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10 Summary

Spade and mud works. An archaeological history of Amsterdam

The circumstances of a marshy landscape, dominated by waterways, and the absence of natural higher ground dictate that artificial raising or reclaiming land is a basic requirement for urban development in Amsterdam. Therefore, in this archaeological city history, the central theme is the creation of 'manmade' land. Amsterdam's archaeological record provides information on the soils and various materials used for land-making dumps, as well as data on soil provenance and stratigraphy. Archaeology also provides (hard) dating evidence and ordnance datum information for analysing soil compaction as well as the methods, means, and processes of land making as a whole. In addition, there is ample documentary evidence detailing the individuals and institutions involved, as well as the motives, municipal decision-making, and overall goals of the land making projects.

Water and land are two of the most important elements in the history of Amsterdam. This study examines the extent the archaeological record, combined with documents contributing multiple lines of evidence, provides new insights into the development of the city. Two themes are highlighted: spatial development and cultural history as reflected by material culture. Another major area is what the archaeological record can contribute to our understanding of the historic elevations of water and land in the past, as well as the effect of soil compaction, or settling.

The foremost source for this study is the dataset created by the decades of archaeological research in Amsterdam. Until recently this rich source of information had been difficult to access, especially concerning projects done before the 1990s. For this analysis, all relevant site information - in combination with historical and topographical sources - was integrated in a GIS system developed by the City of Amsterdam Office for Monuments and Archaeology (MenA).

Spatial development

The spatial development and expansion of Amsterdam begins with the eleventh- and twelfth-century landscape created by laying out agricultural lots in adjacent peat lands. Combining archaeologically-traced boundary ditches with historic maps and historical studies allows a detailed reconstruction of the allotments west of the Amstel River, from the Nieuwendijk to the Kostverlorenvaart. This research gives strong support to the historical hypothesis that the original eleventh- and twelfth-century lots used a standard width of c. 115 m.

From the Amstel, the original tracts – primarily for livestock - stretched out to what is now the Kloveniersburgwal, and from there, followed the bend in the river to the northeast. Present-day Linnaeusstraat may have originated as a small dike erected to prevent the adjacent wetlands from flooding the newly-converted lots. Indirect historical evidence for this hypothesis is this street's location, parallel to the Amstel and roughly 1,250 meters away, a common length for the lots.

The first settlement at the mouth of the river Amstel dates from c. 1175. A series of storm floods in the years around 1170 had transformed the landscape drastically and created favourable conditions for settlement. On the basis of the spatial distribution of the oldest artefacts from the riverbed of the Amstel, areas of settlement can be located. The find of a much-earlier burial at the c. 1300 Oude Kerk (Old Church) gives indications the site may also contain a late twelfth-and early-thirteenth-century cemetery. After this first settlement washed away with storm floods in 1214 and 1219, around 1225 a new settlement developed at the landside of the later Nieuwendijk / Kalverstraat and Warmoesstraat / Nes.
At the Nieuwendijk and Kalverstraat, buildings stood on mounds constructed with chunks of peat and clay. These structures were used both for living and artisanal activities, such as the archaeologically-documented workshop of a weaver (1225-1250) and a blacksmith (1250-1300). At the eastern bank of the Amstel the first houses were built c. 1250. Instead of standing on mounds, the occupation here developed on a dike. The construction of the dam in the Amstel - between c. 1260 and 1275 – made it possible to

regulate water draining from the hinterland into the IJ. The waterway of the Boerenwetering was diverted from its mouth south of the dam (Spui) to a location north of the dam (present-day Dirk van Hasseltssteeg). In the 1280s or 1290s, a small brick castle was built by Count Floris V of Holland at the western bank of the Amstel, at the northern tip of the settlement. No written evidence on this defence work survives. The archaeological record indicates it was already levelled in the beginning of the fourteenth century.

Around 1350, Amsterdam was enclosed by a ring of moated earthworks. These stood on the western and eastern borders of the city, respectively the Nieuwezijds Voorburgwal and the Oudezijds Voorburgwal. At the Nieuwezijds Armsteeg, archaeology exposed a well-preserved section of this earthen rampart in the northern bend of the Nieuwezijds Voorburgwal to the Amstel. The location of the northern bend of the Oudezijds Voorburgwal was debated. According to one theory, the first phase of this wall was located near the Oudezijds Armsteeg, where the dike on Warmoesstraat made a turn eastwards. It was theorized the defence works were relocated after the dike was redirected to the north, and a new city gate was built (Sint-Olofspoort) about 1375. However, archaeological research found no evidence for a wall and moat around the Oudezijds Armsteeg, while the northern section of the dike proved to be older, dating from around 1350. It therefore seems likely that in the first phase, the northern bend of the Oudezijds Voorburgwal was located at the Nieuwebrugsteeg.

