Cultural Heritage Agency
Ministry of Education, Culture and Science

PROGRAMMA KENNIS VOOR ARCHEOLOGIE

PROJECT ONDERZOEKSAGENDA'S

National Archaeological Research Agenda of the Netherlands. Themes and research questions.

version (October 2020)

Content

National Archaeological Research Agenda of the Netherlands

Research requires focus. Most Dutch archaeologists would agree. More than ten years after publication of the first edition, the new version of the National Archaeological Research Agenda (NOaA) was launched in April 2016. The National Archaeological Research Agenda 2.0, like its predecessor, is a joint product of the entire archaeological community in the Netherlands, and is designed to feed and guide development-led archaeology, providing topical and relevant research questions. This is essential in order to maximize the benefits – both to science and to society – of archaeological research. It centres on 139 archaeological (i.e. 'cultural historical') research questions that highlight the most pressing issues of the day. Practical guidelines associated with each question will make it easier to address them in the field, bringing us closer to answers. The National Archaeological Research Agenda 2.0 is more tailored to its users, and ready for the future.

The new Archaeological Research Agenda is designed as a flexible web-based information system, accessible through noaa.cultureelerfgoed.nl. The agenda is updated annually. The NOaA 2.0 consists of modules rather than chapters: research questions accompanied by explanatory notes, instructions for translating them into fieldwork, and relevant background information (relevant publications). To place the research questions in a broader context, 23 overarching research themes have been identified. The questions can be accessed via four search filters: place, period, subject and site type. This makes it possible for the user to select the relevant questions on the basis of a specified expectation (with geographical, chronological and/or thematic scope).

This document provides an English translation of all the research themes and research questions from the national research agenda at the time of writing, i.e. April 2019.[1] These are complemented by a translation of the explanatory notes, operationalizations and bibliographical references of 10 questions with a distinctly international character.

To get an idea of the selection process and the basic principles used to formulate the questions please read: Groenewoudt, B.G., M.C. Eerden, T. de Groot & E.M. Theunissen 2017: Answers to questions. The new National Archaeological Research Agenda of the Netherlands, in: R.C.G.M. Lauwerier, M.C. Eerden, B.J. Groenewoudt, M.A. Lascaris, E. Rensink, B.I. Smit, B.P. Speleers & J. van Doesburg (eds),, *Knowledge for Informed Choices. Tools for more effective and efficient selection of valuable archaeology in the Netherlands*. Amersfoort (Nederlandse Archeologische Rapporten 55), 179-194.[2]

[1] Updates added after this date are not taken into account.
[2] Free downloadable on: https://www.cultureelerfgoed.nl/publicaties/publicaties/2017/01/01/knowledge-for-informed-choices

Research themes

1. Blind spots

For some parts of the Netherlands, even the broad outlines of the occupation history are not yet well known. In terms of research, these 'geographical knowledge gaps' present a problem, as they can frustrate efforts to achieve a balanced reconstruction at supra-regional level. A lack of basic knowledge also hampers the making of well-founded choices within the context of archaeological heritage management, even at a national level. This applies, for example, to the archaeological regions of the Zeeland clay area and the Frisian Peat bog area. At present, the most prominent gap is 'Doggerland': currently the section of the North Sea off the coast of the Netherlands, but during the last ice age a stretch of land that gradually flooded as sea levels rose.

2. Landscape dynamics

The Dutch landscape has changed considerably in the course of thousands of years changing from natural to cultural. Increasingly, this landscape has become the stage but also the product of human activity. Over time, the Dutch landscape constantly changed under the influence of natural factors and human activities, and the interaction between the two. This complex interaction can only be unravelled by obtaining a detailed picture of the structure and morphology of landscapes in different areas and periods, highlighting both the abiotic and biotic aspects of the landscape, and understanding the underlying processes that shape the landscape.

3. Use of water

The Netherlands is one of the most water-rich areas in the world. It is situated by the sea and intersected by countless natural and man-made watercourses. Since prehistoric times, water is thought to have played a major role in communication: over short and long distances, with regard to both the transport of people and goods, and the exchange of ideas. Both inland waterways and the sea formed part of this network of water routes, which incorporated all kinds of supporting facilities. Water also played an important military role: water as a weapon. Yet in spite of this special situation, Dutch archaeology has tended to focus strongly on land, while the attention paid to the maritime sector has long been limited to shipwrecks. The cultural-historical role of water in the Netherlands as a 'land of water' deserves a wider, more intensive and more integral examination.

4. Riverine and coastal settlement and adaptation

Essentially, the Netherlands is one vast, low-lying delta with a long tradition of dense population. From an international perspective, this gives the Netherlands a special status, comparable to the Nile Delta or Bangladesh. Wet conditions dominate, especially in the Holocene coastal lowlands from Zeeland to Groningen and the Utrecht-Gelderland river area. Before the construction of dykes, opportunities for habitation and other forms of land use in the Netherlands were strongly dependent on the influence of the sea (sea level rise, currents, storm frequency) and the behaviour of the rivers (flow, displacement, high water frequency). People had to continuously adapt to changing natural conditions, which required great flexibility and resulted in specific adaptations. Such adaptations are also interesting in light of present-day rises in sea level and increasing peak river discharges. From the late Iron Age and certainly from Roman times onwards, interventions took place in an effort to exert greater control over the wet conditions.

5. Social and economic differentiation

Inequality is a fact of life, but levels of inequality change and these changes often have major consequences. Inequality can be situational, institutional, or gender-determined. Archaeologically, social and economic differentiation is reflected in different ways, in a variety of contexts and on various spatial scales. Generally speaking, differences in wealth and social position can be read from material expressions of possession and behaviour (monumental homes, personal possessions, eating and drinking culture, burial gifts etc.). Inequality also manifests itself in forms of specialization, including in the field of crafts and workmanship, and also in gender-related activities and areas of activity.

6. Emigration, immigration, acculturation

Initially cultural change, as reflected in material culture, was thought to be the outcome of migration. Later, the prevalent view was that cultural change was the result of acculturation: the dissemination and (possibly selective) adaptation of new ideas. The only exception was made for the rapid expansion of the first farmers (the *linearbandkeramik* culture). In recent years, it has become increasingly clear that migration did indeed take place in various historical periods, sometimes over great distances. This has resulted from the more general application of DNA research and isotope analysis (carbon, nitrogen, strontium). In all likelihood, the truth lies somewhere in the middle, but where?

7. The archaeology of ritual

Until recently, ritual and religion played a very important role, which extended into all kinds of everyday activities. At times there may have been hardly any distinction between 'the profane' and 'the ritual'; in specific activities (and therefore the associated material precipitation) both may be inextricably intertwined. It is clear that the way in which historical societies function cannot be properly understood without devoting serious and systematic attention to possible manifestations of ritual and religion, both within evident ritual and funerary contexts (such as cult places and burial grounds), and 'profane' contexts such as settlements and field complexes. Modern archaeological practice perhaps reflects the far-reaching secularization of contemporary society, and is perhaps less likely to accept 'ritual' explanations.

