

Destruction of Trecht in 1134 by a tsunami and the supremacy of Utrecht

The destruction of *Traiectum*/Trecht in the 12th Century does not correspond to any period of heavy rainfall and river floods, the nearest being a century later, 1236–1308 (Cohen et al. 2016).

There were two tsunamis in the North Sea in the Middle Ages, most likely caused by severe earthquakes or large land-slips around Iceland.

The first was on 28 September 1014 and penetrated the English coast 'many miles inland', reaching the Netherlands coast the same evening. It caused thousands of deaths in Flanders and the south of the Netherlands, breaking through parts of the coastal dunes, with severe damage to the then island of Walcheren. Seemingly it did not penetrate far inland. There are hints that it also hit the coast of North America.¹

Tsunami 1134 with surges inland via Friesland and the Rhine

A tsunami on 4 October 1134 opened up the Zwin inlet in Zeeland Flanders² and destroyed the coastal dunes around Monster and Naaldwijk (South Holland). It increased the size of channels along the coast southwards to Flanders, turning Zeeland and South Holland south of the New Waterway into a series of islands and peninsulas.³ It probably opened up the present Rhine estuary. Marine sediments of the period in the Rhine Valley indicate that the surge ran as far east as Nijmegen and Arnhem. There seems to be no documentary evidence for Friesland but the line of coastal dunes was turned into the Friesian Isles in the 12th Century and an inland lake became the Zuyder Zee.⁴

The surge from Friesland continued into the north-south straight steep-sided Vallei (alt. 0–10 m), a glacial valley formed by a tongue of a Scandinavian glacier. A large surge of water from the north would have travelled its whole length (about 35 km). The surges of water from the west along the Rhine Valley and from the north met and broke through the eastern end of the Nude-Brakel levée at the south end of the Vallei, as indicated by the depth of recent deposits in the area of Wageningen bus-station over a mediaeval settlement, probably part of Brakel, and the secondary drainage from the Vallei north of later Wageningen as well as along the Eem further west.

