Nijmegen Coinage 450–1200 CE: Riverine Comparisons in the Rhine-Meuse Delta

Robert Jan Duchateau, 2026

Nijmegen Coinage 450–1200 CE: Riverine Comparisons in the Rhine-Meuse Delta

Robert Jan Duchateau, February 14, 2026

Abstract

This study examines monetary circulation patterns in Nijmegen, Netherlands, from 450 to 1200 CE, comparing them with nearby riverine and deltaic sites to evaluate continuity, discontinuity, and regional differences. Using 90 provenanced coins from the Numismagus citizen-science database, augmented by NUMIS records and seven 2025 Winkelsteeg finds (totalling 97), coins are grouped into five 150-year phases and issuer categories (Byzantine, Merovingian, Anglo-Frisian, Carolingian, Holy Roman, others). Chi-square tests, Fisher's exact tests, Cramér's V, and residuals reveal strong continuity in Nijmegen's profile, which persists after integrating the Winkelsteeg coins. These findings challenge linear emporia succession models and support polycentric exchange networks. Regional patterns reveal Anglo-Frisian dominance in the northwest delta quadrant during 600–750 CE, shifting toward Holy Roman dominance in the southwest delta quadrant in later periods. Despite sample size and bias limitations, the findings highlight Nijmegen's hybrid administrative-redistributive role and the value of citizen science in numismatic research.

Keywords: Nijmegen, Rhine-Meuse delta, medieval numismatics, early medieval coinage, Anglo-Frisian sceattas, Merovingian deniers, polycentric exchange networks, citizen science, Winkelsteeg

Introduction

Winkelsteeg Discoveries Overview

The discovery of coin finds from the Merovingian cemetery adjacent to Winkelsteeg in Nijmegen during the latter half of 2025 represents a pivotal archaeological development (Witlox, 2025). These artifacts increase the total number of early and high medieval coins documented within the municipal boundaries from 90 to 97 and raise the count of gold specimens from three to six. Concurrently, the number of early medieval coins rises from 21 to 27. Unearthed beneath the former athletic fields of SV Hatert, this assemblage provides a compelling basis for delineating Nijmegen's numismatic profile across the period 450–1200 CE, drawing on a meticulously curated database (Duchateau, 2025).

Coin Profile Analysis

The focal silver specimen featured in promotional imagery displays characteristics indicative of a Merovingian denier, reinforcing the Frankish influence in Nijmegen's numismatic record, consistent with the small Carolingian hoard found near De Oversteek (Woldringh, 2025). The accompanying silver pieces may represent deniers or Anglo-Frisian sceattas, echoing similar discoveries from the historic "mint hills" in the urban core (Duchateau, 2024); see Table 3. Although the gold coins attract considerable visual attention (later augmented by a fourth; Jansen, 2026), most coins originate from Nijmegen-Noord, underscoring its prominence in the overall survey of early and high medieval coinage within the Nijmegen municipality.

Key Research Questions

This study addresses the following research questions: (1) Which coins from the period 450–1200 CE have been found within the municipality of Nijmegen, and how can they be classified chronologically and by issuer? (2) How does the coin pattern of pre-urban Nijmegen compare to that of other historical Dutch riverine settlements, and what distinctive patterns emerge from these comparisons? (3) What impact do the recently discovered coins from the Winkelsteeg site have on these comparative relationships? (4) What insights can the coin pattern provide into the history of pre-urban settlements in the municipality of Nijmegen?

Methods

Numismagus Database Composition

The Numismagus database, compiled for this study through citizen science, focuses on early and high medieval coin finds (450–1200 CE) within Nijmegen's municipal boundaries. Numismagus integrates professionally verified sources: archaeological excavations, published literature, and NUMIS records. Citizen science is limited to aggregation (Duchateau, 2025). The initial 90 coins were supplemented by seven from the 2025 Winkelsteeg excavation, yielding a total of 97. NUMIS selection criteria: period 450–1200 CE, find location (municipality), character find: stray and excavation finds only, no hoards (De Nederlandsche Bank, 2025).

Classification Framework

Coins were grouped into five successive 150-year phases: 450–600, 600–750, 750–900, 900–1050, and 1050–1200 CE. Issuer classification follows standard categories: Byzantine (including imitations where appropriate); Merovingian; Anglo-Frisian (combining Anglo-Saxon and Frisian types); "Monetarian" (combining Merovingian and Anglo-Frisian where relevant); Carolingian; Holy Roman (encompassing Ottonian, Salian, and Staufic issues); "Episcopal" (separated

from Holy Roman where relevant). Determinations rely on established numismatic references (Hill & Metcalf, 1984; Lafaurie & Morrisson, 1987; Ilisch, 2000; Schuuring, 2014) and archaeological publications. The "Monetarian" category reflects the anonymous nature of many Merovingian, Anglo-Saxon, and Frisian issues. The separation of "Episcopal" issues is based on the emergence of local coinage in the 11th century.

Statistical Analysis Approach

Statistical comparisons used contingency tables analyzed with chi-square tests ($\alpha = 0.05$). Significant results were followed by post hoc Fisher's exact tests with Holm correction, inspection of adjusted standardized residuals, and effect size measurement via Cramér's V. Power considerations were assessed using G*Power 3.1 to evaluate the detectability of observed effects, ensuring methodological robustness given the dataset's constraints.

Delta Quadrant Definitions

For regional comparisons, the Rhine-Meuse delta is divided into four quadrants, oriented along the main northwestward flow of the river system (roughly following principal distributaries such as the Waal, Nederrijn, and Maas branches): (1) Southeast delta: Nijmegen–Land van Cuijk–Tiel area (2) Northeast delta: Eastern parts toward the IJssel/Lower Rhine (not fully covered in this dataset) (3) Northwest delta: Bunnik–Buren–Alphen a/d Rijn area (4) Southwest delta: West Betuwe–Zaltbommel–Rotterdam area. This quadrant-based division is scalable, explicitly addresses the modifiable areal unit problem (MAUP) through consistent, geographically motivated boundaries, and provides clearer spatial context for interpreting directional shifts in monetary circulation.

Results

Inter-Riverine Comparison

Nijmegen's monetary profile from 450–1200 CE, based on the Numismagus dataset ($N = 90$, augmented to 97 with Winkelsteeg), exhibits a relatively balanced distribution across periods and issuers (Figure 1). When excavation coins and stray finds from NUMIS for the municipalities Nijmegen-Maastricht, Bunnik-Alphen a/d Rijn, and Tiel-Rotterdam are compared by period (Tables 4–6), they prove to be significantly differently distributed across riverine areas ($\chi^2(8, N = 251) = 35.16$, $p < .001$, $V = 0.26$). As shown in Figure 4, adjusted standardized residuals show that period 450–600 is significantly more materialized in Nijmegen-Maastricht (+3.04), period 600–750 is more materialized in Bunnik-Alphen a/d Rijn (+4.12) and is less materialized in Tiel-Rotterdam (−3.53), while for 900–1050 the pattern reverses, with Bunnik-Alphen a/d Rijn (−2.64) and Tiel-Rotterdam (+3.40). Differences remain significant after post hoc Fisher's exact tests with Holm correction for periods 450–600 ($p = .0357$), 600–750 ($p = .0001$), and 900–1050 ($p = .0061$). Other periods do not deviate. See Appendix A.