8. Archaeology of conflict

The Netherlands is far from a militarist country. That is probably the reason why, until recently, relatively little attention was paid to our military past and military heritage. This contrasts sharply with some of the Netherlands' neighbours, where historic battles and battlefields have always been the centre of attention. Wars and other conflicts are historical realities which had complex causes and often profound consequences. For this reason alone, it is important to understand them better.

9. Death and burial

Graves and burial grounds have long been a traditional focus for archaeological study. This is hardly surprising, given that they are important and multifaceted sources of information about people, societies and attitudes from the past. Nevertheless, there are still significant gaps in our knowledge of funerary practices (the burial ritual). This applies to the earliest period in particular, the time up to and including the Middle Neolithic period (up to around 2850 BC). Another relatively unknown aspect concerns funerary practices in the period between formal Christianization (this differs per region: 6th-8th centuries) and the widespread appearance of churches with cemeteries (11th-12th centuries). Little is understood about the variation in the long-term use of cemeteries. Some have been used for a long time, or used again and again, while others have not.

10. The earliest occupation of the Netherlands

In the Netherlands, the oldest traces of human habitation date from the period prior to the formation of ice-pushed ridges during the Saalien glaciation, i.e. over 150,000 years ago and possibly even over 350,000 years ago (Maastricht, Woerden). During the late phase of the Middle Pleistocene and the Late Pleistocene, Neanderthals (*Homo neanderthalensis*) inhabited the Netherlands, though not under all climatic conditions: habitation was discontinuous and during long periods there was no human occupation at all. Given our country's position on the geographical periphery, i.e. the northwestern edge of the European continent, Dutch sites are of great importance to the current, international scientific discussion about the earliest occupation of this part of Europe.

11. Late Palaeolithic to Early Mesolithic transition

The climate changed rapidly at the start of the Holocene, becoming warmer and more humid. The open Late Pleistocene landscape with its limited spectrum of large, migrating, mammals (reindeer, horse, steppe bison) changed dramatically: dense forest flourished and the environment became richer in water. A richer variety of flora and fauna developed, and the fauna also became more settled in one place. All these changes forced humans to adapt rapidly, as shown in the diversification of the food economy and the adoption of alternative hunting methods. The importance of exploiting maritime resources (salt and fresh water) is thought to have increased considerably, certainly along the coast. Territories became smaller. It is thought that populations increased.

12. The Neolithization process

Throughout the world, the introduction of agriculture was one of the most profound changes in human history. The how and why of this change remains an important research topic. The Netherlands is special due to its relatively peripheral location in relation to the area from which its agriculture originated: the Near East. It is also interesting that the introduction of agriculture was initially limited to the loess zone in South Limburg. Specific 'Neolithic' ideas and elements filtered through to the north, where partly agricultural economies gradually developed. For a long time there may have been interaction between farming groups and groups that were essentially hunter-gatherers.

13. Farming life established

Around 1500 BC, fundamental changes occurred in the use and organization of agricultural landscapes. Settlements became more permanent, farms and outbuildings more robust and built to last. Field complexes also became more fixed and were subdivided. It is thought that fields were more intensively used for crop cultivation. In certain situations, this led to problems: from soil degradation to sand drift. The increased spatial stability of settlements and fields led to the emergence of 'familiar landscapes' and probably encouraged a stronger awareness of territoriality.
A cultural landscape of settlement territories becomes visible suggesting territorial claims by local communities.

14. The role of natural food sources after the introduction of agriculture

The introduction of agriculture was not an event, but in most cases a lengthy process. It may not have led to the complete abandonment of the old way of life based on the exploitation of natural food sources by means of hunting, fishing and gathering nuts and fruit. Little is known about the extent to which natural food sources were still exploited after the introduction of agriculture. This might vary considerably according to period and region, possibly related to restrictions on hunting and fishing, for example.

15. The *limes*: organization and interaction

The Roman border (*limes*) followed the Rhine from the German border at Lobith to the mouth of the Rhine at Katwijk. This water boundary was part of the northern border of the province of Germania Inferior. The *limes* consisted of a chain of large and small fortifications with associated infrastructure (roads, ports, quays), civil settlements (vici) and burial grounds. The Rhine was an

important transport and trade artery, but it also functioned as a route for interaction: the exchange of cultures and ideas. It recently has become clear that there was also a coherent military infrastructure along the coast, in which the canal commissioned by Corbulo (Fossa Corbulonis) played an important role. The Dutch section of the *limes* is characterized by a long, continuous lifespan, from the last decades before the Common Era until the first half of the 5th century. The Dutch part of the *limes* is exceptional in the sense that it included different types of water management. The wet, fluviatile and perimarine conditions affected the organization and shape of the *limes*. These conditions also ensured an exceptional range of well-conserved organic residues. The organization and habitation of the *limes* in a wetland environment are important research topics for the future. So are the connections with the foreland and hinterland.

16. Transition from the Roman period to the Early Middle Ages

Communities living from 400 to 600 AD (late Roman period and the transition to the early Middle Ages) are poorly known. The disintegration of the Roman Empire had far-reaching consequences, the nature and scope of which are still insufficiently understood. It was certainly not an event, but a lengthy process which varied per region. This diversity deserves a stronger focus. To date, there has not been enough recognition of the fact that the disappearance of Roman institutions, markets and structures – both tangible and intangible – may have had major consequences not only within the former Roman borders, but also beyond. These included effects of a demographic, socio-economic and cultural nature. Major changes in the landscape also occurred along the coast and the major rivers. And there are indications to suggest climate deterioration, which means changes at the transition between the Roman period and the Early Middle Ages may therefore, partly, have had natural causes.

17. 'Frankization' and Christianization

An important historical development was the incorporation of the present-day Netherlands into Francia, the Empire of the Franks, predominantly in the 7th-8th centuries. This process was broadly intertwined with the expansion of Christianity (Christianization). Expansion and Christianization were gradual in part, enacted through diplomatic efforts that focused primarily on elite groups. In the 8th century in particular, the Frankish expansion periodically took on the character of a war of conquest. The ultimate victory for the Franks resulted in all kinds of changes, such as altered trade networks and distribution patterns, a redistribution of land ownership, land reclamation, changes in settlement patterns and probably also agricultural innovation. The introduction of Christianity led, albeit gradually, to the emergence of new ritual practices, and other cult places (churches and chapels) and churchyards.

18. Village formation

Initially, the landscape in later Prehistory was only home to dispersed settlements. A major contraction of farmsteads and settlement territories took place in the later part of the Iron Age and the early Roman period: the rural population concentrated in villages. There were probably significant regional differences. Relatively large settlements have existed in the Netherlands since Roman times (or perhaps even in the Late Iron Age, as in neighbouring countries). Villages as we know them today – compact groups of buildings offering some level of central facilities to the surrounding countryside (usually including a church) – only appear much later, in the Late Middle Ages or the Early Modern Period. There are still many uncertainties about the ways in which villages were formed and, for example, the role played by the foundation of churches.