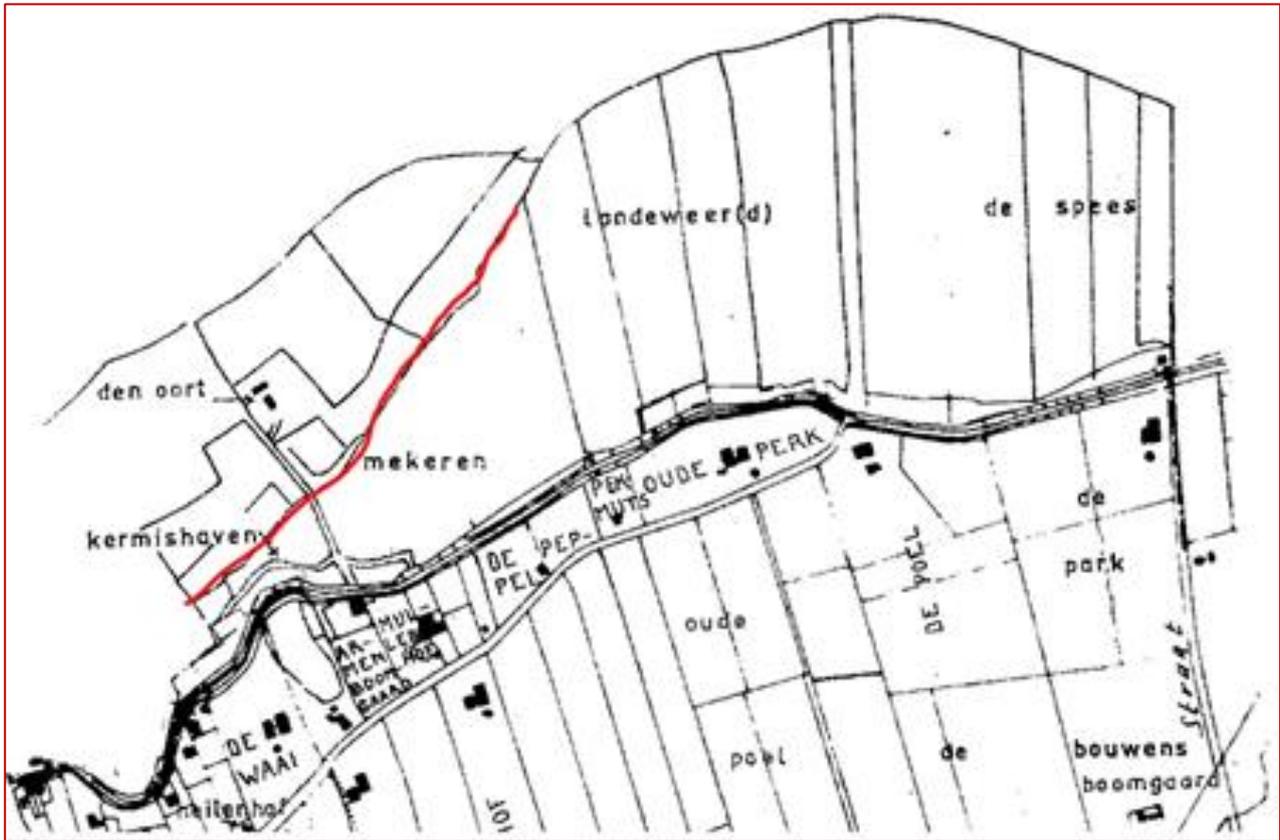
The combined surges released roughly 100 000 000 m³ of water from Lake Almere.⁵ That explains the complex pattern of water channels between Wageningen and Lienden with a series of polders: Klaverwaard, Wolfswaard, Maneswaard, Oudewaard and the Marsch, all but Oudewaard previously on the north bank. Trecht and St Martin's Minster to the south of Rhenen, damaged by the surge up the Rhine Valley, were wiped out, leaving no reported archaeological remains.⁶ The only present hints are names: the place-name Kesteren (*Castrum*) and the road-name Vicarieweg in the Marsch Polder.

It is likely that the next Roman fortress eastwards along Hadrian's *Limes* line was also destroyed. It would have stood either near Randwijk, perhaps the site of the Nijburg, or near Herveld North and Loenen.

Contemporary documentary evidence

Trecht, Utrecht and, after the year 1000, Maastricht all used the name *Traiectum*. So the context of records needs to be read critically, namely the records of the Diocese of *Traiectum* and of the Earldom, later Duchy, of Guelder. Most evidence is indirect. The two visits of the emperor to Utrecht, granting it the status of prince-bishopric, and the gradual establishment of abbeys in Utrecht in the 11th Century must have altered the balance of power between the city and the bishop, even though the bishop's seat was St Martin's Minster in Trecht until 1134. The abbeys and the Utrecht St Saviour Church (the *Dom*, the present cathedral) seem to have suppressed evidence about the priority of Trecht. In the published versions of records 1131 to 1134 (u329, u330, u351, u352) is the statement 'false', seemingly forged in favour of Utrecht. The suspect records all concern Utrecht, not Trecht: the canons of St Peter's Abbey, St Saviour and the Old Minster.

In 1135 (g265 u354 about 1135), Bishop *Andreas*/Andrew of Cuijck (1128-1139) of *Traiectum* granted the people of *Aelste*/Aalst between Kesteren and Lienden the right to their own chapel and priest "in consideration of the difficult way across the water" to their mother church in *Wyck/Wic/Wijk*, because of the change in course of the Rhine. The Kesteren Old Rhine formed at this time. Their church must previously have been to the south of any river channel. They could have fallen under either St Martin's Minster or a chapel in the area of the later Huys ter Leyde. Probably because the Abbey of *Lauresheim*/Lorsch owned property in Aalst since 814/815 (g27), they were not directed to Kesteren or Lienden. A certain Balderic had granted *Halosta*/Aalst to Lorsch abbey.



