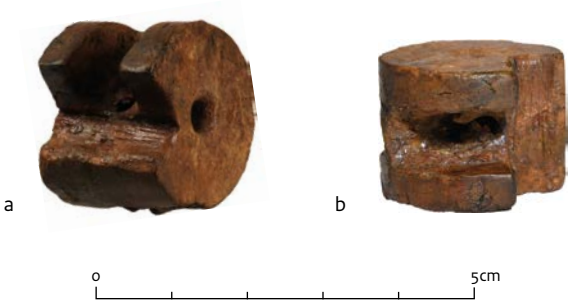


6.3 Weaponry

6.3.1 Crossbows

6.3.1.C1 Crossbow nut – *tuimelaar*

1. Alblasserdam
2. Lange Steeg
3. Urban canal (GA01)
4. Late Medieval Period (1350-1500)
5. Antler (deer)
6. 33 x 23 x 7 (l x w x ø)
7. Cylindrical antler object, a. and b. different views. The centre of the flat end is pierced. A wedge-shaped notch along the side held the bow string, while a rod pressed against the small ridge at the bottom of the disk prevented the nut from twisting.
8. Nooijen, C., 2006: Metaal, in: P.C. de Boer (red.), *In de voetsporen van heren (en) boeren. De ontdekking van een Stenen Kamer en een vlasverwerkende nederzetting aan de Lange Steeg te Alblasserdam*, Amersfoort (ADC Rapport 519), 45-51.
9. Collection Provinciaal Archeologisch Depot Zuid-Holland, image ADC ArcheoProjecten
10. –
11. –



6.3.1.C2 Arrow support plate – *pijlsteun*

1. Bunschoten
2. Dorpsstraat 28-30
3. Raised surface (V6-B1)
4. Late Medieval Period (1350-1500)
5. Antler (-)
6. 131.9 x 23.76 x 5.81 mm (l x w x d)
7. Elongated flat antler slab with filed diagonal grooves at the back. A rounded groove with polished edges runs along the centre of the top of the front; on each side of the groove is a drilled hole. The original end of the slab is now broken off.
8. Huisman, B., & M. van Dijk 2022: *Bunschoter boogfragment – een pijlsteun van gewei*, Amersfoort (Vondst van de maand – Centrum voor Archeologie 11), maart 2022.
   Huisman, B., 2022: *Door been en gewei*, Deventer (Afstudeerproject Saxion Hogeschool).
9. Collection Provinciaal Depot Utrecht, image B. Huisman
10. -
11. -

6.3.2 Firearm mountings

6.3.2.C1 Firearm mountings – *vuurwapenbeslag*

1. Zutphen
2. Lange Hofstraat 7
3. Rubbish pit
4. Early Modern Period A (1580-1608)
5. Bone (A and B: cattle, metatarsus; C: -)
6. 93 (I, A); 43 (I, B); 104 (I, C)
7. Three fragments of firearm fittings. Two semicircular mounts are made of cattle metatarsals. Of these two, the first (A) is complete and has straight sides. Its faceted surface carries an engraved decoration. The second mount (B) is incomplete, with one straight and one curved side. Its surface is covered by an engraved floral motif. Scratches along the edges probably ensured a better bond with the glue. The third fragment (C) is a virtually complete, elongated bone slab (species and skeletal element unknown) decorated with incised lines and curves.
8. Rijkelijkhuizen, M., 2013: Wapenbeslag van bot uit de Tachtigjarige Oorlog, *Zutphense Pracht* 3, 38-39.
9. Collection Erfgoed Centrum Zutphen, Archeologie, images M.J. Rijkelijkhuizen
10. 19626, 19627 and 19628
11. 5.3.3, 6.8.6

A: The complete, semicircular mount

B: The incomplete semicircular mount

C: The flat, elongated mount

6.3.3 Cutlasses

6.3.3.C1 Cutlass hilt – *heft van houwdegen*

1. Wieringen
2. YWV-31
3. Shipwreck (freighter)
4. Early Modern Period B (1700-1800)
5. Bone (cattle, metatarsus)
6. 130 (l)
7. A hilt of a cutlass with a large bone grip, hexagonal or octagonal in cross-section. Towards the end of the knuckle bow the grip curves slightly upwards.
8. Van der Heide, G.D., 1969: Scheepswrak van het Wieringer Vlaak, *Land + Water* 12, 24-25.
9. Collection and image Maritiem Archeologisch Depot Batavialand (inv. no. YWV-31)
10. -
11. 4.3.3, 6.3.4

6.3.4 Daggers

6.3.4.C1 Dagger handle – *dolkgevest*

1. Amsterdam
2. Houtgracht 4-16
3. - (MW5-31)
4. Late Medieval Period - Early Modern Period A
5. Bone (cattle, metatarsus)
6. >110 x 29 (l x ø)
7. Handle of a so-called bollock dagger; one of the 'bollocks' is still present. The handle is richly decorated with spiralling grooves and a ring ornament.
8. Rijkelijkhuizen, M., 2004: *Dierlijke materialen in Amsterdam*, Amsterdam (MA thesis).
9. Collection Monumenten en Archeologie Amsterdam, image M.J. Rijkelijkhuizen
10. 16807
11. 4.3.3, T5.3.1, 6.3.3

6.3.5 Powder horns

6.3.5.C1 Powder horn – *kruithoorn*

1. 's-Hertogenbosch (Den Bosch)
2. Loeffplein
3. Cesspit (DBLO 2748.1)
4. Early Modern Period A (1550-1600)
5. Antler (red deer) and metal
6. 123 x 91 x 35 (l x w x ø)
7. Powder horn made from beam of a red-deer antler by removing the top and bottom part and a section of the intermediate tine and hollowing out the inside of the beam. At both ends, a thin layer of the outer surface of the antler has been removed to allow metal fittings to be attached. At the top, two holes pierce both the antler and the metal mount. At the bottom, one hole runs through both antler and metal while a second hole pierces the antler just above the mount. A fourth, frontal hole is positioned where the tine branches off from the beam. Engraved surface decorations show on one side a male and female couple in an amorous position with the man holding a drinking glass in his hand; the other side is covered in leaf motifs.
8. Nijhof, E., 2007: Wapens en paardentuig, in: H.L. Janssen & A.A.J. Thelen (red.), *Tekens van leven. Opgravingen en vondsten in het Tolbrugkwartier in 's-Hertogenbosch*, Utrecht, 240-248.
9. Collection Erfgoed 's-Hertogenbosch, image T. Haartsen
10. -
11. 6.3.6

6.3.6 Priming powder flasks

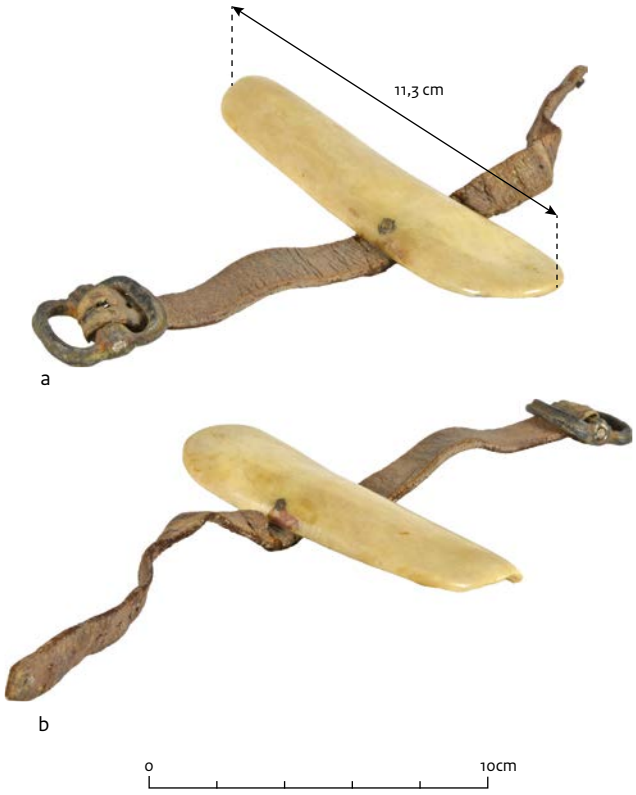
6.3.6.C1 Powder flask – *kruitflacon*

1. Amsterdam
2. NoordZuidLijn
3. Rokin (NZR2.00462FAU021)
4. Early Modern Period (1600-1700)
5. Ivory (elephant) and wood
6. 17 x 55 (d x ø)
7. Ivory disks set in a wooden ring with two holes on opposite sides, each with a screw thread on the inside. A spout could be attached to one opening while powder could be added through the other which was originally closed with a screw top with a suspension ring. The illustration shows front and back of the assembled object (a and b) and the individual components (c).
8. Rijkelijkhuizen, M.J., 2023: *Verzonken in de Amstel, Archeologisch onderzoek Noord/Zuidlijn (2005-2021). Deel IVb: Artefacten van bot, gewei, ivoor, schildpad, parelmoer en noot*, Amsterdam (Amsterdamse Archeologische Rapporten 115).
9. Collection Monumenten en Archeologie Amsterdam, image H. Strak
10. 12041
11. 6.3.5

6.3.7 Bracers

6.3.7.C1 Bracer or wrist guard – *polsbeschermer*

1. Haarlem
2. Brinkmann-complex
3. Cesspit (No. 11)
4. Late Medieval Period - Early Modern Period A (1200-1600)
5. Bone (large mammal, -), leather and metal
6. 113 x 45 x 4 (l x w x d)
7. Polished bone bracer with rounded ends, gently curving and tapering lengthwise. A leather strap with metal buckle is still attached to it.
8. Van Greevenbroek, J.Th.R., 1980: *Een benen polsbeschermer uit het Brinkmann-complex*, Haarlem (Haarlems Bodemonderzoek 12), 125-126.
9. Collection and image Gemeente Haarlem, Team Erfgoed, Bureau Archeologie
10. -
11. -



6.4 Household items

6.4.1 Knives

6.4.1.C1 Carving knife – *voorsnijmes*

1. 's-Hertogenbosch (Den Bosch)
2. Achter 't vergulde harnas (HTVH)
3. -
4. Late Medieval Period
5. Osseous (-) and metal
6. 88 (I, osseous part)
7. The osseous figural handle features a woman with a robe holding one or two objects.
8. -
9. Collection and image Erfgoed 's-Hertogenbosch
10. -
11. 4.2.12, 5.6.8

6.4.1.C2 Knife handle – *mesheft*

1. The Hague
2. Marktstraat (V218.002)
3. Cesspit
4. Early Modern Period A (1600-1650)
5. Ivory (elephant)
6. 82.5 x 23.2 x 16.9 (l x w x d)
7. Decorated knife handle, hollowed to allow the insertion of the tang of a blade. The blade end is narrower to accommodate a protective ring, now missing. The handle has been carved into a male figure with a crown and harp, presumably David, king of Israel and Juda, who would sooth his predecessor King Saul by playing a lyre.
8. Rijkelijkhuizen, M.J., 2013: Koning David en een luizenkam. Ivoren vondsten van de opgraving Den Haag Grote Marktstraat, in: N. Bouma, *Van ambachts- en handelswijk tot Nieuw Haagse Passage. Een inventariserend veldonderzoek in de vorm van proefsleuven en een archeologische opgraving in de Grote Marktstraat 44-46 in Den Haag*, Amersfoort (ADC Rapport 3468), 137-140.
9. Collection Archeologie Den Haag, image M.J. Rijkelijkhuizen
10. 4255
11. 4.2.12, 5.6.8

6.4.1.C3 Knife handle – *mesheft*

1. Dordrecht
2. Statenplein I - Kromme Elleboog
3. Raised surface
4. Late Medieval Period (1300-1400)
5. Bone (large mammal, -)
6. 100 (l)
7. Knife handle consisting of two bone plates with decorative inlay, riveted together. Each plate has been sawn out of the compact outer tissue of a longbone shaft of a large mammal. Both plates carry three sets of four small ring-and-dot motifs alternating with three carved larger circles and terminating in two additional small ring-and-dots. The top end is carved.
8. Dorst, M.C., 2014: *Stadsontwikkeling op het Statenplein. Opkomst en ondergang van een 14e -eeuwse ambachtswijk in Dordrecht*, Dordrecht (Dordrecht Ondergronds 40).
9. Collection and image Archeologie, Dordrechts Museum, inv. no. 9701.928.008
10. -
11. 4.2.12, 5.6.8

6.4.2 Butter knives

6.4.2.C1 Butter knife – *botermes*

1. Noordwijkerhout
2. Dorpstraat 5
3. -
4. Early Modern Period A (1600-1650)
5. Bone (large mammal, -)
6. 17 x 2.8 (l x w)
7. Butter knife, made of a single piece of the compact outer tissue of a large mammalian longbone. At the tip, where a tiny fragment is now broken off, a hole is partly visible. An engraved pattern of two rings filled with oblique lines decorates the end. One face of the 'knife' section is ribbed, the other entirely smooth.
8. Leijnse, K., 2012: *Wonen bij de Witte Kerk. Plangebied Dorpsstraat, gemeente Noordwijkerhout. Een archeologische begeleiding en opgraving*, Amsterdam (RAAP-rapport 2278).
9. Collection and image Provinciaal Archeologisch Depot Zuid-Holland (inv. no. 14678)
10. -
11. -

6.4.2.C2 Butter knife – *botermes*

1. Egmond aan den Hoef
2. Castle site
3. Moat
4. Late Medieval Period
5. Bone (large mammal, metapodial)
6. 142 (l)
7. Ring-and-dots decorate the full length of the front of the knife. A piercing at the top is a suspension hole. The front (b) of the lower, wider section is smooth and ends in short teeth, while the back (a) has fifteen parallel grooves.
8. Zeiler, J.T., 2007: *Adellijk afval - Archeozoölogisch onderzoek van de Laat-Middeleeuwse kastelen Egmond en Brederode*, Leeuwarden (ArchaeoBone rapport 61).
9. Collection and image Provinciaal Depot voor Archeologie Noord-Holland (inv. no. 6019-01)
10. 4384
11. -

6.4.3 Spoons

6.4.3.C1 Spoon – *lepel*

1. Utrecht
2. Smakkelaarsveld
3. Cesspit (BP101)
4. Early Modern Period B - Late Modern Period (1800-1950)
5. Bone (large mammal, -)
6. 120 (l)
7. Undecorated bone spoon; on the back (a), at the transition between handle and bowl, is a ridge.
8. Aal, J.H.J.M., 2022: Dierlijk bot, in: M.A. Tolboom & R.G. Mousch, *De voorstad Buiten Catharijne. Bewoningssporen uit de late middeleeuwen en nieuwe tijd op het Smakkelaarsveld,* 's-Hertogenbosch (BAAC-rapport A-17.0258), 227-254.
9. Collection Erfgoed gemeente Utrecht, image BAAC
10. 12761
11. 5.4.3

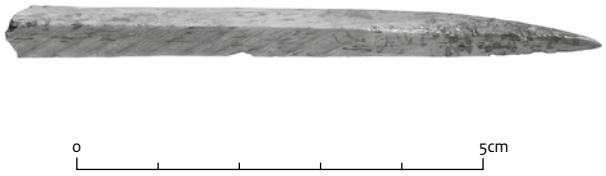
6.4.4 Pastry wheels

6.4.4.C1 Pastry wheel – *deegwiel*

1. Amsterdam
2. Waterlooplein
3. - (WLO-135-46)
4. Early Modern Period B (1725-1775)
5. Bone (large mammal, -)
6. 38.5 x 3.9 (ø x d)
7. Round disk with serrated edge and a central hole, made out of the compact outer tissue of a large mammalian bone.
8. Rijkelijkhuizen, M., 2004: *Dierlijke materialen in Amsterdam*, Amsterdam (MA thesis).
9. Collection Monumenten en Archeologie Amsterdam, image M.J. Rijkelijkhuizen
10. 16930
11. -

