

**Catalogue Archaeological Finds
Amsterdam's North/South Metro Line**

STUUF

Van Zoetendaal Publishers

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Foreword

For over 20 years, the construction of the North/South metro line has held the city of Amsterdam in its grip. Countless debates were held on the technical feasibility, the costs, the inconvenience and the safety of this new metro line. To protect the heart of the city, it was decided in 1996 that the tunnel of the North/South metro line would follow the course of the River Amstel. However, no other city in the world has ever constructed a metro line in such soft soil (the builders themselves called it 'thick water'). Yet Amsterdam took up the challenge, and from July 2018 the metro will connect the North and South districts of Amsterdam.

Few people are aware that part of this complex construction project was given over to archaeological research. During the excavations between 2003 and 2010, the City of Amsterdam's archaeological team descended into the construction pits to meticulously study the soil, metre by metre. This resulted in the retrieval of more than 700,000 finds between 2005 and 2010. 'Stuff' that the people of Amsterdam had thoughtlessly cast into the River Amstel throughout the centuries. In the heart of the city, 25 metres under the ground, the construction of the North/South metro line made a unique archaeological investigation possible, which revealed that more than 3000 years ago, people were already living at this site, in what we now know as Amsterdam.

The finds present a new tangible history of the city, in every detail of everyday reality. They show Amsterdam in the world and the world in Amsterdam. The soil layers beneath the Amstel reveal the layers in the character of the city of Amsterdam.

This new history of Amsterdam was made possible by the unique collaboration between the archaeological team of the City's office of Monuments and Archaeology and the engineers and contractors working on the North/South metro line. The well-preserved state of the finds and the high quality of the photography and design means that you and I are now also able to experience this rich treasury of 'stuff'.

On behalf of the City of Amsterdam, I would like to thank everyone, city employees, contractors and others, experts, volunteers and students, who contributed to this extraordinary archaeological project and this unique book. It is my heartfelt hope that generations to come will also be inspired by this new and old history of our wonderful city.

J.J. van Aartsen

Acting Mayor of Amsterdam

Archaeology of Amsterdam's North/South Metro Line

Jerzy Gawronski,
Peter Kranendonk

Urban histories can be told in a thousand ways. This photographic catalogue of archaeological finds, *Stuff*, lends the River Amstel a voice in the historical portrayal of Amsterdam. The Amstel was once, more so than today, the vital artery, the central axis, of the city. At Damrak and Rokin in the city centre, archaeologists had a chance to physically access the riverbed, thanks to the excavations for the massive infrastructure project of the North/South metro line between 2003 and 2012. *Stuff*, with its 11,279 photographs, presents a visual summary of the finds from the Amstel at Damrak and Rokin.

Rivers in cities are unlikely archaeological sites. It is not often that a riverbed, let alone one in the middle of a city, is pumped dry and can be systematically examined. The excavations in the Amstel yielded a deluge of finds, some 700,000 in all: a vast array of objects, some broken, some whole, all jumbled together. Damrak and Rokin proved to be extremely rich sites on account of the waste that had been dumped in the river for centuries and the objects accidentally lost in the water. The enormous quantity, great variety and everyday nature of these material remains make them rare sources of urban history. The richly assorted collection covers a vast stretch of time, from long before the emergence of the city right up to the present day. The objects paint a multifaceted picture of daily life in the city of Amsterdam. Every find is a frozen moment in time, connecting the past and the present. The picture they paint of their era is extremely detailed and yet entirely random due to the chance of objects or remains sinking down into the riverbed and being retrieved from there. This is what makes this archaeological collection so fascinating, so poetically breathtaking and abstract at one and the same time.

This book gathers the archaeological finds from the riverbed into a material history of the city. The catalogue, with its series of photographs of the finds, documented with Harold Strak's unmatched eye for detail, colour and texture, can be read in a number of ways. At first glance, *Stuff* is a never-ending stream of different, more or less recognisable objects that invites us to browse and explore our own associations and reconstructions. But behind the cascading images lies an archaeological story that gradually emerges out of the systematic structure of the catalogue, thanks to Willem van Zoetendaal's lucid and seductive design. The photographs tell their own story, prompted not by text but by their arrangement in chapters and sections according to the different functions that a city fulfils as a living organism. The material remains are primarily organised according to the role the object once assumed within these different urban functions. The finds derive their significance from the functional and chronological relation with the city assigned to them in the catalogue. At the same time, they reveal how the river behaves, how the age-old waterway through the heart of the city acts as a reservoir for the accumulation of urban material culture. Just as the smooth surface of the Amstel

and the canals on a windless day reflects the buildings and passers-by along the quayside, the photographs of the objects from the riverbed are reflections of the city's tangible past.

Stuff is the first of two publications on the archaeological research of the North/South metro project. This first publication is a catalogue of all the objects that were found, hence the title *Stuff*. The second, with the working title *Underground and City*, is scheduled to appear in 2019 and will discuss the organisation and outcome of the archaeological research along with the physical aspects of the project, such as the archaeological fieldwork and excavation methods, as well as the findings. Further, a variety of essays and articles look into the background of the finds and their connection with the city of Amsterdam. In addition, this catalogue has inspired two large displays measuring 14.4x3 and 12x3 metres in the Rokin metro station. As part of the North/South line art project, artists Daniel Dewar and Grégory Gicquel and the archaeological team were jointly responsible for designing the displays for some 10,000 finds.

All these results were inconceivable without the untiring efforts of the versatile research team. From 2003 to the present day, staff, volunteers and students from Amsterdam University have been pivotal in every aspect of the work, from the excavation, cleaning, sorting, conservation and restoration of the finds, to their identification, digital processing and presentation. The same applies to the many specialists who have provided expertise in highly diverse professional fields. Their names are gratefully credited at the end of this publication. Further, our thanks go to the many municipal organisations, in particular Metro en Tram, and the countless construction companies that have made this archaeological work possible.

The aim and structure of this photographic catalogue will be explained after a brief discussion of the complex civil engineering aspects of the North/South metro project, the background and the results of the archaeological research and the significance of the archaeological finds from the River Amstel.

The North/South line

The North/South line is a 9.7 km metro connection between the north and south of Amsterdam, which are separated by the IJ (pronounced 'ay'), a body of open water and a former sea inlet in the southernmost part of the Zuiderzee. The line begins overground in the north at Nieuwe Leeuwarderweg (Stations Noord and Noorderpark) and plunges underground on the shore of the IJ. The 7.1 km long underground line runs under the water of the IJ to Central Station and from Stationsplein goes on to Damrak, Rokin, Vijzelstraat, Ferdinand Bolstraat (Station De Pijp) and finally to Europaplein, where it continues overground to Station Zuid wrc.

The initial plans for the metro line date back to the



Research of the Amstel bed at the Rokin at 6 to 11 metres below NAP (c. 1050 BC – AD 1500) (photo: Ranjith Jayasena, M&A)



The route of the North/South line and the stations

1960s. They were not implemented at the time because priority was given to the construction of an eastern connection. The method used in the construction of the East line, which started in 1970 and was completed in stages in 1982, involved assembling the metro tunnel from caissons. These concrete segments were sunk from ground level after demolishing the existing buildings along the tunnel route. The damage caused by the construction of this metro to the historic centre of Amsterdam, and the Nieuwmarkt district in particular, led to mounting social opposition to the metro project, culminating in violent riots. As a result, the plans for other metro lines were abandoned in 1975.

The late 1980s saw a revival of interest in a new metro line and in 1996 the city council decided to construct the North/South line. Given the experience with the East line, the engineers were specifically instructed to spare the monumental historic inner city when drawing up their plans. This precondition laid down by the city council and the general public determined the civil engineering approach. To avoid damaging buildings, a route was selected that followed where possible the existing infrastructure. This consisted partly of streets (Nieuwe Leeuwarderweg, Ferdinand Bolstraat) and partly of (filled-in) waterways: the IJ (Stationsplein), the River Amstel (Damrak, Rokin) and Vijzelgracht. The possibility of building a 3.8 km tunnel at ground level was ruled out because of the high-density development and shortage of space. A solution was found in the form of a bored tunnel concept. The tunnels were to be drilled at a depth of 20 to 30 metres below NAP (Amsterdam Ordnance Datum

defining the city's normal water level), deep below the wooden foundation piles of the buildings, which went down to an average of 12 metres below NAP.

At the time there was no experience of boring tunnels through a soft subsoil of sand and clay in a historic city centre such as that of Amsterdam. This meant that the metro project was a technological challenge from the start, involving the development of new construction methods and customized techniques. There were also a number of logistically and technically extremely complicated locations, such as the rail junction of Central Station where a tunnel underpass had to be constructed with no disruption to rail traffic and leaving the listed station intact. Before the national and local governments consented to construction in 2002, several technical trials and financial feasibility studies were carried out in order to draw up a realistic project management plan. When construction started in 2003, the projected completion date was 2011; this was ultimately adjusted to mid-2018. The boring of the tunnel itself caused few difficulties; it was the setbacks surrounding the construction of the deep-level stations that were mainly to blame for the delay. At Rokin, Vijzelgracht and Ferdinand Bolstraat the roughly 200 metre-long underground station structures were installed using the deepwall method. They were built up of concrete walls milled into the subsoil to an approximate depth of 35 metres. These 'boxes' were then excavated to a depth of roughly 25 metres. The caisson method was only applied for the stretch of open water at Damrak: here three caissons were used to build the launch shaft from which the tunnel boring machine drove off in a southerly direction.

The archaeology of the North/South line

The challenges of the North/South line were not confined to civil engineering, but applied equally to the archaeological research, which formed an integral part of the construction programme. Given the numerous finds that came to light during the construction of the East line and the location of the construction sites in the medieval city centre, the archaeological implications were assessed in the early stages of the planning. In parallel with the technical feasibility studies, in 1999 a desk study was carried out by the City's office of Monuments & Archaeology (M&A) to identify likely archaeological sites along the future metro route.¹ This resulted in 2003 in the project management plan *Archeologie Noord/Zuidlijn* being drawn up and executed on behalf of 'Projectbureau' Noord/Zuidlijn.² The various fieldwork operations were carried out between 2003 and 2012 and the research, including the processing of all the finds, is set to be completed by 2019.

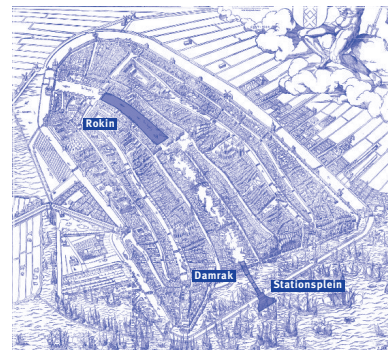
Archaeological research focused on the vertical excavation pits for the stations along the route and not on the tunnel. At a depth of 20 to 30 metres below NAP the tunnel boring machine cut through different levels from several landscape periods dating from 124,000 to

10,000 BC (the geological epoch of the late Pleistocene). Between roughly 12 and 25 metres below NAP (Weichselian or the last glacial period, c. 114,000-10,000 BC) a steppe landscape was uncovered and from approximately 25 metres below NAP, the shores of a warm sea, the Eemian Sea (Eemian, c. 124,000-114,000 BC). If these layers contained archaeological remains, they would get mixed up together during any work, making it impossible to carry out systematic archaeological research based on the location of the deposits. A spatial or landscape context is paramount for archaeological interpretation. Finds have added value if they are mutually related and connected with their surroundings, otherwise, out of context, their only significance is their intrinsic value. Quite apart from the impossibility of working ahead of the tunnel boring machine, the slim chance of retrieving archaeological material was the main reason for deciding against the tunnel as the primary research area. With a diameter of six metres, the cutting face of the tunnel boring machine was relatively limited. Moreover, remains of animals, such as mammoths, or of prehistoric hunter-gatherers (Neanderthals) and their implements mostly occur in small quantities and widely dispersed in the West Holland coastal area, primarily in the low-lying and wetter parts of the prehistoric landscape. This meant that there was very little likelihood that the tunnel trajectory would contain finds from the last Ice Age period. Nonetheless, random samples of the soil that was loosened and ejected during tunnelling were examined for archaeological remains, but nothing was found.

The station construction pits were archaeologically all the more interesting. These sites offered the greatest chance of finding archaeological heritage because they were excavated from ground level, exposing a deep cross-section of the subsoil. The soil layers up to 12 metres below NAP were from the Holocene epoch, which dates from 10,000 BC to the present day. It was in this period that the peat bog and fen landscape was formed which was reclaimed in the Middle Ages for agricultural purposes and on which Amsterdam was founded around AD 1200. In the vertical excavation pits it was possible to conduct archaeological research into the Amsterdam landscape as well as into the landscape's ancient history long before the city sprang up. What made this research so special was not the vast scale or the depth of the construction pits but their topographical location within the city. Unlike most urban construction sites, it was not the solid ground, but the city's streambeds – the bottoms of natural or man-made waterways – with their embedded archaeological remains that became accessible for research during the North/South metro project. For in the city centre the tunnel route follows the open infrastructure of the waterways where there are no buildings or foundations. And waterways and underwater depositions are archaeological sites with a research dynamic all of their own.



Bird's-eye view map of Amsterdam by Cornelis Anthonisz from 1544 with the River Amstel (Damrak and Rokin) as the vital artery of the city (Amsterdam City Archives, 010001001032). The tunnel of the North/South line follows the open waterway of the Amstel in the historical city centre.



The map by Cornelis Anthonisz showing the excavation sites at Stationsplein, Damrak and Rokin in the bed of the IJ and the River Amstel

The archaeology of the River Amstel

The archaeological research involved six construction sites, four of which were former or existing streambeds: Stationsplein, Damrak, Rokin and Vijzelgracht. Stationsplein, the square in front of Central Station, which was excavated for the railway station's new underground hall, had formed an integral part of the IJ Harbour at the mouth of the River Amstel until the artificial island was created for the station between 1870 and 1880. The construction sites at Damrak and Rokin along the trajectory through the city centre were positioned literally in the River Amstel: Damrak, where the launch shaft for the tunnel boring machine was built, was still open water when construction work began in 2005, and Rokin, where an underground metro station was planned, had been filled in 1937. Lastly, the building site for the station at Vijzelgracht was situated in a canal that had been dug in 1660 and filled in 1933. The construction sites for the Ferdinand Bolstraat (underground) and Amsterdam North (overground) stations were situated not in watercourses but on solid ground.