Map of historical field names. Pottemsche Straat continues northward into part of the Oudewaard here called the Podeweerd, probably meaning the weerd/weir closing off the Kesteren Old Rhine and the Leigraaf.



. Sketch map of the situation of the Roman fortress of Traiectum/Trecht in 690. The caption at the foot of the map assumes that Utrecht was meant. The map is clearly a later copy with a new caption below the map. It confuses Trecht with Utrecht and uses the Second Millennium spelling Vecht; in the First Millennium, it was be Fecht. Though a late copy, the map seems correct for the First Millennium situation. North of Vecha fl./River Vecht was the Nude-Brakel levée.

Wijk by Rhenen, on the north bank below Rhenen, had its own history, in later times confusable with Wijk by Duurstede. The plan of Trecht dated 690 shows *Vetus Vicus*, 'Old Wijk', south of *Vecta fl./Vecht* and north of the Rhine at the foot of the Heimmeberg. Charlemagne confirmed the right of *Uuicus* to collect toll (779 u50). In the grant of 814/815 (g27), Balderic also granted a farm at *Podarwic* near Trecht to Lorsch Abbey. *Podar* may be related to 'puddle' and mean 'wet', perhaps a farm in an easily flooded area. *Poddinghse-straat*, later *Pottumsche Straat* (1925)/*Pottumsestraat* runs north-east from the hamlet of Podding/Pottum on the Linge west of Ochten and south of Aalst to Kesteren station and then turns north through the Oudewaard to the Leigraaf just west of Ambtse. *Podarwic* could have been somewhere along it or perhaps near Aalst on the north side of the old Kesteren Rhine and so out of reach of the Aalst people after 1134. The northernmost end of *Pottumsestraat* would have been part of the harbour area of *Ambtse-Trecht-Wick* until 1134. In the atlas of old field names, the middle part of the Oudewaard is labelled *Podeweerd*(d) or perhaps *Landeweerd*(d), possibly taking its name from the *weer/weir* permitted by Emperor Frederic in 1165 (see below).