19. The development of cities

Cities are larger settlements, not primarily agricultural and often fortified, with economic, administrative, social and religious functions. They did not always exist. With the exception of a few cities founded in the Roman period and specialized early medieval trade settlements (emporia) such as Dorestad, cities in the Netherlands only began to develop from around the 9th or 10th century. From that point on, they developed rapidly; in the Late Middle Ages, the region that is now the Netherlands became one of the most urbanized areas of Europe. There is a large degree of regional and context-specific variation with regard to the dating, background and manifestations of urban development, and also how functions and setting in the landscape are reflected in the spatial form and structure of cities.

20. The relationship between city and countryside

Apart from Roman times, cities only began to appear in the Netherlands from the 9th-10th century onwards. These cities had a major influence on the surrounding countryside, especially the immediate vicinity but also further away. That influence was primarily economic in nature. To meet the needs of the rapidly growing urban population, land reclamation, intensification and agricultural specialization were needed. Route networks focused on the city began to appear, both on water and on land. Indirectly, they also connected the countryside with the outside world, or improved these relationships. A city's culture radiated outward and affected the surrounding countryside, as reflected in all sorts of changes in material culture. The reverse influence also existed. The urban and the rural were often closely interwoven, and not only in the smaller cities. In medieval cities, both the long-established local nobility and new urban elite groups (trade, administration, church) made their presence felt.

21. Land use dynamics

Land use has undergone major changes over time. In part, these changes have a cultural background. They may involve shifting preferences as a result of acculturation, but also take the form of innovation and the effects of innovation. Changes in natural conditions also forced people to adapt, certainly in the Netherlands, and particularly in the exceptionally dynamic landscapes of the coastal zone and river region. Certain human interventions had major consequences (e.g. deforestation, drainage, soil depletion) and also influenced future possibilities (path dependence). This therefore represents a dynamic, ever-changing interaction between nature and culture, continuously translated into changes in how the landscape is used and – as a result – changes to the cultural landscape. This also led to alternative location choices, shifts in centre and periphery, and changes in the significance of specific landscape zones.

22. Human-material cultural relationships

By nature, humans are social beings. Solidarity is deeply rooted in the evolution of the human species. In every society – often at different levels – a distinction is made between 'own' and 'other', i.e. between the group(s) to which one attaches oneself on the one hand and other groups on the other hand. The formal or informal membership of a group brings more than rights and duties for its members. Group-specific systems of ideas, values and norms also – and above all – offer a context for individual self-realization. The boundary between the two usually deserves a clear symbolic mark, both inwards and outwards; often, but not always, defined in situations of competition and conflict. Ways of emphasizing individual or group identity, or of making them literally visible (e.g. through clothing or behaviour) can be recognized in the material culture. Material culture and social agency are important concepts to understand the relationship between people and things in the past.

23. Networks and infrastructure

The proper functioning of cultural systems stands or falls with good communication. This takes place through communication channels, both tangible and intangible, which combine to form communication networks (infrastructure). Tangible networks are land and water routes, including their supporting facilities. Some of those routes were naturally present in the landscape, some came into existence automatically (through use), and some were constructed. Intangible networks concern relationships between social groups that translate into patterns of distribution and redistribution. Infrastructure changes in time and space and these changes reflect not only cultural but potentially also landscape dynamics. The latter has certainly had an impact in a dynamic country like the Netherlands.

Research questions per theme

1. Blind spots

- When and how were areas which are now underwater used by people, what are the characteristics of these landscape zones, and how does this use relate to what we know about the land? (National Research Agenda for Archaeology, question 6)

2. Landscape dynamics

- To what extent did existing anthropogenic structures influence later spatial organisation and development of cultural landscapes? (National Research Agenda for Archaeology, question 19)
- What influence did subsidence and waterlogging have on land use and habitation patterns in peatland areas? (National Research Agenda for Archaeology, question 41)
- How did the expansion of peat affect land use? (National Research Agenda for Archaeology, question 42)
- When, where, to what extent and in what circumstances did arable land become overgrown with forest again (forest regeneration)? (National Research Agenda for Archaeology, question 16)
- How did the groundwater level fluctuate and what were the effects of these fluctuations on landscape and land use? (National Research Agenda for Archaeology, question 37)
- What influence did local landscape conditions (soil, vegetation) have on regional house-building traditions? (National Research Agenda for Archaeology, question 116)
- In what way did people influence landscape and/or vegetation before the Neolithic period? If so, where, in what form, for what purpose(s) and on what scale? (National Research Agenda for Archaeology, question 10)

3. Use of water

- Where are different types of shipwrecks found and how can the presence of these wrecks be explained? (National Research Agenda for Archaeology, question 12)
- How did wooden shipbuilding develop (use of materials, technology, innovation, typology)? (National Research Agenda for Archaeology, question 11)

4. Riverine and coastal settlement and adaptation

- What is the nature, age, location, function and coherence of structures associated with water management? (National Research Agenda for Archaeology, question 34)
- Along the coast, what kind of relationships existed between physical-geographical changes, land use and settlement patterns? (National Research Agenda for Archaeology, question 13)
- What kind of relationships existed between the dune strip and adjacent salt marsh and peatland areas in the western Netherlands and how did they develop? (National Research Agenda for Archaeology, question 51)
- How and when were river and sea dykes built and adapted? (National Research Agenda for Archaeology, question 86)
- How and when were undyked salt marshes and peatland areas along the coast (i.e. coastal wetlands) exploited, colonized and spatially organised? (National Research Agenda for Archaeology, question 46)
- In what way were river floodplains and forelands used and landscaped by humans? (National Research Agenda for Archaeology, question 122)
- Along the rivers, what kind of relationships existed between physical-geographical changes, land use and settlement patterns? (National Research Agenda for Archaeology, question 14)
- What is the origin, function and development of 'geest' areas (complexes of old arable land) along the west coast of the Netherlands?(National Research Agenda for Archaeology question 76)
- When, where, in what context and for what purpose do different types of mills appear? (National Research Agenda for Archaeology, question 85)

5. Social and economic differentiation

- What is the form, development, dating and context of earthen defences? (National Research Agenda for Archaeology, question 43)
- What kind of changes (technological, functional) can be observed in the different types of windmills and watermills? (National Research Agenda for Archaeology, question 111)
- What is the nature, origin and meaning of 'luxury goods' whether imported or not? (National Research Agenda for Archaeology, question 40)
- What are the manifestations and the socio-economic context of agricultural specialization? (National Research Agenda for Archaeology, question 49)
- Where, how and in which context do elite groups manifest themselves? (National Research Agenda for Archaeology, question 118)
- In which context, for what purpose(s) and to what extent was written text used? (National Research Agenda for Archaeology, question 120)
- How did monasteries function as part of monastic landscapes? (National Research Agenda for Archaeology, question 94)
- Where, how and in what context did designed landscapes occur? (National Research Agenda for Archaeology, question 95)
- How did castles function in relation to their environment? (National Research Agenda for Archaeology, question 103)
- Where, how and to what extent did coins function? (National Research Agenda for Archaeology, question 48)
- In what ways are identity and social position expressed in clothing? (National Research Agenda for Archaeology, question 134)