6.4.5 Sausage pins

6.4.5.C1 Sausage pin – *vleespen* or *worstpen*

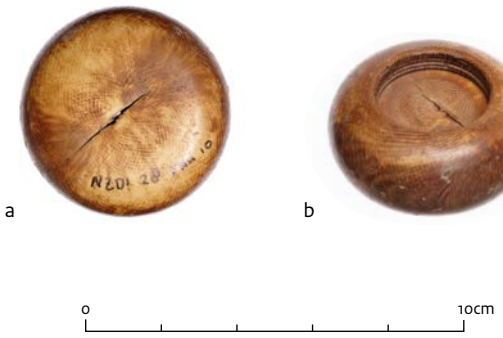


1. Amsterdam
2. Nieuwendijk 154-158
3. - (NDK-1735-1)
4. Late Medieval Period (1200-1400)
5. Bone (-)
6. 74 (l)
7. Possible sausage or meat pin; triangular cross-section and pointed end.
8. Rijkelijkhuizen, M., 2004: *Dierlijke materialen in Amsterdam*, Amsterdam (MA thesis).
9. Collection Monumenten en Archeologie Amsterdam, image A. Dekker (University of Amsterdam)
10. 18495
11. -

6.4.6 Furniture ornaments

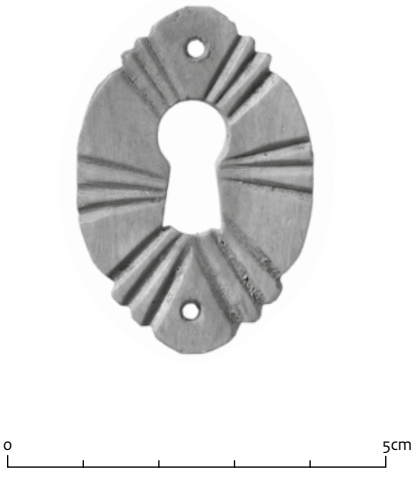
6.4.6.C1 Furniture ornament – *meubel ornament*

1. Amsterdam
2. NoordZuidlijn
3. Damrak (NZD1.00028FAU010)
4. Early Modern Period (1600-1700 or 1700-1800)
5. Ivory (elephant)
6. 545 x 26 (ø x h)
7. Ivory knob, turned on a lathe, with a screwthread on the inside (b).
8. Rijkelijkhuizen, M.J., 2023: *Verzonken in de Amstel, Archeologisch onderzoek Noord/Zuidlijn (2005-2021). Deel IVb: Artefacten van bot, gewei, ivoor, schildpad, parelmoer en noot*, Amsterdam (Amsterdamse Archeologische Rapporten 115).
9. Collection Monumenten en Archeologie Amsterdam, image H. Strak
10. 12004
11. -



6.4.6.C2 Keyhole plate or protector – *sleutelgatbeschermer*

1. Amsterdam
2. Open Havenfront (metro caisson)
3. - (MC6-1222)
4. Late Medieval Period - Early Modern Period
5. Bone (-)
6. 46 x 31.3 x 2.9 (l x w x d)
7. Small bone keyhole plate, decorated with six sets of three radiating lines, and two attachment holes (above and below the keyhole).
8. Rijkelijkhuizen, M., 2004: *Dierlijke materialen in Amsterdam*, Amsterdam (MA thesis).
9. Collection Monumenten en Archeologie Amsterdam, image A. Dekker (University of Amsterdam)
10. 18571
11. -



6.5 Personal hygiene

6.5.1 Combs

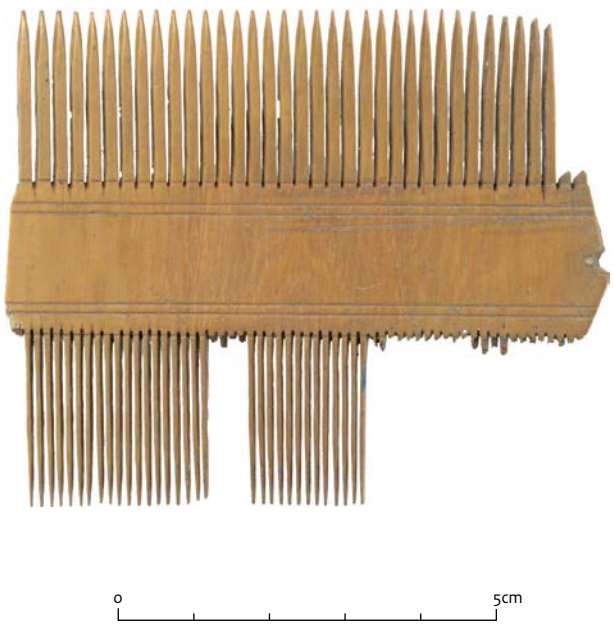
For a more detailed typology of combs, see section 6.5.2 of Part II: A typology of Dutch combs.

6.5.1.C1 Longbone comb – *lange kam*

1. Kapel Avezaath
2. Muggenborch
3. Ditch (F14001)
4. Late Medieval Period (1200-1300)
5. Bone (cattle, metatarsus)
6. 122.7 x 37.6 (l x w)
7. Comb with twelve teeth sawn out of the compact outer tissue of a cattle metatarsal. The top has been roughly finished by removing the protruding parts.
8. Groot, M., 2011: Dierlijk bot, in: J. van Renswoude (red.), *Archeologisch onderzoek in de dorpskern van Kapel-Avezaath, gemeente Tiel. Een uitzonderlijk rijk 13de-eeuws erf en een 14de-eeuwse gracht in het plangebied Muggenborch*, Amsterdam (Zuidnederlandse Archeologische Rapporten 43), 109-131.
9. Collection Archeologisch Depot Gelderland, image M.H. Kriek
10. 12796
11. 4.4.1, 5.5.1, T5.5.2, T6.5.2

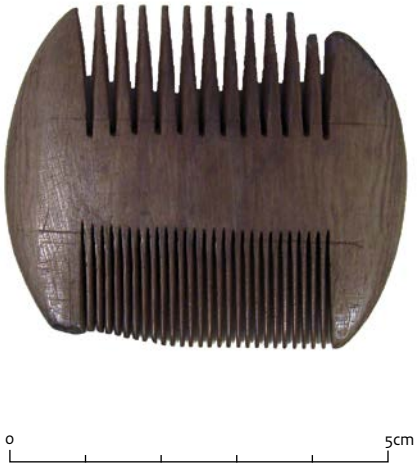
6.5.1.C2 Lice comb – *luizenkam*

1. Enkhuizen
2. Noorder Havendijk
3. Well (S87)
4. Early Modern Period (1630-1660)
5. Ivory (elephant)
6. 80 x 65 (l x w)
7. Double-sided comb sawn out of a single piece of ivory. On one side coarse teeth, on the other fine teeth. Along the edges of the body, close to the teeth, a decoration of two incised parallel lines.
8. Duijn, D.M. & C.P. Schrickx 2012: *Huis en haven onder de straat, Archeologisch onderzoek tijdens rioolwerkzaamheden van de Noorder Havendijk tot de Compagniesbrug in Enkhuizen*, Hoorn (West-Friese Archeologische Rapporten 46).
9. Collection and image Provinciaal Depot voor Archeologie Noord-Holland (inv. no. 6210-10)
10. -
11. 4.4.1, 5.5.1, T5.5.2, T6.5.2



6.5.1.C3 One piece large double sided ivory comb – *luizenkam*

1. Rotterdam
2. Markthal
3. Beerbak (S40-66, V575)
4. Late Medieval Period (1450-1500)
5. Ivory (elephant)
6. 53 x 44.6 x 3.5 (l x w x d)
7. Double-sided comb with curved edges, sawn out of a single piece of ivory; undecorated.
8. Esser, E., M.J. Rijkelijkhuizen & B. Beerenhout 2013: Archeozoölogisch onderzoek, in: P.H.J.I. Ploegaert, *Rotterdam Markthal, archeologisch onderzoek 2. Bewoningssporen en vondsten uit de stedelijke periode (14e-18e eeuw); de bedijking van en de bewoning op het voormalige Westnieuwland in Rotterdam*, Rotterdam (BOORrapporten 468 - deel 2), 357-404.
9. Collection Archeologie Rotterdam, image M.J. Rijkelijkhuizen
10. 6694
11. 4.4.1, 5.5.1, T5.5.2, T6.5.2



6.5.1.C4 One piece elongated one sided comb – *kam*

1. Ens, Flevoland
2. R3NOP/NR3
3. Shipwreck (freighter)
4. Early Modern Period B (1775-1825)
5. Keratinous (-)
6. 83 x 40 (l x w)
7. One-sided comb with coarse teeth.
8. Batavialand, Lelystad, Maritiem Archeologisch Depot (2019): *Opgravingsdocumentatie scheepswrak NR-3/NR3 (Noordoostpolder)*.
9. Collection and image Maritiem Archeologisch Depot Batavialand (inv. no. Z1952-VIII70)
10. 16507
11. 4.4.1, 5.5.1, T5.5.2, T6.5.2

6.5.3 Toothbrushes

6.5.3.C1 Toothbrush – *tandenborstel*

1. Utrecht
2. Smakkelaarsveld
3. Cesspit (BP101)
4. Early Modern Period B - Late Modern Period (1800-1950)
5. Bone (cattle, radius)
6. 140 (l)
7. Single-sided toothbrush with a central row of seventeen holes and two flanking rows of sixteen holes each. The polished handle narrows at the transition from brush to handle, then widens again towards a blunt point at the end.
8. Aal, J.H.J.M., 2022: Dierlijk bot, in: M.A. Tolboom & R.G. Mousch, *De voorstad Buiten Catharijne. Bewoningssporen ui de late middeleeuwen en nieuwe tijd op het Smakkelaarsveld*, 's-Hertogenbosch (BAAC-rapport A-17.0258), 227-254.
9. Collection Erfgoed gemeente Utrecht, image BAAC
10. 12756
11. 6.5.4

6.5.3.C2 Toothbrush – *tandenborstel*

1. Utrecht
2. Neude
3. Drain GT01 (V122-4)
4. Late Modern Period (later than 1847)
5. Bone (large mammal, -)
6. (>) 124 x 6 (l x w)
7. Toothbrush with incomplete brush. Three parallel rows of bristles; the original number can no longer be established. One side of the handle carries the inscription *A. VAN LEEUWEN JR. COIFFEUR STADHUISBRUG N.3 UTRECHT*, followed by an image of a swan above the text TRADE MAR(K) and to the right COATE & C. LONDON.
8. Van Hees, L., M. Dütting & M. Rijkelijkhuizen in collaboration with J. van Dijk 2021: Archeozoölogie, in: J. van der Kamp, *Burgers, zusters en munters. NEU03: Archeologische begeleiding binnenplaats postkantoor Neude (Utrecht)*, Utrecht (Basisrapportage Archeologie 123), 187-208.
   Rijkelijkhuizen, M., 2021: Poetsen met koeienbot en varkenshaar. De tandenborstel in archeologische context, *Archeologie in Nederland* 5 (1), 26-31.
9. Collection Erfgoed gemeente Utrecht, image M.J. Rijkelijkhuizen
10. 12756
11. 6.5.4

6.5.4 Brushes

6.5.4.C1 Brush – *borstel*

1. Alphen aan de Rijn
2. Buitenplaats Rijnoord
3. Cesspit (Feature 4)
4. Early Modern Period B (1800-1825)
5. Bone (cattle, radius)
6. 151 x 23.5 (l x w)
7. Brush with seven rows of seventeen holes each for the bristles. Lines drawn on the brush head mark the position of the drilled holes. The attachment of the bristles follows Method 2 (See Section 6.5.3). A semicircular indentation on each side of the handle marks the transition to the brush head. On the end of the handle is another semicircular indentation.
8. Rijkelijkhuizen, M., 2015: Benen en leren voorwerpen, in: M.S. Jordanov, *Plangebied Buitenplaats Rijnoord. Gemeente Alphen aan den Rijn. Archeologisch onderzoek: een archeologische begeleiding*, Amsterdam (RAAP-Rapport 3041), 51-57.
9. Collection Provinciaal Archeologisch Depot Zuid-Holland, image M.J. Rijkelijkhuizen
10. 4269
11. 6.5.3

6.5.4.C2 Brush head – *borstelkop*

1. Utrecht
2. Neude
3. Drain GT01 (V207-2)
4. Modern Period
5. Bone (large mammal, -)
6. 101.1 x 35 x 4.2 (l x w x d)
7. Front (a) and back (b) of an elongated rectangular bone brush head with rounded corners. The attachment of the bristles follows Method 1b (Fig. 6.36). There are nine rows of eightteen to twenty bristle holes each. Presumably the brush originally had a handle (now missing) of a different material, probably attached to the brush head by the four small rivets that are still visible.
8. Van Hees, L., M. Dütting & M. Rijkelijkhuizen in collaboration with J. van Dijk, 2021: Archeozoölogie, in: J. van der Kamp, *Burgers, zusters en munters. NEU03: Archeologische begeleiding binnenplaats postkantoor Neude (Utrecht)*, Utrecht (Basisrapportage Archeologie 123), 187-208.
9. Collection Erfgoed gemeente Utrecht, image M.J. Rijkelijkhuizen
10. 6718
11. -

6.5.5 Ear spoons, toothpicks, and toiletry sets

6.5.5.C1 Ear spoon with toothpick – *oorlepel met tandenstoker*

1. Vleuten
2. Huis te Vleuten
3. Moat
4. Early Modern Period (1600-1800)
5. Bone (large mammal, -)
6. 54.7 x 5.0 x 1.5 (l x w x d)
7. Ear spoon combined with a tooth pick, made of the compact outer tissue of a large mammalian bone; undecorated. The tip is slightly worn by use.
8. Van Dijk, J., E. Esser, B. Beerenhout & M.J. Rijkelijkhuizen 2005: Archeozoölogisch onderzoek, in: J. Dijkstra & P.C. de Boer, *Huis te Vleuten opgegraven. Archeologisch onderzoek in het kader van het project Spoorverbreding VleuGel/Randstadspoor*, Amersfoort (ADC rapport 403), 144-172.
9. Collection Provinciaal Archeologisch Depot Utrecht, image M.J. Rijkelijkhuizen
10. 3924
11. 5.2.6, 5.6.1, 5.8.1, 6.8.1

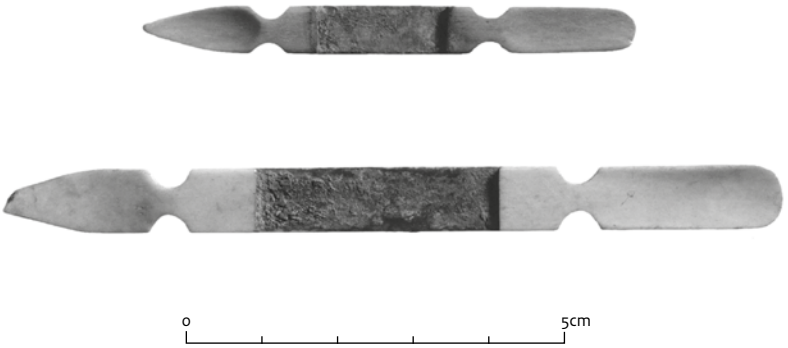
6.5.5.C2 Toiletry set – *toiletset*

1. Amsterdam
2. Nieuwendijk 154-158
3. - (NDK-856-1)
4. Late Medieval Period (1360-1390)
5. Bone (-) with a metal pivot
6. 80.6 x 8.7 x 2.7 (l x w x d)
7. Toiletry set in four parts, comprising an earspoon, a toothpick, and two other items of unknown function. The sickle-shaped object may be a nail cleaner or a tongue scraper; the little 'fork' with its roughly parallel pointed tines may be a tweezer.
8. Rijkelijkhuizen, M., 2004: *Dierlijke materialen in Amsterdam*, Amsterdam (MA thesis).
9. Collection Monumenten en Archeologie Amsterdam, image A. Dekker (University of Amsterdam)
10. 18649
11. -