The sites make the archaeological project of the North/South line essentially a river archaeology project, involving a systematic examination of the River Amstel.³ For purposes of the research, there were two intertwining strands: the city and the landscape. These revolved around the origin and history of Amsterdam. Finds from the river, consisting of (the remains of) ceramic, bone or metal man-made objects (artefacts), afford an insight into the material culture of the city. Ultimately, archaeological remains reflect the everyday activities of humans, in this case, of the inhabitants of Amsterdam and its visitors. As such, they are invaluable in the reconstruction of the historical picture of Amsterdam. The value of material remains as sources of urban history lies largely in their connection with the topographical structure of the city. Hence, the vital importance of the link between the deposits and their spatial origin in urban archaeology. What function did a particular site fulfil in the historic city and what was the significance of the finds within that spatial context? Historical information is indispensable for interpreting places and topographical development. With a variety of sources – from maps, documents and prints to paintings and photographs – a spatial context can be constructed for interpreting the finds. The multidisciplinary character of the archaeological research of the Amstel was defined to a large extent by this historical component.

The river is not only a carrier of material and cultural data in the form of archaeological finds, it also forms a physical part of the city and as such embodies information about the landscape. For this reason, in addition to investigating the historical-cultural aspects, a geo-ecological line of research was pursued. Based on sediments, shells, diatoms, pollens, seeds and other such organic and geological remains (ecofacts), data was collected on the development and age of the river

and the role it played in the wider landscape. This study of the landscape, which also looks at climate and the environment, is not confined to the period of Amsterdam's history but spans the long (prehistoric) period that predated this, for as a landscape element the River Amstel is much older than the city.

The archaeology of streambeds

Before going on to discuss the research on the River Amstel, the question of what makes streambeds archaeologically so special needs addressing. The answer is simple: in rivers, canals and open water material remains can sink to the bottom and large quantities can pile up over time. The everyday practice of dredging illustrates this. Dredgers at work in the canals and ditches in the city never fail to attract an audience because of the variety of objects that comes to the surface, from bicycle wrecks and scrap metal to archaeological items.

Archaeologists were first alerted to the research potential of streambeds by the nascent discipline of underwater archaeology in the 1960s. The upsurge of finds and discoveries from lakes, rivers, canals and their banks raised general awareness of the scientific value of streambeds as repositories of archaeological finds, while excavations of reclaimed waterways and harbours served to strengthen this idea. In Amsterdam several excavations have demonstrated the archaeological potential of landfilled banks.⁴ Elsewhere, recent metro construction projects that transect water zones have likewise yielded a plethora of deposits, such as the excavations of the Byzantine Harbour of Theodosius in Istanbul during the construction of Yenikapi metro station in 2004-2013, or those of the Roman harbour in the Rhine in Cologne while building the Nord-Süd Bahn in 2003-2012.⁵ The special archaeological nature of banks and underwater sites has not only been recognised by science, but even in art. Of significance is Mark Dion's *Tate Thames Dig* in 1999. Dion used the banks of the River Thames in London as a backdrop for an archaeological installation by collecting finds there at low tide, thereby representing the river as a material source.⁶

Quite apart from the physical aspect of archaeological material sinking down in water, underwater depositions differ from deposits on land in the diverse origin and generally mixed nature of the finds. They are primarily associated with shipping activities and vary from items that have fallen overboard to complete shipwrecks and parts of ships. Archaeological remains can also be connected with activities ashore. As such, they can often be linked to objects associated with a building or structure, workshop or installation along the bank. A very different category is the personal belongings that were somehow lost in the water. However, by far the largest group of archaeological finds from streambeds can be attributed to universal human behaviour, namely, to the habit of dumping waste in water. It is an easy way of getting rid of waste, as it



Cross-section of the upper part of the Amstel bed at Rokin, consisting of the modern sand of the infill (R6: ground level–3 metres below NAP) and finely layered fill of freshwater sediments packed with organic remains and habitation debris (R5: 3.00-6.43 metres below NAP) (photo: Ranjith Jayasena, M&A)



Cross-section of the different layers of the old Amstel bed at Rokin. On top the layer which relates to the phase of the river when it had an open connection with the IJ and the Zuiderzee (late twelfth century, R4 6.43-8.86 metres below NAP). The next layers belong to the prehistoric freshwater river from 1050 BC onwards (R3, 8.86-10.40 metres below NAP and R2, 10.40-12.37 metres below NAP). At the bottom right the layers of the tidal channels of the Oer-IJ, from c. 4000-1050 BC (R1.1, 12.70-12.37 metres below NAP; R1.2, 9.50 metres below NAP) (photo: Ranjith Jayasena, M&A)

immediately disappears out of sight or is carried away by the current. The chance of finding concentrations of material remains is highest in the beds of urban canals due to the high habitation density and the frequency with which inhabitants and workshops discarded their unwanted 'stuff' in water. In a water-rich city such as Amsterdam, this was certainly the case. The city's many historical rulings on the disposal of waste in waterways go back as far as the fifteenth century and clearly attest to the widespread practice of this illegal form of waste disposal and the difficulty in curbing it.

Another factor that makes streambed sites unique is their tendency to remain intact on account of the inaccessibility of the sunken objects. Once they had fallen in the water it was not easy to get them out. This was, of course, the very point of illegally dumping the waste. Archaeological deposits in streambeds are subject to erosion, however, for instance, if the water level of a river is controlled by dredging or by other hydrological means. In addition to this kind of human intervention, natural conditions and the way the watercourse is used also affect the presence and quantity of underwater archaeological deposits. A longstanding natural streambed that is deeply eroded may hold more finds than a dug canal of recent date. On the other hand, fast-flowing rivers and waterways subject to the rise and fall of the tide or with a rocky bed offer conditions less conducive to the deposition of material remains than a slow river with a soft, muddy bed. Lastly, the nature of the archaeological objects also determines the residue in a watercourse. Light materials will drift on the surface, whereas heavier objects will sink to the bottom at their point of entry in the water.

The archaeological expectations of the construction sites

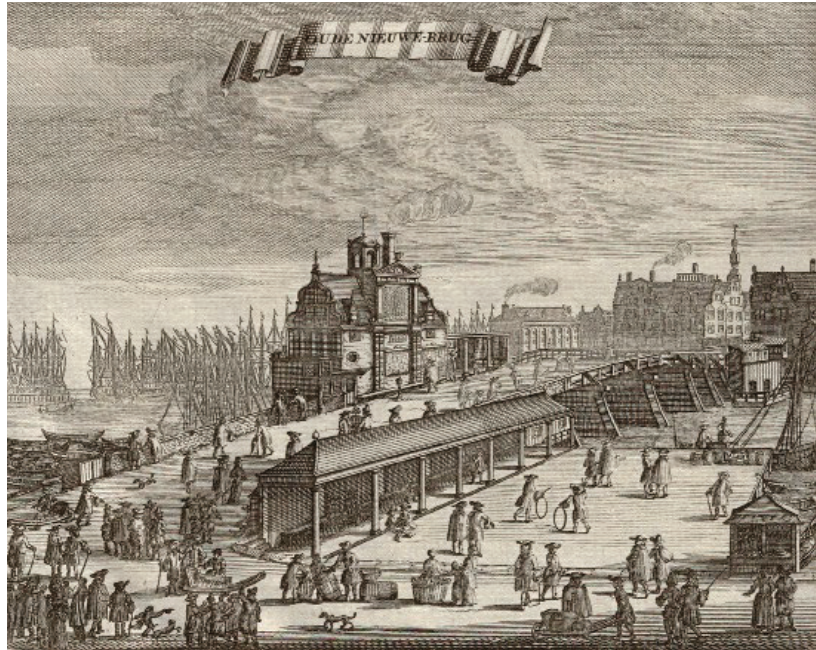
The construction sites at Stationsplein, Damrak and Rokin were selected for intensive archaeological research. This meant planning a full-scale archaeological excavation at these locations. The decision was based on the knowledge that deposits are concentrated in the oldest part of the city and that they were topographically connected with the IJ and the River Amstel. The expectations of the archaeological potential of the Amstel were high, since it was a slow-flowing river with a soft bed of sand and a peat into which archaeological material could easily sink without being washed away. Civil engineering borings and probes along the metro trajectory provided important advance information on the natural riverbed, which was deeply eroded (at approximately 12 metres below NAP) and hence was more likely to contain more archaeological material than the man-made canals (generally 3 metres below NAP). The river fill of layers of sand, peat and clay, along with the underlying (deeper than 12 metres below NAP) older layers which the Amstel had incised, yielded geological data on the complex generative history of the river within the landscape developments from circa 5000 BC.

Besides geo-ecological materials, the fill of the deep Amstel bed contained, as anticipated, a mixture of material remains. This expectation was based on the crucial role that the Amstel has played in Amsterdam's infrastructure for centuries. Its urban core developed at the mouth of the River Amstel around AD 1200. For centuries its two banks – the east bank originally where Warmoesstraat and Nes now lie, the west bank roughly where Nieuwendijk and Kalverstraat are situated today – were gradually extended with landfill to make room for wider quays and new building, while the city sprawled in easterly and westerly directions. Until the nineteenth century the river remained the central transport artery within the urban structure. Material remains from the bed of the Amstel would most certainly add a new dimension to the existing archaeological picture of the city. Urban excavations tend to be associated with a single location, such as a house or a cesspit from a certain era. But in this instance they concerned the waste from multiple households and workshops and the lost property of residents and passers-by. In short, the deposits in the river were related to the material culture of the city as a whole and that over a long period of time.

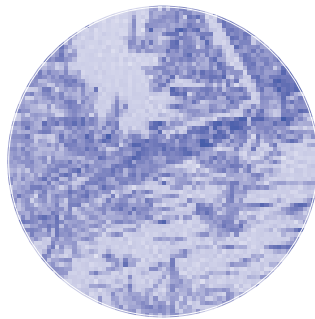
As the archaeological work progressed it became clear that archaeological expectations of the Stationsplein site had to be adjusted downwards. The bed of the IJ on which in 1870-1880 the artificial island had been built for the railway station lay at 6 metres below NAP, at the level of Damrak's find-packed soil layers. But despite the busy maritime traffic in historical times, the bed of the IJ yielded relatively few remains (136 finds in 55 records in the find database). This was the result of the dredging works that took place in the 1870s when the soft layer of sludge was removed along with any embedded material. It is possible that the IJ had been dredged for centuries to maintain the water level for shipping. Tidal currents in the IJ may also have swept things away and it is feasible that fewer objects were lost overboard than along the quays. At this site only an archaeological watching brief was needed to document the geological composition of the IJ's tidal channel, which had been eroded to a depth of at least 20 metres below NAP.

The Vijzelgracht, Ferdinand Bolstraat and Nieuwe Leuwarderweg sites were expected to yield fewer finds than Damrak and Rokin from the start. This meant that an archaeological watching brief sufficed during the excavation of the site. Relatively little material was found at the Vijzelgracht site (290 finds in 261 records in the find database) since the canal was probably cleared before it was filled in, in 1933. Although the Rokin was filled in and may (partly) have been dredged, Vijzelgracht contained even fewer finds because the bed of the dug canal was geologically shallower and less layered.

The research site at Ferdinand Bolstraat station was situated in a street outside the historical centre that had been open country until well into the nineteenth century.



The Nieuwe Brug, seen from the west, presented as an open public space. In the centre the *Paalhuis* and in the foreground the gallery of the shipping exchange (1693, Amsterdam City Archives, 010097003130)



The subsoil had not been eroded by a natural watercourse nor a canal dug here. As a result, the top layers of the original peat landscape lay immediately under the street. Little more than two separate metal finds were retrieved here. Nonetheless, the location was archaeologically important because of the opportunity it offered for geo-ecological research. Working down from ground level, the original stratification of the Holocene landscape (from 0 to 12 metres below NAP; from 10,000 BC to the present) to deep in the Pleistocene landscape (down as far as 35 metres below NAP; 124,000 BC) was sampled for organic and geological components.

The construction site at Nieuwe Leeuwarderweg in the north of Amsterdam was selected for research because of the medieval dyke that the metro trajectory transected. But the body of the dyke turned out to have been dug up during earlier construction works and yielded no further finds.

In order to reinforce the soft soil, vertical shafts were drilled close to a number of large buildings along the trajectory, including at Dam Square and Munttoren (the Mint). These incidental research locations yielded further finds from the layers of landfill (Dam 1,276 finds in 609 records in the find database).⁷

The urban topography of Damrak and Rokin

Damrak and Rokin yielded far and away the richest deposits. Although both locations lie in the bed of the Amstel, topographically they differ. The topographical structure of a city is an important indicator for archaeological finds since urban life with its accompanying

activities varies with every neighbourhood and district. As a result of this, there is a connection between the spatial structure and the archaeology of a city. The same applied to the River Amstel. It was a matter of location whether certain things ended up in the water or not. Based on the topographical features, an archaeological expectation model was drawn up for every section of the river within the city, indicating what might be embedded in the riverbed.

The Damrak was defined by the open connection of this section of the Amstel with the IJ and had a more dynamic water balance through the rise and fall of the tide. In the Middle Ages the Damrak served as an international harbour, and in the post-1600 Early Modern Period it was a busy port for the shipment of goods in and out of the city. A vital topographical feature of Damrak was the Nieuwe Brug (New Bridge) and the presence of the western part of the bridge underneath the largest caisson determined to a large extent the nature of the material deposition at this site. This bridge, which was first mentioned in 1365 but which was built at an earlier date, connected the eastern and western banks of the mouth of the Amstel.⁸ Originally of wood, the bridge was fitted with stone arches around 1529 on the west side, keeping its span of wooden piers at the eastern end certainly until well into the seventeenth century. In 1681 the bridge became part of Amsterdam's new water management system, introduced by Burgomaster Johannes Hudde, creating two passages, each with its own lock, the whole structure built of brick.

In connecting the two sides of the river, the Nieuwe Brug played a key role in the ever-changing urban infrastructure. Many different activities were concentrated on and around the bridge so that a similarly varied assortment of archaeological finds could be expected here. First and foremost, the bridge formed the entrance to the harbour and as such there were sure to be countless maritime objects, such as ship's equipment or parts of ships.

Objects of a military or weaponry nature were a second functional category of goods that could be expected. Originally, the bridge formed part of the city's northern fortifications. Cornelisz Anthonisz's 1544 map of the city shows artillery along the balustrade and a stone tower at the west approach, which was pulled down in 1550. One of the two wooden blockhouses that were used to defend the bridge and the harbour was also still there then. This was demolished in 1560, and with the post-1600 urban renewal, the bridge lost its military function altogether.