Nijmegen–Tiel Temporal Comparison

Historically, Tiel and Nijmegen are often viewed as complementary centres in the central Dutch river area, with distinct yet overlapping roles in economic and administrative activities during the early and high middle ages. The presumed site of Dorestad formed the dominant trade centre c. 700–900, Tiel largely took over that role c. 900–1100, while Nijmegen is thought to have had a more constant, partly overlapping administrative role (Frank, 2011, pp. 32–36; Kosian, 2015, pp. 99–104; Verhoeven, 2018, p. 20). This should reasonably be reflected in the coin profile as a different frequency distribution of coin finds across periods. Even after adding the Lent data to Numismagus for Nijmegen, the coin profile of the municipalities of Nijmegen and Tiel remains significantly different ($\chi^2(4, N = 186) = 11.48$, $p = .022$, $V = 0.25$). According to adjusted standardized residuals and post hoc Fisher's exact tests with Holm correction, however, only period 450–600 deviates significantly (+/−2.71; $p = .0397$). The discovery of at least seven coins near the Winkelsteeg now reverses the picture ($\chi^2(4, N = 193) = 8.58$, $p = .072$, $V = 0.21$), so that the coin finds (450–1200) in the municipalities of Nijmegen and Tiel no longer appear to have a different distribution across periods, as period 450–600 also no longer deviates significantly (+/−2.58; $p = .0920$). See Figure 2.

Issuer-Based Regional Differences

When coin finds in the municipalities of Nijmegen and Tiel are compared by issuer rather than period, adjusted standardized residuals show that Byzantine issuers occur significantly more in Nijmegen (+2.61) and Holy Roman issuers significantly more in Tiel (+3.00), while the distribution of "Monetarian", Carolingian, and "Episcopal" issuers does not deviate significantly ($\chi^2(4, N = 172) = 18.12$, $p = .001$, $V = 0.32$). The seven new coins from Nijmegen are included here. The differences in Byzantine ($p = .0108$) and Holy Roman ($p = .0045$) distributions remain significant after post hoc Fisher's exact tests with Holm correction. See Figure 3.

Expanded Delta Groupings

Expanding the analysis to broader delta-wide groupings (Nijmegen–Land van Cuijk–Tiel ($N = 140$), Bunnik–Buren–Alphen a/d Rijn ($N = 276$), and West Betuwe–Zaltbommel–Rotterdam ($N = 172$), see Table 7) reveals pronounced regional patterning in period distributions ($\chi^2(8, N = 588) = 119.16$, $p < .001$, $V = 0.32$; Figure 5). Adjusted standardized residuals show the Anglo-Frisian period (600–750 CE) significantly over-represented in Bunnik–Buren–Alphen a/d Rijn (+9.06) and under-represented in West Betuwe–Zaltbommel–Rotterdam (−8.11), with a clear reversal for Holy Roman periods (900–1050 and 1050–1200 CE: −5.75/−4.36 and +5.22/+4.81,

respectively). The Byzantine period (450–600 CE) is over-represented in Nijmegen–Land van Cuijk–Tiel (+2.42). These patterns indicate a temporal shift: from southeast delta emphasis in the early phase (post-Roman continuity) to northwest delta dominance during the Anglo-Frisian peak, followed by southwest delta quadrant predominance under Holy Roman influence in later times. This dynamic across the three delta quadrants (southeast, northwest, southwest) is reinforced by including municipalities like Buren and Zaltbommel, supporting differentiated yet mixed exchange networks in the Rhine-Meuse delta. See Appendix B.

Areal Unit Considerations

This broader comparison also highlights the modifiable areal unit problem (MAUP): redefining spatial aggregations (from narrower riverine clusters to expanded delta groupings) materially influences observed distributions and statistical outcomes. The moderate-to-strong effect size (V = 0.32) in the larger sample underscores non-uniform coin patterns, emphasizing the sensitivity of interpretations to boundary choices (see Figures 4 and 5) and the necessity for cautious, spatially contextualized analysis in reconstructing delta-wide economic dynamics.

Limitations

Data Fragmentation Challenges

The opportunistic and fragmentary nature of coin finds poses inherent challenges for reconstructing pre-urban monetary circulation and urbanization processes in Nijmegen. The total sample *(N* = 97 after Winkelsteeg inclusion) remains small and is heavily skewed toward Nijmegen-Noord (approximately 80% of documented findspots); see Table 1. This reflects intensive modern excavation effort rather than historical distribution. An a priori power analysis (G*Power 3.1) indicates that for chi-square tests on tables similar to those used here (df = 4), detecting medium-small effects (w ≈ 0.21–0.30, matching observed Cramér's V values of 0.21–0.32) at α = 0.05 and power = 0.80 requires roughly 180–300 coins (Faul et al., 2007). The current dataset robustly identifies medium-to-large patterns but remains sensitive to additional finds, as demonstrated by the substantial impact of the seven Winkelsteeg coins on the Nijmegen–Tiel temporal comparison.

Geographical Bias Concerns

Geographical bias is a further concern, as under-representation of coin finds in the historic city centre and other areas of Nijmegen limits generalizability. Methodological choices in classification, periodization, and exclusion of hoards introduce interpretive biases. Moreover, the modifiable areal unit problem (MAUP) significantly affects broader regional inferences, as evidenced by the amplified differences in expanded delta groupings *(N* = 588), where aggregation choices alter residuals and effect sizes, potentially masking or exaggerating underlying patterns.

Interpretation Cautions Needed

These limitations underscore the need for cautious interpretation and continued data expansion through citizen science and professional recording, potentially incorporating advanced techniques such as geospatial modeling to mitigate spatial distortions and enhance the reliability of inferences. Ethically, this synthesis tempers hypotheses, acknowledging that new finds could alter conclusions and emphasizing responsible use of citizen science to avoid overgeneralization.

Discussion

Monetary Continuity

The Numismagus dataset, augmented by the 2025 Winkelsteeg finds, reveals marked long-term continuity in Nijmegen's monetary profile across 450–1200 CE (see Figure 1). This persistence challenges proposed linear models of emporia succession in the Rhine-Meuse delta and supports a polycentric interpretation of early and high medieval exchange networks, wherein multiple locations of economic activity operated concurrently rather than in strict sequential order, gradually adapting to river diversions in the delta.

Regional Issuer Variation

Comparisons with other riverine settlements highlight pronounced regional variation. The elevated presence of Byzantine issues in Nijmegen (adjusted standardised residual +2.61), relative to sites like Tiel (see Figure 3), suggests potential sustained or recurring early connections to broader networks to the south, consistent with depositions of Byzantine coinage or imitations, possibly via Merovingian channels. In contrast, the stronger representation of Holy Roman coinage in the southwestern riverine area suggests a later shift toward regional and imperial integration under Ottonian and Salian influences. The predominance of Anglo-Frisian issuers in the northwestern riverine area during 600–750 CE further delineates a differentiated monetary landscape, potentially more strongly tied to Frisian maritime networks.