6.5.6 Manicure sets

6.5.6.C1 Manicure set – *nagelgarnituur*

1. Amsterdam
2. Waterlooplein (WLO), Rozengracht 168-182 (ROG)
3. WLO-28 (above); ROG3-3 (below)
4. Late Modern Period (top: 1900-2000); Early Modern Period B - Late Modern Period (bottom: 1700-1800 or 1800-1900)
5. Bone (-)
6. Above: 63.8 x 6.5 x 4.6; below: 101.0 x 8.6 x 5.1 (l x w x d)
7. Two manicure sets of identical type but different sizes. Both have two different utilitarian tips defined by indentations. One face of the middle section is flat, the other slightly hollow; traces of rust on this hollow surface suggest that a metal file may originally have been present. The nail cleaner ends in a blunt, slightly raised point while the semicircular edge and raised sides on the other end were used to push back cuticles.
8. Rijkelijkhuizen, M., 2004: *Dierlijke materialen in Amsterdam*, Amsterdam (MA thesis).
9. Collection Monumenten en Archeologie Amsterdam, image A. Dekker (University of Amsterdam)
10. 18416 and 18417
11. -



6.5.7 Syringes

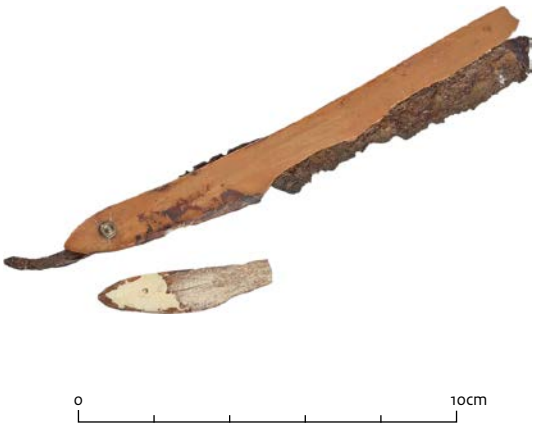
6.5.7.C1 Syringe – *spuit*

1. Amsterdam
2. Rokin 12-16 (POL) Waterlooplein (WLO)
3. POL-3-23 (left) and WLO-179-6 (right)
4. Early Modern Period B (left: 1750-1800; right: 1725-1750)
5. Ivory (elephant) and bone (-)
6. >70 (l)
7. One almost complete syringe (left) and a bone plunger from a syringe (right). The barrel of the complete syringe is made of elephant ivory, as is the separate tip. The barrel was closed on the other end with a bone disc with a central hole through which the plunger (or piston) could be moved. The plunger is made of bone and has a separate knob connected by a screw thread.
8. Rijkelijkhuizen, M., 2004: *Dierlijke materialen in Amsterdam*, Amsterdam (MA thesis).
9. Collection Monumenten en Archeologie Amsterdam, image A. Dekker (University of Amsterdam)
10. 17324 and 17325
11. -

6.5.8 Razors

6.5.8.C1 Razor – *scheermes*

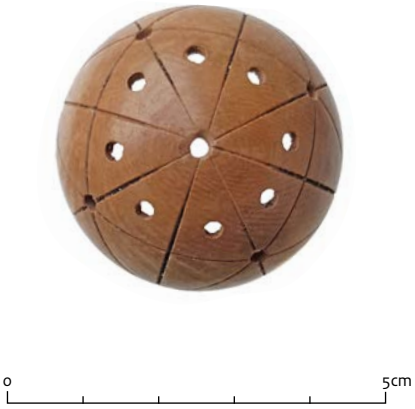
1. Lelystad, Flevoland
2. Oostvaardersdijk (F3OFL/OF3)
3. Shipwreck *Fiducie, alias de Zeehond* (Groningen *tjalk* sailing vessel)
4. Late Modern Period (1882)
5. Osseous (-) and metal
6. 134 x 24 (l x w)
7. Razor; the blade pivots between a handle composed of two slightly convex osseous plates.
8. Oosting, R. & K. Vlierman 1991: *De Zeehond, een Groninger tjalk gebouwd in 1878, vergaan in 1886*, Lelystad (Flevobericht 323).
9. Collection and image Maritiem Archeologisch Depot Batavialand (inv. no. OF3-166)
10. -
11. -



6.5.9 Pomanders

6.5.9_C1 Pomander – *pomander*

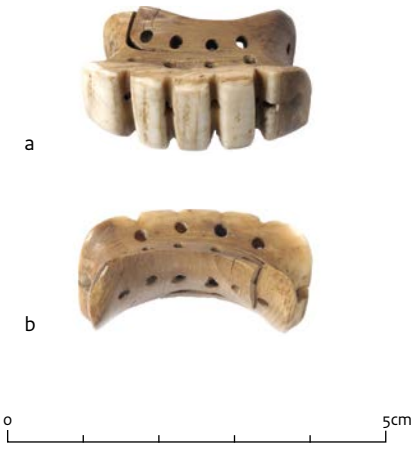
1. Alkmaar
2. Langestraat 60
3. Pit (Feature 411E)
4. Early Modern Period B (1780/1800)
5. Ivory (elephant)
6. 20 x 37 (h x ø)
7. Only one hemisphere of this now incomplete pomander was found. When complete it would have been attached by a screw thread to the other section. The perfume was released through a series of holes of equal diameter.
8. Bitter, P. & R. Roedema 2022: Huisraad van overige materialen, in: P. Bitter (red.), *Zeven eeuwen wonen, werken en winkelen in de Langestraat van Alkmaar*, Alkmaar (Rapporten over de Alkmaarse Monumentenzorg en Archeologie 25 (2), 903-942.
9. Collection Erfgoed Alkmaar, Archeologisch Centrum, image P. Bitter/R. Roedema
10. 16397
11. -



6.5.10 Dentures

6.5.10.C1 Denture – *kunstgebit*

1. Amsterdam
2. Warmoesstraat
3. Cesspit (WA-92-40)
4. Early Modern Period B (1750-1800)
5. Ivory (hippopotamus)
6. 31 x 19-20 x 16 (w x h x d)
7. Partial upper dentures (a: front, b: back), cut so as to keep the original enamel in front, with five carved teeth. The holes (the largest 2 mm across) allowed for the dentures to be held in place.
8. IJzereef, G.F. & T. Pot 1998: Een staaltje tandtechniek uit de 17e eeuw: twee partiële gebitsprothesen uit Amsterdam, *KNOB Bulletin* 87 (4), 139-145.
Rijkelijkhuizen, M., 2004: *Dierlijke materialen in Amsterdam*, Amsterdam (MA thesis).
Rijkelijkhuizen, M, L. van Wijngaarden-Bakker & J. Gawronski 2006: Amsterdams oudste kunstgebit, *Ons Amsterdam* 5, 206-207.
Rijkelijkhuizen, M. & R. de Raat 2015: 'Konstige tanden' – Gebitsprothesen van bot en ivoor in Nederlandse collections, *Studium* 8 (4), 212-226.
9. Collection Monumenten en Archeologie Amsterdam, image W. Krook
10. 17039
11. -



6.6 Personal adornment and possessions and religious items

6.6.1 Buttons

6.6.1.C1 Button mould – *knoopkern*

1. Leiden
2. Lammermarkt
3. Cellar (S 11078, V150)
4. Early Modern Period B (1750-1800)
5. Bone (-)
6. 18.2 (ø)
7. Button mould in the form of a circular flat disk with a central hole.
8. Rijkelijkhuizen, M., 2018: Objecten van hout, bot, noot en rubber, in: R. van der Mark, *Leiden Lammermarkt, Archeologisch onderzoek naar een 17e -eeuws bouwblok*, 's-Hertogenbosch (BAAC-rapport A14.0170), 195-198.
9. Collection Erfgoed Leiden en Omstreken, image M.J. Rijkelijkhuizen
10. 5265
11. -

6.6.1.C2 Four-holed button – viergatsknoop

1. Leiden
2. Lammermarkt
3. Cellar (S14007, V337)
4. Late Modern Period (1885-1910)
5. Bone (-)
6. 19.2 (ø)
7. Four-holed button with decorative raised rim.
8. Rijkelijkhuizen, M., 2018: Objecten van hout, bot, noot en rubber, in: R. van der Mark, *Leiden Lammermarkt, Archeologisch onderzoek naar een 17e -eeuws bouwblok*, 's-Hertogenbosch (BAAC-rapport A14.0170), 195-198.
9. Collection Erfgoed Leiden en Omstreken, image M.J. Rijkelijkhuizen
10. 12762
11. -

6.6.1.C3 Loop button – *knoop met oog*

1. Delft
2. Spoorzone
3. DC149 (S 270, V 88)
4. -
5. Bone (-)
6. 7.3 x 21.8 (d x ø)
7. Button made of a single piece of compact outer bone tissue. Slightly conical back with a raised loop for attachment.
8. Van Dijk, J., F. Kerklaan & M.J. Rijkelijkhuizen 2020: *Spoorzone DC149 en DC152 - Een archeozoölogische analyse*, Delft (internal report Archeoplan Eco, Ossicle 376).
9. Collection Erfgoed Delft, *Archeologie*, image M.J. Rijkelijkhuizen
10. 4837
11. -

6.6.2 Belt buckles

6.6.2.C1 Belt buckle – *riemgesp*

1. Dordrecht
2. Tolbrugstraat-Waterzijde
3. -
4. Late Medieval Period (1325-1375)
5. Bone (-)
6. 58 x 27 x 7.5 (l x w x d)
7. Belt buckle with pin and bar (a: front, b: back), made from a single piece of the compact outer layer of a bone of a large mammal and decorated with a simple pattern of lines and dashes.
8. -
9. Collection and image Archeologie, Dordrechts Museum (inv. no. 6801.269.001)
10. -
11. 5.6.3

a

b

6.6.3 Shoehorns

6.6.3.C1 Shoehorn – *schoenlepel*

1. Amsterdam
2. Bloemgracht 56
3. - (BLS-9)
4. Early Modern Period (1600-1775)
5. Keratine (cattle, horn)
6. 212.5 (l)
7. Shoehorn made of horn. The tip has a suspension hole (a: outside, b: inside).
8. Rijkelijkhuizen, M., 2004: *Dierlijke materialen in Amsterdam*, Amsterdam (MA thesis).
9. Collection Monumenten en Archeologie Amsterdam, image M.J. Rijkelijkhuizen
10. 18568
11. -

6.6.4 Hairpins and hair parters

6.6.4.C1 Hair parter – *haarscheidingspin*

1. 's-Hertogenbosch
2. Zuidwal
3. Loam floor
4. Late Medieval Period (1275-1350)
5. Bone (-)
6. 150 x 18 (l x w)
7. Hairparter shaped like a woman with an intricate hairstyle and holding an unknown item. Below the female figure are three dice with a random number of dots.
8. Janssen, H., 2002: Een middeleeuwse dobbelaar? Een benen voorwerp uit de Zuidwal, in: *Bossche Bladen* 2002.3, 's-Hertogenbosch, 100-101.
9. Collection and image Erfgoed 's-Hertogenbosch
10. -
11. 5.6.1

6.6.4.C2 Hairpin – *haarpin*

1. Amsterdam
2. Waterlooplein
3. - (WLO-118-128)
4. Early Modern Period B (1700-1800)
5. Ivory (elephant)
6. 58 (l)
7. Ivory strip with rounded corners and a round hole at each end.
8. Rijkelijkhuizen, M., 2004: *Dierlijke materialen in Amsterdam*, Amsterdam (MA thesis)
9. Collection Monumenten en Archeologie Amsterdam, image M.J. Rijkelijkhuizen.
10. -
11. -

6.6.5 Finger rings

6.6.5.C1 Finger ring – *vingerring*

1. Amsterdam
2. Buikslotermeer
3. - (BU-4)
4. Late Medieval Period - Early Modern Period A (1400-1500 or 1500-1600)
5. Bone (large mammal, -)
6. 23.0 (ø)
7. The ring, which is shaped like a signet ring, is made of the compact outer tissue of a large mammalian bone.
8. Baart, J., W. Krook, A. Lagerweij, N. Ockers, H. Van Regteren Altena, T. Stam, H. Stoepker, G. Stouthart & M. Van der Zwan 1977: *Opgravingen in Amsterdam. 20 jaar stadskernonderzoek*, Amsterdam/Haarlem, 212-213.
Rijkelijkhuizen, M., 2004: *Dierlijke materialen in Amsterdam*, Amsterdam (MA thesis).
9. Collection Monumenten en Archeologie Amsterdam, image M.J. Rijkelijkhuizen
10. 18693
11. 5.6.7

6.6.6 Feather fans and feather curlers

6.6.6.C1 Feather curler – *verenkruller*

1. Breda
2. Huis Brecht
3. Cess cellar 1082
4. Early Modern Period A (1575-1625)
5. Bone (large mammal, -)
6. 136 x 15 x 4 (l x w x h)
7. Feather curler, made from a large mammalian bone. The blade section is rounded, the handle is decorated with several transverse and diagonal incised lines and a finial tip with a suspension hole.
8. De Jong, Th., F. Kerklaan & H, de Kievith 2021: *Bijzondere beesten uit het Huis van Brecht te Breda. Archeozoölogisch en archeo-ichthyologisch onderzoek*, Breda (Erfgoedrapport Breda 341).
9. Collection and image Erfgoed Breda
10. 14600
11. 6.6.7

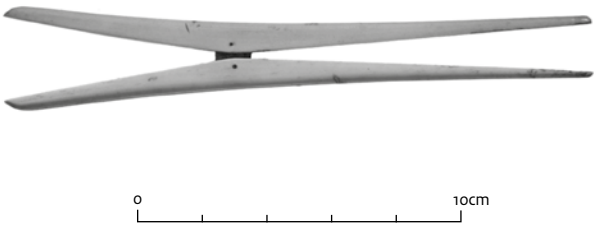
6.6.7 Foldable fans

6.6.7.C1 Foldable fan – *opvouwbare waaier*

1. Utrecht
2. Zijdebalen
3. Cesspit (V589)
4. -
5. Bone (-)
6. 120 (l)
7. Several sticks and one guard stick of one folding fan. The sticks are decorated with carved-out organic motifs; the slightly thicker guard stick is undecorated. The leaf, usually made of perishable materials like paper or textile, rarely survives in archaeological contexts and is also missing here.
8. Rijkelijkhuizen, M., 2018: *Voorwerpen van bot, gewei en ivoor uit (post)middeleeuwse contexten. Opgraving Utrecht Plangebied Zijdebalen (ZEE06)*, Delft (Elpenbeen rapportage).
9. Collection Erfgoed gemeente Utrecht, image M.J. Rijkelijkhuizen
10. 4714
11. 6.6.6

6.6.8 Glove stretchers

6.6.8.C1 Glove stretcher – *handschoenoprekker*



1. Amsterdam
2. Rozengracht 168-182
3. - (ROG3-2)
4. Early Modern Period B/Late Modern Period (1700-1800 or 1800-1900)
5. Bone (-)
6. 180.8 (l)
7. Glove stretcher consisting of two segments connected in the middle by a metal pivot.
8. Rijkelijkhuizen, M., 2004: *Dierlijke materialen in Amsterdam*, Amsterdam (MA thesis).
9. Collection Monumenten en Archeologie Amsterdam, image A. Dekker (University of Amsterdam)
10. 17077
11. -