- What is the nature, dating, function, meaning and development of (partial) Roman stone constructions? (National Research Agenda for Archaeology, question 61)
- What changes occur in the composition and spatial organisation of farm yards? (National Research Agenda for Archaeology, question 104)
- To what extent was the settlement system differentiated in terms of settlement size, location, function and importance? (National Research Agenda for Archaeology, question 44)
- What was the nature, form, scope and context of craft specialization? (National Research Agenda for Archaeology, question 67)

6. Emigration, immigration, acculturation

- What was the nature of the relationships between the Frisian-Groningen coastal salt marshes and the northern sandy soils and how did they change over time? (National Research Agenda for Archaeology, question 50)
- To what extent did the population (demography) of cities and villages change? (National Research Agenda for Archaeology, question 117)
- What is the nature of and background to regional and chronological differentiation in population decline and growth and demographic composition? (National Research Agenda for Archaeology, question 58)

7. The archaeology of ritual

- Which actions and activities can be associated with the falling into disuse of settlements, buildings, wells, etc.? (National Research Agenda for Archaeology, question 131)
- How are 'sacrificial landscapes' situated and structured, and how long were they used? (National Research Agenda for Archaeology, question 28)
- What is the nature, context and meaning of intentional (ritual?) depositions in and around the house and (farm)yard (National Research Agenda for Archaeology, question 29)
- How and when did formal cult places appear, and how were they situated and structured? (National Research Agenda for Archaeology, question 39)

8. Archaeology of conflict

- How were complex military structures such as lines and siege works built and situated in the landscape? (National Research Agenda for Archaeology, question 101)
- What can archaeological remains and structures tell us about the nature and course of armed conflicts and underlying military-strategic insights? (National Research Agenda for Archaeology, question 93)

9. Death and burial

- How were the deceased treated in early prehistory? (National Research Agenda for Archaeology, question 9)
- What is the nature and context of 'animal graves'? (National Research Agenda for Archaeology, question 57)
- How, where and to what extent did post-depositional intervention take place in graves? (National Research Agenda for Archaeology, question 123)
- How did people bury their dead in the coastal area in prehistoric and Roman times? (National Research Agenda for Archaeology, question 129)
- When, where and how did burial sites around churches develop (churchyards)? (National Research Agenda for Archaeology, question 78)
- What is the context and meaning of scattered human skeletal remains in and outside settlements? (National Research Agenda for Archaeology, question 54)
- How are graves and burial grounds situated in relation to coexisting rural settlements and how does this evolve through time? (National Research Agenda for Archaeology, question 25)
- What is the nature and context of variation and change in the burial system? (National Research Agenda for Archaeology, question 45)
- To what extent and for what purposes were prehistorical and early-historical burial sites and burial monuments reused in later times? (National Research Agenda for Archaeology, question 27)
- What is the archaeological and landscape context of isolated graves or diffuse groups of graves? (National Research Agenda for Archaeology, question 56)

10. The earliest occupation of the Netherlands

- Where, in which phases of the Pleistocene, and in what landscape and climatic conditions did early hominids settle in the area that is now the Netherlands? (National Research Agenda for Archaeology, question 1)
- What can be concluded about the origin, mobility and territory size of groups of Neanderthals and their links with areas beyond the Netherlands? (National Research Agenda for Archaeology, question 2)

11. Late Palaeolithic to Early Mesolithic transition

- When, where and in what landscape and climatic conditions did the various late Palaeolithic cultures and cultural traditions appear? What is their geographical and chronological scope, and what are the mutual relationships? (National Research Agenda for Archaeology, question 3)
- In what ways were plant and animal sources used in Early Prehistory in the food economy, as raw material for the manufacture of objects and as objects for exchange and trade? (National Research Agenda for Archaeology, question 4)

12. The Neolithization process

- What is the significance of early Neolithic, non-*linearbandkeramik* finds in a *linearbandkeramik* context and beyond? (National Research Agenda for Archaeology, question 119)
- What changes and diversification occurred in the final phase of the *linearbandkeramik* culture? (National Research Agenda for Archaeology, question 30)
- How did the mode of existence change during the late Mesolithic to the Middle Bronze Age? (National Research Agenda for Archaeology, question 7)
- Which landscape zones were used in late Mesolithic and early Neolithic for habitation, hunting, arable farming and livestock farming? (National Research Agenda for Archaeology, question 8)
- What forms did buildings and settlements take before the Middle Bronze Age B (1500 BC)? (National Research Agenda for Archaeology, question 23)
- To what extent did continuity (or discontinuity) characterize Neolithic habitation after *linearbandkeramik*? (National Research Agenda for Archaeology, question 31)

13. Farming life established

- How did plough farming develop? (National Research Agenda for Archaeology, question 53)
- What was the internal and functional structure of houses? (National Research Agenda for Archaeology, question 35)
- How does the ratio of arable farming to livestock farming change within the agricultural economy? (National Research Agenda for Archaeology, question 38)
- Where, when and to what extent did fixed-place, compartmentalized or non-compartmentalized agricultural fields appear (e.g. Celtic Fields), and how were these cultivated? (National Research Agenda for Archaeology, question 36)
- Where and when did vegetable gardens, orchards and ornamental gardens appear, and how were they arranged and used? (National Research Agenda for Archaeology, question 132)
- What changes occurred in the method, size and location of food storage? (National Research Agenda for Archaeology, question 21)
- Where, how, when and for what reason were structures built on *stiepen* (stone or wooden stilts) and what does their configuration say about the construction of the buildings above ground? (National Research Agenda for Archaeology, question 84)
- How long were houses, outbuildings and wells in use? (National Research Agenda for Archaeology, question 124)
- What can be said about the form, function, dating and context of buildings (and sections of buildings) constructed largely below ground? (National Research Agenda for Archaeology, question 126)

14. The role of natural food sources after the introduction of agriculture

- How did fishing develop, technologically and economically? (National Research Agenda for Archaeology, question 102)
- What role did the exploitation of natural food sources (including hunting and fishing) play after the introduction of agriculture? (National Research Agenda for Archaeology, question 22)

15. The *limes*: organization and interaction

- How was the Roman military presence along the Rhine and the North Sea coast structured and organized? (National Research Agenda for Archaeology, question 63)
- What were the mutual cultural effects of the interaction between the Roman Netherlands on the one hand and the area north of the limes on the other? (National Research Agenda for Archaeology, question 60)