Delta Patterns Reinforcement

The broader delta patterns reinforce this view: the significant over-representation of Anglo-Frisian material in the northwest delta quadrant (Bunnik–Buren–Alphen a/d Rijn grouping, +9.06 residual) during 600–750 CE, contrasted with Holy Roman reversals in the southwest delta quadrant (e.g., +5.22/+4.81 in West Betuwe–Zaltbommel–Rotterdam for 900–1200 CE; see Figure 5), illustrates a dynamic yet non-

linear evolution of circulation. Byzantine emphasis in the southeast delta quadrant (Nijmegen–Land van Cuijk–Tiel, +2.42) is consistent with hypotheses of post-Roman continuity and regional connectivity in the early medieval period (Willems, 1986, pp. 160–169, 300–301), while issuer shifts toward southern delta branches in subsequent centuries suggest resilient, overlapping networks rather than abrupt replacements (Bijsterveld & Theuws, 2012, pp. 90–99).

Winkelsteeg Impact

The Winkelsteeg coins proved transformative: their addition eliminated the previously significant temporal difference between Nijmegen and Tiel (reducing χ^2 p from .022 to .072), particularly by bolstering the 450–600 CE phase (compare Figure 2). This illustrates how dataset completeness influences perceived discontinuities and emphasizes the risk of over-interpreting apparent shifts based on incomplete recovery, thereby advocating for iterative data augmentation in numismatic studies to refine historical narratives.

Nijmegen's Hybrid Role

Overall, Nijmegen's balanced issuer distribution across phases (see Figure 1) indicates a resilient hybrid role as an administrative centre with redistributive functions, rather than episodic dominance. The pattern aligns with emerging views of overlapping, polycentric riverine landscapes where multiple nodes coexisted and interacted, potentially underpinned by natural hydrological stability, secular fortifications, ecclesiastical patronage, and manufacturing hubs. For Nijmegen, the coin pattern corresponds with archaeological evidence for habitation in the city centre during the 7th/8th, 9th/10th, and 11th/12th centuries (Den Braven & Ristow, 2017, pp. 6–20; Den Braven, 2019, pp. 6, 26; Den Braven, 2021, pp. 149–162; Kloosterman et al., 2024, pp. 63–66; Theuws & den Braven, 2025, pp. 175–178; Thijssen, 1983, pp. 9–11; Van Enckevort, 2021b, pp. 21–25, 29–34), although archaeological evidence for habitation in the 5th/6th centuries remains absent (Bloemers, 2016, pp. 224–231). These insights contribute to a better understanding of the development of pre-urban Nijmegen by highlighting monetary continuity and suggest that the site's position along the Waal River fostered recurring connectivity within Merovingian, Anglo-Frisian, Carolingian, and Holy Roman networks.

Future Research Directions

To extend this analysis, future investigations could incorporate interdisciplinary proxies such as ceramic assemblages, isotopic analyses of metal artifacts, or GIS-based spatial modeling to corroborate numismatic patterns and provide a more holistic reconstruction of economic resilience (Burström, 2019, pp. 231–263). Moreover, expanding the scope to include comparative data from non-riverine inland sites could elucidate whether the observed polycentrism is a delta-specific phenomenon or reflective of wider European trends in the early and high Middle Ages. Such endeavors would not only address current methodological vulnerabilities, including the MAUP sensitivities evident in larger-scale comparisons, but also enrich the historiographical discourse on urban genesis in the Low Countries.

Conclusions

These findings align well with established hypotheses for post-Roman Nijmegen and Ottonian Tiel (Frank, 2011, pp. 32–36; Oudhof et al., 2013, pp. 122–139). However, they provide no additional indication of the presumed prominent role of Carolingian, Ottonian, and Salian Nijmegen. What stands out for Nijmegen is the consistency across issuers, underscoring the place's long-term significance. The evidence from this study posits Nijmegen as a steadfast node in the early and high medieval networks of the Rhine-Meuse delta, characterised by continuity rather than rupture. By challenging succession-based models and endorsing polycentrism, the findings invite a reevaluation of regional dynamics, with implications for archaeological policy and heritage management (Cohen et al., 2009, pp. 53–72; Kosian, 2015, pp. 99–104; Pierik & van Lanen, 2017, pp. 23–39). Continued citizen science efforts, coupled with professional validation (Bourgeois et al., 2024, pp. 1662–1678), remain valuable for advancing this field. A validated coin catalogue would also be useful, together with a provisional hypothesis on Lent's function in the development of pre-urban, potentially shifting, settlements of Nijmegen based on archaeological records (Bijsterveld & Theuws, 2012, pp. 90–99).

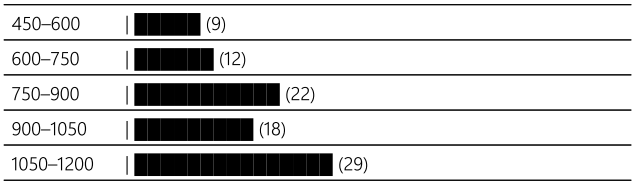
Summary of Key Findings

Period	Dominant Issuer	Key Residuals
450–600	Byzantine	+ Southeast delta
600–750	Anglo-Frisian	+ Northwest delta; – Southwest delta
750–900	Carolingian	= Balanced over delta
900–1050	Holy Roman	+ Southwest delta; – Northwest delta
1050–1200	Holy Roman	+ Southwest delta

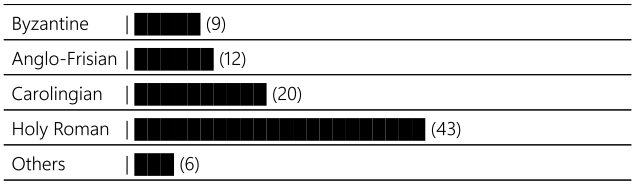
Figures

1. Nijmegen (Periods; Issuers)

Periods: Numismagus: 90

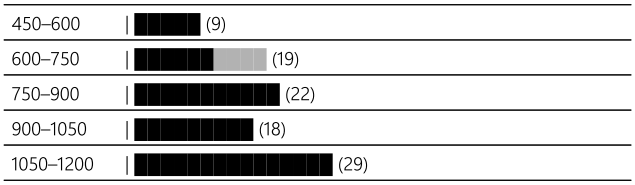


Issuers: Numismagus: 90

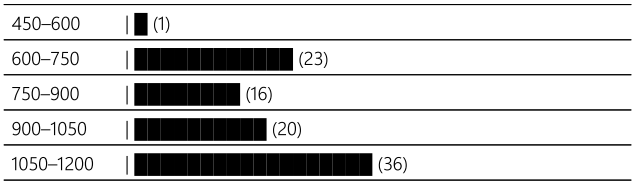


2. Nijmegen–Tiel Comparisons (Periods)

Nijmegen: Numismagus: 90 (+7)

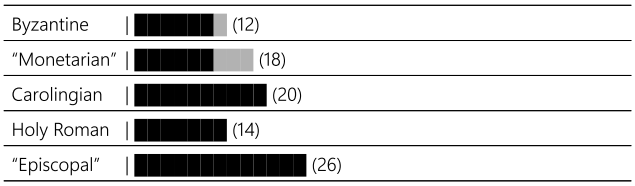


Tiel: NUMIS: 96

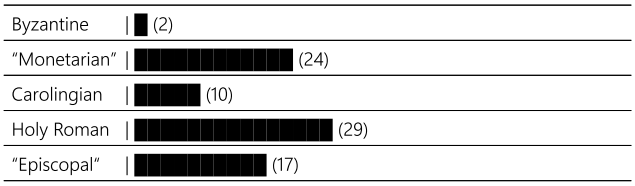


3. Nijmegen–Tiel (Issuers)

Nijmegen: Numismagus: 83 (+7)