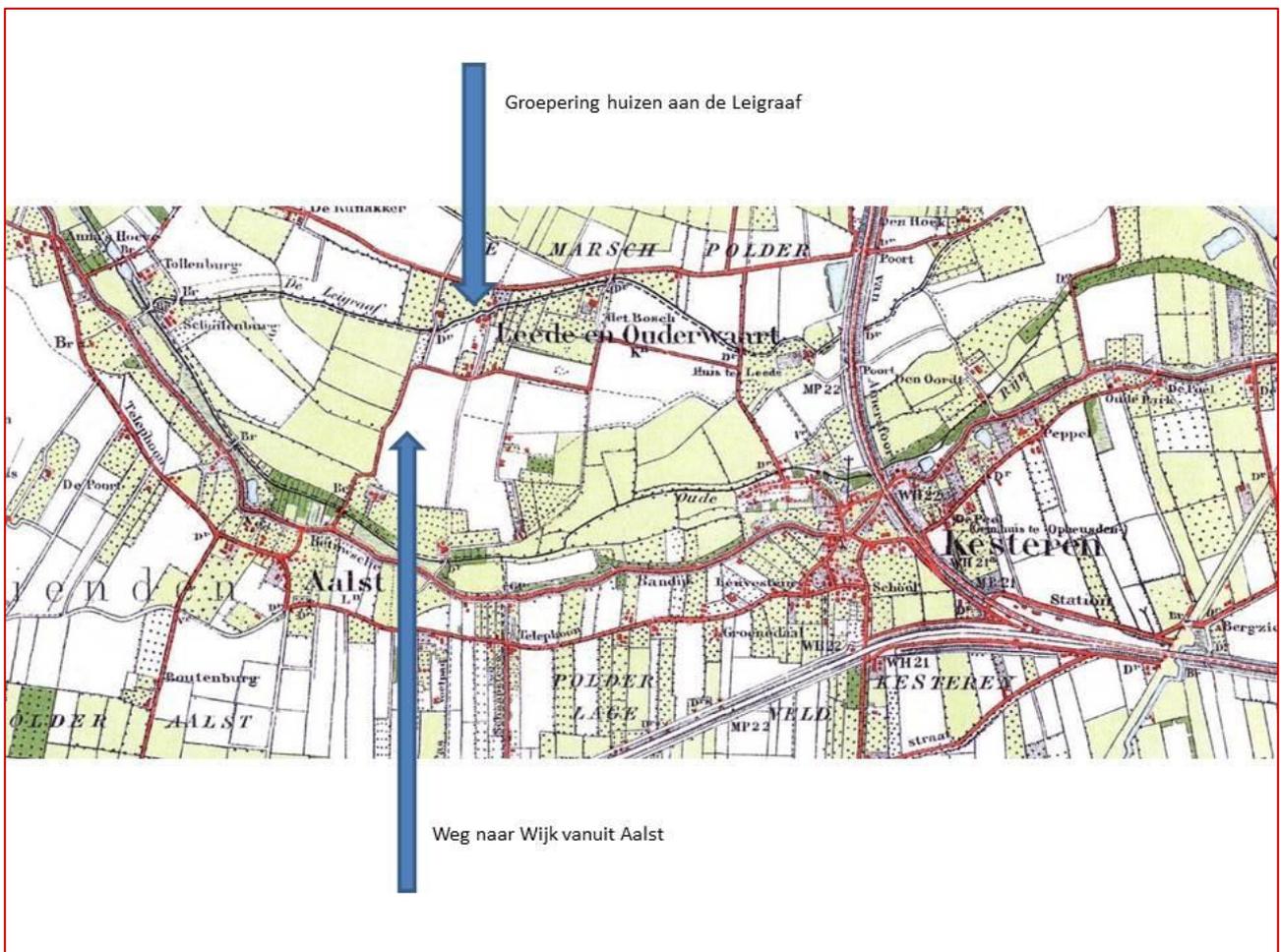
In 1019 (u172), Archbishop *Heribertus* of Cologne granted various properties to the abbey he had recently founded at Deutz near Cologne including *Wich/Wijk*, *Werchinge/Werkhoven*[?] and *Odinghe/Odijk* and three properties he had received from Count *Baldricus/Balderic* at *Rinwich/Randwijk*, *Vellepe/Velp* and *Eltinge/Elden* (now part of Arnhem South).

Ambtse on the south bank of the Rhine also had a customs house for Trecht; its returns from river toll fell to zero in the years 1140/1145.

Measures by Duke Henry of Guelder and Bishop Godfrey of Trecht

To alleviate the suffering of the people in the Betuwe caused by the floods and by the changes in the course of the river, Duke Henry of Guelder approached Emperor Frederic (1165 g313 u448), who permitted Count Henry of Guelder and Bishop *Godfridus*/Godfrey of Trecht

- (1) to maintain a weir, probably near De Spees north-west of Opheusden, to direct water away from the Kesteren Old Rhine and from the old main course of the Rhine;
- (2) to dig *aqueductum*/a watercourse for the Rhine further north, which was called the *Noyen Grave*/New Cut in the *Node/Nude*. The channel may have been that now leading to the harbour of Wageningen. The *Noyen Grave* and the weir (or sluice) relieved Kesteren, Aalst and Lienden on the south side of the Kesteren Old Rhine. The old main course of the Rhine in the map of 690 became a drainage channel, the *Leigraaf*, entering the Kesteren Old Rhine east of Lienden. The Rhine moved (or was moved) into a course corresponding to the east-north-west moats of the later City of New-Wageningen. The first harbour of Wageningen developed at that time around the eastern moat.