16. Transition from the Roman period to the Early Middle Ages

- What cultural and demographic changes occurred during the transition from the Roman period to the Early Middle Ages in the coastal area of the Northern Netherlands? (National Research Agenda for Archaeology, question 52)
- What is the nature and origin of decorative and functional objects dating to the period c. 400-600 AD? (National Research Agenda for Archaeology, question 113)
- What were the material, socio-economic and landscape effects of the emergence and later disappearance of Roman markets and networks (physical and non-physical)? (National Research Agenda for Archaeology, question 59)
- What role did Roman settlements, buildings, temples, infrastructure and other structures play once they had lost their primary function? (National Research Agenda for Archaeology, question 62)

17. 'Frankization' and Christianization

- How did emporia and other early medieval centres and trade settlements function, both locally and within international trade networks? (National Research Agenda for Archaeology, question 72)
- How is the process of Christianization expressed archaeologically? (National Research Agenda for Archaeology, question 71)
- Where, when and how did domain centres (manors) arise (and disappear)? (National Research Agenda for Archaeology, question 79)
- To what extent did changes in settlement patterns, land division and material culture relate to expanding Frankish influence? (National Research Agenda for Archaeology, question 77)

18. Village formation

- In which context and in what way did systematically planned settlements arise? (National Research Agenda for Archaeology, question 125)
- How, where and when did villages become fixed in the landscape? (National Research Agenda for Archaeology, question 75)
- How did the expansion of settlements in the medieval and post-medieval countryside take place and what were the factors that influenced this expansion? (National Research Agenda for Archaeology, question 83)

19. The development of cities

- What were the hygiene conditions in cities, and what measures were taken to improve them? (National Research Agenda for Archaeology, question 91)
- What role did 'urban agriculture' play in urban society and in the spatial organization of cities? (National Research Agenda for Archaeology, question 88)
- In what way did manors, and the system of land ownership associated with them, influence the process of city formation? (National Research Agenda for Archaeology, question 80)
- What effects did infectious and epidemic diseases have on the development of cities? (National Research Agenda for Archaeology, question 90)
- How and when did urban houses develop? (National Research Agenda for Archaeology, question 89)
- How did population pressure change the use of space and buildings in cities? (National Research Agenda for Archaeology, question 115)
- What determined the main spatial structure of medieval cities, and how did this structure change? (National Research Agenda for Archaeology, question 81)
- What effect did access to water, and more specifically access to navigable water, have on the development of settlements/ cities? (National Research Agenda for Archaeology, question 96)
- How did the defences of cities, towns and villages develop? (National Research Agenda for Archaeology, question 136)
- In what way, to what extent and at what pace does the change from wood as building material to stone as building material take place in cities? (National Research Agenda 137)

20. The relationship between city and countryside

- What influence did Roman centres (cities, fortifications, vici) have on their environment? (National Research Agenda for Archaeology, question 64)
- What influence did port cities have on their hinterland? (National Research Agenda for Archaeology, question 97)
- What influence did the city have on the surrounding countryside and vice versa? (National Research Agenda, question 87)

21. Land use dynamics

- In what ways did soil improvement and restructuring of agricultural land take place? (National Research Agenda for Archaeology, question 107)
- How was space defined and how were boundaries marked? (National Research Agenda for Archaeology, question 106)
- How and when were peat bogs exploited, colonized, drained and cultivated? (National Research Agenda for Archaeology, question 47)
- What are the indications for seasonal habitation and for specialization of settlements? (National Research Agenda for Archaeology, question 5)
- What were the economic functions of peripheral areas ('marginal' landscape zones) and what are the archaeological manifestations of this use? (National Research Agenda for Archaeology, question 33)
- To what extent do the nature and function of Mesolithic hearth pits vary, and to what extent is this related to differences in age, location, shape and wood use? (National Research Agenda for Archaeology, question 133)
- To what extent did regional, interregional and diachronic variation exist in the distance over which settlements, fields and pastures were moved and the frequency with which this took place? (National Research Agenda for Archaeology, question 24)
- How does the development of late prehistoric cultural landscapes relate to the location, size, use, mobility of field complexes? (National Research Agenda for Archaeology, question 32)
- What influence did humans as farmers (arable and livestock) have on vegetation and fauna? (National Research Agenda for Archaeology, question 15)
- When, where and to what extent did wind and slope erosion occur, and to what extent was there a direct or indirect relationship with human activities (and if so, which activities)? (National Research Agenda for Archaeology, question 17)
- When, where and to what extent did erosion and sedimentation occur, and to what extent was there a direct or indirect link with human activities (and if so, which activities)? (National Research Agenda for Archaeology, question 18)
- What role do 'persistent places' play and what are their characteristics and context? (National Research Agenda for Archaeology, question 130)
- When did late medieval reclamation works begin and how did it progress? (National Research Agenda for Archaeology, question 82)

22. Human-material cultural relationships

- Where and how were the remains of ships reused? (National Research Agenda for Archaeology, question 68)

- What do material sources reveal about overseas relations with the colonial territories? (National Research Agenda for Archaeology, question 98)
- What are the nature and significance of objects made of organic material within the context of material culture? (National Research Agenda for Archaeology, question 114)
- How did the rise of industrial and preindustrial production (mass products) affect material culture? (National Research Agenda for Archaeology, question 100)
- In what ways did industrially manufactured mass products take on a personal history in armed conflicts? (National Research Agenda for Archaeology, question 110)
- In what ways are individual and group identities expressed in material culture? (National Research Agenda for Archaeology, question 109)
- How did the production, processing, use, re-use and distribution of metals evolve? (National Research Agenda for Archaeology, question 20)
- To what extent did (fragments of) objects function as primitive valuables? (National Research Agenda for Archaeology, question 127)
- To what extent and for what purposes were functional and decorative items and objects reused? (National Research Agenda for Archaeology, question 121)
- How was waste handled? (National Research Agenda for Archaeology, question 108)
- Where and how were building materials obtained, produced and distributed? (National Research Agenda for Archaeology question 138)
- In which context and in what ways were building materials recycled? (National Research Agenda for Archaeology question 112)