A third topographical role the bridge played as a result of its position at the entrance to the harbour was that of a meeting place for skippers and merchants, giving the bridge a commercial function. Until the completion of Hendrick de Keyser's Stock Exchange in 1611, trading took place here in the open air. In the brick *Paalhuis*, the tax office at the west end of the bridge, which was in use between 1561 and 1681, auctions were held, harbour dues and beaconage were paid and mail was kept. A covered

landing stage on the south side of the bridge served as a shipping exchange from 1661 to 1681. Furthermore, for centuries every corner of the bridge had been occupied by craftsmen and dealers and an assortment of booths and kiosks at the entrances to the bridge served as workshops or for storage. These economic activities meant there might be finds associated with transactions (coins) or production processes (semi-finished products or series of similar objects).

From an infrastructural perspective, the Nieuwe Brug was an extremely busy public area, attracting a colourful array of people: seamen, city-dwellers, travellers, children playing and promenading passers-by. It could also be the scene of religious ceremony, such as the annual *Miracle Procession to the Oude Kerk* (Old Church), or of ritual violence, as at the *hoopgevechten*, the yearly fight between youths from the Oudezijds and Nieuwezijds neighbourhoods, east and west of the river, respectively. The variety of lost personal belongings and the range of public events meant that the archaeological material would be accordingly diverse.

Lastly, the public amenities on the bridge in the form of toilets, built out into the water and in use until well into the sixteenth century, could also yield finds. In view of the location on the open water of the IJ at the city's northern boundary, the shore and the bridge were popular places for disposing of rubbish. Hence vast quantities of mixed refuse were to be expected at the foot of the Nieuwe Brug.

The topographical situation at Rokin was different again. In the third quarter of the thirteenth century a dam and a lock were created in the River Amstel near where Dam Square is currently situated. In the centuries that followed, the river was consistently narrowed as the quaysides were progressively extended. The Rokin served as an inland harbour for boats transporting goods and people from the hinterland. Both banks were densely developed with housing, workshops, shops and institutions, among which the Nieuwezijds Chapel (1347). The local urban fabric was constantly changing as major spatial interventions were implemented. For instance, until the end of the sixteenth century, the development at the eastern end of Rokin had consisted largely of monasteries, but as a result of the 'Alteration' of 1578 – when there was an administrative and religious change of power and the Catholic establishment was replaced by a Protestant city council – they were designated public institutions, with new uses such as a hospital, an abattoir, and the Municipal Pawnbroker. The intensive economic activity and increasing habitation of the riverbanks were bound to yield concentrated deposits of highly diverse domestic and artisanal waste as well as the lost property of countless visitors to the city centre.⁹

The fieldwork at Damrak and Rokin

The technical complexity of the metro construction project meant that standard procedures for archaeological



View along Rokin in northerly direction. At the left the Nieuwezijds Kapel (Nieuwezijds Chapel) and the Rotterdam ferry, in the background the Stock Exchange of 1611 by Hendrick de Keyser (Jan de Beijer (1703-1780), engraver: J. Folkema. Amsterdam City Archives, 010094003470)



research could not be used. Working methods had to be tailored to the civil engineering programme at the two locations. At Damrak three caissons were sunk to a depth of 25 metres below NAP in 2005-2006 and in 2012.¹⁰ The south caisson (1) was the largest (approximately 60x20 metres) and was sunken over the historical location of the Nieuwe Brug. Joining up with this on the north side were two smaller caissons (2 and 3) which were positioned in the once tidal water of the IJ to link up with the archaeological site on the artificial island on which Central Station was built. After the dismantling of the existing bridge, caisson 1 was constructed on the bed of the Damrak. The caisson was sunk by liquefying the soil beneath the caisson with high-pressure water cannons and extracting the slurry through an ejector pipe. The working chamber beneath the caisson was kept under overpressure to keep out the groundwater. The only access was via a decompression chamber. Every day the jetting work was carried out by two teams operating in shifts, each team consisting of a maximum of six workers due to the limited capacity of the decompression chamber. As in diving, the duration of the shift depended on the depth. Each team worked underground for four to six hours and the deeper the caisson sank, the shorter their effective working hours were and the longer they were required to spend in the decompression chamber before returning to normal levels.

The three-pronged approach of the archaeological programme was devised to fit in with this sinking operation. It was standard procedure for each jetting team to be accompanied by a member of the archaeological

team to collect individual finds and to identify areas of find concentration and geological phenomena for further research on site. While jetting operations were in progress underground, above ground six to ten archaeologists operated an industrial sieve built into the pump system. The sieve had two decks with different sized mesh (upper deck 4x4 cm, lower deck 1x1 cm) that caught any finds larger than a centimetre from the ejected slurry. Further, a sludge container underneath the sieve collected any even smaller material such as brooches and coins. A third team of archaeologists worked in the evening at the end of sinking operations to document in detail the find and soil context underground. All in all the Damrak fieldwork yielded 465,536 finds (43,045 records in the find database), few of which were retrieved from caissons 2 and 3 in the IJ (4,488 and 3,774, respectively), reflecting the same low retrieval rate as at Stationsplein.

At Rokin the archaeological work was carried out in several phases between 2003 and 2011.¹¹ Rokin was one of the larger metro stations and the construction pit (approximately 280x25 metres) encompassed virtually the whole of the northern end of the River Amstel between Grimburgwal in the south and the Dam in the north, which had been filled in in 1937. Within the deepwalls two entrance halls were constructed and a concrete 'box' measuring 190x25 metres for the deep station itself.

The floor of the station box was injected at a depth of 30 metres below NAP and a roof constructed so that traffic could continue over Rokin. February 2008 marked the start of the first of five phases in which the station box was excavated to a depth of 27 metres below NAP underneath this roof. Two excavators operating simultaneously side by side removed a 4-5-metre-high layer of soil over the whole length of the pit from south to north, which was then transported to a soil depot. The archaeological work was spread over two locations: on the one hand, in situ at the Rokin site as part of the civil engineering excavation, and on the other, at the soil depot for find research. Split into a morning and an afternoon/evening shift of 16 workers, the Rokin team was responsible for examining the filling of the Amstel, which extended to a depth of approximately 12 metres below NAP. The richest find deposits in the river were uncovered during the initial excavation to approximately 6.5 metres below NAP. The stratigraphic position and depth of the finds in the different layers were documented with cross-sections of the Amstel fill, over 100 of which were made. Samples of the sediments were taken for geo-ecological research. The horizontal distribution of the finds was recorded using the east-west division of the excavated area into two 12.5 metre-wide halves, each subdivided into 5-5.5 metre wide sections. By correlating this grid system with the actual parcel layout, the archaeological finds could be linked to historical buildings on both banks of the Rokin along Kalverstraat and Nes. This grid system also made it possible to record the location of the excavated soil. At the soil depot another archaeological

team of ten people sifted through the soil for finds, looking especially for small metal finds using metal detectors. The archaeological research at Rokin ultimately yielded 229,943 finds (90,258 records in the find database).

Processing the finds

Altogether a total of 697,235 archaeological finds were retrieved (table 1). This included both complete objects as well as individual sherds. These are documented in 134,282 individual records in a digital relational database (i.e. a database compiled from multiple separate data tables). Multiple finds can be recorded under one record (sherds of a single pot, for instance). A record in a database consists of a number of fields in which the attributes of a find are recorded. In principle, there are two categories of information: fieldwork data and object data. The former are mainly administrative and might concern, for instance, the date on which the find was made or the location within the excavation. The object data are more varied and primarily describe the perceived attributes of a find, such as its dimensions, material, production method, type of decoration (important for differentiating pottery, for example), the number of fragments or parts within a record or the extent to which an object is complete.

Secondly, the registration of every find also involves a set of extrinsic data. In archaeology these concern the find's functional, chronological and spatial attributes.¹² Functional data records what an object was used for. Many archaeological finds are broken and consist of fragments. When identifying functionality, the aim is to define the function of the complete original object, so that when a find consists of the foot of a vase, the function of the object is given as 'vase' and not 'foot'. The chronological attribute of an object is determined by the period when it was made or used. A dating can be deduced from the object itself because it is representative of a certain type from a certain period, or else from its relation with other finds of known date, which thus provide a relational chronology. The spatial data is recorded under fieldwork data to document the location where the find was embedded. This is why archaeological finds are registered with a stratigraphic indication, recording in which layer, at which depth or exactly where in the horizontal section a find was deposited. For finds from a riverbed such as the Amstel, such data offers something to go on when assessing the spatial context and in turn enables (bulk) finds or certain soil layers to be dated. In a wider context, the spatial attribute of an object has to do with where it was made or, in the case of an import, its place of origin, which in turn can be linked with the type of material and the production technique. This applies in particular to pottery; for example, if the material is porcelain the place of origin could be China.

The database is an interpretive instrument that can be organised in different ways based on the data categories. Finds can be sorted into groups by establishing

The Rokin, detail of the map by Cornelis Anthonisz from 1544 (see page 14). The east bank along the Nes (below left) was densely developed with monasteries and other religious institutions in this period.

Table 1. The total number of archaeological finds from Damrak, Rokin and other sites of the North/South line project, including the number of records and the total weight of the finds

Site	Number of finds	%	Number of records	Total weight (gr)
Damrak NZD1	465,536	66.7	43,045	8,010,552
Rokin NZR1 and NZR2	229,943	33	90,258	13,347,833
Other sites	1,756	0.3	979	344,719
Total	697,235	100	134,282	21,703,104

Category	Damrak number of finds	Damrak number of records	Damrak weight (gr)	Rokin number of finds	Rokin number of records	Rokin weight (gr)
CER (ceramics)	201,823	16,947	3,326,919	148,668	50,334	8,581,922
FAU (fauna)	111,198	4,538	2,889,223	15,169	3,948	947,878
MTL (metal)	74,867	10,308	1,221,127	16,982	14,556	834,118
LEE (leather)	45,775	2,278	2,939	12,822	5,255	6,451
CPY (pipe clay)	15,088	3,239	898	11,137	6,382	3,195
GLS (glass)	7,586	1,674	88,389	13,632	4,971	784,453
BWM (building ceramics)	2,494	880	133,788	7,911	2,949	971,760
HT (wood)	1,175	985	167,714	810	627	25,925
KSC (clay sculpture)	120	120	2,196	7	6	383
KST (synthetics)	641	369	7,697	51	42	2,320
PLT (botanical)	1,790	270	5,064	536	166	4,483
STN (stone)	1,032	514	110,317	1,468	437	1,133,720
TW (rope)	73	51	326	133	101	2,791
TXT (textile)	753	585	10,895	389	289	2,162
VST (flint)	549	137	27,702	1	1	11
Other	572	150	15,358	227	194	46,261
Total	465,536	43,045	8,010,552	229,943	90,258	13,347,833

links between their respective attributes. All sorts of comparisons can be made, based, for example, on dating, type of material, use, special origins, or combinations of these. Within these groups further connections can be established, thereby refining the find categories in response to specific research questions, for example, the grouping of all the knives with brass fittings from Damrak dated between 1500 and 1600.

Processing the finds from Damrak and Rokin

The find data can be used to compare the sites. An initial distinction can be made on numerical grounds: the yield of 465,536 finds from the riverbed at Damrak is double that of the 229,943 finds from the entire excavation at Rokin, which constitute respectively 66.7% and 33% of the total yield from all the research sites put together. Comparison of the types of material reveals a similar picture of the type of objects – waste – that were disposed of in the river at both locations (table 2). The bulk of the finds consists in both cases of ceramics (350,491), followed by bone (126,367), metal (91,849), leather (58,597), pipe clay (26,225), glass (21,218) and building ceramics (10,405). There were very few finds in any of the other categories. However, there were also differences between them. Although there were half as many finds at Rokin, the average weight per find at Rokin was 3.5 times greater than that of the Damrak finds. The difference in weight indicates that the finds at Damrak were more fragmented. These simple comparisons of quantity and weight offer an initial indication of the different waste disposal practices at the two locations: at the mouth of the river the disposal of bulk waste and in the city centre the disposal of complete household items. Another factor determining the statistical outcome is the collection method. The sieve with the 1x1cm mesh yielded a comparatively large number of small finds, including a relatively large number of virtually indestructible metal objects.

Another striking difference between the two sites is the dating of the finds. The chronological data shows that the bulk of the Damrak material dates from 1450 to 1600 (graph 1). The peak in the first half of the sixteenth century can be put down to the construction in the first quarter of that century of a land abutment for the Nieuwe Brug, which was filled with urban waste. Another factor affecting the chronology of the finds is the construction of the massive wooden floor of the lock in 1681, sealing the streambed beneath the bridge. The Rokin finds, on the other hand, mainly date from the period 1650-1850. The more recent dating can be attributed largely to the dredging operations carried out from 1600 to maintain water levels for shipping, which cleared the waterways of material remains from earlier periods. Thus, the two sites give a further insight into the city's material culture in these eras. Besides their different datings, the two locations show the same pattern between 1600 and 1900, with a similar (slight) peak around 1650-1725 and 1800-1875. This dating pattern may well

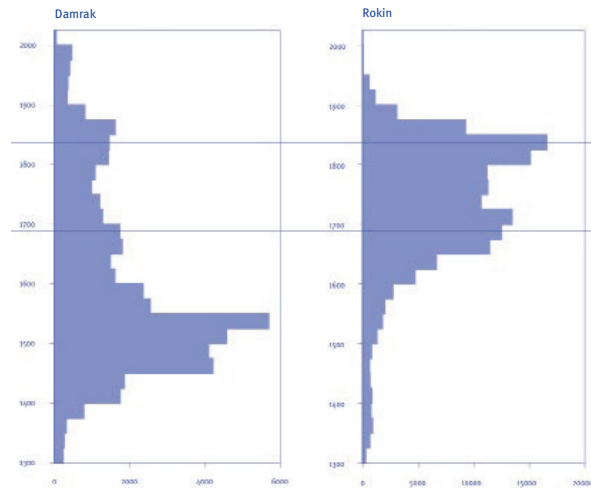


Table 2. Distribution of the finds from Damrak and Rokin by material category

mirror major economic cycles, such as the blossoming of trade and the city in the seventeenth century, the stagnation and decline in the eighteenth century, and the renewed opportunity and growth brought by the industrial revolution in the nineteenth century.