6.6.9 Powder boxes

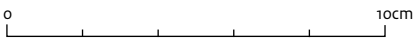
6.6.9.C1 Powder box – *poederdoos*

1. Amsterdam
2. Noordzuidlijn
3. Rokin (NZR2.00575MTL165)
4. Late Modern Period (1875-1900 or 1900-1925)
5. Tortoiseshell, decorated with metal floral rims and textile
6. 85 (ø)
7. Small round powder box made of different materials. The body of the box is tortoiseshell, decorated with metal floral rims and lined with textile. Side, top, and bottom view (a, b, c).
8. Rijkelijkhuizen, M.J., 2023: *Verzonken in de Amstel, Archeologisch onderzoek Noord/Zuidlijn (2005-2021). Deel IVb: Artefacten van bot, gewei, ivoor, schildpad, parelmoer en noot*, Amsterdam (Amsterdamse Archeologische Rapporten 115).
9. Collection Monumenten en Archeologie Amsterdam, image R. Tousain
10. 11987
11. -

a

b

c



6.6.10 Smoking implements

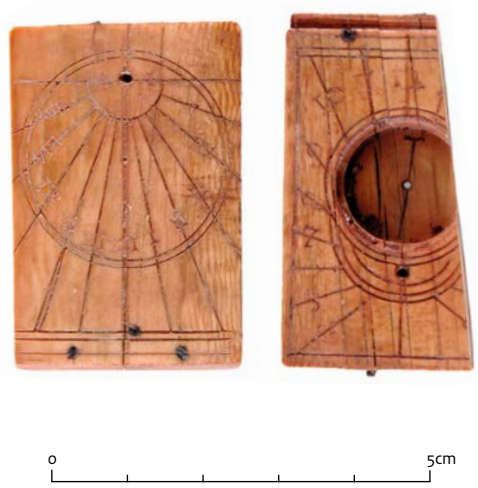
6.6.10.C1 Tobacco pipe component – *pijponderdeel*

1. Middelburg
2. Berghuijskazerne
3. Cesspit
4. Early Modern Period B - Late Modern Period (1775-1900)
5. Keratine (-, horn)
6. 70 (l)
7. Mouth section and extension piece of a tobacco pipe, both made of horn and screwed together. The rest of the pipe could be attached by means of another screw thread on the inside of each end of the extension.
8. Esser, E., B. Beerenhout, W.J. Kuijper & M.J. Rijkelijkhuizen 2006: Dierlijke resten uit de stad, in: J. Dijkstra, S. Ostkamp & G. Williams (red.), *Middelburg-Berghuijskazerne*, Amersfoort (ADC Rapport 595), 177-228.
9. Collection Zeeuws Archeologisch Depot, image M.J. Rijkelijkhuizen
10. 4010
11. -

6.6.11 Portable diptych sundials

6.6.11.C1 Diptych sundial – *diptiek-zonnewijzer*

1. Delft
2. DC093 (Waterloopkundig laboratorium)
3. - (Feature 49, V51)
4. Early Modern Period (1600-1700)
5. Ivory (elephant)
6. 43 x 30 (h x w)
7. Pocket sundial in two sections with can be closed when not in use. The lower panel has a small built-in compass. A piece of string between the panels served as a gnomon.
8. Rijkelijkhuizen, M., 2020: Hout uit de bodem. Houten gebruiksvoorwerpen uit laat- en postmiddeleeuws Delft, in: M. Rijkelijkhuizen & S. Jongma (red.), *Niet al het hout is timmerhout. Houten gebruiksvoorwerpen uit Delftse bodem*, Delft, 39-66.
9. Collection and image Erfgoed Delft, Archeologie
10. 21919
11. -



6.6.12 Telescopes

6.6.12.C1 Telescope – *verrekijker*

1. Amsterdam
2. Vinkenstraat
3. Cesspit (VIN9-1)
4. Early Modern Period B (1725-1775)
5. Bone (cattle, metatarsus) and metal
6. 84 x 26 (l x ø)
7. Telescope made from the diaphysis of a cattle metatarsus. The marrow cavity has been modified to create a container for the lens. Small metal rings keep the lenses in place. On the outside are three raised decorative ridges, one in the middle and one at each end. A screw thread on the outside of both ends makes it possible to add lens caps.
8. Rijkelijkhuizen, M., 2004: *Dierlijke materialen in Amsterdam*, Amsterdam (MA thesis).
Rijkelijkhuizen, M.J., 2011: Bone telescopes from Amsterdam, *Journal of Archaeology in the Low Countries* 3 (1-2), 107-114.
9. Collection Monumenten en Archeologie Amsterdam, image W. Krook
10. 18690
11. -

6.6.13 Seal stamps

6.6.13.C1 Seal stamp – *lakstempel*

1. Utrecht
2. Vredenburg Castle
3. Moat (V2050)
4. Early Modern Period B - Late Modern Period (1700-1800 or 1800-1900)
5. Bone (cattle/large mammal, metatarsus/-)
6. Handle: 89.6 x 32.2 (l x ø); seal stamp: 107.4 (l)
7. The stamp itself carries the initials “D D”. The handle is in three sections. The wider top section is made from a metatarsus, probably cattle; its marrow cavity is closed off with a flower-shaped bone plate. The narrower bottom section is made from the compact outer tissue of a large mammalian longbone. The entire handle is decorated all over.
8. Van Dijk, J., E. Esser, M. Rijkelijkhuizen & F. Kerklaan 2019: *De dierlijke resten uit kasteel Vredenburg*, Delft (report Archeoplan Eco, Ossicle 329).
9. Collection Erfgoed gemeente Utrecht, image M.J. Rijkelijkhuizen
10. 4691
11. -

6.6.14 Spectacles

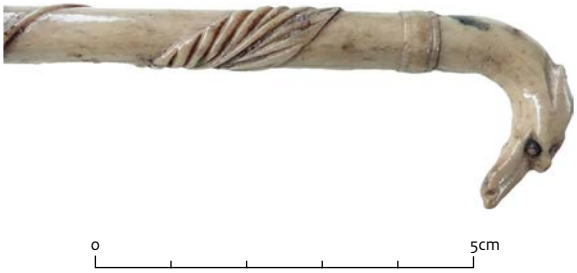
6.6.14.C1 Spectacle frame – *brilmontuur*

1. Vlissingen
2. West-Souburg, Aldegonde Castle
3. Cesspit (?)
4. Late Medieval Period - Early Modern Period B (1450-1783/84)
5. Osseous (-)
6. *c.* 35 (ø)
7. Spectacle frame in two parts to hold a pair of lenses.
8. Hendrikse, H. & L. Goldschmitz-Wielinga 1998: Het vondstmateriaal uit het kasteel van Souburg, in: C.E.H.J. Verhoef (red.), *Philips van Marnix van Sint Aldegonde*, Antwerpen, 107-132.
9. Collection and image Zeeuws Archeologisch Depot (inv. no. 0002-3)
10. -
11. -

6.6.15 Parasols

6.6.15.C1 Parasol handle – *handvat van parasol*

1. Utrecht
2. Zeedijk
3. Cesspit (P19, V454)
4. Early Modern Period B - Late Modern Period (1800-1900)
5. Bone (large mammal, -)
6. >235 (l)
7. Incomplete parasol handle; original length unknown. The remaining part is in five sections, all made from the compact outer tissue (*compacta*) of a longbone and joined by metal pins. Four of the sections belong to the pole; the upper one is now incomplete, the three lower ones are 56, 66, and 71 mm long, respectively. The fifth section, the end of the handle, is carved like a curving head of a dog, perhaps a greyhound type, with eyes in separate inlay (one now missing). The pole is decorated with carved leaf motifs.
8. Rijkelijkhuizen, M., 2017: *Voorwerpen van bot en ivoor – Opgraving Utrecht Zeedijk (ZEE1)*, Delft (Elpenbeen rapportage).
9. Collection Erfgoed gemeente Utrecht, image M.J. Rijkelijkhuizen
10. 4677
11. -



6.6.16 Walking canes

6.6.16.C1 Walking cane handle – *handvat van wandelstok*

1. Amsterdam
2. Noordzuidlijn
3. Damrak (NZD1.00096FAU034)
4. Early Modern Period B - Late Modern (1800-1900 or 1900-2000)
5. Bone (large mammal, -)
6. 73.6 (l)
7. The cavity in the handle, which originally contained the bone marrow, is now closed off on both sides with a round disk with a screw thread (a). Another hole with screw thread, at the bottom, served to attach the handle to the stick. The top is decorated with a pattern of horizontal and vertical lines and cross-hatching (b).
8. Rijkelijkhuizen, M.J., 2023: *Verzonken in de Amstel, Archeologisch onderzoek Noord/Zuidlijn (2005-2021). Deel IVb: Artefacten van bot, gewei, ivoor, schildpad, parelmoer en noot*, Amsterdam (Amsterdamse Archeologische Rapporten 115).
9. Collection Monumenten en Archeologie Amsterdam, image H. Strak
10. 12003
11. -

6.6.17 Pocket knives

6.6.17.C1 Pocket knife – *zakmes*

1. Amsterdam
2. Zeedijk 9-13
3. - (ZDK-21-18)
4. Early Modern Period B (1700-1800)
5. Bone (-) and Ivory (elephant)
6. 72 (l)
7. Pocket knife with two cover plates, one of bone and the other (shown here) of ivory. Both were perforated to create a suspension hole.
8. Rijkelijkhuizen, M., 2004: *Dierlijke materialen in Amsterdam*, Amsterdam (MA thesis).
9. Collection Monumenten en Archeologie Amsterdam, image A. Dekker (University of Amsterdam)
10. -
11. -

6.6.18 Beads and rosaries

6.6.18.C1 Rosary – *rozenkrans*

1. 's-Hertogenbosch (Den Bosch)
2. Loeffplein
3. Cesspit of the Elisabeth Bloemenkamp convent
4. Early Modern Period A (1500-1550)
5. Bone (-)
6. Smaller beads: 6 (ø), larger beads 10 (ø)
7. Part of a rosary composed of smaller and larger round beads and a pewter pendant.
8. Janssen, H.I. & A.A.J. Thelen (red.) 2007: *Tekens van Leven. Opgravingen en vondsten in het Tolbrugkwartier in 's-Hertogenbosch*, Utrecht.
9. Collection and image Erfgoed 's-Hertogenbosch
10. -
11. 4.5.1, 5.6.6, 5.7.6

6.6.18.C2 Bead – *kraal*

1. 's-Hertogenbosch (Den Bosch)
2. Museumkwartier
3. Bogarden (Kuil F1114)
4. Late Medieval Period - Early Modern Period A (1475-1550)
5. Bone (-) and jet
6. Largest bead: 10 (ø)
7. The lighter beads are made of bone, the darker ones are jet. The shape and dimensions of the bone beads vary; the image shows an elongated specimen and several round ones.
8. Rijkelijkhuizen, M., 2018: Gebruiksvoorwerpen van organische materialen, in: R. van der Mark, S.A.L. Peters, M.A. Tolboom & A.C. van de Venne, *'s-Hertogenbosch Museumkwartier. Ambachtslieden en kloosterlingen. Huizen en afval in de oude stad*, 's-Hertogenbosch (BAAC rapport A-09.0165), 372-388.
Van der Mark, R., M. Rijkelijkhuizen, M.A. Tolboom & A.C. van de Venne 2018: Ambachtelijke activiteiten, in: R. van der Mark, S.A.L. Peters, M.A. Tolboom, A.C. van de Venne, *'s-Hertogenbosch Museumkwartier Ambachtslieden en kloosterlingen Huizen en afval in de oude stad*, 's-Hertogenbosch (BAAC rapport A-09.0165), 272-278.
9. Collection Erfgoed 's-Hertogenbosch, image M.J. Rijkelijkhuizen
10. 5551
11. 4.5.1, 5.6.6, 5.7.6

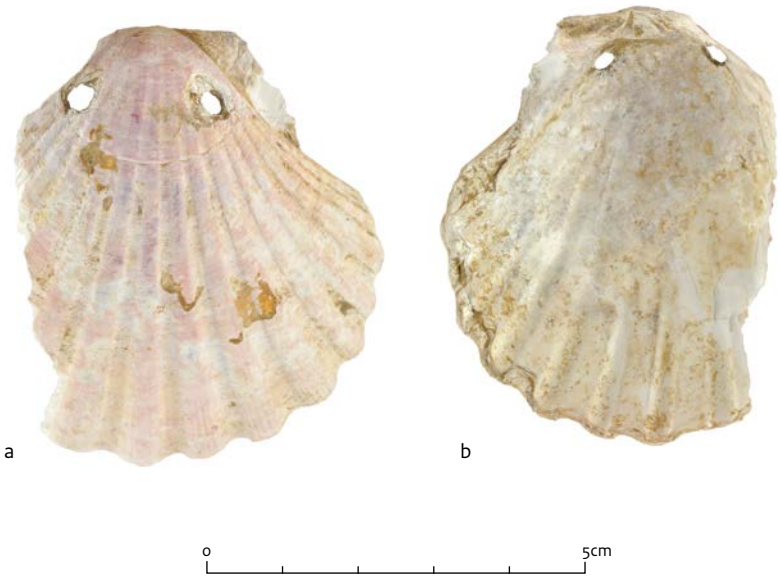
6.6.18.C3 Bead – *kraal*

1. Eindhoven
2. Catharinakerk
3. Inhumation burial (S 2909)
4. Early Modern Period B (1650-1800)
5. Bone (-)
6. Largest bead: 8 (ø)
7. Bone rosary beads, found in the inhumation grave of an adult male.
8. Arts, N. & B. van den Broek 2013: Archeologische vondsten uit het kerkterrein, in: N. Arts, *Een knekelveld maakt geschiedenis. Het archeologisch onderzoek van het koor en het grafveld van de middeleeuwse Catharinakerk in Eindhoven, circa 1200-1850*, Utrecht, 82-106.
9. Collection and image Archeologisch Centrum Eindhoven en Helmond
10. -
11. 4.5.1, 5.6.6, 5.7.6

6.6.19 Pilgrim badges

6.6.19.C1 Pilgrim badge – *pelgrimsinsigne*

1. Monster
2. Havenstraat
3. Inhumation burial
4. Late Medieval Period - Early Modern Period (1400-1700)
5. Scallop (*Pecten maximus*)
6. 63 (l)
7. Convex valve of a scallop shell (a: outside, b: inside). Two perforations at the top of the shell served to attach or suspend the object.
8. Van Horssen, J., 2018: Westland, Monster-Havenstraat, *Archeologische kroniek van Zuid-Holland* 2018, 36.
Rijkelijkhuizen, M., 2019: Sint Jacobsschelp, in: J. van Horssen (red.), *Middeleeuwse graven onder de Havenstraat in Monster, Gemeente Westland. Een archeologische begeleiding in een leiding-sleuf*, Delft (Delftse Archeologische Notities 194), 17.
9. Collection and image Erfgoed Delft, Archeologie
10. -
11. -



6.6.20 Crucifixes

6.6.20.C1 Figure of Christ (part of a crucifix) – *Christusfiguur*

1. Arnhem
2. Weerdjesstraat 94-102
3. Cesspit S84 (V61.101)
4. Late Modern Period (1875-1900 or 1900-1925)
5. Osseous (-)
6. 39 x 7 (l x w)
7. Carved image of the crucified Christ (corpus), originally probably attached to a small crucifix.
8. Verduin, J.T. (red.), 2019: *Arnhem, Weerdjesstraat 94-102. Een archeologische opgraving*, Amersfoort (ADC Rapport 4985).
9. Collection Archeologisch Depot gemeente Arnhem, image ADC ArcheoProjecten
10. 13981
11. -