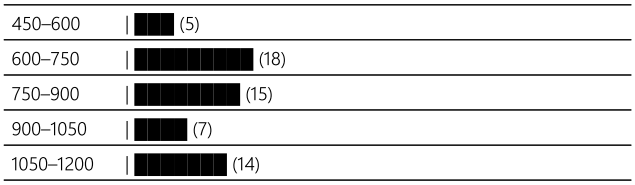


Tiel: NUMIS: 82

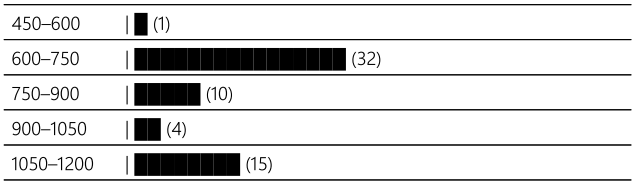


4. Riverine Areas (Periods)

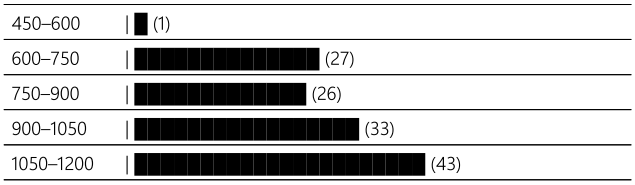
Nijmegen–Maastricht: NUMIS: 59



Bunnik–Alphen a/d Rijn: NUMIS: 62

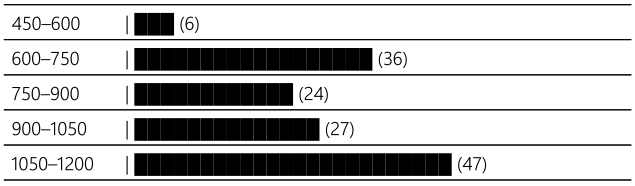


Tiel–Rotterdam: NUMIS: 130

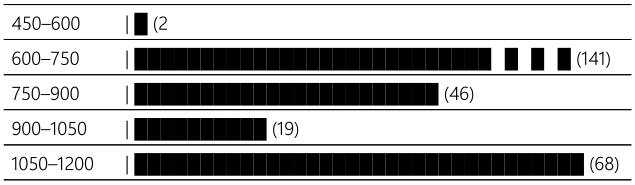


5. Delta Areas (Periods)

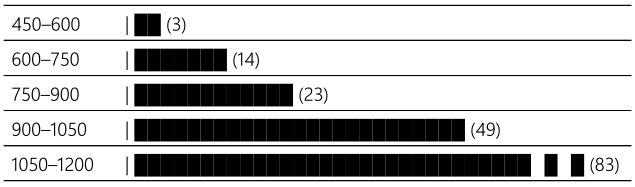
Nijmegen–Land van Cuijk–Tiel: NUMIS: 140



Bunnik–Buren–Alphen a/d Rijn: NUMIS: 276



West Betuwe–Zaltbommel–Rotterdam: NUMIS: 172



Numismagus Tables

1. Nijmegen (Locations[1])

Period	Lent	Nijmegen
450–600	2	0
600–750	2	4
750–900	13	7
900–1050	15	2
1050–1200	26	2
Total	58	15

2. Nijmegen (Coin Types)

Count	Coin type	Issuer
43	Penny (Ag)	Holy Roman
20	Denarius / ½ (Ag)	Carolingian
11	Sceatta (Ag/Cu)	Anglo-Frisian
1	Denarius (Ag)	Anglo-Frisian
4	Follis / ½ (Cu/Br)	Byzantine
3	Unknown (Cu/Br)	Byzantine
2	Solidus (Au)	Byzantine
2	Dirham (Ag)	Arabic
2	Denier (Ag)	French
1	Tremissis (Au)	Merovingian
1	Siliqua ¼ (Ag)	Gothic

3. Nijmegen (Mint Hills: Issuers)

Issuer	Count	Period
Anglo-Frisian	4	600–750
Carolingian	5	750–900
Holy Roman	4	900-1200
Unknown[2]	2	750-1200

NUMIS Tables

4. Nijmegen and Maastricht (Periods)

Period	Nijmegen	Maastricht
450–600	3	2
600–750	7	11
750–900	7	8
900–1050	3	4
1050–1200	6	8
Total	23	33

5. Bunnik and Alphen a/d Rijn (Periods)

Period	Bunnik	Alphen a/d Rijn
450–600	1	0
600–750	28	4
750–900	3	7
900–1050	1	3
1050–1200	4	11
Total	37	25

6. Tiel and Rotterdam (Periods)

Period	Tiel	Rotterdam
450–600	1	0
600–750	23	4
750–900	16	10
900–1050	20	13
1050–1200	36	7
Total	96	34

7. Delta Areas (Extra: Periods)

Period	L v Cuijk	Buren	W Betuwe	Zaltbommel
450–600	2	1	2	1
600–750	6	109	4	6
750–900	1	36	10	3
900–1050	4	15	26	20
1050–1200	5	53	37	39
Total	18	214	69	69