The spatial distribution of the Damrak and Rokin finds

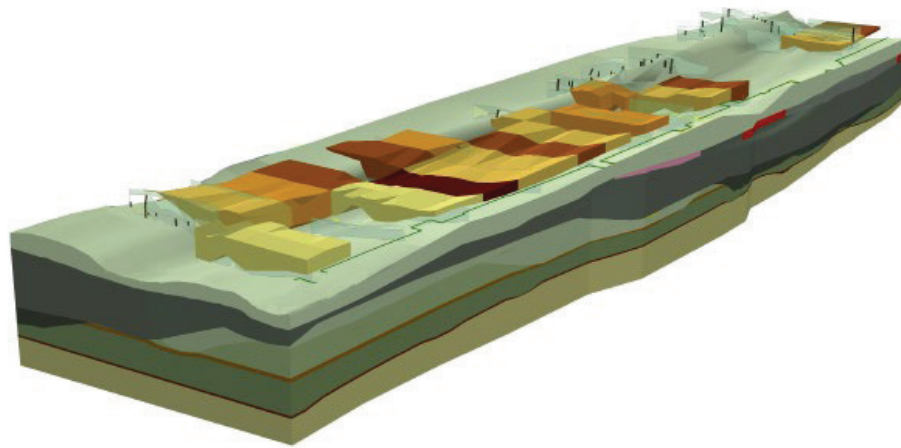
In addition to numerical and statistical analyses, the spatial distribution of the finds provided further evidence for a reconstruction of activities at Damrak and Rokin and the functional significance of these locations within the city's topography. For Damrak the role and use of the Nieuwe Brug were primarily examined from this perspective. The spatial analysis of the Rokin finds was broader in scope and focused on the relation between the find distribution patterns in the river and the function of individual parcels as a workshop, shop, dwelling or zone of activity, such as the ferry boat terminal.

As to the vertical distribution of the Damrak finds, the vast majority were found in the upper soil layers, between approximately 3.5 and 7.5 metres below NAP, peaking at 4 to 6 metres. Metal objects were distributed in a similar pattern, but peaked approximately one metre lower, demonstrating the principle that heavier and elongated objects descend deeper into a soft subsoil. The great similarities in the vertical find pattern of different material groups suggests that the spatial distribution of the finds had not been disturbed by secondary processes, such as natural events (storm tides), human interventions (dredging) or the construction process (sinking of the caisson). The same applied to the chronological pattern within the vertical distribution, judging by the depth at which finds predating 1200 BC were found, for example. Although these finds only represent a small proportion (a few hundred) of the total number, a pattern could clearly be detected, namely, that the older the object, the deeper it lay.

In the horizontal distribution of certain individual types of finds, characteristic patterns could be picked out that could be traced back to historical activities around the bridge. At the same time these are a good indicator of the reliability of the spatial distributions in the riverbed. When interpreting horizontal distribution it was important to take into account the position of the site in relation to the bridge. The caisson was divided into three chambers: chamber 1 contained the bed of the IJ on the harbour side of the bridge and chamber 3 the Damrak bed on the land side. Chamber 2 in the middle was largely taken up by the soil layers of the abutment from the first quarter of the sixteenth century and partly by the streambed beneath the bridge, which was covered by the lock floor in 1681. The chamber division beneath the caisson served as a reference for the horizontal location of the finds. In the case of the sieve finds, however, it was not always possible to make this distinction as the suction tube was in use

in two chambers at the same time. But there is sufficient material to distinguish meaningful patterns. The boat hooks was one find category in point. Their large number (228) illustrates how busy shipping traffic was around the bridge. The fact that two-thirds lay on the land side of the bridge and one-third on the IJ side further refines the picture and shows that the Damrak was apparently the trickier of the two waterways to navigate near the bridge. Large quantities of 'throwing bones' (*speelkoten*) (304) indicate that the Nieuwe Brug in the sixteenth and seventeenth centuries was a highly popular children's play area. Judging by the distribution, they did not play in the middle but down the sides of the bridge and then preferably on the harbour side, where over half of these finds were retrieved. The distribution of 110 arrowheads on either side of the bridge rather than in the water underneath or in the fill of the land abutment suggests they may have been fired from the bridge. They probably predate 1550, for around that time the bow fell into disuse as a weapon. The older weapons recovered at the bridge included a remarkably large collection of daggers. Altogether a total of 79 daggers or dagger fragments were found, including 49 ballock or kidney daggers from the fifteenth century. This is an exceptional number, since ballock daggers were personal weapons of an exclusive nature which would not have been thrown into the water without good reason. These stabbing weapons were retrieved under the bridge and on the land side and to a lesser extent on the harbour side. Their distribution may relate to the bridge's control post function or possibly even to the *hoopgevechten* mentioned earlier, the massive brawls that took place on the bridge every year.

For the spatial analyses of the finds at Rokin new digital techniques were used. The primary aim was to digitally reconstruct the excavated riverbed. For this over one hundred cross-sections of the river, which had been mapped over the entire length of the excavation site, were digitised and combined to create a three-dimensional model of the Amstel's ancient riverbed. By adding the geological data of hundreds of borings and probes within the seventeenth-century city centre, the digital river model could be placed in a wider landscape setting. Two-dimensional data, such as historical maps and other digitised information, could also be imported into this three-dimensional model. Even though the finds had no exact XYZ-coordinates, they could still be incorporated into the model using their position in the grid or soil layer. The integration of different data sets and map layers opened up new possibilities for working with complex archaeological and geological data. Modern software in the form of GIS (Geographic Information System) was used to develop a 3D GIS-model for an integral and more refined analysis of large quantities of finds within a three-dimensional reconstruction of the river. In effect, the model turned the riverbed as a whole into a queryable database on the spatial distribution of the finds and their functional



3D GIS model of the archaeological site at Rokin. An example of the volumes analysis of the various soil layers of the Amstel bed, showing the densities of various finds within (parts of) the riverbed (model: Jort Maas / Bart Visser, M&A)

relations. One of the possibilities the model offers is the analysis of volumes. This makes it possible to take into account the densities of finds so that the find situation can be more accurately represented. The visual impact of the 3D approach is extremely powerful. Sometimes the relations between the finds or soil layers only become clear when the spatial context can be seen in three dimensions. Within the 3D GIS model it is possible to navigate in a digital environment and render these three-dimensional relationships visible.

The Rokin finds are an indirect reflection of life and work along the riverbank as well as of transport over or along the water and of the disposal of rubbish. With the 3D GIS model it is possible to plot variation in find distributions using cartographic representations, and in this way to take stock of changes in the use of space. The similarities as well as the differences between the maps can indicate that certain functional find groups correspond with certain activity areas. This is illustrated by the different distribution of sugar jars and funnels and syrup jugs, all of which were made of the same red earthenware (redware) but which were functionally different. The sugar jars and funnels were exclusively used in the refining process whereas the syrup jugs are thought to have been involved with distribution and consumption. This functional difference is reflected in their two different spatial concentration patterns, pointing to a possible association with activities in certain parcels along the river. In the case of the sugar jars and funnels this pattern can be historically substantiated, for it can be traced back to the premises of the confectionery establishment 'De Drie Suikerbroden' (The Three Sugar Loaves) on parcels 87-89 along Rokin. The sugar factory was founded in 1611 by the Hamburg emigrant Hans Pelt and after extending the business to parcels 81-85 in 1651, he continued to operate under the name 'De Vier Suikerbroden' (The Four Sugar Loaves) until 1842.¹³ Two and a half centuries later, the sugar jar and funnel finds attest to the disposal of industrial waste right

in front of the building on Rokin. This pattern clearly indicates that, despite soil disturbances that can be expected of an urban river, spatial relations between finds and activity areas can still be identified. The concentration of syrup jugs farther along the riverbank raises the question of whether this could point to a historically unknown sales or distribution point.

A second example of find patterns which can partly be explained historically and which validate the reliability of archaeological find distributions at Rokin, is the cluster of cow, sheep and goat bones. These can be divided into horn cores and butchering waste. The horn cores are connected with the semi-processing and tanning of hides. The horn cores were left on the hides until it was time for them to be processed because they were important for demonstrating the quality of the hide. A high concentration of these bone deposits was discovered in the northwest corner of the research site and date mainly from the fourteenth to the sixteenth century. It is possible that leather tanning activities were still being carried out there in this period. There is archaeological evidence that a tannery was situated at this point along the Rokin from the late thirteenth century. The other bone finds were butchering waste from more recent soil layers from the seventeenth and eighteenth centuries. These concentrations were found on the east bank in front of *Wijde Lombardsteeg* and *Sint-Pieterspoortsteeg*. Both alleyways led to the Nes, where after the Alteration of 1578 the *Grote Vleeshal* (Large Meat Hall; 1582) and the *Kleine Vleeshal* (Small Meat Hall; 1587) were housed in *St. Pietersgasthuis* and *St. Margrietenklooster* monasteries, respectively. These cattle and poultry abat-toirs remained in use until well into the nineteenth century. The archaeological patterns reflect the daily task of the butcher boys of dumping their barrow loads of butchering waste in the Rokin. The discovery of over 80 kosher seals in the Rokin may indicate that the meat halls also had facilities to process meat for Amsterdam's Jewish citizens.

The Amstel and the founding of Amsterdam

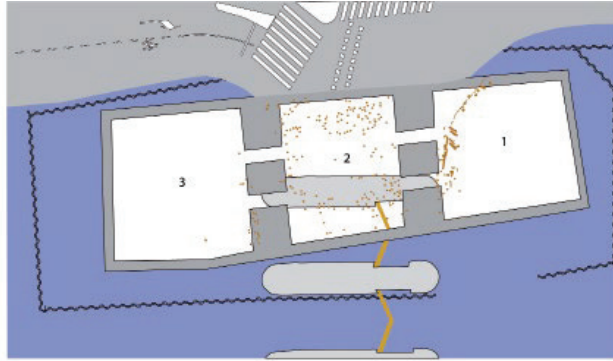
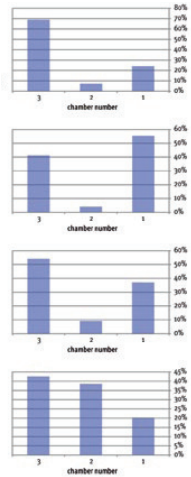
The geo-ecological research at Damrak and Rokin has provided a detailed picture of the development of the Amstel.¹⁴ Elaborating on this, the archaeological finds from the riverbed offer an insight into the development of habitation at the mouth of the river in this landscape setting. Landscape and habitation are two distinct processes, each with their own dynamics and time frame, and it was the crucial confluence of these two phenomena – the age-old River Amstel and the recent sudden appearance of settlement at its mouth – that gave birth to Amsterdam.

Between roughly 4000 and 1000 BC the area now occupied by Amsterdam lay on the banks of the tidal River Oer-IJ (literally, the 'Primeval IJ'). Water from the hinterland found its way via creeks and channels to the open water of the Oer-IJ, where it flowed on to an outlet in the dunes at IJmuiden into the North Sea. As the dunes constantly expanded, the Oer-IJ altered its course and flowed north to near Castricum. In the deeper-lying subsoil of Amsterdam many (tidal) channels can still be identified, including a channel which flowed from the Damrak via the Rokin into the hinterland (deposit R1.2, 9.50 metres below NAP). Around 1050 BC, a freshwater river, the prehistoric Amstel, cut into this channel and flowed into the Oer-IJ at Damrak and drained towards the west coast. This prehistoric Amstel can be recognised in the Rokin as a meandering channel (deposit R2, at 10.40-12.37 metres below NAP). The fill of sand, shells, wood and vegetal detritus is identical to that of a comparable, new channel in the Damrak (deposit D2, 11.40-11.70 metres below NAP), which means that the two watercourses belonged to the same water system. By this time the Amstel formed part of the larger Rhine-Vecht river system that discharged Rhine water from the peat bogs in the west of North Holland towards the North Sea. The increasing stagnation of the main discharge of the Oer-IJ between 350 BC and AD 100 meant the end of the Angstel-Vecht-Oer-IJ-prehistoric-Amstel system. It was then that the historic Amstel began to evolve into a main artery in the drainage of Amstelland, following the prehistoric riverbed and flowing into the IJ. When the discharge of the IJ towards Castricum and the North Sea silted up, it migrated to the Almere basin in the east. For a long time the IJ was a modest peat stream and the Almere a relatively closed water basin with a limited connection with the Wadden Sea. Stagnating drainage had made the mouth of the Amstel so wet and soggy that it was unappealing for habitation. Evidence of the transition to a slower flowing river with periods of sluggish water and dense vegetation in the Rokin can be found in a finely layered fill of organic material and deposits of freshwater shells (deposit R3, 8.86-10.40 metres below NAP).

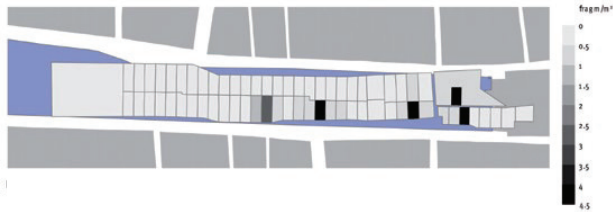
Despite this, the mouth of the Amstel was not a deserted area that only became inhabited in the Middle Ages. Countless archaeological finds in the tidal channel and the Amstel point to habitation that goes back to the Late Neolithic and Early Bronze Age (2700-1800 BC). The

finds comprise utensils, tools, food remains, and possibly a grave gift. While they fail to provide incontrovertible proof of permanent habitation, they do point to temporary, seasonal settlements on the banks of a freshwater stream in the peat bog near the tidal channel of the Oer-IJ in the vicinity of the Rokin between 2700 and 2000 BC. Finds from the ensuing Late Bronze Age-Late Iron Age (1100-50 BC) are scarcer and less varied. It is common knowledge that the wider environs of the Amstel were inhabited. The finds attest to human presence in the immediate vicinity of the river mouth, although, once again, not on a permanent basis. This possibly suggests transients travelling on the River Amstel. The same goes for the Roman Period in the Netherlands (50 BC-AD 450), which is represented by various finds, including coins, fibulae and ceramics. Early medieval material from the river is extremely rare, but this ties in with the overall picture of the peat bog. Once Amstelland started to be reclaimed around 1000, it attracted habitation. Working back from the Amstel, the main river, which served as an axis for reclamation, the peat bog was brought into cultivation. On either side of the Amstel, around what was later to become Amsterdam, numerous agricultural settlements and farmsteads sprang up in the eleventh and twelfth centuries. Only the mouth of the Amstel remained uninhabited, it still being too wet due to stagnating drainage into the IJ.