The first half of the fourteenth century saw large-scale reclamation in the Amstel. Archaeological evidence indicates this process did not involve the filling of open water, but rather, raising the existing foreshores with chunks of clay and peat, mixed with small amounts of refuse. From the second half of the fourteenth century, the developed area around the dikes expanded inland to the moated earthworks of the voorburgwallen. These areas were raised and made accessible from the main streets by alleys.
Filling the foreshores of the Amstel resulted in a narrowed streambed, and this channelisation reduced the capacity of water that could be drained. Probably for this reason, the achterburgwal canals were dug in the 1380s. In 1425, the city was expanded to a new ring of defence works on Singel, Kloveniersburgwal and Geldersekade. The ramparts, primarily earthen, were replaced by a brick city wall from 1482.

In the sixteenth century, Amsterdam was an overcrowded city. Outside the walls, a harbour area (Lastage) flourished. Large tracts of pasture to the west and south were illegally transformed into suburbs. After Protestants replaced the Catholics in the city government in the Alteration of 1578, Amsterdam saw four large-scale extensions within a century. This started in 1585 and 1592 with the First and then Second Extension, followed by the 1613 Third Extension, and was concluded with the 1660 Fourth Extension. The seventeenth-century extensions consisted primarily of new city walls enclosing areas which had already been developed as illegal suburbs. The uncontrolled organic growth of the suburbs continued.

In the second half of the nineteenth century, the city expanded on a large scale outside the seventeenth-century bastioned ramparts. Mechanisation of earth-moving techniques allowed large areas of pasture to be raised to realise the Plan Kalff extension (1875). At the same time, these technical developments provided the ability to create large islands in the open water of the IJ. This new land included a site for the construction of the central station (1872-1877), the Zeeburgereiland (1866-1894) the IJ-eiland (1896). At the end of the twentieth century, large-scale reclamation commenced with – the still-ongoing - creation of the island archipelago of IJburg, in the IJ-meer.

Organisation and land-raising techniques

Land raising, either on the waterfront, in the Amstel, or in the canals, was initiated either by the municipality or by private-property owners on the orders of the municipality, or on private initiative. When the city undertook large-scale projects, the new land was often divided into lots and sold. A profitable way for the municipality to reduce the costs was to sell parcels of water under the strict conditions that the buyers had to do the reclamation themselves - and provide the city with a public road. This was done on the waterfront in 1424. Later, private owners began to expand their property by pushing out further, resulting in an irregular pattern of conversion.

A variety of timber structures was used in raising the land. These varied from standard pile and plank revetments, with or without tie-backs, to crib constructions. Over time, revetments had to be renewed or increased in height to withstand high tides.

In the sixteenth century, projects undertaken by the municipality became the responsibility of the 'Stadsfabriekambt,' predecessor of the 20th-century Public Works Department. Archaeological research revealed that by the end of the sixteenth century, the Stadsfabrieksambt employed a systematic method for creating land, consisting of three phases. To raise artificial islands in pasture, the poorly-drained surface was first reinforced. For the maritime islands of the Second Extension (1592), this was done by covering the surface with layers of twigs and small branches. In raising the island of Vlooienburg in the bend of the Amstel (1595-1597), portions of the river and adjacent wetlands were filled with a massive dump of city refuse. This surface was then raised with peat and clay spoils from digging canals. Finally, the surface was capped with a layer of clay. In 1660, Oostenburg was raised in a similar way as Vlooienburg. City refuse was not only used for conversion projects organised by the city, but also for the earthen ramparts.

For late nineteenth-century conversions, the polders around the city were raised from roughly 1.5 m below Amsterdam Ordnance Datum (NAP) up to the city level, using sand deposits several meters in thickness. The water level in the area developed in the twentieth century was at c. NAP -2 m, with its surface at around NAP -1.5 m. Until 1950 it was common practise, as required by the city, to raise polders to the city level. Taking into account the extent of soil compaction, or settling, this meant that raising a surface 2 m required sand deposits with a thickness of 4 m. For economic reasons, and new insights into living conditions in the city, in 1950 it was decided that these converted areas were adequate at 1.2 m above the water level, c. NAP -0.8 m. This required a sand fill of only about 2 m, instead of 4 m.