1 Duchateau (2025). Location: Lent = 1 Noord; Nijmegen = 2 West, 3 Centrum, 4 Oost and 5 Zuid.

2 De Roode et al. (2019, p. 218); Oosterbaan et al. (2009, pp. 13–14)

Numismagus Extract

Period	Coin type	Issuer	Reference
450–600	Follis	Byzantine	Van den Broeke et al. (2011a, pp. 41–46)
450–600	Follis	Byzantine	Koot & Heirbaut (2016a, pp. 106–109)
450–600	Tremissis	Merovingian	Willemsen (2014, fig. 157)
450–600	Siliqua ¼	Gothic	De Nederlandsche Bank (2025)
450–600	Unknown	Byzantine	Byvanck (1947, p. 97)
450–600	Unknown	Byzantine	Byvanck (1947, p. 97)
450–600	Solidus	Byzantine	Lafaurie (1987, p. 82)
450–600	Unknown	Byzantine	Acker Stratingh (1849, p. 431)
450–600	Follis ½	Byzantine	Lafaurie (1987, p. 82)
600–750	Sceatta	Anglo-Frisian	Van den Broeke et al. (2011a, pp. 41–46)
600–750	Sceatta	Anglo-Frisian	Eimermann et al. (2017, pp. 153–154)
600–750	Sceatta	Anglo-Frisian	Op den Velde et al. (1984), p. 142)
600–750	Sceatta	Anglo-Frisian	Op den Velde et al. (1984), p. 142)
600–750	Sceatta	Anglo-Frisian	Verrijt (1986, pp. 47-49)
600–750	Sceatta	Anglo-Frisian	Bloemers & Thijssen (1990, p. 144)
600–750	Follis ½	Byzantine	De Nederlandsche Bank (2025)
600–750	Solidus	Byzantine	Lafaurie (1987, p. 82)
600–750	Sceatta	Anglo-Frisian	Leemans (1879, p. 58)
600–750	Sceatta	Anglo-Frisian	Op den Velde & Metcalf (2007, pp. 148, 194)
600–750	Sceatta	Anglo-Frisian	Op den Velde & Metcalf (2007, pp. 148, 194)
600–750	Sceatta	Anglo-Frisian	Metcalf & op den Velde (2010, p. 272)
750–900	Dirham	Arabic	Tunker et al. (2021, pp. 105–106)
750–900	Dirham	Arabic	Tunker et al. (2021, pp. 105–106)
750–900	Denarius	Carolingian	Koot et al. (2021, pp. 390–393)
750–900	Denarius	Carolingian	Hermsen et al. (2021, pp. 567–573)
750–900	Denarius	Carolingian	De Nederlandsche Bank (2025)
750–900	Unknown	Carolingian	Willemse et al. (2019, pp. 244–246)
750–900	Denarius	Carolingian	Koot & Heirbaut (2016b, pp. 517–519)
750–900	Denarius	Carolingian	De Nederlandsche Bank (2025)
750–900	Denarius	Carolingian	Van den Broeke et al. (2011b, pp. 91–95)
750–900	Unknown	Carolingian	Willemse et al. (2019, pp. 244–246)
750–900	Obolus	Carolingian	Koot et al. (2021, pp. 316–317)
750–900	Denarius	Anglo-Frisian	De Nederlandsche Bank (2025)
750–900	Denarius	Carolingian	Tunker et al. (2021, pp. 105–106)
750–900	Unknown	Carolingian	Woldringh (2025, pp. 10–13)
750–900	Unknown	Carolingian	Woldringh (2025, pp. 10–13)
750–900	Obolus	Carolingian	Van Enckevort (2021a, pp. 391, 401–402)
750–900	Denarius	Carolingian	Van Enckevort (2021b, pp. 57–59)
750–900	Denarius	Carolingian	Delahaye (1999, p. 353)
750–900	Denarius	Carolingian	Van Enckevort et al. (2014, p. 29)
750–900	Denarius	Carolingian	Van Enckevort et al. (2014, p. 29)
750–900	Sceatta	Anglo-Frisian	De Nederlandsche Bank (2025)
750–900	Denarius	Carolingian	De Nederlandsche Bank (2025)
900–1050	Denarius	Carolingian	Verhelst et al. (2018, pp. 307, 313)
900–1050	Obolus	Carolingian	Verhelst et al. (2018, pp. 307, 313)
900–1050	Penny	Holy Roman	Heirbaut & Hendriks (2017, pp. 101–106)
900–1050	Penny	Holy Roman	Brussé & Koot (2017, pp. 131–132)
900–1050	Penny	Holy Roman	Koot & Heirbaut (2016b, pp. 517–519)
900–1050	Penny	Holy Roman	Koot & Heirbaut (2016a, pp. 106–109)
900–1050	Penny	Holy Roman	Koot et al. (2021, pp. 390–393)
900–1050	Penny	Holy Roman	Koot et al. (2021, p. 566)
900–1050	Penny	Holy Roman	Heirbaut & Koot (2016a, p. 227)
900–1050	Penny	Holy Roman	Heirbaut & Hendriks (2017, pp. 101–106)
900–1050	Penny	Holy Roman	Van der Linde et al. (2012, pp. 81–82)
900–1050	Penny	Holy Roman	Koot et al. (2021, p. 566)
900–1050	Penny	Holy Roman	De Nederlandsche Bank (2025)
900–1050	Penny	Holy Roman	Harmsen et al. (2012, pp. 51–53)
900–1050	Penny	Holy Roman	Heirbaut & Koot (2016a, p. 227)
900–1050	Penny	Holy Roman	Zee et al. (2013, pp. 21–24)
900–1050	Penny	Holy Roman	Van Enckevort et al. (2014, p. 29)
900–1050	Penny	Holy Roman	Van der Chijs (1859, p. 25)
1050–1200	Penny	Holy Roman	Van den Broeke et al. (2013, pp. 49–50)
1050–1200	Penny	Holy Roman	Koot et al. (2021, pp. 390–393)
1050–1200	Penny	Holy Roman	Heirbaut & Koot (2016a, pp. 100–101)
1050–1200	Penny	Holy Roman	Heirbaut & Koot (2016a, p. 227)
1050–1200	Penny	Holy Roman	Vosselman et al. (2018, p. 64)
1050–1200	Penny	Holy Roman	Koot & Heirbaut (2016b, pp. 517–519)
1050–1200	Penny	Holy Roman	Heirbaut & Hendriks (2017, pp. 101–106)
1050–1200	Denier	French	Hermsen et al. (2021, pp. 567–573)
1050–1200	Penny	Holy Roman	Koot & Heirbaut (2016a, pp. 106–109)
1050–1200	Penny	Holy Roman	Harmsen et al. (2012, pp. 51–53)
1050–1200	Penny	Holy Roman	Hermsen et al. (2021, pp. 567–573)
1050–1200	Penny	Holy Roman	Van der Linde et al. (2012, pp. 64–66)
1050–1200	Penny	Holy Roman	Heirbaut & Koot (2016a, pp. 66–67)
1050–1200	Penny	Holy Roman	Heirbaut & Koot (2016b, pp. 626–627)
1050–1200	Penny	Holy Roman	Heirbaut & Koot (2016b, pp. 626–627)
1050–1200	Penny	Holy Roman	Koot & Heirbaut (2016a, pp. 106–109)
1050–1200	Penny	Holy Roman	Koot & Heirbaut (2016b, pp. 517–519)
1050–1200	Penny	Holy Roman	Koot & Heirbaut (2016b, pp. 517–519)
1050–1200	Penny	Holy Roman	Koot et al. (2021, p. 441)
1050–1200	Penny	Holy Roman	Meijer et al. (2012, p. 111)
1050–1200	Penny	Holy Roman	Meijer et al. (2012, p. 95)
1050–1200	Penny	Holy Roman	Meijer et al. (2012, p. 111)
1050–1200	Penny	Holy Roman	Hermsen et al. (2021, pp. 567–573)
1050–1200	Penny	Holy Roman	De Nederlandsche Bank (2025)
1050–1200	Penny	Holy Roman	Van den Broeke et al. (2011b, pp. 91–95)
1050–1200	Denier	French	Koot & Heirbaut (2016a, pp. 106–109)
1050–1200	Penny	Holy Roman	Van Enckevort (2021a, pp. 391, 401–402)
1050–1200	Penny	Holy Roman	Kloosterman et al. (2019, p. 169)
1050–1200	Penny	Holy Roman	De Nederlandsche Bank (2025)

References

Acker Stratingh, G. (1849). *Aloude staat en geschiedenis des vaderlands* (Vol. 2)*: De bewoners* (Vol. 1)*: Vóór en onder de Romeinen: Met zes platen*. Schierbeek.

Bijsterveld, A-J. A. & Theuws, F. C. W. J. (2012). Vroege stadswording in Nederland: Een Romeinse erfenis, Carolingiane impulsen en een stroomversnelling in de twaalfde eeuw. In E. Taverne, L. de Klerk, B. A. M. Ramakers, & S.Dembski, S. (Eds.), *Nederland Stedenland: Continuïteit en Vernieuwing* (pp. 90–107). nai010.

Bloemers, J. H. F., & Thijssen, J. R. A. M. (1990). Facts and reflections on the continuity of settlement at Nijmegen between AD 400 and 750. *In* J. C. Besteman, J. M. Bos, & H. A. Heidinga (Eds.), *Medieval Archaeology in the Netherlands: Studies presented to H. H. van Regteren Altena*. (pp. 133–150). Van Gorcum.