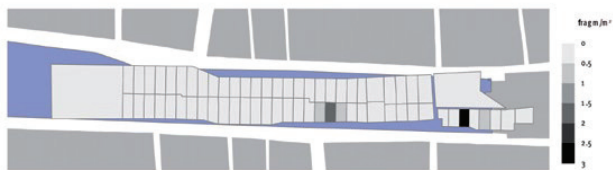
The turning point came at the end of the twelfth century following a series of storm floods, with the flood of 1170 having the biggest impact on the landscape. The IJ swelled to form a wide, full-fledged arm of the Zuiderzee, as the Almere was now called. The Almere basin had turned into a veritable inland sea with a direct opening to the North Sea after its western and northern peatland shores had caved in under the force of storms and floods. This new geological phase, during which a connection between the Amstel and the Zuiderzee was forged via the IJ, is recorded in the fill of the tidal channel at Rokin as a dark brown, finely veined layer of sandy clay with chunks of peat and fragments of shells (deposit R4, 6.43-8.86 metres below NAP). For the first time, the mouth of the Amstel was directly linked with waterways to the Wadden Sea, North Sea and the rivers in the east and south. From a place on a river in an otherwise closed landscape, the mouth of the Amstel was suddenly transformed into the most favourable location in Amstelland, with shipping connections with the rest of the country, enabling it to take over the role of the River Vecht as the main economic route. The settlement of Amsterdam, which sprang up here immediately after the landscape transformation in 1170, soon entirely focused on artisanal production and trade, and not on an agrarian or fishery economy. It is fascinating to perceive that founding of the settlement of Amsterdam was the answer of the farming communities who had lived on the reclaimed peatlands around the Amstel for two centuries to the climatological disaster that had fundamentally transformed their landscape.



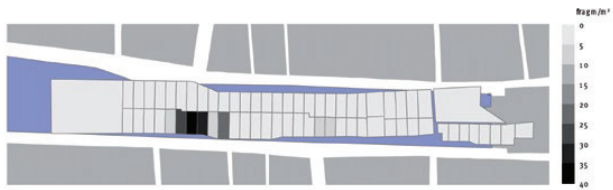
Distribution of finds within the three chambers under the caisson: 1 the IJ side, 2 the bridge foundation, 3 the Damrak side. The graphs represent the percentages of boat hooks, 'throwing bones', arrowheads and (ballock) daggers in the three chambers.



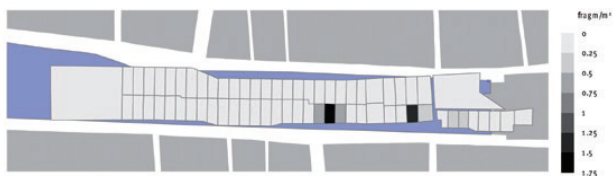
Distribution of horn cores along Rokin, showing concentrations in front of the passageways leading to the abattoir in the Nes in the seventeenth and eighteenth centuries. Another concentration in the northwest corner is possibly linked to a tannery in the fourteenth to sixteenth centuries.



Distribution of butchering waste along Rokin showing a concentration in front of Wijde Lombardsteeg and Sint-Pieterspoortsteeg. The waste from the abattoir in the Nes was transported to the river through these passageways.



Distribution of sugar jars and funnels which were used in the sugar refining process. This waste was dumped in the water right in front of the sugar factory, which was in operation on Rokin 81-89 from 1651 to 1842.



Distribution of syrup jugs, used in the distribution of sugar products. The concentration is not related to the location of the sugar factory, but is situated in front of the passageways to the Nes and possibly suggests nearby outlets.

For the first time, the mouth of the River Amstel presented the opportunity for serious habitation and new economic activity. That opportunity was immediately seized and, after a flying start in the thirteenth century, the settlement of Amsterdam swiftly developed into a trading city, with the first urban development dating from 1300. The urban river phase is evident in the Rokin channel as a finely layered fill packed with organic elements and freshwater sediments and a dense layer of habitation debris, the oldest of which date from roughly the beginning of the thirteenth century and the most recent from 1937, when the Rokin was filled in (deposit R5, 3.00-6.43 metres below NAP).

The constant factor in this urban history is the River Amstel itself, which as a natural stream has its origins in a prehistoric precursor connected with the tidal system around 2500 BC. Within the old channels, which created shallow watercourses in the landscape along which the water could find its way, the Amstel evolved from a prehistoric drainage channel into the main river in the reclamation area, with an uninterrupted bed from its mouth to deep into its hinterland beyond Ouderkerk. The metamorphosis of the landscape at the end of the twelfth century turned the mouth of the Amstel into an ideal location for a new trading settlement in the agrarian Amstelland, and paved the way for Amsterdam's development into a shipping city.

Cataloguing urban artefacts

In addition to painting a geo-ecological picture of the Amstel and the natural landscape from natural remains (ecofacts), the archaeological research of the North/South line resulted in a massive collection of man-made objects. These (remains of) artefacts embody information about the material culture of Amsterdam down the ages. In order to make this information accessible, the finds had to be identified and ordered. When the objects were excavated, they were broken, incomplete and disordered, and hence unrecognisable and unusable for a historical reconstruction of the city.

As discussed, cataloguing of archaeological remains is based on three criteria: function, time and space. On the basis of these criteria finds are ascribed meaning. How this is done and the meaning they are given is for the archaeologist to decide. Ultimately, archaeological meaning is a subjective perception even though it is based on calculated and objective information. This applies even more so to an archaeological catalogue, since it entails by definition a selective arrangement of the finds. For the central structure of a catalogue can only be based on one criterion or attribute at a time. Various catalogue systems exist. For instance, to convey an era, the objects can be presented chronologically, or, for a spatial presentation, arranged according to where they were produced or how they were distributed at the site. Archaeological catalogues tend to be functional overviews in which the objects are grouped according to their function or purpose, very

often in conjunction with the material they are made of.

In the catalogue *Stuff* the finds are arranged under the city's functions. Since they are all finds from the River Amstel, they primarily derive significance as tangible reflections of the city. For this reason, the catalogue is structured around the functional, spatial, logistical, economic and cultural characteristics that typify an urban centre. A city sets itself apart from the country and non-urban communities in the scale and diversity with which these characteristics are given expression.

The functional characteristics of a city such as Amsterdam can be broken down into ten main categories:

- 1 Buildings & Structures:** the city is a spatial phenomenon with a built environment that is shaped by the constructed amenities of urban life, such as city walls, churches, hospitals and theatres.
 - 2 Interiors & Accessories:** the city provides a living environment which is reflected in the furnishings of interiors, including furniture and permanent fixtures.
 - 3 Distribution & Transport:** the city functions as an infrastructural junction for the transportation of goods and people by water, land and air.
 - 4 Craft & Industry:** the city is a centre of multifarious production with the capacity to upscale from an artisanal to an industrial level.
 - 5 Food Processing & Consumption:** the city is a subsistence environment where people provide for their daily needs themselves.
 - 6 Science & Technology:** the city is a centre of knowledge serving the advancement of science and technology.
 - 7 Arms & Armour:** the city provides citizens with a safe environment, generally in tandem with law enforcement and the use of arms.
 - 8 Communication & Exchange:** the city is an environment conducive to the exchange of ideas, goods and news. This is what sets urban culture apart. Social and cultural processes in such diverse areas as information transfer, religion, art, monetary transactions and (product) quality guarantee fall into this category.
 - 9 Games & Recreation:** the city is an environment where people relax and enjoy free time.
 - 10 Personal Artefacts & Clothing:** the city is a place made up of individuals with both a private life and a life as a member of the urban community. Anything that distinguishes a person as an individual, from prostheses to jewellery, falls into this category.
- These ten functional urban characteristics define the overall arrangement of the finds from the North/South line in this catalogue. This structure is based on classifications used for large museum collections, and these in turn are based on the assumption that every artefact originally assumed a specific role and place in the interaction between man and his surroundings. Within this system a hierarchical distinction is made between these main categories and the functional subcategories of the objects.¹⁵
- In line with the ten functional urban characteristics,

the catalogue consists of ten chapters. An introductory chapter (Chapter 0) has been added on the geo-ecological environment. This focuses on the finds which embody physical information on the sediments and botanical and zoological aspects (ecofacts) of the landscape, including material remains of human activities (artefacts) in the period before the emergence of Amsterdam as a settlement. The allocation of finds to one of the eleven chapters was determined by the functional identity of the original object, even if the find consisted of a single part or fragment. This organisational principle resulted in a residual group of finds which were too fragmented to be traced back to the original complete artefact and hence to be attributed to functionally different objects.

The catalogue is based on an adjusted total number of finds, namely, on the total number of objects that were found as opposed to the total number of fragments (697,235), as in the database. After piecing fragments together, the find collection amounted to a total of 665,412 objects. In approximately 73% of the finds (482,502 objects), the significance could be traced to the urban or pre-urban context. These finds are reproduced in this catalogue, in 11,279 photographs. In the remaining 27%, the urban function is unclear because the finds are too fragmented or damaged to be able to attribute them to an original object. As a result, these finds fall outside the scope of this catalogue. Of this residual group, 94% consists of potsherds, i.e. pottery fragments (172,706), the majority from the Damrak (159,181 fragments, over 87% of the non-catalogued finds). In view of the high degree of fragmentation, this bulk group has not been specified to the level of the original object, but, in principle, the sherds can be classed as tableware which would put them in the main category of 'Food processing & consumption' (Chapter 5). After subtracting these sherds, a residual group of 23,722 finds is left, consisting of parts and fragments of a general nature, such as tops, rods, bars, rings or screws. This means that the urban function could not be identified in only 3.6% of the finds.

The structure of the catalogue varies considerably for each thematic chapter, and, depending on the quantity and quality of the objects, offers an insight into the urban material culture in Amsterdam. The chapters of the catalogue can be summed up as follows:

0 Natural & Pre-Urban Environment: 17,906 objects (212 reproduced); mainly consisting of bone remains of natural fauna.

1 Buildings & Structures: 72,226 objects (946 reproduced); this chapter is devoted to building materials, the largest group being the 55,847 nails, primarily from Damrak. In the main, Rokin yielded building fragments, including over 6,249 wall tiles, 1,737 roof tiles, 1,186 paving stones and 2,688 window-pane shards.

2 Interiors & Accessories: 17,901 objects (1,074 reproduced); the bulk of these finds were associated with portable heating devices, among which were 4,423

braziers and 2,063 chafing dishes. The sanitary ware included 4,513 chamber pot fragments. In the builders' hardware category 195 keys and 172 locks were retrieved.

3 Distribution & Transport: 3,824 objects (643 reproduced); this category was primarily made up of finds from Damrak associated with ships: some 2,250 items, over 1,117 being iron sintels from shipbuilding components, and 402 boathooks. A second group of finds was associated with horse-drawn transport, including fragments of tackle (220, 114 of which were belt fragments) and horseshoes and farrier nails (110). At Damrak modern transport was also represented with finds associated with bicycles (211 fragments) and car remains (75 fragments).

4 Craft & Industry: 35,161 objects (1,152 reproduced); the types of production in this category varied, with sugar production being the most prevalent with 20,384 fragments of sugar jars and funnels and syrup jugs found, a direct result of waste disposal by the sugar factory on Rokin. Leather processing could be recognised by the 7,780 fragments of production waste, textile processing by almost 3,104 objects associated with sewing, including over 2,805 pins, and metalworking by 1,140 fragments of manufacturing waste. In the category of cutting, piercing and splicing tools, such as axes, adzes, drills and files, 531 artefacts were retrieved, and for dyeing and tarring 444 objects. Evidence of pottery making was found in the form of 676 fragments, the majority biscuit ware, a semi-finished product that had been fired but not yet glazed.

5 Food Processing & Consumption: 277,628 objects (2,409 reproduced); food remains were present in abundance with over 101,697 finds (especially bone waste). A further 32,636 finds were associated with beverages and their storage, including over 13,418 mineral water bottles (stoneware) and more than 7,354 wine bottles (glass). Crockery for food preparation accounted for 34,750 finds, some 27,187 of which were cooking pots. Tableware amounted to 35,507 fragments, two-thirds of which were plates. Cutlery was also fairly well represented with more than 2,559 finds, including 713 spoons and 1,394 table knives, mainly from Damrak. In total 26,677 finds were tobacco smoking related, among which 16,485 fragments of clay tobacco pipes.

6 Science & Technology: 599 objects (355 reproduced); of the different instruments, the majority have to do with weighing (209, of which 171 were weights), followed in second place by objects for timekeeping (154).

7 Arms & Armour: 932 objects (490 reproduced); the weaponry finds present a chronologically continuous picture from the late Middle Ages to the present. Dating from the early periods are the arrowheads (114) and daggers, including a series of 49 fifteenth-century ballock daggers from Damrak. The transition to early modern weapons is illustrated by 265 lead bullets, and ends with modern rifle and pistol cartridges from the late nineteenth and twentieth century (58 items), and a modern Browning FN-5 pistol and an anti-riot smoke bomb.

8 Communication & Exchange: 4,846 objects (1,593 reproduced); the numerically largest group within this category are coins (2,947), ranging from a Roman sestertertius to euros. A second important group is the lead textile weights (436 items), which afford an insight into the textile trade in the late Middle Ages and the Early Modern Period. The discovery of 82 kosher seals from Rokin points to the slaughter of animals as from the mid-seventeenth century, possibly in the meat hall at the back of Rokin, for consumption by Amsterdam's Jewish community. Various finds are associated with hand-written and printed communication, varying from a wax tablet, stylus, slate pencil, slate and BIC ballpoint pen to printing type (180) and the remains (89) of book covers and book clasps from the late Middle Ages and Early Modern Period.

9 Games & Recreation: 2,752 objects (680 reproduced); judging by the number found, marbles (550) and 'throwing bones' (381) were the playthings children were most likely to lose, at least in the play area on the Nieuwe Brug where over 300 throwing bones ended up in the water. At Rokin large numbers (345) of miniature toys, such as tin soldiers and children's crockery (especially plates), were retrieved. Fragments of musical instruments (160) were also found.

10 Personal Artefacts & Clothing: 48,734 objects (1,725 reproduced); the bulk of the remains of clothing lost in the Amstel over the centuries was from leather footwear (42,049 fragments, especially in the Damrak). The second largest group (3,244 finds) consists of fasteners, such as buttons (908 finds), aglets (1,188 finds), belts (267 finds) and buckles (771 finds). Among the medical items (1,292 finds), ointment jars were well represented (919 fragments). Hair care items were present in the form of lice combs (197 fragments), and 209 items of jewellery were found, among which was a fairly large number of finger rings (58).

Within these main categories, extensive series of finds are presented, providing an imposing cross-section of Amsterdam's material culture in all its diversity and detail. The catalogue provides direct access to the objects used in everyday life in Amsterdam down the centuries, from its early beginnings around 1200 until the first decade of the twenty-first century.

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¹ Veerkamp 1998

² Kranendonk 2003; Kranendonk 2005

³ Gawronski and Kranendonk 2010

⁴ Jayasena (forthcoming)

⁵ Kocabaş 2015

⁶ Coles and Dion 1999

⁷ Kranendonk 2010

⁸ Gawronski 2012; 30; Haar 2009

⁹ Gawronski 2010

¹⁰ Kranendonk and Gawronski 2006; Gawronski, Kranendonk and Maas 2008

¹¹ Kranendonk and Gawronski 2007

¹² Gawronski 2012, 8-13

¹³ Alings 1964

¹⁴ Kranendonk, Kluiving and Troelstra 2015; Gawronski 2017.