Water and land

Cross-referencing documentary records with the archaeological data on stratigraphy details the nature and extent of soil compaction resulting from the massive filling. The degree of settling depended on several factors, the first being the inevitable compaction of the underlying peat, and second, the nature of the fill. Dumping loads on the saturated surface temporarily fulfilled the need to raise the land above the flood line, but at the same time accelerated the process of compaction.

On the basis of archaeological evidence, it is possible to reconstruct the surface of the sixteenth-century pasture land around the walled city – except for the Lastage harbour area – at around 0.0 m NAP. In contrast, in the archaeological record this surface underwent soil compaction to a depth of NAP -2 m. In the middle of the sixteenth century the surface of the harbour area stood at c. NAP +1,25 m; a fraction higher than the streets in the city. The artificial islands on the outer shores of the IJ from the 1592 city extension were all raised to a comparable level. The islands of the 1613 and 1660 city extensions were raised to approximately the level of the sea dikes, NAP +2 m. A comparison between the depth of archaeological surfaces and ordnance datum records from the seventeenth- and eighteenth century further indicates that whereas the level of the streets has not changed, and likewise the houses built on 12 m.-long piles, the soil underwent a compaction of 2 m. Keeping Amsterdam at its level required – and still requires – periodic raising of the sinking soil.

Cultural history

This theme focuses on the interpretation of material culture – as recovered from landfill deposits - to provide insights into cultural history. The first important questions are what methods are necessary to evaluate these groups, and how to determine whether they provide representative samples of Amsterdam's urban material culture.

Archaeologists focus on ceramics because their physical characteristics reflect the time in which they were made, and because they have very short periods of use before being broken and discarded. In research, the best results generally come from comparing data, making standardized methodology crucial, specifically in the sampling of deposits and cataloguing. In this work, ceramics are quantified by Es-

timated Vessel Equivalents (EVE) estimating the percentage of a vessel recovered, allowing evaluation of the overall representative nature of the sample. The national classification system of ceramics, known as the Deventer System, was also used to enable comparisons with other artefact assemblages both in and outside Amsterdam.

For this study – as a follow-up to the 2012 Amsterdam Ceramics publication – dates have been calibrated on the basis of the Deventer System. For Amsterdam, this led to refining the ceramics chronology, as well as the chronology of the urban development. For decades the dating of the city's earliest ceramics was under debate. For example, the transition from proto-stoneware to real stoneware was dated earlier in Amsterdam than in the rest of the country. These differing interpretations had impact on the theories about the city's development in the thirteenth and fourteenth century.

When broken down by vessel types and EVE, analysis of the ceramics from the deposits used to raise Vlooienburg and Oostenburg shows the range of vessels and their percentage of completeness is comparable to other city groups, such as cesspits – which contain refuse from a specific place. This implies the city's waste management process did not select specific types of refuse for use as landfill. Instead, the entire range of municipal refuse is represented in the assemblage. In turn, this implies the artefacts from the fill deposits of Vlooienburg and Oostenburg can be considered representative samples of the material culture of the city at the time of that construction. These two assemblages can therefore be used as reference groups in the interpretation of other deposits from the sixteenth and seventeenth centuries.

Because they follow fashion and were quickly broken, ceramics become valuable sources of information on time, function, and space. In landfill groups, the aspect of time generally refers to the – hard historical – context date known from contracts and other records. Such closed contexts give insight into the material culture of the city at a specific point in time. Well-dated groups allow researchers to determine the period of introduction, general use, and disappearance of different types of poorly-documented, everyday objects in Amsterdam.

Ceramic function can be clustered into two main groups: ceramics for household use and those for commercial production or transportation. The commercial group also provides information on artisanal activities in the city.

In the aspect of space, the information is twofold. It deals with the city as a whole, and at the same time, with the geographical origins of the city's material culture. Archaeologically-recovered ceramics are the best source of material residues from Amsterdam's trade. What is most readily apparent in the landfill assemblages is that the large-scale urban extensions - from 1585 onwards - were coinciding with a globalising city.