6.7 Games, toys and musical instruments

6.7.1 Skates and sledges

6.7.1.C1 Skate – *glis*

1. Arnhem
2. Kerkplein
3. Ditch (S5183)
4. -
5. Bone (horse, metacarpal)
6. 250 (l)
7. Skate made from a horse's metacarpal bone (a: bottom, b: front, c: side). Holes are drilled at each end, one through the top end lengthwise and one at the other end perpendicular (i.e. transverse) to the bone. The bottom of the skate (i.e. the front of the bone) is severely worn by repeated use on an ice surface.
8. Aal, J.H.J.M., 2020: Zoöarcheologisch onderzoek, in: R. van der Mark & M.A. Tolboom (red.), *In de schaduw van de Eusebius. Archeologisch onderzoek naar de prestedelijke bewoning en ontwikkeling van een bouwblok/woonblok op het Kerkplein in Arnhem*, 's-Hertogenbosch (BAACrapport A016.0325), 489-556.
9. Collection Archeologisch Depot gemeente Arnhem, image BAAC
10. 12746
11. 5.7.1

6.7.1.C2 Sledge runner – *glijder*

1. Arnhem
2. Kerkplein
3. Posthole (S6099)
4. -
5. Bone (horse, radius)
6. 321 (l)
7. Incomplete skate or sledge runner made from a horse radius. Chop marks at the back of the radius (b) suggest an attempt at levelling the surface. Both ends of the shaft have been pierced, while a second perforation on both far ends crosses the first at a right angle. The gliding surface, i.e. the front of the radius (a), is greatly worn by use.
8. Aal, J.H.J.M., 2020: Zoöarcheologisch onderzoek, in: M.R. Van der & M.A. Tolboom (red.), *In de schaduw van de Eusebius. Archeologisch onderzoek naar de prestedelijke bewoning en ontwikkeling van een bouwblok/woonblok op het Kerkplein in Arnhem*, 's-Hertogenbosch (BAACrapport A016.0325), 489-556.
9. Collection Archeologisch Depot gemeente Arnhem, image BAAC
10. 12740
11. 5.7.1

6.7.1.C3 Skate – *glis*

1. Egmond aan den Hoef
2. Castle site
3. Moat
4. Late Medieval Period
5. Bone (red deer, metacarpus)
6. 23.8 x 3.4 (l x w)
7. Skate made from a red-deer metacarpus (a: bottom, b: side). Protruding elements on both sides of the bone have been cut or chopped off. A hole pierces the width of the top end of the bone; a second perforation runs through the joints at the lower end.
8. Zeiler, J.T., 2007: *Adellijk afval - Archeozoölogisch onderzoek van de Laat-Middeleeuwse kastelen Egmond en Brederode,* Leeuwarden (ArchaeoBone rapport 61).
9. Collection Provinciaal Depot voor Archeologie Noord-Holland, image J.T. Zeiler
10. 4382
11. 5.7.1

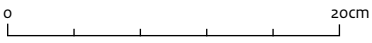
6.7.2 Jaw sledges

6.7.2.C1 Jaw sledge – *kaakslee*

1. Dordrecht
2. -
3. - (0004.000.488)
4. Late Medieval Period (*c.* 1400?)
5. Bone (horse, mandible)
6. 395 x 185 x 110 x 395 (l x h x w)
7. Sledge made from the lower jaw of a horse. Two perforations, one halfway each cheek bone, are aligned (a: just visible in the rear jaw). A stick through these two holes supported a wooden seat which further rested on the teeth. Of the two perforations, the one in the right cheek is no longer present as this bone section has now broken off. The hole in the left cheek is still partially present. The smoothened and/or worn bottom of the jawbone characterizes this type of sledge (b).
8. IJzereef, G.F., 1974: A Medieval Jaw-Sledge from Dordrecht, *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 24, 181-184.
9. Collection Archeologie, Dordrechts Museum, image B. van Os (Cultural Heritage Agency of the Netherlands)
10. -
11. -

a

b



6.7.3 Dice

6.7.3.C1 Dice – *dobbelsteen*

1. Helmond
2. Het 'Oude Huys'
3. Moat section near gatehouse (HM-OHhm-oh-81-84-87.108d-lm-1149)
4. Late Medieval Period (1100-1220)
5. Bone (-)
6. 7 x 7 x 7 (l x w x d)
7. Bone dice; the numbers are indicated by ring-and-dots.
8. Arts, N., 2001: Het 'Oude Huys'. De archeologie van het eerste kasteel van Helmond, circa 1175-1375, in: N. Arts, H. Roosenboom & L. van Zalinge-Spooren (red.), *De kastelen van Helmond. Een machtscentrum aan de rand van de Peel*, 59-60. De Jong, Th., S. Peters & I. Vossen 2015: *Verwerkt Verleden. Helmond vanaf prehistorie tot nieuwe tijd*, Leiden, 178, 180.
9. Collection and image Archeologisch Centrum Eindhoven en Helmond, image L. Mulkens (Archeofoto Eindhoven)
10. 14056
11. 5.7.6

6.7.4 Dominoes

6.7.4.C1 Domino – *dominosteen*

1. 's-Hertogenbosch (Den Bosch)
2. Loeffplein
3. Aanleg valk 1 (V4)
4. -
5. Bone (-)
6. 30.5 x 15.6 x 3.1 (l x w x d)
7. The front of the piece is divided into equal halves by a superficial groove. In each half drilled dots indicate the value, one on one side and six on the other.
8. Aarts, A.C. (red.) 2020: *Burg. Loeffplein, perceelnr. 2679. Proefsleuvenonderzoek met doorstart naar een opgraving (BNIE-26)*, 's-Hertogenbosch (BAAC-Rapport A-18.0155).
9. Collection Erfgoed 's-Hertogenbosch, image BAAC
10. 12767
11. -

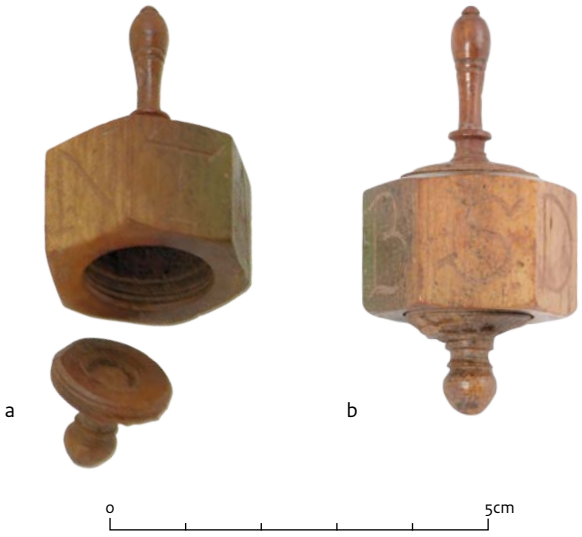
6.7.4.C2 Domino – *dominosteen*

1. Helmond
2. Markt 38, Sprengers.
3. At the north wall, between a timber floor and the outer wall (HM-SP-89-lm-3 [1005])
4. Early Modern Period B - Late Modern Period (1800-1900)
5. Bone (-), metal and wood
6. 47 x 2.3 x 9.5 (l x w x d)
7. Domino, made in two sections. The top section is bone, its surface divided in two halves by a groove with drilled dots on each side indicating the value. The bottom section is ebony. The two sections are joined by a metal rivet through the centre of both.
8. -
9. Collection Archeologisch Centrum Eindhoven en Helmond, image L. Mulkens (Archeofoto, Eindhoven)
10. 7004 and 7005
11. -

6.7.5 Gaming tops (teetotums)

6.7.5.C1 Teetotum – *teetotum*

1. Alkmaar
2. Langestraat 64 A447-W
3. Cesspit (Feature 10U, 01LAN2BP1-RAB)
4. Early Modern Period (1625-1850)
5. Bone (-)
6. 54 x 25 (l x w)
7. Hexagonal, hollow game top with a screwed-on axle on top and a small lid with finial at the bottom. A letter on each of the six faces indicates the action that is to be performed: S=*Spelen* [play], D=*Dubbel* [double], N=*Niet trekken* [don't draw], T=*Trekken* [draw], A=*Allen trekken* [all draw], B=*Betalen* [pay].
8. Bitter, P. & R. Roedema 2022: Huisraad van overige materialen, in: P. Bitter (red.), *Zeven eeuwen wonen, werken en winkelen in de Langestraat van Alkmaar*, Alkmaar (Rapporten over de Alkmaarse Monumentenzorg en Archeologie 25, deel 2), 903-942.
9. Collection Erfgoed Alkmaar, Archeologisch Centrum, image P. Bitter/R. Roedema
10. -
11. -



6.7.6 Gaming pieces

6.7.6.C1 Chess pieces – *schaakstukken*

1. Helmond
2. Burcht het 'Oude Huys'
3. Moat section near gatehouse (left: HM-OH-81-84-87-105; right: HM-OH-81-84-33-87-106)
4. Late Medieval Period (left: *c.* 1100-1150; right: 1000-1200)
5. Left: Ivory (walrus); right: osseous
6. Left: 43 x 40 x 13; right: 15 x 10 x 13 (h x w x d)
7. Left: Walrus-ivory chess piece with foliage decoration and on the bottom runic inscriptions. Right: Stylized knight of osseous material. The piece is cylindrical with a rounded top; two cone-shaped protomes are directed obliquely forward. on the top and back a decoration of four circle-and-dots.
8. Kluge-Pinsker, A., 1991: *Schach und Trictrac. Zeugnisse Mittelalterlicher Spielfreude in Salischer Zeit*, Sigmaringen (Römisch-Germanisches Zentralmuseum, Monographien 30).
Arts, N., 2001: Het 'Oude Huys'. De archeologie van het eerste kasteel van Helmond, circa 1175-1375, in: N. Arts, H. Roosenboom & L. van Zalinge-Spooren (red.), *De kastelen van Helmond. Een machtscentrum aan de rand van de Peel*, Helmond/Utrecht, 22-75.
Kloprogge, M. & I. Kloprogge 2007: *Chessmen, Art and history*, Amsterdam.
De Jong, Th., S. Peters & I. Vossen 2015: *Verwerkt Verleden. Helmond vanaf prehistorie tot nieuwe tijd*, Leiden, 178.
Willemse, A., 2023: *Het jaar 1000. Nederland in het midden van de Middeleeuwen*, Leiden, 77.
9. Collection Archeologisch Centrum Eindhoven en Helmond, image L. Mulkens (ArcheoFoto, Eindhoven)
10. 14054 and 14055
11. -

6.7.7 Gaming counters

6.7.7.C1 Gaming counter – *speelschijfje*

1. Middelburg
2. Berghuijskazerne
3. Cesspit (Bp14)
4. Early Modern Period B - Late Modern Period (1775-1900)
5. Bone (-)
6. 60.9 x 12.0 x 1.3 (l x w x d)
7. Flat bone platelet with clipped corners.
8. Esser, E., B. Beerenhout, W.J. Kuijper, & M.J. Rijkelijkhuizen 2006: Dierlijke resten uit de stad, in: J. Dijkstra, S. Ostkamp & G. Williams (red.), *Middelburg-Berghuijskazerne*, Amersfoort (ADC Rapport 595), 177-228.
9. Collection Zeeuws Archeologisch Depot, image M.J. Rijkelijkhuizen
10. 3956
11. 4.6.1, 5.7.2, 6.7.16

6.7.8 Billiard balls

6.7.8.C1 Billiard ball – *biljartbal*

1. Helmond
2. Mierlo-Hout, Houtse Parallelweg
3. Garbage dump. (HM-PW-16-1-677).
4. Late Modern Period (1850-1920)
5. Ivory (elephant)
6. 55 (ø)
7. Round billiard ball of (elephant) ivory.
8. De Jong, Th., A. van den Akker & P. van den Boom 2020: *Helmond in 100 stukskes. Vuilnis met verhalen*, Helmond, 250: bijlage 15.1, no. 409.
9. Collection and image Archeologisch Centrum Eindhoven en Helmond
10. -
11. -

6.7.9 Phalangeal bones

6.7.9.C1 Phalangeal bone – *koot* or *werpkoot*

1. Velsen
2. Brederode Castle
3. Moat
4. Late Medieval Period
5. Bone (cattle, phalanx 1) and lead
6. -
7. In the top of the phalanx is a hole through which lead was poured into the cavity. Not very neatly: the lead spilled over the top, and at some later point the lead plug has cracked. The back face has been levelled; on the front face are several scratches.
8. Zeiler, J.T., 2007: *Adellijk afval - Archeozoölogisch onderzoek van de Laat-Middeleeuwse kastelen Egmond en Brederode*, Leeuwarden (ArchaeoBone rapport 61).
9. Collection and image Provinciaal Depot voor Archeologie Noord-Holland (inv. no. 1552-04)
10. 6595
11. -

6.7.10 Knucklebones

6.7.10.C1 Knucklebone – *bikkel*

1. Arnhem
2. Kerkplein
3. Pit (S5096)
4. -
5. Bone (sheep/goat, astragalus)
6. -
7. Knucklebone made from a sheep/goat astragalus. Both sides of the bone have been chopped off to create a level surface.
8. Aal, J.H.J.M., 2020: Zoöarcheologisch onderzoek, in: M.R. van der Mark & M.A. Tolboom (red.), *In de schaduw van de Eusebius. Archeologisch onderzoek naar de prestedelijke bewoning en ontwikkeling van een bouwblok/woonblok op het Kerkplein in Arnhem*, 's-Hertogenbosch (BAACrapport A016.0325), 489-556.
9. Collection Archeologisch Depot gemeente Arnhem, image BAAC
10. 12744
11. 5.7.3

6.7.11 Buzz bones

6.7.11.C1 Buzz bone – *snorrebot*

1. Santpoort-Zuid, Velsen
2. Brederode Castle
3. Moat
4. Late Medieval Period
5. Bone (pig, metacarpal 3)
6. 66.5 x 25 (l x w)
7. In the middle of the shaft is a perforation with some traces of wear around the edges.
8. Zeiler, J.T., 2007: *Adellijk afval - Archeozoölogisch onderzoek van de Laat-Middeleeuwse kastelen Egmond en Brederode*, Leeuwarden (ArchaeoBone rapport 61).
9. Collection and image Provinciaal Depot voor Archeologie Noord-Holland.
10. -
11. 4.5.3

6.7.12 Rattles and 'rinkelbellen'

6.7.12.C1 'Rinkelbel' – *rinkelbel*

1. Rotterdam
2. Timmerhuis
3. Cesspit (S232)
4. Early Modern Period A (1575-1625)
5. Bone (-) and silver
6. 115 (l)
7. Elongated bone 'rinkelbel' with whistle, small bells, and suspension hole. The flat end piece is a teether.
8. Ploegaert, P.H.J.I., 2015: *Rotterdam Timmerhuis. Archeologisch onderzoek tussen Rodezand en Haagseveer. Een dijk uit de 13e eeuw en de stedelijke ontwikkeling vanaf de 14e eeuw*, Rotterdam (BOORrapporten 541).
9. Collection Archeologie Rotterdam, image BOOR/T. van Pinxsteren (Rotterdam)
10. -
11. 4.6.2, 5.4.1, 5.7.7, 6.7.15

6.7.12.C2 'Rinkelbellen' – *rinkelbellen*

1. Amsterdam
2. Waterlooplein (WLO), Prins Hendrikkade t/o 59-72 (PH8)
3. WLO-155-215, PH8-94 and WLO-322-10
4. Early Modern Period A (WLO-155-215: 1592-1597; WLO-322-10: 1500-1675)
5. Bone (large mammal, -) and metal
6. ? x 6.1 - 6.3 (l x d)
7. 'Rinkelbellen' with a bone teether in the shape of a tooth. The teethers have metal fittings, some with rings to attach little bells.
8. Rijkelijkhuizen, M., 2004: *Dierlijke materialen in Amsterdam*, Amsterdam (MA thesis).
9. Collection Monumenten en Archeologie Amsterdam, image A. Dekker (University of Amsterdam)
10. 18563, 18557 and -
11. -