¹⁵ Chenhall 1988

Chapter

0.0.1, 0.0.2 etc

(sub) Category, object

NZN1.5555BWM000 LxWxH Ø
 () ** information

Chapter of the cataloguing system

Numerical code of the paragraph subdivision

- functional category or object name
- () material code
- dating in (parts of) centuries
- Σ = the number of objects in the category, with (N) = the number of photographs in the category
- in some cases specification of multiple objects in the category with material types and object codes, including Σ and (N)
- in some cases explanation of object details

Vertical 1

- find number: unique number consisting of the topographical code of the site, a (five-digit) serial number of the location within the site, the material code and a (three-digit) subcategory number within the material code
- dimensions in mm; L: length, W: width, H: height, Ø: diameter

Vertical 2

- () specification material code
- ** inscriptions
- in some cases additional information and dating of the object

Topographical code

NZN1	Nieuwe Leeuwarderweg
NZS1	Stationsplein and underneath Central Station
NZD1	Damrak (three caissons)
NZDAM1	Dam (shaft in front of De Bijenkorf)
NZR1 and NZR2	Rokin
NZM1	Muntplein (shaft at the Mint)
NZV1	Vijzelgracht
NZC1	Ferdinand Bolstraat
NZTBM	Tunnel Boring Watching Brief

Material codes

BWM	Building material
CER	Ceramics
CPY	Pipe clay
FAU	Fauna
GLS	Glass
HK	Charcoal
HT	Wood
KHL	Daub
KSC	Sculptures
KST	Synthetics
LEE	Leather
MTL	Metal
MA	General sample
MHK	Carbon sample
MHT	Wood sample
MIX	Mixed
MP	Pollen sample
MSC	Shell sample
PLT	Botanical
SC	Shells
SLK	Metal slag
STN	Natural stone
TW	Rope
TXT	Textile
VST	Flint
XXX	Unknown

0 Natuurlijk & pre-urbaan landschap

<p>0.4.1.4 NZC1.00017 Bontpoosjes pommer</p> 	<p>0.5 Landschap: Holoceen (wadden met getijdengoulen: 6000-3000 v.Ch.) 11-6 m -NAP</p> <p>0.5.1 Vegetatie: begroeiing van het (hoog)wad 7,40-6,90 m -NAP, bak NZC1.00017 (pollen van 7,32-6,91 m -NAP)</p>	<p>0.5.1.1 Diverse zouttolerante soorten</p>	<p>0.5.1.1 NZC1.00017 Gastropoda</p> 	<p>0.5.1.1 Landschap: Holoceen (veen doorsneden met getijdengoulen: 3000-1000 v.Ch.) 6-4 m -NAP</p> <p>0.6.1 Vegetatie: planten (Klokbekker periode: 2400-2000 v.Ch.) 9,65-9,15 m -NAP</p>	<p>0.6.2.3 NZC2.00913FAU005-01 LUB.58240 middelevensbeent</p> 	<p>0.6.2.4 Edelhert (<i>Cervus elaphus</i>) Σ=2(1)</p>	<p>0.6.2.4 NZC2.00913FAU005-01 LUB.57976 elkbeent</p> 	<p>0.6.2.5 Wild zwijn (<i>Sus scrofa</i>) Σ=2(2)</p>	<p>0.6.2.5 NZC2.00913FAU004-01 LUB.53340 schouderbeent</p> 	
<p>0.5.1.1 NZC1.00017 Alnus (Bijvoet)</p> 	<p>0.5.1.1 NZC1.00017 Cassia/Amelie</p> 	<p>0.5.1.1 NZC1.00017 Zinnia</p> 	<p>0.5.1.1 NZC1.00017 Asteraceae</p> 	<p>0.6.2.5 NZC2.00913FAU005-01 LUB.48444 borstbeent</p> 	<p>0.6.2.6 Snoek (<i>Esox lucius</i>) Σ=2(2)</p>	<p>0.6.2.6 NZC2.00913FAU005-01 LUB.48445 beent</p> 	<p>0.6.2.6 NZC2.00913FAU005-01 LUB.48445 beent</p> 	<p>0.6.2.6 NZC2.00913FAU003-01 LUB.50440 zandbeent</p> 	<p>0.6.2.7 Bever (<i>Castor fiber</i>) Σ=5(4)</p>	
<p>0.6.1.1 Bos van natte bodems</p>	<p>0.6.1.1 NZC2.00913 Eis</p> 	<p>0.6.1.2 Planten van voedselrijke waterkanten en moerassen</p>	<p>0.6.1.2 NZC2.00913 Grote watermiegel</p> 	<p>0.6.1.2 NZC2.00913 Brossen</p> 	<p>0.6.1.2 NZC2.00913FAU005-01 LUB.11110 elkbeent</p> 	<p>0.6.1.2 NZC2.00913FAU005-01 LUB.37445 elkbeent</p> 	<p>0.6.1.2 NZC2.00913FAU005-01 LUB.37445 elkbeent</p> 	<p>0.6.1.2 NZC2.00913FAU005-01 LUB.37445 elkbeent</p> 	<p>0.6.1.2 NZC2.00913FAU006-01 LUB.30440 elkbeent</p> 	<p>0.6.1.2 NZC2.00913FAU005-01 LUB.37445 elkbeent</p> 
<p>0.6.1.2 NZC1.00011 Riet (wadden)</p> 	<p>0.6.1.2 NZC1.00011 Riet (Klokbekkerperiode)</p> 	<p>0.6.1.3 Hoogveenvegetatie</p>	<p>0.6.1.3 NZC2.00913 Vennens</p> 	<p>0.6.1.3 NZC2.00913 Vennens</p> 	<p>0.6.2.8 NZC2.00913FAU005-01 LUB.27147 Huis</p> 	<p>0.6.2.8 NZC2.00913FAU005-01 LUB.27147 Huis</p> 	<p>0.6.3 Gebruiksvoorwerpen (Klokbekker periode: 2400-2000 v.Ch.) Σ=20(12)</p>	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 
<p>0.6.2 Fauna: zoogdier en vis (Klokbekker periode: 2400-2000 v.Ch.) 9,65-9,15 m -NAP, Σ=518(19)</p> <p>0.6.2.1 Rund (<i>Bos taurus</i>) Σ=19(5)</p>	<p>0.6.2.1 NZC2.00913FAU005-01 LUB.10440 opperarmbeent</p> 	<p>0.6.2.1 NZC2.00913FAU005-01 LUB.10440 opperarmbeent</p> 	<p>0.6.2.1 NZC2.00913FAU005-01 LUB.10440 middelevensbeent</p> 	<p>0.6.2.1 NZC2.00913FAU005-01 LUB.10440 middelevensbeent</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 
<p>0.6.2.1 NZC2.00913FAU005-01 LUB.10440 spondyleent</p> 	<p>0.6.2.1 NZC2.00913FAU005-01 LUB.10440 opperarmbeent</p> 	<p>0.6.2.1 NZC2.00913FAU005-01 LUB.10440 opperarmbeent</p> 	<p>0.6.2.1 NZC2.00913FAU005-01 LUB.10440 spondyleent</p> 	<p>0.6.2.1 NZC2.00913FAU005-01 LUB.10440 spondyleent</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 
<p>0.6.2.2 Schaap/geit (<i>Ovis/Capra</i>) Σ=5(1)</p>	<p>0.6.2.2 NZC2.00913FAU005-01 LUB.60445 tandbeent</p> 	<p>0.6.2.3 Varken (<i>Sus domesticus</i>) Σ=8(3)</p>	<p>0.6.2.3 NZC2.00913FAU005-01 LUB.30440 spondyleent</p> 	<p>0.6.2.3 NZC2.00913FAU005-01 LUB.30440 spondyleent</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 
<p>0.6.2.2 NZC2.00913FAU005-01 LUB.60445 tandbeent</p> 	<p>0.6.2.2 NZC2.00913FAU005-01 LUB.60445 tandbeent</p> 	<p>0.6.2.3 Varken (<i>Sus domesticus</i>) Σ=8(3)</p>	<p>0.6.2.3 NZC2.00913FAU005-01 LUB.30440 spondyleent</p> 	<p>0.6.2.3 NZC2.00913FAU005-01 LUB.30440 spondyleent</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 
<p>0.6.2.2 NZC2.00913FAU005-01 LUB.60445 tandbeent</p> 	<p>0.6.2.2 NZC2.00913FAU005-01 LUB.60445 tandbeent</p> 	<p>0.6.2.3 Varken (<i>Sus domesticus</i>) Σ=8(3)</p>	<p>0.6.2.3 NZC2.00913FAU005-01 LUB.30440 spondyleent</p> 	<p>0.6.2.3 NZC2.00913FAU005-01 LUB.30440 spondyleent</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 	<p>0.6.3 NZC2.00913FAU005-01 LUB.50440 (gebruiksvoorwerpen 2400-2000 v.Ch.)</p> 

1 Gebouwen & constructies

1.5.12
Flavis, ruftvormig (gebakken klei, loodglazuur, koperoxide) 1300-1500 Σ=1(1)



NIZI.000145BIMM007 LABO:145042023

1.5.13
Flavis, ruftvormig (gebakken klei, loodglazuur, engobe) 1400-1500 Σ=1(1)



NIZI.000181BIMM004 LABO:14042023

1.5.14
Flavis, achthoekig (gebakken klei, loodglazuur, koperoxide) 1500-1650 Σ=1(1)



NIZI.00048BIMM004 LABO:150402027

1.5.15
Flavis, vierkant (industriëel gebakken klei) 1875-1937/2005 Σ=64(4)



NIZI.000645BIMM001 LABO:146416416416 (proefsteens) 1890-1930 (N=3)

1.5.15



NIZI.000702BIMM002 LABO:130420232 1890-1930

1.5.15



NIZI.000510BIMM006 LABO:160416041604 1890-1930

1.6
Wand Σ=6249(205)

1.6.1.1
Bloemen Σ=79(15)

1.6.1
Tegel (gebakken klei, tinglazuur, beschilderd) Σ=2214(200)



NIZI.000808BIMM001 LABO:130413041304 1825-1825



NIZI.000571BIMM006 LABO:142514251425 1825-1825



NIZI.000258BIMM006 LABO:130413041304 1825-1825



NIZI.000721BIMM006 LABO:142514251425 1825-1825



NIZI.000511BIMM013 LABO:137090137090 1825-1825



NIZI.000511BIMM013 LABO:137090137090 1825-1825



NIZI.000145BIMM001 LABO:130413041304 1825-1825



NIZI.000688BIMM004 LABO:140414041404 1825-1825



NIZI.000688BIMM004 LABO:140414041404 1825-1825



NIZI.000702BIMM002 LABO:130413041304 1825-1825



NIZI.000999BIMM017 LABO:160416041604 1825-1825



NIZI.000510BIMM006 LABO:160416041604 1825-1825



NIZI.00048BIMM004 LABO:150415041504 1825-1825

1.6.1.1
NIZI.000538BIMM031 LABO:140027148 1900-1900



1.6.1.2
Bloempot, fruit(schaal) Σ=105(11)

1.6.1.2
NIZI.000145BIMM001 LABO:130413041304 1825-1825



1.6.1.2
NIZI.000145BIMM001 LABO:130413041304 1825-1825



1.6.1.3
NIZI.00048BIMM004 LABO:150415041504 1825-1825



1.6.1.3
NIZI.00048BIMM004 LABO:150415041504 1825-1825



1.6.1.1
NIZI.000702BIMM002 LABO:130413041304 1825-1825



1.6.1.2
NIZI.000510BIMM006 LABO:160416041604 1825-1825



1.6.1.1
NIZI.000538BIMM031 LABO:140027148 1900-1900



1.6.1.2
NIZI.000721BIMM006 LABO:142514251425 1825-1825



1.6.1.2
NIZI.000721BIMM006 LABO:142514251425 1825-1825



1.6.1.2
NIZI.000085BIMM001 LABO:130413041304 1825-1825



1.6.1.2
NIZI.000510BIMM006 LABO:160416041604 1825-1825



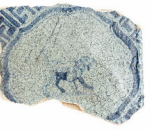
1.6.1.2
NIZI.000145BIMM001 LABO:130413041304 1825-1825



1.6.1.2
NIZI.000702BIMM002 LABO:130413041304 1825-1825



1.6.1.3
NIZI.00048BIMM004 LABO:150415041504 1825-1825

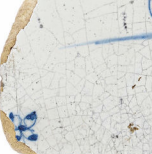


1.6.1.3
NIZI.00048BIMM004 LABO:150415041504 1825-1825

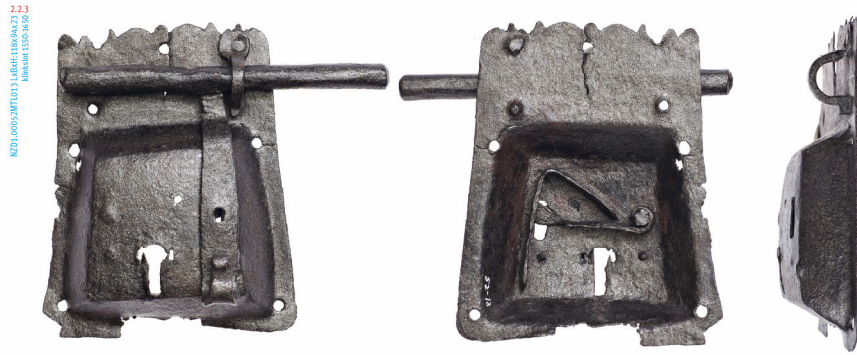
1.6.1.3
NIZI.00048BIMM004 LABO:150415041504 1825-1825



1.6.1.3
NIZI.00048BIMM004 LABO:150415041504 1825-1825



2 Interieurinrichting & -benodigheden



2.2.3
NED.00052MT0171.LABRIK1550-1600
Mantelkast 1550-1600



2.2.3
NED.00144MTL001.LABRIK1400-1500
grendelen met overslag 1450-1600

2.2.4
Schootveerslot met schootsluiting (ijzer)
1450-1800 $\Sigma=3(2)$



2.2.4
NED.00193MTL004.LABRIK1500-1550
ingegaten 1450-1550

2.2.5
Schootgrendelslot met schootsluiting (ijzer)
1725-1900 $\Sigma=6(3)$



2.2.5
NED.00037MTL1191.LABRIK1600-1725
ingegaten met veer 1725-1800

2.2.6
NED.00037MTL151.LABRIK1800-1897



2.2.6
NED.00059MTL035.LABRIK1800-2005



2.2.6
NED.00059MTL058.LABRIK1800-2005



2.2.4
NED.00045MTL007.LABRIK1800-1925
ingegaten 1800-1900

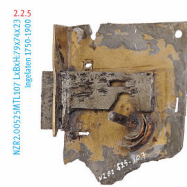
2.2.5
NED.00052MTL101.LABRIK1800-1925
ingegaten 1750-1900