Stafkaart 1871 with the area of Aalst and part of De Marsch. The Kesteren 'Old' Rhine just north of Aalst formed in 1134 and blocked the route from Aalst to their church. Before 1134 the main channel of the Rhine followed the present Leigraaf. Traiectum/Trecht may have been in the large oblong group of fields south of the word 'Leede'. Pottemsche Straat begins south of Kesteren station running south-west to Pottemsche Brug over the Linge and continues to De Podding, also called Pottum, a hamlet west of Ochten.

New bishop's palace

With the destruction of St Martin's Minster, the bishops of *Traiectum*, Andrew and his successors Hartbert van Bierum (1139–1150) and Herman van Hrone (1150–1156), seem to have exercised uncertain authority with Frederik van Berg, Bishop-Elect of Cologne, claiming the diocese. Godfrey of Rhenen (1156–1178) brought new stability. He established a new bishop's seat, rebuilding *Castrum Horst*, which had stood on the west bank of Lake Almere until 1134 below Achterberg and Rhenen, after 1141 on the western slope to the Kromme Eem, which is the boundary between the Provinces of Utrecht and Guelderland, and formerly boundary of the prince-bishopric. It stood about 2 km north of Trecht. There the bishop withstood attacks, in which Bishop Frederik of Cologne may have colluded. After people from Guelderland set the wooden fortress afire, Bishop Godfrey rebuilt and enlarged it with tuffstone (1157/1158). According to his daughter *Heelwig*

Pater meus Godefridus de Renen preparaverat Horst, locum castrum edificando et jam quibusdam fossatis et edificiis levibus munierat. Sedit igitur in eminentiori [parte] loci illius, ubi nunc turris est lapidea ... / My father Godfried of Rhenen prepared Horst for the [re]building of the castle with a moat. Much of the fortification is of [tuf]stone ... (1178 g350 u499).

Possibly the stone was plundered from the St Alexander Church of Bennekom and the St Pancratius/Pancras Chapel in the Kraats district of Bennekom as a reprisal for the attack. In his will, Godfrey granted the fortress to the Bishopric of *Traiectum* on condition that his brother Gerlach and his offspring could lease it.

In that same deed, we read:

Postea tamen totum castrum destructum pro werra Traiectensium et desolatumque et sine habitore longo tempore fuit / After total destruction of the Roman fort by the weir at [upstream of?] Trecht, which had been uninhabited for a long time [44 years].

Horst was founded by Bishop *Ansfridus* in 1006 (995–1010) as Hohorst⁷ when he became blind as a place of retreat, becoming a monastery in itself. Around 1050, its community moved to Utrecht as St Paul's Abbey, leaving it vacant for the Bishops.

In 1528, the bishop's fortress was demolished and the tuffstone used for Vredenburg Castle in Utrecht. In 1942, the last foundations of Horst were removed. According to Alpertus (§1.16), the distance from *Hohorsta* to *Traiectum* is 6 *milibus*, which Hans van Rij 'corrected' as "16 mijl". It means 6000 ..., perhaps *passi*, 'steps'.

Other events

With prompting from Abbot Walter of Laon abbey and approval by Bishop Andrew, a woman from the nobility, Alveradis, and her two sons Godfrey and Herman granted lands for the establishment of a Norbertine Abbey on the 'island' (river polder) of Heringer near Beesd north of the Linge. The island and abbey are now called Marienweerd. The lands were all in the far west of the Betuwe: *Runeresbusch*/Runeresborch, *Paveia*/Paveien, *Rietvelt*/Rietveld, *Triiecti*/Tricht, *Spihe*/Spijk, *Inspihe*/Enspiijk and *Bisde*/Beesd (1129 g248). The abbey received further grants from *Focoldus de Berna* and his wife *Bescela* of lands in *Bernam*/Berne (Brabant), *Masemunde*/'Meuse Estuary' (perhaps Monster, South Holland), *Erthepe*/Epe (Brabant), *Altfurse*/Altforst (municip. West Maas & Waal, Guelderland) and *Merseberch*/Maarsbergen (municip. Utrechtse Heuvelrug) (3 August 1134 u350). I suspect that these deeds may have been backdated before the tsunami (4 October 1134) and may originally have been gifts intended for St Martin's Trecht. The new abbey in the far west of Guelderland was away from possible interference by the Bishop of Cologne.