6.7.13 Pacifiers *(fopspenen)*

6.7.13.C1 Pacifier – *fopspeen*

1. Utrecht
2. Smakkelaarsveld
3. Cesspit (BP101)
4. Early Modern Period B - Late Modern Period (1800-1925)
5. Bone (-)
6. Diameter ring and disc: 25 (ø)
7. Elements of a pacifier. Most pacifiers consist of four elements: a ring, a connecting piece, a disc, and a nipple. The rubber piece of this specimen is now missing. It would have been placed over the end of the connecting piece, which would be inserted through a hole in the centre of the disk. The back side of the disk is decorated with two concentric rings; the front has a raised edge.
8. Aal, J.H.J.M., 2022: Dierlijk bot, in: M.A. Tolboom & R.G. Mousch, *De voorstad Buiten Catharijne. Bewoningssporen uit de late middeleeuwen en nieuwe tijd op het Smakkelaarsveld*, 's-Hertogenbosch (BAAC-rapport A-17.0258), 227-254.
9. Collection Erfgoed gemeente Utrecht, image BAAC
10. 12763
11. -

6.7.14 Dolls and miniatures

6.7.14.C1 Doll – *pop*

1. Amsterdam
2. Kalverstraat
3. - (KA-114-31)
4. Modern Period (1700-1800 or 1800-1900)
5. Bone (-)
6. >60 (l)
7. Hand of a doll, cut from compact bone tissue. The hand could be attached to the rest of the arm by a hole.
8. Rijkelijkhuizen, M., 2004: *Dierlijke materialen in Amsterdam*, Amsterdam (MA thesis).
9. Collection Monumenten en Archeologie Amsterdam, image A. Dekker (University of Amsterdam)
10. 18506
11. 5.7.9

6.7.15 Flutes

6.7.15.C1 Whistle – *fluit*

1. Egmond aan den Hoef
2. Castle
3. Moat
4. Late Medieval Period
5. Bone (sheep/goat, tibia)
6. 80 (l)
7. Whistle made from a sheep/goat tibia. Both ends of the bone were sawn off at a right angle. A small obliquely-cut rectangular hole in the front reaches into the marrow cavity. Below it, at the other end, is a finger hole.
8. Zeiler, J.T., 2007: *Adellijk afval - Archeozoölogisch onderzoek van de Laat-Middeleeuwse kastelen Egmond en Brederode*, Leeuwarden (ArchaeoBone rapport 61).
9. Collection and image Provinciaal Depot voor Archeologie Noord-Holland, image J. Buist
10. 4383
11. 4.6.2, 5.4.1, 5.7.7, 6.7.13

6.7.15.C2 Whistle – *fluit*

1. Vleuten
2. Huis te Vleuten
3. Moat
4. Early Modern Period (1600-1800)
5. Bone (large mammal, -)
6. 45.3 x 26.4 (l x ø)
7. Mouth piece and body of a whistle, both sections made from the diaphysis of a large mammalian bone. The two sections are invisibly joined by a screw thread. The decorated, hollow body (originally the marrow cavity) is closed off at the top by a small bone lid which is also screwed on. The decoration was applied after the lid was in place and almost completely hides the joint.
8. Van Dijk, J., E. Esser, B. Beerenhout & M.J. Rijkelijkhuizen 2005: Archeozoölogisch onderzoek, in: J. Dijkstra & P.C. de Boer (red.), *Huis te Vleuten opgegraven. Archeologisch onderzoek in het kader van het project Spoorverbreding VleuGel/ Randstadspoor*, Amersfoort (ADC Rapport 403), 144-172.
9. Collection Provinciaal Archeologisch Depot Utrecht, image M.J. Rijkelijkhuizen
10. 3922
11. -

6.7.16 Piano keys

6.7.16.C1 Piano keys – *pianotoetsen*

1. Amsterdam
2. -
3. - (WIT-11-129)
4. -
5. Ivory (elephant)
6. Left: 100.8 x 13.4 x 1.4; right: 46 x 22.7 x 1.7 (l x w x d)
7. Three piano keys. The image of the left specimen shows the underside, which has been roughened for a stronger bond with the glue.
8. Rijkelijkhuizen, M., 2004: *Dierlijke materialen in Amsterdam*, Amsterdam (MA thesis).
9. Collection Monumenten en Archeologie Amsterdam, image A. Dekker (University of Amsterdam)
10. 18499 and 18500
11. 6.7.7

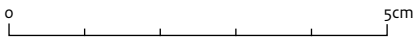
6.7.17 Stringed instruments

6.7.17.C1 Tailpiece – *snaarhouder*

1. Arnemuiden
2. Clasinastraat
3. Cellar
4. Early Modern Period A (1525-1573)
5. Bone (large mammal, -)
6. 83 (l)
7. Component of a string instrument, made from the longbone of a large mammal. Three holes at the broad end allow for strings to pass through. Two holes placed close together at the narrow end serve to attach the tailpiece to the rest of the instrument.
8. Rijkelijkhuizen, M.J., 2012: Een muzikale vondst. Een staartstuk van een snaarinstrument, in: E. Jacobs & J. Vandevelde, *De haven van Arnemuiden. Het archeologisch onderzoek aan de Clasinastraat*, Amersfoort (ADC Rapport 1675), 149-150.
9. Collection Zeeuws Archeologisch Depot, image ADC ArcheoProjecten
10. 6728
11. 5.7.8

6.7.17.C2 Tuning peg – *stemsleutel*

1. Amsterdam
2. Leprozengracht 17-33/Nieuwe Amstelstraat 12-20
3. - (MH2-607)
4. -
5. Bone (-)
6. 76.3 x 8.7 (l x w)
7. Tuning peg. One end is rounded in cross section while the other end is square.
8. Rijkelijkhuizen, M., 2004: *Dierlijke materialen in Amsterdam*, Amsterdam (MA thesis).
9. Collection Monumenten en Archeologie Amsterdam, image M.J. Rijkelijkhuizen
10. 17046
11. 4.5.3



6.8 Other objects

6.8.1 Writing implements

6.8.1.C1 Inkwell – *inktpot*

1. Middelburg
2. Berghuiskazerne
3. Dung pit
4. Early Modern Period A (1525-1575)
5. Keratine (-)
6. 40 x 30 (h x ø)
7. Small cylindrical inkwell and stopper, wider at the bottom than at the top. The body of the inkwell is made from the hollow section of a horn while the bottom was inserted separately. The stopper is made from a solid horn tip. Two oblique holes at the rim of the body and two others in the stopper allow for a carrying string to pass through.
8. Esser, E., B. Beerenhout, W.J. Kuijper, & M.J. Rijkelijkhuizen 2006: Dierlijke resten uit de stad, in: J. Dijkstra, S. Ostkamp & G. Williams 2006, *Middelburg-Berghuijskazerne*, Amersfoort (ADC Rapport 595), 177228.
9. Collection Zeeuws Archeologisch Depot, image M.J. Rijkelijkhuizen
10. 4021
11. 5.5.3

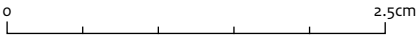
6.8.1.C2 Stylus – *stylus*

1. Rotterdam
2. Markthal
3. Raised surface
4. Late Medieval Period - Early Modern Period A (1350-1600)
5. Bone (-)
6. 88 (l)
7. Bone stylus with a pointed end for writing on a wax tablet and a flattened top for erasing text. The shaft just below the top is decorated with three concentric rings.
8. Ploegaert, P.H.J.I., 2013: *Rotterdam Markthal, archeologisch onderzoek 2. Bewoningssporen en vondsten uit de stedelijke periode (14e-18e eeuw); de bedijking van en de bewoning op het voormalige Westnieuwland in Rotterdam*, Rotterdam (BOORrapporten 468 - deel 2).
9. Collection Archeologie Rotterdam, image BOOR/T. van Pinxsteren (Rotterdam)
10. -
11. 5.2.6, 5.6.1, 5.8.1, 6.5.5

6.8.2 Panels

6.8.2.C1 Panel – *paneel*

1. Egmond aan den Hoef
2. Castle site
3. Moat
4. Late Medieval Period
5. Ivory (elephant)
6. 40 x 22 (w x h)
7. Ivory panel with an image in low relief of an apostle holding two books.
8. Zeiler, J.T., 2007: *Adellijk afval - Archeozoölogisch onderzoek van de Laat-Middeleeuwse kastelen Egmond en Brederode*, Leeuwarden (ArchaeoBone rapport 61).
9. Collection Provinciaal Depot voor Archeologie Noord-Holland (inv. no. 6019-03), image J. Buist
10. -
11. -



6.8.3 Coin balances (tumbrels)

6.8.3.C1 Coin balance – *muntbalans*

1. 's-Hertogenbosch (Den Bosch)
2. Achter de Tolburg (V DBAT 1/1-05-108)
3. Raised surface
4. Late Medieval Period (1200-1325)
5. Bone (large mammal, -)
6. 83 (l)
7. A coin could be placed on the small platform at one end while a metal pivot would be inserted through the small hole in the beam. The coin balance is decorated with double ringand-dots.
8. Janssen, H.L., 1983: Bewerkt been, in: H.L. Janssen (red.), *Van Bos tot Stad. Opgravingen in 's-Hertogenbosch,* 's-Hertogenbosch, 293-302.
Van Vilsteren, V.T., 1987, *Het Benen Tijdperk. Gebruiksvoorwerpen van been, gewei, hoorn en ivoor, 10.000 jaar geleden tot heden*, Assen.
9. Collection and image Erfgoed 's-Hertogenbosch
10. 609
11. -

6.8.4 Boxes

6.8.4.C1 Box – *doosje*

1. Amsterdam
2. Korte Houtstaat 28
3. - (WLO-94-36)
4. Early Modern Period B (1725-1750)
5. Tortoiseshell
6. 59 x 45 x 15 (l x w x h)
7. Rectangular small box and lid, each with two small holes (in the lid at the top, in the box on the rim, below) which are aligned so the two parts can be joined together.
8. Rijkelijkhuizen, M., 2004: *Dierlijke materialen in Amsterdam*, Amsterdam (MA thesis).
   Rijkelijkhuizen, M.J., 2010: Tortoiseshell in the 17th and 18th century Dutch Republic, in: A. Legrand-Pineau, I. Sidéra, N. Buc, E. David & V. Scheinsohn (eds), *Ancient and modern bone artifacts from America to Russia. Cultural, technological and functional signature*, Oxford (BAR International Series 2136), 97-106.
9. Collection Monumenten en Archeologie Amsterdam, image A. Dekker (University of Amsterdam)
10. 17015 and 17016
11. -

6.8.5 Pegs

6.8.5.C1 Peg – *knijper*

1. Alkmaar
2. Laat/Bloemstraat
3. Afvalkuil 4CD
4. Early Modern Period A (1575-1625)
5. Bone (-)
6. 150 (l)
7. A two-pronged bone peg with linear decoration and suspension hole.
8. Bitter, P., 2014: Huisraad van vroegere bewoners, in: P. Bitter & G. van den Berg, *Onder 'De Houtmarkt'. Opgravingen bij Laat/Bloemstraat in 1998 en 1999 (98BLO, 99BLO)*, Alkmaar (Rapporten over de Alkmaarse Monumenten en Archeologie 18), 107-169.
9. Collection Erfgoed Alkmaar, Archeologisch Centrum, image P. Bitter/R. Roedema
10. 15654
11. -

6.8.6 Mounting plates

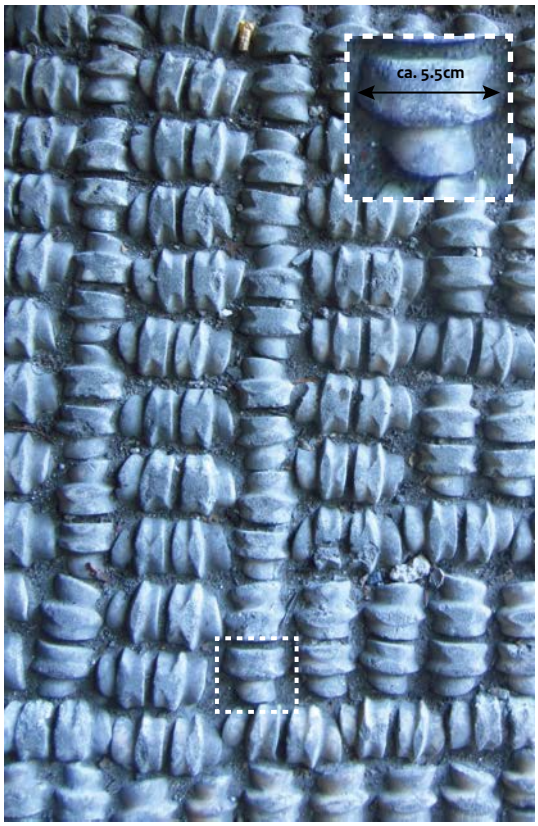
6.8.6.C1 Mounting plates – *beslag*

1. Eindhoven
2. Eindhoven Castle, Vestdijk
3. Moat section 21.1 (left: EHV-RD-92-21-9/9347; right: 9348)
4. Early Modern Period A (1500-1650)
5. Bone (large mammal, metapodium ?)
6. Left: 108 x 19.5 x 2; right: 76 x 17 x 3.5 (l x w x d)
7. Bone mounts with engraved decoration. To the left, undulating lines; to the right, a human figure, with moustache and beard.
8. -
9. Collection Archeologisch Centrum Eindhoven en Helmond, images L. Mulkens (Archeofoto, Eindhoven)
10. 7106 and 7107
11. 5.3.3, 6.3.2

6.8.7 Bone floors

6.8.7.C1 Bone street pavement – *bestrating van bot*

1. Ghent (Belgium)
2. Maalte
3. Cave
4. Early Modern Period B (1785)
5. Bone (cattle, metapodia)
6. -
7. Floor made of closely packed cattle metacarpal and metatarsal bones, positioned so the pivot joints face upwards. The pattern was created by alternating the bone axes.
8. Devriese, L., 2012: Grotten in onze streken: devotionele plaatsen en follies, *Van Mensen en Dingen: tijdschrift voor volkscultuur in Vlaanderen* 10 (2).
9. -
10. -
11. -



Appendices

Appendix I Dutch-English glossary of object types and index to the text and catalogue

Dutch-English glossary of object types and index to the text and catalogue. The T-numbers only refer to the text.