23. Networks and infrastructure

- What was the position of early medieval Frisia in terms of cultural exchange and trade around the North Sea? (National Research Agenda for Archaeology, question 74)
- What role did shipping play in military and trade infrastructure during Roman times? (National Research Agenda for Archaeology, question 65)
- Where and how was salt extracted, processed and distributed? (National Research Agenda for Archaeology, question 128)
- How did the origin and distribution of imported goods change in the course of the early Middle Ages? (National Research Agenda for Archaeology, question 73)
- What role did cities play in the supply, transit and redistribution of objects, food and building materials which were not produced locally? (National Research Agenda for Archaeology, question 92)
- What do material sources tell us about the functioning of medium and long-distance trade at the time of the Hanseatic League? (National Research Agenda for Archaeology, question 99)
- How were various building materials supplied in Roman times and where did they come from? (National Research Agenda for Archaeology, question 66)
- Where, how and when did changes to the water infrastructure take place? (National Research Agenda for Archaeology, question 70)
- How was the land infrastructure including supporting facilities organised? (National Research Agenda for Archaeology, question 26)
- What infrastructural and socio-economic role did waterways and shipping play? (National Research Agenda for Archaeology, question 69)
- Where do non-local raw materials for objects come from? (National Research Agenda for Archaeology, question 139)
- What was the role of animals and animal products in exchange networks? (National Research Agenda for Archaeology, question 135)

Research questions including explanation, operationalization and literature

How were complex military structures such as lines and siege works built and situated in the landscape? (National Research Agenda for Archaeology, question 101)

A line of defence is a more or less linear system of continuous, connected or otherwise related defence works, which can consist of both field fortifications and built works. To date, attention has mainly been focused on the built works. Lines consist of combat positions (such as trenches) and shelters for troops, emplacements for heavy guns, storage for ammunition and other facilities. Lines are often equipped with obstacles to counter the advance of infantry and/or vehicles, such as inundations, barbed wire barriers, minefields and anti-tank obstacles. The various objects and structures of a line – built and unbuilt – form a logical, coherent whole ('military geography'). Lines generally consist of several, consecutive parts to give depth to the defence and have often been in use for longer periods of time, with war or the threat of war often prompting modification and expansion according to the latest insights. Lines of defence can be found throughout the Netherlands and are often constructed in conjunction with natural barriers such as rivers and canals, lower lying marshy areas or terrain that can be easily flooded. The position of a line is determined by the location of the area to be defended, the enemy's position, expected route of attack and the possibilities offered by the landscape. The intended function of the line partly determines the design and strength of the individual works. By examining historically layered military landscapes from a long-term perspective, insight into changing military doctrines can also be obtained.

Operationalization

The complex military structures mentioned in the explanation, such as lines, siege works and their constituent parts, are not 'recent disturbances but potentially informative archaeological phenomena. Study them according to the rules of art, in context and in relation to their landscape background (relation to natural barriers in the landscape). Also investigate relevant historical and historical-geographical sources (such as historical cartographic material). Images derived from the Digital Elevation Model database (Lidar, providing current information on elevation in the Netherlands) can also be very informative. Map the course of linear structures by using aerial photographs, lidar-derived images, drilling and test trenches.

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What can be concluded about the origin, mobility and territory size of groups of Neanderthals and their links with areas beyond the Netherlands? (National Research Agenda for Archaeology, question 2)

Sites dating from the Middle Palaeolithic in the Netherlands consist exclusively of stone and flint artefacts (with some exceptions, such as the Maastricht-Belvédère and Den Bosch quarries). Given the enormous depth of time of this period and the major climatic changes throughout, these sites are representative of various 'cultural groups', 'cultural traditions' and periods. Neanderthals were present in the Netherlands from approximately 350,000 years ago until 35,000 years ago, although their presence was certainly not continuous. The origins of Neanderthal groups and their underlying motives for colonizing northern parts of the European continent are unclear. At the level of material culture, chronological and spatial developments in the typological and technological characteristics of stone artefacts form an important field of research. For example, differences in types of hand axes can be used to research the geographical origins of groups, their cultural background, but also aspects such as territory size and technological organization. The origin – local versus non-local – and the transportation of stone types used to produce stone tools are also important in this context.

Operationalization

Be aware that research into this period is particularly well-suited to a multidisciplinary approach, bringing together knowledge from disciplines such as archaeology, geology, bioarchaeology and anthropology, and also requires an international perspective. Realize that archaeological research into the Stone Age does not take place in isolation and that analysis of the landscape and environment (fauna and vegetation) at that time is also important. Determine the type of raw material and the origin of stone artefacts. Describe the typological and technological characteristics of finds and establish differences and similarities between them and (more or less contemporary) sites in the Netherlands and abroad. Fire: to a certain extent it is possible to distinguish anthropogenic fire (used as a heat source and for food preparation) from natural fire by determining its temperature.

Investigate the relationship between mobility and changes in climate and/or vegetation. Human remains from this period are rare. When found, detailed morphology testing using 3D surface scans and CT scans can provide insight into human type, gender,

age and pathology, while isotope research offers information about paleo diet and origin. The latter can provide insights into the presence of a land bridge between the United Kingdom and the Netherlands.

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How was the Roman military presence along the Rhine and the North Sea coast structured and organized? (National Research Agenda for Archaeology, question 63)

Around 19 BC the first legionary camp was built in Nijmegen, followed around the beginning of the Common Era by a military reinforcement along the river Rhine in Vechten and a fort in Velsen on the Oer IJ. From around 40 AD the Rhine border was gradually expanded with more forts, watchtowers and a road, a development that seems to have been more or less completed by the end of the first century. A little later, this river boundary became part of the northern border of the province of Germania Inferior. With the exception of a short interruption at the end of the 3rd century, the Lower German limes appears to have functioned until the beginning of the 5th century. The reinforcements were located at strategically chosen locations, in particular at points where waterways flowed into or branched off from the Rhine. They monitored traffic and transport on water and on land. Military infrastructure was also present along the North Sea coast, south of Katwijk. Midway through the second century, reinforcements were built along important road and water junctions to protect the coast against sea raids by Germanic tribes. Major research topics are the occupation and construction of the military sites (use of building material, who was responsible for building, which army units). Also important are the relationships between the military installations, and with the roads, waterways, vici and rural settlements in the foreland and hinterland. The Late Roman phase of the limes is still largely unknown. Other important (inter) national research topics, are the interaction between the limes and the 'wet' landscape (selection of site location, role of shipping, fleet and ports, use of different parts of the landscape and available raw materials) and water management (canals, dams, divers etc.).

Operationalization

Due to reuse and post-depositional processes, building material (natural stone and ceramic) is no longer always found in its primary context. To gain a greater insight into the materials used and the function of a structure, the building material (natural stone and ceramic) must be fully documented and collected. Preferably, selection should only be made after evaluation. Aspects such as degree of fragmentation and distribution can provide a wealth of information about primary or secondary use and about formation processes. Epigraphic sources such as inscriptions, roof tile stamps and graffiti on pottery are important in determining the nature of the occupation. To obtain a deeper understanding of the final phases of use, attention must be paid to the most recent finds, even or perhaps especially if they do not come from a closed context. In addition to mapping the lay-out, dating and phasing of military settlements, there should also be a focus on the surrounding military infrastructure. Wet contexts in particular can provide a wealth of information about organic finds, constructions and ships. Research in the limes zone should always take into account such finds and the deployment of various specialists (including dendrochronology, archaeobotany and archaeozoology). It is important to realize that the military infrastructure did not stop at our existing national borders. When interpreting the findings, it is preferable to include research results from the neighbouring German Rhineland and Belgian coastal area.