Property that had belonged to Trecht was transferred to the new abbey. In 1135 (u355), Snelger de Arde granted to Marienweerd Abbey lands at *Langesmerh* (1148 g291)/*Langesmeere* (1148 g292)/Lanxmeer and Paveien (districts of Culemborg), probably a gift originally intended for St Martin's Minster, Trecht.

In 1148 (g292), Pope Eugenius confirmed the grants to Mariënweerd but speaks also of *totam decimam de inferiori Tillo*/all the tithes of lower Tuil, which may previously under the water of

Lake Almere between Manen in Ede and the Kraats in Bennekom or Tuil in the far west of Guelderland.

In 1139 (g273), 3 carucates of land in *Lindinia*/Lienden were granted to the Cathedral of St Martin in *Traiectensi*, perhaps meaning the St Martin's side-chapel in the St Saviour Cathedral in Utrecht. Also in 1139 (g274), Bishop Andreas of *Traiectum* transferred property between *Meldrika*/**Maurik or Medel, *Ravenswade*/Ravenswaaij, *Ryswich*/Rijswijk and *Solen*/Zoelen in the Lower Betuwe to the canons of the Church of St Salvator/the Holy Saviour in Utrecht, a sign that *Traiectum* was already destroyed by floods. In 1148 (g291), Bishop *Hardbertus*/Hardbert granted 10 properties to the new abbey of Marienweerd including *Treiecti*/Trecht itself, and two properties granted to Trecht in the days of Boniface: *Vurdene*/Woerden in Zetten and *Boninghem*/Bennekom.

The only record of the destroyed part of the Nude-Brakel levée in the century after 1134 is the will of a Rhenen landowner holding properties in *Noda*/Nude and *Brakele*/Brakel, both now part of Wageningen, and around Rhenen on *montem versus Lare*/the Laarberg and *Marsche versus Rhenen*/de Marsch (1250 g718). The name Brakel thus did not disappear, though the part under the present bus station of Wageningen was covered by a metre of sediment.

In 1172 (g334 u473), *Heinricus de Cuk*/Henry of Cuyck withdrew his rights to land at Balgoij owned by St John's Abbey in Utrecht, which he had misappropriated. In the deed, Henry described himself as *comes Traiectensis*/Count of Trecht. The deed refers also to *Muda*/Ambtse, *Eki*/Eck (& Wiel), which had belonged to Trecht since the 8th Century. The name *Muda* was quietly switched to Muiden near Amsterdam. Henry must have been a close relation of Bishop Andrew of Cuijck, possibly Hendricus/Henry, the father of Bishop Andrew, or a brother Henry to have usurped this title, which had been reserved to the bishops.

Any ambiguity in the meaning of place-names owned by Trecht was exploited for the benefit of Utrecht. In 1171 (u472), Emperor Frederic confirmed to Bishop Godfrey (1156–1178) the possessions and rights of *ecclesiam sancti Martini* that had been granted by Emperor Otto II, though Utrecht probably never had more than a side-chapel to St Martin. The rights included toll on shipping at *Muda*, switched to Muiden; fisheries in *Almere* switched to the Zuyder Zee; fisheries in parts of a stream called *Vecht*, switched to the Utrecht Vecht. The grant also included estates that Count Otto once held in *Eki* / Eck on the Linge and in Loenen on the Waal⁸ and mintage were all transferred to Utrecht.⁹

Perhaps as a result of the breakout of Lake Almere, there is no sign of the prehistoric and Roman Betuwe Yssel west of Andelst, though its course further east from Valburg through Herveld North to Andelst is clearly marked in the landscape. Further west, the river seemingly joined the Linge north of Dodewaard. Its course from Andelst to the Linge seems obliterated.