Bourgeois, Q., Kaptijn, E., Verschoof-van der Vaart, W., & Lambers, K. (2024). Assessing the quality of citizen science in archaeological remote sensing: results from the Heritage Quest project in the Netherlands. *Antiquity, 98*(402), pp. 1662–1678. https://doi.org/10.15184/aqy.2024.127

Brussé, S., & Koot, C. W. (Eds.). (2017). *De Lentse Lus archeologisch ontrafeld: Bewoningssporen uit de middeleeuwen en vondsten uit de Tweede Wereldoorlog* (Archeologische Berichten Nijmegen - Rapport 68). Gemeente Nijmegen, Bureau Leefomgevingskwaliteit - Archeologie. https://doi.org/10.17026/DANS-2BP-H5HN

Burström, N. M. (2019). Money, coins, and archaeology. In R. Naismith (Ed.), *Money and coinage in the Middle Ages* (pp. 231–263). Brill. https://doi.org/10.1163/9789004383098_011

Byvanck, A. W. (1947). *Excerpta Romana: De bronnen der Romeinsche geschiedenis van Nederland*. (Vol. 3) (Rijks Geschiedkundige Publicatiën - Vol. 89). Minister van Onderwijs, Kunsten en Wetenschappen.

Cohen, K. M., Stouthamer, E., Hoek, W. Z., Berendsen, H. J. A., & Kempen, H. F. J. (2009). *Zand in Banen: Zanddieptekaarten van het Rivierengebied en het IJsseldal in de provincies Gelderland en Overijssel*. Provincie Gelderland.

De Nederlandsche Bank. (2025). *Numismatisch Informatie Systeem (NUMIS)* [Dataset]. De Nederlandsche Bank. Retrieved November 12, 2025, from https://tinyurl.com/57dy58pm

De Roode, F., van der Linde, C., & van der Meer, W. (2019). *Evaluatie- en selectierapport Lange Baan - De Bastei, Nijmegen: Definitief Onderzoek, opgraven (DO) & variant Archeologische Begeleiding (AB)* (Archeologische Berichten Nijmegen - Rapport 90). Gemeente Nijmegen, Bureau Leefomgevingskwaliteit - Archeologie.

Delahaye, A. (1999). *De Ware Kijk Op...* (Vol. 2): *Het eerste Millennium: Historische Mythen van de Lage Landen*. Stichting Albert Delahaye.

Den Braven, J. A. (2019, June 21). *Het Valkhof in vlammen! De Vikingaanval van Nijmegen (880-881)* [Congrespresentatie]. Middeleeuwen Symposium Zutphen, Zutphen, Nederland.

Den Braven, J. A., & Ristow, S. (2017). Thermolumineszenzdatierung (TL) von Ziegeln 6 aus Nijmegen und Aachen: Spätantike und Karolingerzeit. *Bericht der Stiftung Ziegelei-Museum, 34*, pp. 6–20.

Duchateau, R. J. (2024). *Heuvelstaatskaart van Nijmegen en omstreken* [Kaart]. https://tinyurl.com/mcbu4ys3

Duchateau, R. J. (2025). *Numismagus: Overzicht van vroeg- en vol-middeleeuwse munten gevonden in de gemeente Nijmegen (450-1200)* [DATASET]. https://tinyurl.com/dzbbmw3c

Eimermann, E., van den Broeke, P. W., Damen, H., Drenth, E., Hendriks, J., Heunks, E., Joosten, I., van Kappel, K., Kokke, B., Komen, M., van Os, B., Smits, L., van Waaijen, M, & Zeiler, J. T. (2017). *Een grafveld uit de IJzertijd en sporen uit andere perioden in Nijmegen-Noord: Proefsleuvenonderzoek in het Zuiderveld: Project Zn3* (Archeologische Berichten Nijmegen - Rapport 75). Gemeente Nijmegen, Bureau Leefomgevingskwaliteit - Archeologie. https://doi.org/10.17026/DANS-XNY-CBKD

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39(2), 175 -191. https://doi.org/10.3758/BF03193146

Frank, C. J. B. P. (2011). *Cultuurhistorisch profiel: Plangebied Oostelijke Waalkade / omgeving Stratemakerstoren*. Gemeente Nijmegen, Bureau Archeologie en Monumenten.

Harmsen, C., Hendriks, J., den Braven, A. J., Reijnen, R. W., & Meijer, Y. (2012). *Archeologisch onderzoek in de Lentse Schoolstraat in Nijmegen-Lent: Nederzettingssporen uit de vroege en volle middeleeuwen* (Archeologische Berichten Nijmegen - Rapport 33). Gemeente Nijmegen, Bureau Archeologie en Monumenten. https://doi.org/10.17026/DANS-ZHY-ZKCE

Heirbaut, E. N. A., & Hendriks, J. (Eds.). (2017). *Bewoningssporen op De Stelt: Proefsleuvenonderzoek in plangebied De Stelt-Noord in Nijmegen-Lent* (Archeologische Berichten Nijmegen - Rapport 53). Gemeente Nijmegen, Bureau Leefomgevingskwaliteit - Archeologie.

Heirbaut, E. N. A., & Koot, C. W. (Reds). (2016a). *Archeologische monumentenzorg in het plangebied van de dijkteruglegging bij Lent* (Vol. 2)*: Zes opgravingen in het binnendijkse deel* (Archeologische Berichten Nijmegen - Rapport 59). Gemeente Nijmegen, Bureau Leefomgevingskwaliteit - Archeologie. https://doi.org/10.17026/DANS-X7K-D84T

Heirbaut, E. N. A., & Koot, C. W. (Reds). (2016b). *Archeologische monumentenzorg in het plangebied van de dijkteruglegging bij Lent* (Vol. 4)*: Archeologisch onderzoek naar vindplaats 9/57 en de bewoningsgeschiedenis van de IJzertijd en Romeinse tijd* (Vol. 2) (Archeologische Berichten Nijmegen - Rapport 61). Gemeente Nijmegen, Bureau Leefomgevingskwaliteit - Archeologie. https://doi.org/10.17026/AR/MEENXW

Hermsen, I. C. G., Verhelst, E. M. P., Baetsen, S., Berends, A. S., van den Berg, G., Gazenbeek, A. E., van Gent, J. T., Hänninen, K., Hesseling, H. J., Keunen, L. J., van Oosterhout, F., de Rijk, P. T. A., Stoots, R., van der Veen, B. J., & Willemse, N. W. (2021). *Lent zone B/C en zone Q-oost: Toeven tegenover het Tiende Legioen & Weren tegen het water. Gemeente Nijmegen: Archeologisch onderzoek: Twee opgravingen in het plangebied 'Ruimte voor de Waal'* (RAAP-Rapport 3205). RAAP Archeologisch Adviesbureau. https://doi.org/10.17026/AR/HAYAD2

Hill, D., & Metcalf, D. M. (Eds.). (1984). *Sceattas in England and on the Continent: The Seventh Oxford Symposium on Coinage and Monetary History* (BAR British Series - Vol. 128). BAR. https://doi.org/10.30861/9780860542667

Ilisch, P. (2000). Die Münzprägung im Herzogtum Niederlothringen. *Jaarboek voor Munt- en Penningkunde, 84-85 (1997/8).*

Jansen, J. (2026). Vossendijk VO6: Beelden van opgraving VO6 te Nijmegen in 2025. *AWN Regio Nijmegen*. Retrieved January 7, 2026, from https://tinyurl.com/368hfvde