Dutch	English	Number
Aardewerk decoratiewerktuig	Pottery decoration tool	5.2.5, 6.2.4
Afgeronde kubusvormige dobbelsteen	Cuboid dice	5.7.6
Afval van de productie van drietanden	Three-pronged-tool production waste	5.2.13
Amulet	Amulet	4.5.2, 5.6.5
Basisbijl	Base axe	4.2.1
Been (van waaier)	Stick (of fan)	T6.6.7
Beitel	Chisel	4.2.1
Beslag	Mounting plate	6.8.6
Bestrating van bot	Bone street pavement	6.8.7
Bewerkte geweibasis	Worked antler base	4.8.1
Bijl	Axe	4.2.1
Bikkel	Knuckle bone	6.7.10
Biljardbal	Billard ball	6.7.8
Bobbelkam	Ripple	4.2.6
Boognok	Bow splint with incorporated nock	5.3.2
Bordoncillo of pelgrimsstaf	Bordoncillo or pelgrimsstaff	6.6.19
Borstel	Brush	6.5.4
Borstelkop	Brush head	T6.5.4
Botermes	Butter knife	6.4.2
Brede priem	Awl (broad)	4.2.2
Breinaaldhouder of breischede	Knitting sheath	6.2.15
Breischede of breinaaldhouder	Knitting sheath	6.2.15
Bril	Spectacles	6.6.14
Brilmontuur	Spectacles frame	6.6.14
Brisé-waaier	Brisé fan	T6.6.7
Broche	Brooch	5.6.4
Brug	Bridge	T5.7.8
Buis	Tube	4.7.1
Buitenbeen (van waaier)	Guard stick (of fan)	T6.6.7
Christusfiguur (deel van crucifix)	Figure of Christ (part of crucifix)	6.6.20
Cilinder	Cylinder	5.8.2
Container	Container	5.8.3
Crucifix	Crucifix	T6.6.20
Deegwiel	Pastry wheel	6.4.4
Deuvel	Dowel	T5.4.2
Diptiek-zonnewijzer	Diptych sundial	6.6.11
Dissel	Adze	4.2.1
Dobbelsteen	Dice	5.7.6, 6.7.3
Dolk	Dagger	4.3.3, 6.3.4
Dolkgevest of dolkheft	Dagger handle	4.3.3, T5.3.1, 6.3.4
Dolkheft of dolkgevest	Dagger handle	4.3.3, T5.3.1, 6.3.4
Dominosteen	Domino	6.7.4

Dutch	English	Number
Doosje	Box	6.8.4
Dop van wandelstok	Ferrule	T6.6.16
Draadhouder of klos	Thread holder	5.2.14, 6.2.12
Drietand	Three-pronged tool	5.2.13
Dubbele dissel	Double adze	4.2.1
Dubbelgepunte priem	Double-pointed awl	4.2.2
Dubbelzijdig aangepunte staaf	Double-pointed rod	5.2.11
Eenzijdig aangepunte staaf	Single-pointed rod	5.2.11
Ellemaat	Yardstick	6.2.11
Enkelvoudige dubbelzijdige kam	One-piece double-sided comb	5.5.1
Enkelvoudige eenzijdige kam	One-piece single-sided comb	5.5.1
Enkelvoudige kam met lang handvat	One-piece long-handled comb	5.5.1
Fluit	Flute	4.6.2, 5.7.7, 6.7.15
Fluitje of lokfluitje	Whistle	5.7.7, 6.7.15
Fopspeen	Pacifier	6.7.13
Gebedskraal	Prayer bead	6.6.18
Gedecoreerde rijgnaald	Decorated bodkin	6.2.13
Gefacetteerde geweipunt	Antler awl with faceted tip	4.2.2
Geschachte punt	Socketed point	5.2.6
Gesp	Belt buckle	5.6.3, 6.6.2
Gevest	Hilt	T5.3.1, 6.3.4
Glijder	Sledge runner	6.7.1
Glis	Skate	5.7.1, 6.7.1
Graafstok	Digging stick	T5.2.6
Greep of heft	Handle	4.3.3, 5.3.1, 5.6.8, 6.3.3, 6.3.4, 6.4.1, 6.6.15, 6.6.16, T6.8.1
Guts	Gouge	4.2.1
Haaknaald	Crochet hook	6.2.14
Haarpin	Hair pin	5.6.1, 6.6.4
Haarscheidingspin	Hair parter or gravoir	6.6.4
Hak of houweel	Pick	4.2.4, 5.2.1
Hakblok	Chopping block	5.2.3
Hamer	Hammer	4.2.3
Handschoenoprekker	Glove strecher	6.6.8
Handvat van parasol	Parasol handle	6.6.15
Handvat van pennemes	Handle of quill knife	T6.8.1
Handvat van wandelstok	Walking cane handle	6.6.16
Handvat-plaat van scheermes	Handle plate of razor	T6.5.8
Handvat-plaat van zakmes	Handle plate of pocket knife	T6.6.17
Hanger	Pendant	4.5.2, 5.6.5
Harpoen	Harpoon	T4.3.1
Heft of greep	Handle	4.3.3, 5.3.1, 5.6.8, 6.3.3, 6.3.4, 6.4.1, 6.6.15, 6.6.16, T6.8.1
Heft van houwdegen	Cutlass hilt	6.3.3

Dutch	English	Number
Houtje-touwtje knoop	Toggle button	4.5.3
Houwdegen	Cutlass	6.3.3
Houweel of hak	Pick	4.2.4, 5.2.1
Huisvloer van bot	Bone house floor pavement	6.8.7
Inktpot	Inkwell	6.8.1
J-bijl	J-axe	4.2.1
Kaakslee	Jaw sledge	6.7.2
Kam	Comb	4.4.1, 5.5.1, T5.5.2, 6.5.1, T6.5.2
Kam met lang handvat	Long-handled comb	4.4.1
Kamfoedraal	Comb case	5.5.1
Kamtypologie	Comb typology	T5.5.2, T6.5.2
Kantklosje	Lace bobbin	6.2.14
Kantwerktuig	Lace tool	6.2.14
Katrol as	Pulley axle	6.2.3
Kistbeslag	Casket mount	5.4.2
Kledingspeld of kledingpin	Clothing pin	5.6.1
Kledingpin of kledingspeld	Clothing pin	5.6.1
Klos	Bobbin or reel	4.2.11, 5.2.8
Klos of draadhouder	Thread holder	5.2.14, 6.2.12
Klotendolk gevest	Ballock or kidney dagger handle	T6.3.4
Kluitenbreker	Rake or clod breaker	5.2.1
Knijper	Peg	6.8.5
Knoop	Button	6.6.1
Knoop met oog	Loop button	6.6.1
Knoop-en-lussluiting	Button-and-loop fastener	5.6.2
Knoopkern	Button mould	6.6.1
Kokerbijl	Socketed axe	4.2.1
Koot of werpkoot	Phalangeal bone	6.7.9
Kraal	Bead	4.5.1, 5.6.6, 5.7.6, 6.6.18
Kruisboog	Crossbow	6.3.1
Kruitflacon of kruitfles	(Priming) powder flask	6.3.6
Kruitfles of kruitflacon	(Priming) powder flask	6.3.6
Kruithoorn	Powder horn	6.3.5
Kubusvormige dobbelsteen	Cubical dice	5.7.6
Kunstgebit	False teeth or denture	6.5.10
Ladeknop	Drawer knob	T6.4.6
Lakstempel	Seal stamp	6.6.13
Lange kam van bot	Longbone comb	6.5.1
Lepel	Spoon	5.4.3, 6.4.3
Lineaal	Ruler	T5.8.1
Lokfluitje of fluitje	Whistle	5.7.7, 6.7.15
Luizenkam	Lice comb	6.5.2
Marlpriem	Marlin spike	T5.6.6, 6.2.1

Dutch	English	Number
Mes	Knife	4.2.12, 5.6.8, 6.4.1
Mesheft	Knife handle	5.6.8, 6.4.1
Meubel ornament	Furniture ornament	6.4.6
Meubelbeslag	Furniture mount	5.4.2, T6.4.6
Momento mori-kraal	Momento mori bead	6.6.18
Muntbalans	Coin balance	6.8.3
Naald	Needle	4.2.2, T5.2.6, 5.2.7, 6.2.13
Naaldenkoker	Needle case	6.2.9
Nagelgarnituur	Manicure set	6.5.6
Objecten gemaakt van cilinders, schijven en knoppen	Objects made of cylinders, discs and terminals	5.8.2
Oesdop (paardentuig)	'Oesdop' (horse gear)	T5.2.9
Oorlepel	Ear spoon	6.5.5
Oorlepel met tandenstoker	Ear spoon with tooth pick	6.5.5
Opvouwbare waaier	Foldable fan	6.6.7
Paardentuig	Horse gear	T5.2.9, 5.8.4
Paneel	Panel	6.8.2
Parasol	Parasol	6.6.15
Pareerstang	Guard	5.3.1
Pelgrimsinsigne	Pilgrim badge	6.6.19
Pelgrimsstaf of bordoncillo	Pilgrimsstaff or bordoncillo	6.6.19
Pennemes	Quill knife	T6.8.1
Pennenhouder	Pen holder	T6.8.1
Perkamenthouder	Parchement holder	T5.8.2
Pianotoets	Piano key	6.7.16
Pijlpunt	Arrowhead	4.3.1
Pijlpuntnaald	Arrowhead needle	T5.2.7
Pijlsteun	Arrow support plate	6.3.1
Pijp	Pipe	6.6.10
Pijpkrabber	Pipe cleaner	T6.6.10
Pijponderdeel	Tobacco pipe component	6.6.10
Pijpstamper	Pipe stopper	T6.6.10
Pin of speld	Pin	5.2.6, 5.6.1
Poederdoos	Powder box	6.6.9
Polijster	Smoother or polisher	4.2.8, 5.2.4, 6.2.6
Polsbeschermer	Wristguard or bracer	6.3.7
Pomander	Pomander	6.5.9
Pommel	Pommel	T5.3.1
Pop	Doll	5.7.9, 6.7.14
Priem	Awl	4.2.2, 5.2.6, 6.2.1
Priem of marlpriem	Awl or marlin spike	6.2.1
Punt	Point	4.2.2, 5.2.6
Pyxis	Pyxide	5.5.3
Rammelaar	Rattle	6.7.12

Dutch	English	Number
Rechthoekige dobbelsteen	Rectangular dice	5.7.6
Retouchoir	Retouchoir	4.2.5
Riembeslag	Belt mount	5.3.3
Riemtong	Strap-end	T5.6.3, T6.6.2
Rijgnaald	Bodkin	6.2.13
Ring	Ring	5.6.7
Ring met schijf	Ring and disc	5.6.7
Ringeloor	Pottery decorating tool	6.2.4
Rinkelbel	'Rinkelbel'	6.7.12
Rozenkrans	Rosary	6.6.18
Rozenkranskruis	Rosary cross	T6.6.18
Samengestelde boog	Composite bow	5.3.1
Samengestelde dubbelzijdige kam	Composite double-sided comb	5.5.1
Samengestelde enkelzijdige kam	Composite one-sided comb	5.5.1
Samengestelde priem	Composite awl	6.2.1
Schaaf	Plane	5.2.2
Schaakstuk	Chess piece	6.7.6
Schaatsstok	Skating pole	T5.2.6
Scharnier	Hinge	5.4.1
Scheermes	Razor	6.5.8
Schijfvormige hanger	Discoid pendant	5.6.5
Schoenlepel	Shoehorn	6.6.3
Schouderbladschep of schouderbladspade	Scapula scoop	4.2.7, 5.4.5
Schouderbladspade of schouderbladsschep	Scapula scoop	4.2.7, 5.4.5
Schraper	Scraper	5.2.4
Schrijfveer	Quill pen	T6.8.1
Sigarenpijpje	Cigarholder	T6.6.10
Sigarettenpijpje	Cigaretteholder	T6.6.10
Sint Jacobsschelp	Shell of St James	6.6.19
Slee	Sledge	5.7.1, 6.7.1, 6.7.2
Sleutelgatbeschermer	Keyhole plate or protector	6.4.6
Slikhaak	Fishing gorge	T4.3.2, T5.2.11
Sluiting	Fastener	5.6.2
Snaarhouder	Tailpiece	5.7.8, 6.7.17
Snorrebot	Buzz bone	6.7.11
Spatel	Spatula	4.2.9
Speelschijfje	Gaming counter	4.6.1, 5.7.2, 6.7.7
Speelstuk	Gaming piece	5.7.4, 5.7.5, 6.7.6
Speer	Spear	T4.3.1
Speld of pin	Pin	5.2.6, 5.6.1
Spinrok	Distaff	T5.8.2
Spinklos of spinsteen	Spindle whorl	4.2.10, 5.2.9
Spinsteen of spinklos	Spindle whorl	4.2.10, 5.2.9

Dutch	English	Number
Spinstok	Spindle	T5.2.9
Spits	Barbed or projectile point	4.3.1
Spleutsteker	'Spleutsteker'	T5.2.6
Spoel	Shuttle	4.7.2, 6.2.12
Sprongbeen	Astragalus	5.7.3
Spuit	Syringe	6.5.7
Staaf	Rod	5.2.11
Stempel	Stamp	T5.2.5
Stemsleutel	Tuning peg	5.7.8, 6.7.17
Stylus	Stylus	5.8.1, 6.8.1
T-bijl	T-axe	4.2.1
Tabaksdoos	Tabacco box	T6.6.10
Talghoorn	Tallow horn	6.2.5
Tandenborstel	Toothbrush	6.5.3
Tandenstoker	Toothpick	6.5.5
Tasring	Bag ring	T5.6.7
Taustaf	Tau staff	5.8.5
Teetotum	Teetotum	6.7.5
Toiletset	Toiletry set	6.5.5
Touwspanner	Rope adjustment buckle	6.2.2
Tuimelaar	Crossbow nut	6.3.1
Tweekoppige knoop	Double-headed button	T6.6.1
Tweekoppige sluiting	Double-headed fastener	5.6.2
Veren waaier	Feather fan	6.6.6
Verenkruller	Feather curler	6.6.6
Verfpalet	Paint palette	6.2.8
Verrekijker	Telescope	6.6.12
Viergatsknoop	Four-holed button	6.6.1
Vingerhoed	Thimble	6.2.10
Vingerring	Finger ring	6.6.5
Vishaak	Fish hook	4.3.2, T5.2.11
Vishaak met weerhaak	Barbed fishook	4.3.2
Vishaak zonder weerhaak	Fishhook without barb	4.3.2
Visspeer	Fishing spear	T5.2.6
Vleespen of worstpen	Sausage pin	6.4.5
Voorsnijmes	Carving knife	6.4.1
Vouwbeen	Folding tool	6.2.7
Vouwmes	Folding knife	5.6.8
Vuurwapenbeslag	Firearm mounting	6.3.2
Waaier	Fan	6.6.6, 6.6.7
Wandelstok	Walking cane	6.6.16
Wangbit (paardentuig)	Bit (horse gear)	5.8.4
Weefkaart	Weaving tablet	5.2.12

Dutch	English	Number
'Weefkam'	'Weaving comb'	T5.5.1
Weefspoel	Weaving shuttle	4.7.2, 6.2.12
Weefstok	Pin beater	T5.2.9, T5.2.11
Weefzwaard	Weaving sword	5.2.10
Werpkoot of koot	Phalangeal bone	6.7.9
Worstpen of vleespen	Sausage pin	6.4.5
Zakmes	Pocket knife	6.6.17
Zeef	Sieve	5.4.4
Zonnwijzer	Sundial	6.6.11
Zuiger	Plunger or piston	T6.5.7
Zwaardpareerstang	Sword guard	5.3.1
Zwaardgevest	Sword hilt	T5.3.1
Zwaardgreep	Sword handle	5.3.1
Zwaardpuntbeschermer	Scabbard chape	5.3.1
Zwaardriembeugel	Scabbard slide	5.3.1

Appendix II English-Dutch glossary of object types and index to the text and catalogue

English-Dutch glossary of object types and index to the text and catalogue. The T-numbers only refer to the text.