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What were the mutual cultural effects of the interaction between the Roman Netherlands on the one hand and the area north of the limes on the other? (National Research Agenda for Archaeology, question 60)

The idea that the fortified Roman border (limes) impeded contact between the people on either side has long been abandoned. Apart from short periods of armed conflict, the border functioned more as a zone where intensive communication took place between areas and population groups within and beyond the limes. The limes was a focal point of cultural exchange, a transition zone with far-reaching and varied influence on both sides of the border. Far into the lands beyond the border, the intertwining of the indigenous and the Roman worlds was such that the area is referred to as a 'frontier zone'. There is still a great deal of uncertainty about the nature and extent of these reciprocal influences and material forms of expression. And they have yet to be studied sufficiently from a diachronic perspective and with an eye to regional differences. These differences were probably considerable, and may partly have been influenced by land and water routes. Moreover, the main emphasis to date has been on the Roman perspective, on Roman influences. Far too little emphasis has been given to indigenous influences. Due to the increasingly large role that indigenous peoples came to play in the Roman army, such influences may well have been significant. Once the limes almost ceased to function, that influence will only have increased and included Roman territory, not least as a result of migration.

Operationalization

Be sensitive to indications of imported goods and materials, on both sides of the border. Also note differences, changes (especially sudden changes), and apparent discontinuity (change in style) that may reflect external influence. This includes architecture and material expressions of cultural behaviour (consumption, forms of burial, clothing, etc.). Not everything that appears to be large-scale or systematic necessarily has Roman origins. Accurate dating is essential. Make use of the most current and regionally specific typochronological insights.

Also consider 'external' influences with regard to eating habits, such as herbs, 'exotic' food (e.g. fish sauce, olive oil), or a preference for certain types of grain or meat. Changes in the burial system may also reflect an external influence, on both sides of the limes. For the same reason, also examine timber construction (house building), wood use and working techniques, and any sudden changes in these fields: whether or not local traditions (e.g. splitting wood into planks) were continued, the types of tools used (saw and broad axe), the dimensions and types of wood used.

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How did emporia and other early medieval centres and trade settlements function, both locally and within international trade networks? (National Research Agenda for Archaeology, question 72)

With the revival of trade after the Roman period, new trading settlements emerged. These locations often differed from former Roman centres. Special, luxury goods – such as precious metal, bronze and glassware, weapons, spices and wine – were often traded over long distances. Distribution of everyday consumer goods tended to be regional and can be found in almost every settlement. Many of these goods were imported from the German Rhineland, such as wheel-turned pottery, grinding stones and wood. Products that found their way upstream from the Low Countries included woollen textiles from Frisia and possibly preserved fish, hides, salt and slaves. Merovingian centres were contact points in an extensive, interregional network of social relationships. The driving forces were prominent figures who supplied products to their own followers. There was also local artisanal production such as bronze casting and bone or antler processing (to make combs, for example). A proportion of these products was sold elsewhere. From the late 7th century, a more hierarchical, independent market system emerged, with a money economy and traders who operated as intermediaries. Emporia appeared: these were larger centres of trade where the king raised tolls and coined currency through his officers, and also offered traders protection and ruled on disputes. Emporia could be found at key intersections on the border between political-cultural worlds. In Dorestad, luxury products from Scandinavia, the German Rhineland and the Belgian Maasland came together and generated lively trade. These centres of trade could not function without being economically integrated – both locally and regionally – and drawing on surplus production of agricultural products. Yet little is known about this time. From the late 9th/10th century, the role of Dorestad was taken over by towns and cities such as Utrecht, Muiden, Medemblik, Tiel, Deventer and Zutphen.

Operationalization

There are several factors to take into account. Is the habitation Merovingian or Carolingian? Are there historical indications? Was the settlement part of a known domain belonging to the church or the king, for example? Money in general: the more specific the work people do, the more central the role of money becomes. Examine quantity and variation with regard to non-agricultural crafts, the presence and quantity of buildings specifically for storage and the extent of structures and facilities serving ships, such as jetties, quays and ramps. The amount of pottery or currency imported need not be a direct indication of a settlement's prominence. Virtually every settlement conveniently located on the water offered many opportunities for import. Settlement remains are often better preserved in the Holocene Netherlands than elsewhere (waste layers in former watercourses).

Examine which agricultural products and food residues are present and whether or not they originate from the region. If necessary, use (strontium) isotope research to determine the origin of farm animals and/or humans (see, for example, Van der Jagt et al. 2012). Make an inventory of the presence (or absence) of exotic organic materials. Examples include cowry shells, hides (the presence of only the paws of furred animals, possibly accompanied by a skull, can indicate trade in hides), ivory, reindeer antlers, fir tree wood, bottle gourds, etc. In wet conditions, also look out for textiles, leather and hides. Map what exotic food plants were traded and used.

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What do material sources reveal about overseas relations with the colonial territories? (National Research Agenda for Archaeology, question 98)

Changes in the presence or absence of specific goods may relate to geopolitical circumstances and changing trade networks, and also to changing preferences (partly due to cultural exchange). Strengthening economic and cultural relations with the colonies has had an ever-greater influence on patterns of behaviour and consumption since the end of the 16th century. The key question concerns the exact nature of these changes (differences in time, differences per social group, regional differences).

Operationalization

Distinguish products from the colonies or overseas spheres of influence (Dutch or those of other countries). Also note tropical species, woods and plant-based foods. Determine the nature, quantity and origin of colonial 'products' in both urban and rural contexts. Also study the cargo of ships that sunk sailing to or from the colonies. Document the find context as accurately as possible. Try to determine the socio-economic position of the user (also through historical research). Date any finds as accurately as possible. Are there indications for the processing of colonial goods?

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How did the production, processing, use, re-use and distribution of metals evolve? (National Research Agenda for Archaeology, question 20)

Early indications for the production and processing of both bronze and iron are remarkably scarce. Only the raw material for iron (ore) could be extracted locally, meaning that production can be described as local. Other metals will mainly have been supplied as ingots or finished objects. The earliest indications of metalwork (copper, gold) date from the Late Neolithic (the Bell Beaker culture). The earliest indications for local bronze processing date from around 1500 to 1300 BC (Middle Bronze Age). It is still unclear when local iron was produced for the first time. There appear to have been substantial regional differences. The earliest evidence for local processing of iron dates from the Middle Iron Age. It is found with some regularity in the Late Iron Age. Iron work was not widely produced until Roman times. Reuse of metal objects was important in all periods. Transport and import have become apparent from finds containing metal ingots, objects made elsewhere and batches of scrap metal. Charcoal, essential for the production and processing of metal, was produced in charcoal piles. The oldest charcoal pile dates from the Late Iron Age. So far, charcoal piles are only known from the sandy soils of the Netherlands.