Kloosterman, R. P. J., Damen, H., van Hemert, J., Hundertmark, H. E. G., Kokke, B., Köther, D., & Kuppens, W. (2019). *Archeologisch onderzoek op de Scheidemakershof en Plein 1944 te Nijmegen: Proefsleuvenonderzoek, een opgraving, variant archeologische begeleiding* (Archeologische Berichten Nijmegen - Rapport 93). Gemeente Nijmegen, Bureau Leefomgevingskwaliteit - Archeologie. https://doi.org/10.17026/DANS-2CN-92UC

Kloosterman, R. P. J., Hundertmark, H. E. G., Komen, M. C. M., van Kooten, M. Y., van Loon, M., & van de Venne, A. C. (2024). *Archeologisch onderzoek langs de westelijke ringmuur van de burcht op het Valkhof, gemeente Nijmegen: Een proefsleuvenonderzoek* (Archeologische Berichten Nijmegen - Rapport 121). Bureau Archeologie en Bodemkwaliteit gemeente Nijmegen. https://doi.org/10.17026/AR/MKMNII

Koot, C. W., & Heirbaut, E. N. A. (Eds.). (2016a). *Archeologische monumentenzorg in het plangebied van de dijkteruglegging bij Lent* (Vol. 5): *Kasteel Lent en de middeleeuwse bewoningsgeschiedenis* (Vol. 1) (Archeologische Berichten

Nijmegen - Rapport 62). Gemeente Nijmegen, Bureau Leefomgevingskwaliteit - Archeologie. https://doi.org/10.17026/AR/NJK3IF

Koot, C. W., & Heirbaut, E. N. A. (Eds.). (2016b). *Archeologische monumentenzorg in het plangebied van de dijkteruglegging bij Lent* (Vol. 6): *Schans Knodsenburg, de nieuwetijdse bewoningsgeschiedenis* (Archeologische Berichten Nijmegen - Rapport 63). Gemeente Nijmegen, Bureau Leefomgevingskwaliteit - Archeologie. https://doi.org/10.17026/AR/YMXUZX

Koot, C. W., Tunker, B. C., van de Geer, P., van Diepen, L., van Dijk, J., Esser, K., van Haaster, H., van Hemert, J., van Kooten, M., Kokke, B., Komen, M., van der Velde, S., & van de Venne, A. (2021). *Bewoningssporen van de Midden-IJzertijd tot en met de volle middeleeuwen in De Stelt-Noord te Lent, Nijmegen-Noord* (Vol. 2)*: Standaardrapportage* (Archeologische Berichten Nijmegen - Rapport 98). Bureau Archeologie en Bodemkwaliteit gemeente Nijmegen. https://doi.org/10.17026/DANS-XQU-3J7U

Kosian, M. (2015). 10. Dorestad's Rise and Fall: How the Local Landscape Influenced the Growth, Prosperity and Disappearance of an Early-Medieval Emporium. In A. Willemsen & H. Kik (Eds.), *New Research into Early-Medieval Communities and Identities* (pp. 99–104). Brepols. https://doi.org/10.1484/M.STMH-EB.5.109459

Lafaurie, J., & Morrisson, C. (1987). La pénétration des monnaies byzantines en Gaule mérovingienne et visigotique du Vi^{e} au VIII^{e} siècle. *Revue Numismatique, Ser. 6, vol. 29*, pp. 38–98. https://www.doi.org/10.3406/numi.1987.1899

Leemans, C. (1878). Rijksmuseum van Oudheden te Leiden: Aankoopen van voorwerpen: Aanwinsten en verliezen. In *Verslagen omtrent 's Rijks verzamelingen van geschiedenis en kunst* (Vol. 1) (pp. 43–66). Nijhoff.

Meijer, I., Sam, D., & Heirbaut, E. N. A. (Eds.). (2012). *Sleuven binnen de dijk: Resultaten van het proefsleuvenonderzoek in het kader van de dijkteruglegging* (Archeologische Berichten Nijmegen - Rapport 38). Gemeente Nijmegen, Bureau Archeologie en Monumenten. https://doi.org/10.17026/DANS-29J-FD2R

Metcalf, D. M., & op den Velde, W. (2010). The Monetary Economy of the Netherlands, c. 690 - c. 760 and the Trade with England: A Study of the 'Porcupine' Sceattas of Series E. *Jaarboek voor Munt- en Penningkunde, 96* (2009).

Oosterbaan, J., Reijnen, R. W., & Hoek, R. (2009). *Archeologisch onderzoek in het Kerkegasje* (Archeologische Berichten Nijmegen - Briefrapport 53). Gemeente Nijmegen, Bureau Archeologie en Monumenten. https://doi.org/10.17026/DANS-XWJ-XC95

Op den Velde, W., & Metcalf, D. M. (2007). The Monetary Economy of The Netherlands, c. 690 - c. 715 and the Trade with England: A Study of the Sceattas of Series D. *Jaarboek voor Munt- en Penningkunde, 90 (2003)*.

Op den Velde, W., de Boone, J. W., & Pol, A. (1984). Survey of sceatta finds from the Low Countries. In D. Hill & D. M. Metcalf (Eds.), *Sceattas in England and on the Continent: The Seventh Oxford Symposium on Coinage and Monetary History* (BAR British Series - Vol. 128) (pp. 117–146). BAR. https://doi.org/10.30861/9780860542667

Oudhof, J. W. M., Verhoeven, A. A. A., Schuuring, I., Scheringa, J., van Kaam, B., & van der Voet, N. (2013). *Tiel rond 1000: Analyse van vier opgravingen in de Tielse binnenstad*.

Pierik, H. J., & van Lanen, R. J. (2017). Roman and early-medieval habitation patterns in a delta landscape: The link between settlement elevation and landscape dynamics. *Quaternary International, 446*, pp. 23–39. https://doi.org/10.1016/j.quaint.2017.03.010

Schuuring, M. P. (2014). *The Circulation and Use of Coins in the Carolingian Era of the Netherlands: A distribution analysis* [Master thesis]. Leiden University.

Theuws, F. C. W. J., & den Braven, J. A. (2025). How did Aristocrats Live in Merovingian and (Early) Carolingian Times in Northern Gaul? An Archaeological Enigma. With some Remarks on the Royal Seat in Nijmegen. In M. Gierszewska-Noszczyńska, O. Grimm, & L. Grunwald (Eds.), *Frankish Seats of Power and the North: Centres Between Diplomacy and Confrontation, Transfer of Knowledge and Economy* (pp. 153–182). https://doi.org/10.11588/propylaeum.1681.c24452

Thijssen, J. R. (1983). Verslag werkgroep middeleeuws Nijmegen. In *Jaarverslag 1982 AWN Afdeling Nijmegen en Omstreken* (pp. 9–11).