English	Dutch	Number
Adze	Dissel	4.2.1
Amulet	Amulet	4.5.2, 5.6.5
Antler awl with faceted tip	Gefacetteerde geweipunt	4.2.2
Arrow support plate	Pijlsteun	6.3.1
Arrowhead	Pijlpunt	4.3.1
Arrowhead needle	Pijlpuntnaald	T5.2.7
Astragalus	Sprongbeen	5.7.3
Awl	Priem	4.2.2, 5.2.6, 6.2.1
Awl (broad)	Brede priem	4.2.2
Awl or marlin spike	Priem of marlpriem	6.2.1
Awl or point	Priem	5.2.6
Axe	Bijl	4.2.1
Bag ring	Tasring	T5.6.7
Ballock or kidney dagger handle	Klotendolk gevest	T6.3.4
Barbed fishook	Vishaak met weerhaak	4.3.2
Barbed or projectile point	Spits	4.3.1
Base axe	Basisbijl	4.2.1
Bead	Kraal	4.5.1, 5.6.6, 5.7.6, 6.6.18
Belt buckle	Gesp	5.6.3, 6.6.2
Belt mount	Riembeslag	5.3.3
Billard ball	Biljardbal	6.7.8
Bit (horse gear)	Wangbit (paardentuig)	5.8.4
Bobbin or reel	Klos	4.2.11, 5.2.8
Bodkin	Rijgnaald	6.2.13
Bone house floor pavement	Huisvloer van bot	6.8.7
Bone street pavement	Bestrating van bot	6.8.7
Bordoncillo or pelgrimsstaff	Bordoncillo of pelgrimsstaf	6.6.19
Bow splint with incorporated nock	Boognok	5.3.2
Box	Doosje	6.8.4
Bracer or wristguard	Polsbeschermer	6.3.7
Bridge	Brug	T5.7.8
Brisé fan	Brisé-waaier	T6.6.7
Brooch	Broche	5.6.4
Brush	Borstel	6.5.4
Brush head	Borstelkop	T6.5.4
Butter knife	Botermes	6.4.2
Button	Knoop	6.6.1
Button mould	Knoopkern	6.6.1
Button-and-loop fastener	Knoop-en-lussluiting	5.6.2
Buzz bone	Snorrebot	6.7.11
Carving knife	Voorsnijmes	6.4.1
Casket mount	Kistbeslag	5.4.2

English	Dutch	Number
Chess piece	Schaakstuk	6.7.6
Chisel	Beitel	4.2.1
Chopping block	Hakblok	5.2.3
Cigaretteholder	Sigarettenpijpje	T6.6.10
Cigarholder	Sigarenpijpje	T6.6.10
Clod breaker	Kluitenbreker	5.2.1
Clothing pin	Kledingspeld of kledingpin	5.6.1
Coin balance	Muntbalans	6.8.3
Comb	Kam	4.4.1, 5.5.1, T5.5.2, 6.5.1, T6.5.2
Comb case	Kamfoedraal	5.5.1
Comb typology	Kamtypologie	T5.5.2, T6.5.2
Composite awl	Samengestelde priem	6.2.1
Composite bow	Samengestelde boog	5.3.1
Composite double-sided comb	Samengestelde dubbelzijdige kam	5.5.1
Composite one-sided comb	Samengestelde enkelzijdige kam	5.5.1
Container	Container	5.8.3
Crochet hook	Haaknaald	6.2.14
Crossbow	Kruisboog	6.3.1
Crossbow nut	Tuimelaar	6.3.1
Crucifix	Crucifix	6.6.20
Cubical dice	Kubusvormige dobbelsteen	5.7.6
Cuboid dice	Afgeronde kubusvormige dobbelsteen	5.7.6
Cutlass	Houwdegen	6.3.3
Cutlass hilt	Heft van houwdegen	6.3.3
Cylinder	Cilinder	5.8.2
Dagger	Dolk	4.3.3, 6.3.4
Dagger handle	Dolk gevest of heft	4.3.3, T5.3.1, 6.3.4
Decorated bodkin	Gedecoreerde rijgnaald	6.2.13
Denture or false teeth	Kunstgebit	6.5.10
Dice	Dobbelsteen	5.7.6, 6.7.3
Digging stick	Graafstok	T5.2.6
Diptych sundial	Diptiek-zonnewijzer	6.6.11
Discoid pendant	Schijfvormige hanger	5.6.5
Distaff	Spinrok	T5.8.2
Doll	Pop	5.7.9, 6.7.14
Domino	Dominosteen	6.7.4
Double adze	Dubbele dissel	4.2.1
Double-headed button	Tweekoppige knoop	T6.6.1
Double-headed fastener	Tweekoppige sluiting	5.6.2
Double-pointed awl	Dubbelgepunte priem	4.2.2
Double-pointed rod	Dubbelzijdig aangepunte staaf	T5.2.11
Dowel	Deuvel	T5.4.2
Drawer knob	Ladeknop	T6.4.6

English	Dutch	Number
Ear spoon	Oorlepel	6.5.5
Ear spoon with tooth pick	Oorlepel met tandenstoker	6.5.5
False teeth or denture	Kunstgebit	6.5.10
Fan	Waaier	6.6.6, 6.6.7
Fastener	Sluiting	5.6.2
Feather curler	Verenkruller	6.6.6
Feather fan	Veren waaier	6.6.6
Ferrule	Dop van wandelstok	T6.6.16
Figure of Christ (part of crucifix)	Christusfiguur (deel van crucifix)	6.6.20
Finger ring	Vingerring	6.6.5
Firearm mounting	Vuurwapenbeslag	6.3.2
Fish hook	Vishaak	4.3.2, T5.2.11
Fishhook without barb	Vishaak zonder weerhaak	4.3.2
Fishing gorge	Slikhaak	T4.3.2, T5.2.11
Fishing spear	Visspeer	T5.2.6
Flute	Fluit	4.6.2, 5.7.7, 6.7.15
Foldable fan	Opvouwbare waaier	6.6.7
Folding knife	Vouwmes	5.6.8
Folding tool	Vouwbeen	6.2.7
Four-holed button	Viergatsknoop	6.6.1
Furniture mount	Meubelbeslag	5.4.2, T6.4.6
Furniture ornament	Meubel ornament	6.4.6
Gaming counter	Speelschijfje	4.6.1, 5.7.2, 6.7.7
Gaming piece	Speelstuk	5.7.4, 5.7.5, 6.7.6
Gaming top	Teetotum	6.7.5
Glove strecher	Handschoenoprekker	6.6.8
Gouge	Guts	4.2.1
Gravoir or hair parter	Haarscheidingspin	6.6.4
Guard	Pareerstang	5.3.1
Guard stick (of fan)	Buitenbeen (van waaier)	T6.6.7
Hair parter or gravoir	Haarscheidingspin	6.6.4
Hair pin	Haarpin	5.6.1, 6.6.4
Hammer	Hamer	4.2.3
Handle	Heft of greep	4.3.3, 5.3.1, 5.6.8, 6.3.3, 6.3.4, 6.4.1, 6.6.15, 6.6.16, T6.8.1
Handle of quill knife	Handvat van pennemes	T6.8.1
Handle plate of pocket knife	Handvat-plaat van zakmes	T6.6.17
Handle plate of razor	Handvat-plaat van scheermes	T6.5.8
Harpoon	Harpoen	T4.3.1
Hilt	Gevest	T5.3.1
Hinge	Scharnier	5.4.1
Horse gear	Paardentuig	T5.2.9, 5.8.4
Inkwell	Inktpot	6.8.1
Jaw sledge	Kaakslee	6.7.2

English	Dutch	Number
J-axe	J-bijl	4.2.1
Keyhole plate or protector	Sleutelgatbeschermer	6.4.6
Kidney or ballock dagger handle	Klotendolk gevest	T6.3.4
Knife	Mes	4.2.12, 5.6.8, 6.4.1
Knife handle	Mesheft	5.6.8, 6.4.1
Knitting sheath	Breinaaldhouder of breischede	6.2.15
Knuckle bone	Bikkel	6.7.10
Lace bobbin	Kantklosje	6.2.14
Lace tool	Kantwerktuig	6.2.14
Lice comb	Luizenkam	6.5.2
Long-handled comb	Kam met lang handvat	4.4.1
Longbone comb	Lange kam van bot	6.5.1
Loop button	Knoop met oog	6.6.1
Manicure set	Nagelgarnituur	6.5.6
Marlin spike	Marlpriem	T5.6.6, 6.2.1
Momento mori bead	Momento mori-kraal	6.6.18
Mounting plate	Beslag	6.8.6
Needle	Naald	4.2.2, T5.2.6, 5.2.7, 6.2.13
Needle case	Naaldenkoker	6.2.9
Objects made of cylinders, discs and terminals	Objecten gemaakt van cilinders, schijven en knoppen	5.8.2
‘Oesdop’ (horse gear)	Oesdop (paardentuig)	T5.2.9
One-piece double-sided comb	Enkelvoudige dubbelzijdige kam	5.5.1
One-piece long-handled comb	Enkelvoudige kam met lang handvat	5.5.1
One-piece single-sided comb	Enkelvoudige eenzijdige kam	5.5.1
Pacifier	Fopspeen	6.7.13
Paint palette	Verfpalet	6.2.8
Panel	Paneel	6.8.2
Parasol	Parasol	6.6.15
Parasol handle	Handvat van parasol	6.6.15
Parchement holder	Perkamenthouder	T5.8.2
Pastry wheel	Deegwiel	6.4.4
Peg	Knijper	6.8.5
Pen holder	Pennenhouder	T6.8.1
Pendant	Hanger	4.5.2, 5.6.5
Phalangeal bone	Koot of werpkoot	6.7.9
Piano key	Pianotoets	6.7.16
Pick	Hak of houweel	4.2.4, 5.2.1
Pilgrim badge	Pelgrimsinsigne	6.6.19
Pilgrimsstaff or bordoncillo	Pelgrimsstaf of bordoncillo	6.6.19
Pin	Pin of speld	5.2.6, 5.6.1
Pin beater	Weefstok	T5.2.9, T5.2.11
Pipe	Pijp	6.6.10
Pipe cleaner	Pijpkrabber	T6.6.10

English	Dutch	Number
Pipe stopper	Pijpstamper	T6.6.10
Piston or plunger	Zuiger	T6.5.7
Plane	Schaaf	5.2.2
Plunger or piston	Zuiger	T6.5.7
Pocket knife	Zakmes	6.6.17
Point	Punt	4.2.2, 5.2.6
Point or awl	Priem	5.2.6
Polisher or smoother	Polijster	4.2.8, 5.2.4, 6.2.6
Pomander	Pomander	6.5.9
Pommel	Pommel	T5.3.1
Pottery decorating tool	Ringeloor	6.2.4
Pottery decoration tool	Aardewerk decoratiewerktuig	5.2.5
Powder box	Poederdoos	6.6.9
Powder flask	Kruitfles of kruitflacon	6.3.6
Powder horn	Kruithoorn	6.3.5
Prayer bead	Gebedskraal	6.6.18
Priming powder flask	Kruitfles of kruitflacon	6.3.6
Projectile or barbed point	Spits	4.3.1
Pulley axle	Katrol as	6.2.3
Pyxide	Pyxis	5.5.3
Quill knife	Pennemes	T6.8.1
Quill pen	Schrijfveer	T6.8.1
Rake	Kluitenbreker	5.2.1
Rattle	Rammelaar	6.7.12
Razor	Scheermes	6.5.8
Rectangular dice	Rechthoekige dobbelsteen	5.7.6
Reel or bobbin	Klos	4.2.11, 5.2.8
Retouchoir	Retouchoir	4.2.5
Ring	Ring	5.6.7
Ring and disc	Ring met schijf	5.6.7
‘Rinkelbel’	Rinkelbel	6.7.12
Ripple	Bobbelkam	4.2.6
Rod	Staaf	5.2.11
Rope adjustment buckle	Touwspanner	6.2.2
Rosary	Rozenkrans	6.6.18
Rosary cross	Rozenkranskruis	T6.6.18
Ruler	Lineaal	T5.8.1
Sausage pin	Vleespen of worstpen	6.4.5
Scabbard chape	Zwaardpuntbeschermer	5.3.1
Scabbard slide	Zwaardriembeugel	5.3.1
Scapula scoop	Schouderbladschep of schouderbladspade	4.2.7, 5.4.5
Scraper	Schraper	5.2.4
Seal stamp	Lakstempel	6.6.13

English	Dutch	Number
Shell of St James	Sint Jacobsschelp	6.6.19
Shoehorn	Schoenlepel	6.6.3
Shuttle	Spoel	4.7.2, 6.2.12
Sieve	Zeef	5.4.4
Single-pointed rod	Eenzijdig aangepunte staaf	5.2.11
Skate	Glis	5.7.1, 6.7.1
Skating pole	Schaatsstok	T5.2.6
Sledge	Slee	5.7.1, 6.7.1, 6.7.2
Sledge runner	Glijder	6.7.1
Smoother or polisher	Polijster	4.2.8, 5.2.4, 6.2.6
Socketed axe	Kokerbijl	4.2.1
Socketed point	Geschachte punt	5.2.6
Spatula	Spatel	4.2.9
Spear	Speer	T4.3.1
Spectacles	Bril	6.6.14
Spectacles frame	Brilmontuur	6.6.14
Spindle	Spinstok	T5.2.9
Spindle whorl	Spinsteen of spinklos	4.2.10, 5.2.9
‘Spleutsteker’	Spleutsteker	T5.2.6
Spoon	Lepel	5.4.3, 6.4.3
Stamp	Stempel	T5.2.5
Stick (of fan)	Been (van waaier)	T6.6.7
Strap-end	Riemtong	T5.6.3, T6.6.2
Stylus	Stylus	5.8.1, 6.8.1
Sundial	Zonnwijzer	6.6.11
Sword guard	Zwaardpareerstang	5.3.1
Sword handle	Zwaardgreep	5.3.1
Sword hilt	Zwaardgevest	T5.3.1
Syringe	Spuit	6.5.7
Tabacco box	Tabaksdoos	T6.6.10
Tailpiece	Snaarhouder	5.7.8, 6.7.17
Tallow horn	Talghoorn	6.2.5
Tau staff	Taustaf	5.8.5
T-axe	T-bijl	4.2.1
Teetotum	Teetotum	6.7.5
Telescope	Verrekijker	6.6.12
Thimble	Vingerhoed	6.2.10
Thread holder	Draadhouder of klos	5.2.14, 6.2.12
Three-pronged tool	Drietand	5.2.13
Three-pronged-tool production waste	Afval van de productie van drietanden	5.2.13
Tobacco pipe component	Pijponderdeel	6.6.10
Toggle button	Houtje-touwtje knoop	4.5.3
Toiletry set	Toiletset	6.5.5

English	Dutch	Number
Toothbrush	Tandenborstel	6.5.3
Toothpick	Tandenstoker	6.5.5
Tube	Buis	4.7.1
Tuning peg	Stemsleutel	5.7.8, 6.7.17
Walking cane	Wandelstok	6.6.16
Walking cane handle	Handvat van wandelstok	6.6.16
'Weaving comb'	'Weefkam'	T5.5.1
Weaving shuttle	Weefspoel	4.7.2, 6.2.12
Weaving sword	Weefzwaard	5.2.10
Weaving tablet	Weefkaart	5.2.12
Whistle	Fluitje of lokfluitje	5.7.7, 6.7.15
Worked antler base	Bewerkte geweibasis	4.8.1
Wristguard or bracer	Polsbeschermer	6.3.7
Yardstick	Ellemaat	6.2.11

This scientific report presents the results of a study which aims to provide a typochronological overview and present the current state of research of osseous and keratinous objects in the Netherlands by means of a systematic inventory and basic analysis of the finds. The study encompasses all osseous and keratinous materials, such as bone, different types of antler and ivory, horn, tortoiseshell, baleen and hoof, as well as teeth and shell. It is based on artefacts and production waste from the Palaeolithic to the modern era and from all archaeological regions in the Netherlands, including the North Sea and Continental Shelf. The resulting scientific synthesis is supplemented by a catalogue and a database.

This scientific report is intended for archaeologists and other professionals as well as enthusiastic amateurs involved in archaeology.

The Cultural Heritage Agency of the Netherlands provides knowledge and advice to give the future a past.