Operationalization

Identify and date every indication of the production, processing, use and re-use of metals: raw materials (also scrap metal), fuels, production waste, processing waste and tools. Determine the distribution and context by systematically collecting and screening. Make systematic use of a metal detector. Determine the composition of metal (including scrap metal) and waste products (using XRF). NOTE: What look like pieces of daub may also turn out to be pieces of ovens, tuyeres, casting moulds, forges and crucibles! Take care when cleaning; let these materials dry first. Also keep an eye out for traces of heating and glazing. Have every indication of metal processing examined by a specialist for traces of metal (e.g. hammer stones, pounding stones, anvil stones and whetstones.) Determine the type of stone (local or not?). Slag: make a distinction between production slag and processing/ forging slag (consult a specialist). Do not confuse iron ore

(limonite or bog iron) with iron slag. Identify and date any indication of charcoal production (charcoal piles). Determine which types of wood have been used. Sample all ovens, charcoal piles etc. with a view to radiocarbon dating.

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What was the position of early medieval Frisia in terms of cultural exchange and trade around the North Sea? (National Research Agenda for Archaeology, question 74)

Before the Carolingian period, the entire coastal area was part of the Frisian Kingdom (Frisia). Particularly in the 7th century, Frisia was, to varying degrees, successful in expanding towards the central river area where the ecclesiastical centre of Utrecht and the important trading centre of Dorestad were located. These centres alternately lay within the Frisian Kingdom and the Frankish Empire. The many kingdoms along the North Sea coasts were connected by the sea and for a time, Frisia was the hub of this maritime network, which was connected by emporia to a rich Frankish hinterland. The close ties between England and Frisia in particular were forged during previous migrations. The peoples were more or less related, spoke related languages and were able to communicate effectively. Relationships between 'top finds' from Frisia, England and Scandinavia indicate an extended and integrated network of elites. From the fifth century there is evidence of very high percentages of imported pottery in settlements in the northwestern coastal area, mainly from the Rhineland. This suggests that other products from that region, including perishable products, were also supplied.

Operationalization

Be alert to objects or goods that may come from England or Scandinavia. Pay particular attention to metal objects such as clothing accessories. Closely examine not only the stylistic characteristics, but also the metal composition (using XRF). The composition of copper alloys in fibulas changes significantly in Frisia during the Merovingian-Carolingian transition phase (from predominantly bronze to predominantly brass). Compare results. Analyse which agricultural products from Frisia were intended for export (e.g. woollen textiles). Livestock may have been imported; this can be seen using isotope research. Note the palaeo-landscape and infrastructural location of the site. Was the site connected to the maritime network and if so, how?

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What do material sources tell us about the functioning of medium and long-distance trade at the time of the Hanseatic League? (National Research Agenda for Archaeology, question 99)

During the time of the Hanseatic trade (13th to early 16th centuries), various materials entered our area by land, river and sea trade networks for use, processing or direct transit. These included luxury products, utility goods, consumables and foodstuffs. The exact workings of these linked networks have only partially been revealed. Account must be taken of major regional and period-specific differences. Luxury products from long-distance trade in the 13th-14th centuries include crystal, Arabic Raqqa pottery, drinking glasses and ivory. In the 15th-16th centuries, luxury products became more general: glass from the Upper Rhine, walrus ivory, lustreware, etc. Utility goods were supplied on a large scale. From the northern area of the North Sea, these included lyddite touchstones (for determining gold content). Pitch, resin and wax came from the Baltic region. Beeswax was used in the casting of bronze, for example. The large-scale import of English and Scottish wool and Russian fur is hardly recognizable as a primary product. The export of woollen fabrics is recognizable (lead seals). Copper, lead and brass were imported on a large scale, from places such as Wales and the German inland. Coal (already present in 10th-century Tiel) was needed to generate the high temperatures used in artisanal processes. Hanseatic brass bowls were a well-known product and were thought to have liturgical significance. Food such as hop beer, wines (in wooden barrels and amphoras), olive oil, pickled fruits, Baltic grain imports, stockfish (bones of cod) can often only be indirectly captured in finds involving packaging material, such as barrels, or in food waste. The influence of the Hanseatic League, including its ideological influence, is also recognizable in material culture, for example in roof turrets and the stove tiles of masonry heaters.

Operationalization

Pay particular attention to materials, food, objects and stylistic influences (see explanation) that may have reached the site through the Hanseatic network (and associated networks). Determine the origin of these objects, including packaging materials (dendroarchaeology). Accurately document the find context and if possible, try to determine the socio-economic position of the user. Date any finds as accurately as possible. Are there indications for the processing and transit of Hanseatic imports?

Carry out research into the content of sunken ships involved in this trade to gain insights into the products that were traded. Did the import of grain increase over time? Archaeobotanical research on field weeds can help identify imported grain. Origin research into isotopes (in particular Sr) can also be performed on (charred) plant remains (Evans & Montgomery, 2009). Watch out for wooden containers (barrels for wine, beer, etc.) that bear the identifying marks of owners and products. Excavate and clean them carefully: avoid damaging the marks and causing scratches that might lead to confusion.

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What was the role of animals and animal products in exchange networks? (National Research Agenda for Archaeology, question 135)

Animals and animal products serve as food and raw materials, or provide traction and manure, but they can also fulfil a role in status, ethnicity, belief systems, marital ties and rituals. In this range of values and meanings they appear in various formal or informal short and long-distance exchange networks, both within and between population groups, forming part of systems of reciprocity, redistribution or trade. Examples include imports of cattle in the West Frisian Bronze Age (thought to be a dowry), Spanish mackerel and songbirds as food in Roman times, cowry shells from the Red Sea as amulets in early medieval graves, rabbits as southern gifts for medieval castles or marine species (e.g. oysters) as a luxury food inland. Introductions and reintroductions of species (e.g. chicken, cat, turkey) are also effects from such networks, as did the exchange of breeding techniques and material (e.g. Roman cattle). In the Middle Ages and beyond, we see evidence of large-scale international trade in herring and cod for example, the import of cattle for livestock farming and the export of sheep to England.

Operationalization

Be alert to the presence of species which do not fit the natural environment or the climate of surrounding area (e.g. Mediterranean species, or marine species in a freshwater environment) or finds which stand out as an early dating of introduced species (e.g. chicken, cat, rabbit). Accurate and reliable dating is of great importance, especially when it comes to determining the introduction of species or techniques. The relationship with the context must of course be thoroughly described. Relevant aspects include containers, such as crockery, in which animal material is found. A composition of skeletal elements which deviates from the 'normally expected' pattern can indicate trade in foodstuffs, while the age composition can provide information about surplus production or breeding. Measurements, especially deviant measurements, and morphological characteristics (e.g. polledness) can also indicate exchange. In general, integration of all this data will lead to new knowledge. The analysis of stable isotopes (C, N, O, Sr) can provide insight into origins.

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