Tunker, B. C., Daniël, A. W. W. J., van Haaster, H., van Haasteren, M., van Hemert, J., Komen, M., van Loon, M., van de Venne, A., & Vermeeren, C. (2021). *Een erf uit de volle middeleeuwen: Archeologisch onderzoek aan de Pastoor van Laakstraat te Lent - gemeente Nijmegen: Een opgraving (variant archeologische begeleiding)* (Archeologische Berichten Nijmegen - Rapport 99). Bureau Archeologie en Bodemkwaliteit gemeente Nijmegen. https://doi.org/10.17026/DANS-XM4-E9Z6

Van den Broeke, P. W., den Braven, J. A., Daniël, A. W. W. J., Altena, E., Ball, E. A. G., van Haaster, H., Hänninen, K., Hendriks, J., Heunks, E., Kars, E. A. K., Meijers, R., de Knijff, P., Reijnen, R. W., Smeding, M., Smits, E., & Zeiler, J. T. (2011b). *Een ijzertijdgrafveld en een erf uit de Ottoonse tijd in het Lentseveld: Archeologisch onderzoek in Nijmegen-Lent* (Archeologische Berichten Nijmegen - Rapport 24). Gemeente Nijmegen, Bureau Archeologie en Monumenten. https://doi.org/10.17026/DANS-X5Y-KXBX

Van den Broeke, P. W., den Braven, J. A., Daniël, A. W. W. J., van Haaster, H., Reijnen, R. W., Thijssen, J. A. R. M., & Zeiler, J. T. (2011a). *Romeinse resten in Nijmegen-Lent: Onderzoek van nederzettingssporen aan de Steltsestraat* (Archeologische Berichten Nijmegen - Rapport 20). Gemeente Nijmegen, Bureau Archeologie en Monumenten. https://doi.org/10.17026/DANS-X6J-V94V

Van den Broeke, P. W., Tunker, B. C., van Beurden, L., Heunks, E., Reijnen, R. W., & Zeiler, J. T. (2013). *Sporen uit de Bronstijd en Vroege IJzertijd te Nijmegen-Noord: Archeologisch onderzoek in plangebied Lent-Laauwik projecten Nla3 en Nla 15* (Archeologische Berichten Nijmegen - Rapport 43). Gemeente Nijmegen, Bureau Archeologie en Monumenten. https://doi.org/10.17026/DANS-2X4-H6FP

Van der Chijs, P. O. (1859). *De munten der Bisschoppen, van de Heerlijkheid en de stad Utrecht: Van de vroegste tijden tot aan de pacificatie van Gend*. Teylers Tweede Genootschap.

Van der Linde, C., van der Leije, J., Hemminga, M., den Braven, J.A., van den Broeke, P. W., Daniël, A. A. W. J., Heeren, S., Hendriks, J., Heunks, E., Huisman, D. J., van der Jagt, I. M. M., Knippenberg, S., van Lith, S. M. E., L. Meurkens, L., & Reijnen, R. W. (2012). *Proefsleuven in het plangebied Laauwik te Nijmegen-Noord (Vol. 1): Projecten Nla1-5* (Archeologische Berichten Nijmegen - Rapport 32). Gemeente Nijmegen, Bureau Archeologie en Monumenten. https://doi.org/10.17026/DANS-XXX-HPNK

Van Enckevort, H. (Ed.). (2021b). *Scherven en botten aan de voet van de noordwestelijke helling van de Valkhofheuvel* (Archeologische Berichten Nijmegen - Rapport 102). Bureau Archeologie en Bodemkwaliteit gemeente Nijmegen.

Van Enckevort, H. (Red). (2021a). *Archeologisch onderzoek in de bouwput van Museum De Bastei in Nijmegen: Een Romeinse poort met wegdek alsmede vestingwerken en huizen uit de late middeleeuwen en nieuwe tijd* (Archeologische Berichten Nijmegen - Rapport 95). Bureau Archeologie en Bodemkwaliteit gemeente Nijmegen. https://doi.org/10.17026/DANS-25U-9ZYH

Van Enckevort, H., Kuppens, W. van der Weyden, T., & Willems, J. W. H. (2014). *Odyssee op het Kops Plateau (Vol. 1): Honderd jaar archeologisch onderzoek in Nijmegen-Oost (1914-2014)* (Archeologische Berichten Nijmegen - Rapport 46). Gemeente Nijmegen, Bureau Archeologie en Monumenten.

Verhelst, E. M. P., & Baetsen, S., Berends, A., Gazenbeek, A. E., van Gent, J. T., Haans, F., Hänninen, K., Hesseling, I., Keunen, L. J., Kootker, L. M., de Rijk, P., Schabbink, M. L., Tuinstra, J. W. D., van der Veen B. J., van der Veen, Y. R., Verhelst, E. M. P., Verspay-Frank, S. L., &

Willemse, N. W. (2018). *Knokken om Knodsenburg: Archeologisch onderzoek naar een fort uit de Tachtigjarige Oorlog, gemeente Nijmegen: Een opgraving, drie archeologische begeleidingen en een proefsleuf in het plangebied 'Ruimte voor de W aal', zones Ha, Hb, Hc, T1 en T2* (RAAP-Rapport 3210). RAAP Archeologisch Adviesbureau. https://doi.org/10.17026/AR/Y9DZUX

Verhoeven, D., Gubbels, M., Smit, M., van der Heijden, P., Arendsen, R., Theeuwen, P., & van Galen, C. (2018). *Verhaal van Gelderland* (Vol. 1). Boom.

Verrijt, M. (1986). Opgravingen tussen Waalkade en het Groene Balkon. In *Jaarverslag 1985 AWN Afdeling Nijmegen en Omstreken* (pp. 47–49).

Vosselman, J., Willemse, N., Verhelst, E., Bosma, K., van Gent, J., Hesseling, I., van der Kroft, P., Maurer, A., & van der Veen, J. (2018). *Hof van Holland, watergang: Een inventariserend proefsleuvenonderzoek in Nijmegen-Noord* (Archeologische Berichten Nijmegen - Rapport 78). Gemeente Nijmegen, Bureau Leefomgevingskwaliteit - Archeologie. https://doi.org/10.17026/DANS-ZCN-UNXS

Willems, W. J. H. (1986). *Romans and Batavians: A regional study in the Dutch eastern river area* [PhD thesis]. University of Amsterdam.

Willemse, N. W., van Daalen, S., Esser, H., Hermsen, I., Hänninen, K., Jans, J., Reimann, T., Versendaal, A., Voskuilen, E., & Verhelst, E. (2019). *De vroege Waal bij Nijmegen. Stratigrafie, sedimentologie en genese van laatholocene rivierafzettingen tussen Nijmegen en Lent (Ruimte voor de Waal)* (RAAP-Rapport 3208). RAAP Archeologisch Adviesbureau. https://doi.org/10.17026/DANS-2CV-XFUQ

Willemsen, A. (2014). *Gouden Middeleeuwen: Nederland in de Merovingische wereld 400-700 na Chr.* Walburg Pers.

Witlox, M. (Ed.). (2025, 24 september). Groot Merovingisch grafveld gevonden in Nijmegen. *De Brug Nijmegen.* Retrieved January 16, 2026, from https://tinyurl.com/pptyzs5d

Woldringh, R. (2025). Opgraving Mec8 Mercuriuspark Koopvaardijweg Nijmegen. In *Jaarverslag 2024 AWN Afdeling Nijmegen en Omstreken* (pp. 10–13).

Zee, K., & Hommes, H. W., den Braven, J. A., Reijnen, R. W., & van der Weynden, T. J. S. M. (2013). *Vestingwerken onder de singel: Archeologisch onderzoek in de Van Schaeck Mathonsingel in Nijmegen* (Archeologische Berichten Nijmegen - Rapport 44). Gemeente Nijmegen, Bureau Archeologie en Monumenten. https://doi.org/10.17026/DANS-XPC-ZTRP

Appendix A: Riverine Areas Map

Appendix B: Delta Areas Map (Delta Quadrants)