2.2.6
Stuitplaat (messing) 1800-2005 $\Sigma=5(4)$



2.2.5
NED.00052MTL107.LABRIK1790-1823
ingegaten 1750-1900



2.2.6
NED.00181MTL007.LABRIK1700-1800



2.2.7
NED.00199MTL009.LABRIK1800-1900



2.2.7
NED.00045MTL008.LABRIK1800-1900



2.3.1
NED.00051MTL018.LABRIK1800-1900



2.3.5
NED.00068MTL010.LABRIK1600-1800



2.3.4
Platte gedreven kast met achterplaat,
klinkslot met voor links
schootgrendelslot met sleepeer (ijzer)
1525-1700 $\Sigma=5(2)$



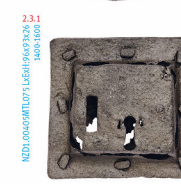
2.3.5
Overslagkrambeugel voor slot met
platte gedreven kast met achterplaat,
waarschijnlijk voor schootgrendelslot met
sleepeer (ijzer) 1500-1750 $\Sigma=4(2)$



2.3.6
NED.00156MTL058.LABRIK1500-1590



2.2.7
NED.00051MTL007.LABRIK1800-1900



2.3.1
NED.00049MTL007.LABRIK1600-1800



2.3.3
NED.00049MTL008.LABRIK1600-1800



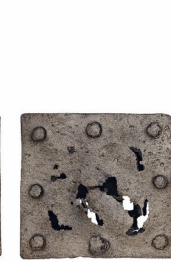
2.3.4
NED.00087MTL004.LABRIK1500-1525



2.3.5
NED.00078MTL015.LABRIK1800-1800

2.3
Sluitwerk: hangslot $\Sigma=134(60)$

2.3.1
Platte gedreven kast met achterplaat,
klinkslot (ijzer) 1350-1600 $\Sigma=6(3)$



2.3.5
NED.00078MTL015.LABRIK1800-1800



2.3.6
NED.00054MTL001.LABRIK1500-1600



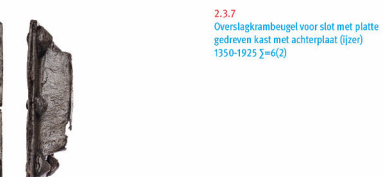
2.3.4
NED.00044MTL010.LABRIK1600-1800
Lafgrendel



2.3.2
Overslagkrambeugel voor platte gedreven
kast met achterplaat, klinkslot (ijzer)
1350-1600 $\Sigma=2(1)$



2.3.4
NED.00053MTL003.LABRIK1600-1800



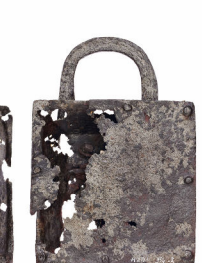
2.3.6
NED.00053MTL003.LABRIK1600-1800



2.2.2
NED.00038MTL015.LABRIK1350-1600



2.3.2
Platte gedreven kast met achterplaat (ijzer)
1350-1925 $\Sigma=6(2)$



2.3.4
NED.00053MTL003.LABRIK1600-1800



2.3.6
Platte gedreven kast met achterplaat (ijzer)
1350-1750 $\Sigma=6(2)$

2.3.7
Overslagkrambeugel voor slot met platte
gedreven kast met achterplaat (ijzer)
1350-1925 $\Sigma=6(2)$

3 Distributie & transport

3.3.7
Roerblad (ijzer, eik) 1700-1900 2-10)

3.3.7
N21.0004081001 LAB 17104419

3.3.8
N21.0004081001 LAB 17104419

3.3.8
N21.0004081001 LAB 17104419

3.3.8
N21.0004081001 LAB 17104419



3.3.8
Vloering (ijzer) 1250-1650 2-32(4)

3.3.8
N21.0004081001 LAB 17104419

3.3.8
N21.0004081001 LAB 17104419

3.3.8
N21.0004081001 LAB 17104419

3.3.8
N21.0004081001 LAB 17104419

3.3.8
N21.0004081001 LAB 17104419

3.3.8
N21.0004081001 LAB 17104419

3.3.8
N21.0004081001 LAB 17104419



3.3.9
Roerhaak (ijzer) 2-3(2)

3.3.9
N21.0004081001 LAB 17104419

3.3.11
N21.0004081001 LAB 17104419

3.3.13
N21.0004081001 LAB 17104419

3.4
Transport, vaartuig: twiisge 2-18(5)

3.4.1
N21.0004081001 LAB 17104419

3.4.1
N21.0004081001 LAB 17104419



3.3.9
N21.0004081001 LAB 17104419

3.3.11
N21.0004081001 LAB 17104419

3.3.11
N21.0004081001 LAB 17104419

3.3.13
N21.0004081001 LAB 17104419

3.4.1
N21.0004081001 LAB 17104419

3.4.1
N21.0004081001 LAB 17104419

3.4.1
N21.0004081001 LAB 17104419

3.3.10
Scheepsschoof (ijzer) 1875-1975 2-2(1)

3.3.10
N21.0004081001 LAB 20041810

3.3.11
N21.0004081001 LAB 17104419

3.3.13
N21.0004081001 LAB 17104419

3.4.1
N21.0004081001 LAB 17104419

3.4.1
N21.0004081001 LAB 17104419

3.4.1
N21.0004081001 LAB 17104419



3.3.11
Roeddel (ijzer) 1250-1650 2-13(5)

3.3.11
N21.0004081001 LAB 17104419

3.3.11
N21.0004081001 LAB 17104419

3.3.13
N21.0004081001 LAB 17104419

3.4.1
N21.0004081001 LAB 17104419

3.4.1
N21.0004081001 LAB 17104419

3.4.1
N21.0004081001 LAB 17104419

3.3.11
N21.0004081001 LAB 17104419

3.3.12
N21.0004081001 LAB 17104419

3.3.12
N21.0004081001 LAB 17104419

3.3.13
N21.0004081001 LAB 17104419

3.4.1
N21.0004081001 LAB 17104419

3.4.1
N21.0004081001 LAB 17104419

3.4.1
N21.0004081001 LAB 17104419



4 Ambacht & industrie

4.1.1.2
NED.000519MTC1231 LAB:3704157
Middelste ijzer



4.1.1.2
NED.000529MTC1231 LAB:3706143



4.1.1.2
NED.000538MTC1001 LAB:1514995



4.1.1.2
NED.000599MTC1019 LAB:2816100



4.1.1.2
NED.000510MTC1231 LAB:3704200



4.1.1.3
Handvat (es) Σ=1(0)



4.1.1.3
NED.000701MTC231 LAB:3704205

4.1.1.2
NED.000494MTC1019 LAB:3700175



4.1.1.2
NED.000599MTC1019 LAB:3700335



4.1.2
Bietenroispaade (ijzer) 1600-1875 Σ=1(1)

4.1.2
NED.000701MTC231 LAB:3704190



4.1.3
Sikkel (ijzer) 1300-1825 Σ=2(2)

4.1.3
NED.000419MTC1019 LAB:3700211
1300-1825



4.1.5
Hoonrook (ijzer) 1300-1825 Σ=3(3)

4.1.5
NED.000284MTC1001 LAB:3704130
1300-1825



4.1.3
NED.000419MTC1019 LAB:3700217
1400-1825



4.1.4
Hark (ijzer) 1300-1825 Σ=1(1)

4.1.4
NED.000510MTC1019 LAB:2715100



4.1.5
NED.000510MTC1019 LAB:2715100
1300-1825



4.1.5
NED.000510MTC1019 LAB:2715100
1300-1825



4.1.6
Mesvork (ijzer) 1825-1925 Σ=1(1)

4.1.6
NED.000599MTC1019 LAB:2816100



5 Voedselbereiding & consumptie

5.2.13
Voormatpot, deksel (poodbakend Deiluck;
glas) (h-dek-1-1550-1200-2-a-0); gl-dek-13
1891-1913-2-10)



5.2.11
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.2.2
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.2.2
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.2.5
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.2.5
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.2.5
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.2.5
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.2.5
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.2.5
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.2.5
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.2.5
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.2.18
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.3
Voormat, drank algemeen-2-32634(207)

5.3.1
Fles voor gedistilleerd, kuttolf (Nederlands;
Duits glas: gl-fls-) 2-802)

5.3.2
Fles voor gedistilleerd, kutterfles (glas;
gl-fls-) 2-146(4)

5.2.14
Dik (metaal) 1800-1937-2-4(1)



5.3.1
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.3.2
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.3.2
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.3.3
Fles voor gedistilleerde drank (beveegd
met glazuur/embobe: s3-fls-, s3-fls-; glas;
gl-fls-; plastic) 1775-2005-2-85(14)

5.2.5
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.2.5
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.3.3
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.3.4
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.3.4
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.3.4
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.3.4
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.3.3
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.3.4
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.3.4
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.3.4
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.3.4
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.3.3
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.3.4
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.3.4
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.3.4
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.3.4
NIZ-000150001-1318-01-01
gl-dek-13-1550-1200-2-10



5.3.4
Wijlen (glas: gl-fls-) 1650-1950-2-7354(1)

6 Wetenschap & technologie

6.16.5
Tandwiel (ijzer) 1825-1937 $\Sigma=4(4)$

NZD.00550MTL371 LUB.36542
1825-1937



6.16.5
NZD.00550MTL371 LUB.36542
1825-1937



6.16.5
NZD.00550MTL0011 LUB.23046
1825-1937



6.16.5
NZD.00550MTL162 LUB.8245
1825-1937



6.16.5
NZD.00550MTL028 LUB.74622
1825-1937



6.16.8
NZD.00550MTL221 LUB.70422
1825-1937



6.17
Brandbestrijding 1600-1800 $\Sigma=9(6)$

6.17.1
Blusemmer (leer) 1600-1800 $\Sigma=9(5)$

6.16.6
Tandheugel (messing) 1850-1937 $\Sigma=1(1)$

NZD.00550MTL111 LUB.61415
1850-1937



6.16.7
Pal (ijzer) 1875-1937 $\Sigma=1(1)$

6.16.8
NZD.00550MTL145 LUB.61415
1875-1937



6.16.8
NZD.00550MTL145 LUB.61415
1875-1937



6.16.8
NZD.00550MTL145 LUB.61415
1875-1937



6.16.8
NZD.00550MTL145 LUB.61415
1875-1937



6.16.8
NZD.00550MTL145 LUB.61415
1875-1937



6.17.1
NZD.00701LEED1 LUB.37045



6.17.1
NZD.00701LEED1 LUB.37045
sparen Hecht in water vurf (Pons (Jans Bakker)) 1864-1790?



6.17.1
NZD.00701LEED1 LUB.37045

6.17.1
NZD.00701LEED3 LUB.38043



6.17.1
NZD.00701LEED1 LUB.37142



6.18
Pomp $\Sigma=83(12)$

6.18.1
Zuiger (es) $\Sigma=5(5)$

6.18.1
NZD.00831POMP1 LUB.10045
1600-1800



6.18.1
NZD.00831POMP2 LUB.10045
1600-1800



6.18.1
NZD.00831POMP3 LUB.10045
1600-1800



6.18.1
NZD.00831POMP4 LUB.10045
1600-1800



6.18.1
NZD.00831POMP5 LUB.10045
1600-1800



7 Wapens & bewapening

7.13.2
NED.00057MUTDOR1.L319
A3.B1.C1.BH, Kling 60



7.13.2
NED.00057MUTDOR1.L319
A3.B1.C1.BH, Kling 60



7.13.2
NED.00057MUTDOR1.L319
A3.B1.C1.BH, Kling 60



7.14
Gevestwapens: klootdoeken met massief ijzeren stootplaat A2 of A3 1350-1550 Σ=9(9)

7.14.1
Kling (ijzer), (deel van) greep (wortelnotenhou), stootplaat A2 of A3 Σ=6(6)

7.14.1
NED.00064MUTDOR1.L319
A2.B4.C1.B0.B3, Kling 60



7.14.1
NED.00064MUTDOR1.L319
A2.B4.C1.B0.B3, Kling 60



7.13.3
Klingvangers A1 (ijzer) Σ=1(1)

7.13.4
Angelknoppen Ea1, Ea3 (messing, ijzer) Σ=3(3)

7.13.4
Ea1



7.14.1
NED.00057MUTDOR1.L319
A3.B1.C1.BH, Kling 60



7.13.3
NED.00042MUTDOR1.L319



7.13.4
NED.00042MUTDOR1.L319
Ea1, Angelknop, vorken (van wortelnotenhou) 02.13.13



7.13.4
Ea3



7.14.1
NED.00057MUTDOR1.L319
A2.B3.C1.B0, Kling 60



7.14.4
NED.00050MUTDOR1.L319
A3.B1.C1.BH, Kling 60



7.14.2
Grep (middervoetsbeen van rund), stootplaat (ijzer) Σ=1(1)

7.14.2
NED.00099MUTDOR1.L319
A3.B3.C1.BH



7.14.3
Kling (ijzer) Σ=2(2)

7.14.3
NED.00099MUTDOR1.L319
A3.B3.C1.BH



7.14.3
NED.00057MUTDOR1.L319
A3.B1.C1.BH, Kling 60



7.15
Gevestwapens: klootdoeken met dunne ijzeren stootplaat A4 (indien aanwezig), nadrukkelijk grote bollen B1 of B2 1350-1550 Σ=7(7)





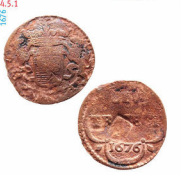




















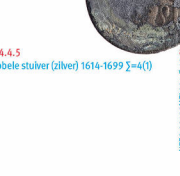
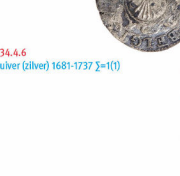
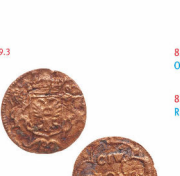

7.15.1
(deel van) Grep (wortelnotenhou) met B1 of B2, kling (ijzer) Σ=4(4)

7.15.1
NED.00050MUTDOR1.L319
A4.B1.C1.BH, Kling 60



7.15.1
NED.00050MUTDOR1.L319
A4.B1.C1.BH, Kling 60

8 Communicatie & overdracht

<p>8.33.20.1 NED.000598MTL003.0.20.1 </p>	<p>8.34 Overdracht, financieel: monetair. Munt, Noordelijke en Zuidelijke Nederlanden 1588-1815 $\Sigma=532(103)$</p> <p>8.34.1 Holland $\Sigma=110(6)$</p> <p>8.34.1.1 Rooschelling (zilver) 1601 $\Sigma=4(1)$</p>	<p>8.34.1.1 NED.000598MTL001.0.20.1 </p>	<p>8.34.1.2 NED.000598MTL003.0.20.1 </p>	<p>8.34.4.7 NED.000598MTL114.0.20.1 </p>	<p>8.34.4.8 Duit (koper) 1600-1796 $\Sigma=45(2)$</p>	<p>8.34.4.8 NED.000598MTL010.0.20.1 </p>	<p>8.34.4.8 NED.000598MTL010.0.20.1 </p>	<p>8.34.5 Utrecht $\Sigma=2(1)$</p>	
<p>8.34.1.3 Dubbele stuiver (zilver) 1614-1670 $\Sigma=3(1)$</p>	<p>8.34.1.3 NED.000598MTL009.0.20.1 </p>	<p>8.34.1.4 Bezemstuiver (zilver) 1738-1739 $\Sigma=1(1)$</p>	<p>8.34.1.4 NED.000598MTL007.0.20.1 </p>	<p>8.34.1.5 Duit (koper) 1590-1780 $\Sigma=100(2)$</p>	<p>8.34.5.1 NED.000598MTL006.0.20.1 </p>	<p>8.34.6 Stad Utrecht $\Sigma=6(5)$</p> <p>8.34.6.1 Dubbele wapenstuiver (zilver) 1799 $\Sigma=1(1)$</p>	<p>8.34.6.1 NED.000598MTL004.0.20.1 </p>	<p>8.34.6.2 Stuiver (zilver) 1627 $\Sigma=1(1)$</p>	<p>8.34.6.2 NED.000598MTL008.0.20.1 </p>
<p>8.34.1.5 NED.000598MTL004.0.20.1 </p>	<p>8.34.1.5 NED.000598MTL007.0.20.1 </p>	<p>8.34.2 West-Friesland $\Sigma=31(7)$</p> <p>8.34.2.1 Drie gulden (zilver) 1697 $\Sigma=1(1)$</p>	<p>8.34.2.1 NED.000598MTL001.0.40.1 </p>	<p>8.34.6.3 Duit (koper) 1617-1793 $\Sigma=59(3)$</p>	<p>8.34.6.3 NED.000598MTL003.0.20.1 </p>	<p>8.34.6.3 NED.000598MTL004.0.20.1 </p>	<p>8.34.6.3 NED.000598MTL003.0.20.1 </p>	<p>8.34.7 Friesland $\Sigma=35(7)$</p> <p>8.34.7.1 Halve snaphaan (zilver) 1599 $\Sigma=1(1)$</p>	
<p>8.34.2.2 Rooschelling (zilver) 1601 $\Sigma=3(1)$</p>	<p>8.34.2.2 NED.000598MTL006.0.20.1 </p>	<p>8.34.2.3 Dubbele stuiver (zilver) 1672 $\Sigma=1(1)$</p>	<p>8.34.2.3 NED.000598MTL007.0.20.1 </p>	<p>8.34.7.1 NED.000598MTL114.0.20.1 </p>	<p>8.34.7.2 Bezemstuiver (zilver) 1622-1623 $\Sigma=3(2)$</p>	<p>8.34.7.2 NED.000598MTL001.0.20.1 </p>	<p>8.34.7.2 NED.000598MTL001.0.20.1 </p>	<p>8.34.7.3 Halve stuiver (fries butken) (zilver) 1580-1605 $\Sigma=1(1)$</p>	
<p>8.34.2.4 NED.000598MTL119.0.20.1 </p>	<p>8.34.2.5 Duit (koper) 1604-1788 $\Sigma=25(3)$</p>	<p>8.34.2.5 NED.000598MTL001.0.20.1 </p>	<p>8.34.2.5 NED.000598MTL001.0.20.1 </p>	<p>8.34.7.3 NED.000598MTL003.0.20.1 </p>	<p>8.34.7.4 Oord (koper) 1600-1649 $\Sigma=14(1)$</p>	<p>8.34.7.4 NED.000598MTL003.0.20.1 </p>	<p>8.34.7.5 Duit (koper) 1604-1740 $\Sigma=16(2)$</p>	<p>8.34.7.5 NED.000598MTL113.0.20.1 </p>	
<p>8.34.3 Holland en Zeeland $\Sigma=1(1)$</p>	<p>8.34.3.1 NED.000598MTL005.0.20.1 </p>	<p>8.34.4 Zeeland $\Sigma=55(9)$</p> <p>8.34.4.1 Daalder (zilver) 1676-1682 $\Sigma=1(1)$</p>	<p>8.34.4.1 NED.000598MTL007.0.20.1 </p>	<p>8.34.7.5 NED.000598MTL018.0.20.1 </p>	<p>8.34.8 Groningen en ommelanden $\Sigma=14(3)$</p> <p>8.34.8.1 Wapenstuiver (zilver) 1681-1684 $\Sigma=1(1)$</p>	<p>8.34.8.1 NED.000598MTL014.0.20.1 </p>	<p>8.34.8.2 Duit (koper) 1674-1772 $\Sigma=13(2)$</p>	<p>8.34.8.2 NED.000598MTL016.0.20.1 </p>	
<p>8.34.3.1 Stoter (zilver) 1586-1595 $\Sigma=1(1)$</p>	<p>8.34.3.1 NED.000598MTL005.0.20.1 </p>	<p>8.34.4.3 Stoter (zilver) 1586-1597 $\Sigma=1(1)$</p>	<p>8.34.4.3 NED.000598MTL005.0.20.1 </p>	<p>8.34.8.1 NED.000598MTL014.0.20.1 </p>	<p>8.34.9 Stad Groningen $\Sigma=3(3)$</p> <p>8.34.9.1 Dubbele flabbe (langrok) (zilver) 1626 $\Sigma=1(1)$</p>	<p>8.34.9.1 NED.000598MTL014.0.20.1 </p>	<p>8.34.9.2 Vlieger of jager (zilver) 1593 $\Sigma=1(1)$</p>	<p>8.34.9.2 NED.000598MTL003.0.20.1 </p>	
<p>8.34.4.2 NED.000598MTL009.0.20.1 </p>	<p>8.34.4.5 Dubbele stuiver (zilver) 1614-1699 $\Sigma=4(1)$</p>	<p>8.34.4.6 Stuiver (zilver) 1681-1737 $\Sigma=1(1)$</p>	<p>8.34.4.6 NED.000598MTL001.0.20.1 </p>	<p>8.34.9.3 Duit (koper) 1690 $\Sigma=1(1)$</p>	<p>8.34.9.3 NED.000598MTL001.0.20.1 </p>	<p>8.34.10 Overijssel $\Sigma=41(6)$</p> <p>8.34.10.1 Rijderschelling (zilver) 1679-1696 $\Sigma=3(1)$</p>	<p>8.34.10.1 NED.000598MTL001.0.20.1 </p>	<p>8.34.10.2 Dubbele wapenstuiver (zilver) 1677-1703 $\Sigma=2(1)$</p>	

9 Spel & recreatie

9.9
Knikkeren 1200-2005 $\Sigma=550(40)$

9.9.1
Knikker (lokaal grijsbakend aardewerk: g-kni; (West-)Nederlands roodbakend aardewerk: r-kni; (West-)Nederlands witbakend aardewerk: w-kni; Duits steengoed: s2-kni; West-Europees porselein: ep-kni) 1200-1950 $\Sigma=408(14)$
g-kni- $\Sigma=1(1)$; r-kni- $\Sigma=6(2)$; w-kni- $\Sigma=10(2)$; s2-kni- $\Sigma=379(7)$; ep-kni- $\Sigma=12(2)$

9.9.1
NED.L0004CE0018.0.13
(g-kni) 1200-1500



9.9.1
NED.L0004CE0018.0.13
(g-kni) 1200-1500



9.9.1
NED.L0004CE0018.0.13
(g-kni) 1200-1500



9.9.1
NED.L0004CE0018.0.13
(g-kni) 1200-1500



9.9.3
NED.L0007GCS019.0.15
(g-kni) 1500-1900



9.9.3
NED.L0008GCS019.0.15
(g-kni) 1500-1900



9.9.3
NED.L0007GCS019.0.15
(g-kni) 1500-1900



9.9.3
NED.L0007GCS019.0.15
(g-kni) 1500-1900



9.9.3
NED.L0007GCS019.0.15
(g-kni) 1500-1900



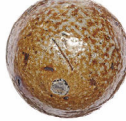
9.9.1
NED.L0004CE0018.0.13
(g-kni) 1200-1500



9.9.1
NED.L0004CE0018.0.13
(g-kni) 1200-1500



9.9.1
NED.L0004CE0018.0.13
(g-kni) 1200-1500



9.9.1
NED.L0004CE0018.0.13
(g-kni) 1200-1500



9.9.1
NED.L0004CE0018.0.13
(g-kni) 1200-1500



9.9.3
NED.L0004CE0018.0.13
(g-kni) 1200-1500



9.10
Schaken $\Sigma=7(7)$

9.10.1
Schaakstuk (hout) $\Sigma=7(7)$

9.10.1
NED.L0009PHT01.1519.0.15
(hout) 1900



9.10.1
NED.L0009PHT01.1519.0.15
(hout) 1900



9.10.1
NED.L0009PHT01.1519.0.15
(hout) 1900



9.9.1
NED.L0004CE0018.0.13
(g-kni) 1200-1500



9.9.1
NED.L0004CE0018.0.13
(g-kni) 1200-1500



9.9.1
NED.L0004CE0018.0.13
(g-kni) 1200-1500



9.9.1
NED.L0004CE0018.0.13
(g-kni) 1200-1500



9.10.1
NED.L0004PHT01.1528.0.15
(hout) 1900



9.10.1
NED.L0009PHT01.1519.0.15
(hout) 1900



9.10.1
NED.L0004PHT01.1528.0.15
(hout) 1900



9.10.1
NED.L0004PHT01.1528.0.15
(hout) 1900



9.11
Domino 1800-1900 $\Sigma=2(2)$

9.11.1
Dominosteen (been middelgroot-zoogdier) 1800-1900 $\Sigma=2(2)$

9.9.1
NED.L0004CE0018.0.13
(g-kni) 1200-1500



9.9.2
Knikker (natuursteen) 1500-1900 $\Sigma=75(3)$

9.9.2
NED.L0009YSTN010.1503.0.15
(natuursteen) 1500-1900



9.11.1
NED.L0009FL009.1503.0.15
(hout) 1900



9.11.1
NED.L0009FL009.1503.0.15
(hout) 1900

9.12
Mahjong 1950-2005 $\Sigma=1(1)$

9.12.1
Mahjongsteen (plastic) 1950-2005 $\Sigma=1(1)$



9.13
Chinese puzzel $\Sigma=1(1)$



9.9.2
NED.L0009YSTN010.1503.0.15
(natuursteen) 1500-1900



9.9.2
NED.L0009YSTN010.1503.0.15
(natuursteen) 1500-1900



9.9.3
Knikker (Duits glas, Nederlands/Duits glas, Japans/Taiwanese glas: gl-kni) 1848-2005 $\Sigma=67(23)$ (Duits $\Sigma=19(11)$; Nederlands/Duits $\Sigma=4(2)$; Japans/Taiwanese $\Sigma=4(10)$)

9.9.3
NED.L0004GCS016.0.15
(g-kni) 1848-2005



9.9.3
NED.L0004GCS016.0.15
(g-kni) 1848-2005



9.14
Kaartspel 1950-2005 $\Sigma=1(1)$

9.14.1
Spelbeendijgedelen, divers 1200-2005 $\Sigma=58(57)$



9.14.1
NED.L0009PHT01.1519.0.15
(hout) 1900



9.15
Speelbeendijgedelen, divers 1200-2005 $\Sigma=58(57)$

9.15.1
Dobbelsteen (metaal, been,ivoor, plastic) 1200-2005 $\Sigma=8(8)$

9.15.1
NED.L0005MTDLS018.1200.0.15
(metaal) 1200-2005



9.9.3
NED.L0004GCS016.0.15
(g-kni) 1848-2005



9.9.3
NED.L0004GCS016.0.15
(g-kni) 1848-2005



9.9.3
NED.L0004GCS016.0.15
(g-kni) 1848-2005



9.9.3
NED.L0004GCS016.0.15
(g-kni) 1848-2005



9.9.3
NED.L0004GCS016.0.15
(g-kni) 1848-2005



9.15.1
NED.L0004GCS016.0.15
(g-kni) 1848-2005



9.15.1
NED.L0004GCS016.0.15
(g-kni) 1848-2005



9.14.1
NED.L0009PHT01.1519.0.15
(hout) 1900



9.15.1
NED.L0005MTDLS018.1200.0.15
(metaal) 1200-2005



9.9.3
NED.L0004GCS016.0.15
(g-kni) 1848-2005



9.9.3
NED.L0004GCS016.0.15
(g-kni) 1848-2005



9.9.3
NED.L0004GCS016.0.15
(g-kni) 1848-2005



9.9.3
NED.L0004GCS016.0.15
(g-kni) 1848-2005



9.9.3
NED.L0004GCS016.0.15
(g-kni) 1848-2005



9.15.1
NED.L0004GCS016.0.15
(g-kni) 1848-2005



9.15.1
NED.L0004GCS016.0.15
(g-kni) 1848-2005



9.15.1
NED.L0004GCS016.0.15
(g-kni) 1848-2005



9.15.1
NED.L0004GCS016.0.15
(g-kni) 1848-2005



9.15.1
NED.L0004GCS016.0.15
(g-kni) 1848-2005



9.9.3
NED.L0004GCS016.0.15
(g-kni) 1848-2005



9.9.3
NED.L0004GCS016.0.15
(g-kni) 1848-2005



9.9.3
NED.L0004GCS016.0.15
(g-kni) 1848-2005



9.9.3
NED.L0004GCS016.0.15
(g-kni) 1848-2005



9.9.3
NED.L0004GCS016.0.15
(g-kni) 1848-2005



9.15.1
NED.L0004GCS016.0.15
(g-kni) 1848-2005



9.15.1
NED.L0004GCS016.0.15
(g-kni) 1848-2005



9.15.2
Speelschijf (lood) 1400-1900 $\Sigma=14(14)$

9.15.2
NED.L0005MTDLS018.1200.0.15
(metaal) 1200-2005



9.15.2
NED.L0005MTDLS018.1200.0.15
(metaal) 1200-2005