Further downstream, the Waal formerly turned northwards between Zandwijk and Tiel, but probably at the time of the tsunami broke through into the new course south-westward along the south side of Tiel as a result of the mass of water from Lake Almere.

Appendix A. Places mentioned in the text

As a guide to places in the text, the Dutch topographic atlas is recommended, <https://topotijdreis.nl/>, which includes all versions from 1815 to the present. Walking distances (from Google) are given from Kesteren for places south of the Rhine, and from Rhenen for places north of the river. Trecht lay between Rhenen and Kesteren.

Aalst: hamlet between Kesteren and Lienden on the south side of the Kesteren Old Rhine.

Achterberg: village about 2 km north-east of Rhenen on the Utrecht Hill-Ridge.

Almere: the lake filling the southern 10 km of the Vallei before 1134, dammed in by the Nude-Brakel levée.

Altforst: village 15 km south of Kesteren in the municipality West Meuse and Waal.

Ambtse: part of the river port of Wijk and Trecht. First recorded as *Amuthon* (777/866 u49, ca 900 u91), 'Mouth of the *Aam*/Eem'. Forms such as *Amuda* (1172) are confounded, probably intentionally, with Amuiden near Amsterdam.

Andelst: village 13 km ESE of Kesteren. The name derives from *An de Yssel*, on the Betuwe Yssel.

Arnhem: provincial city of Guelderland, north of the *Nederrijn/Lower Rhine*, 25 km upstream from Rhenen.

Balgoij: village 25 km SE of Kesteren near the River Meuse.

Beesd: village 33 km WSW of Rhenen, north of the Linge, outside of which the Abbey Mariënweerd was established in the 1130s.

Bennekom: village 11 km NE of Rhenen on the east side of the Vallei between Wageningen and Ede.

Brakel: former settlement at the north-west end of the Wageningse Berg, an area now part of Wageningen.

Cuijk: a settlement and lordship 13 km south of Nijmegen on the west bank of the River Meuse.

Deutz: town on the right bank of the Rhine opposite Cologne. Archbishop Heribert established an abbey there in 1003, partly with estates in the Betuwe and Cleves area granted by Balderik, second husband of Athela of Renkum.

Eck & Wiel: twin settlement on the Linge 11 km downstream of Kesteren.

Eem: the river along the Vallei forming the boundary between the provinces of Guelderland and Utrecht. In early historical times, it was an overflow from Lake Almere.

Elden: former village 24 km upstream of Kesteren, downstream of Malburgen, upstream of Driel, now part of Arnhem South.

Enspijk: village 30 km west of Kesteren, on the Linge in West Betuwe.

Heimenberg, also called Grebbeberg: the southern promontary of the Utrecht Hill-Ridge at Rhenen overlooking the Rhine to the south and the Vallei to the east. It takes its name from the River *Heem/Eem*, which ran at its foot from Lake Almere to the Rhine at Amtse.

Heringer: Beest, Marienweerd

Herveld North: hamlet 14 km upstream from Kesteren at the junction of the Early Mediaeval Betuwe Yssel (east-west) with the Roman canalized south-north river from Loenen to the Nijburg.

Heteren: village 14 km upstream from Kesteren, upstream of Randwijk.

Horst, earlier Hohorst: monastic house, later bishop's residence, east of the Kromme Eem/Winding Eem downhill of Achterberg, before 1134 on the bank of the Almere.

Kesteren: village south of the Kesteren Old Rhine between Opheusden and Lienden, 4 km south of Rhenen. Name derived from the Roman fortress *Castrum Traiectum*.

Klaverwaard: polder south of Wageningen and the Rhine west of Lakemond.

Kraats: hamlet west of Bennekom, 9 km NE of Rhenen. Before 1134, it formed a peninsula in the Almere. The name seems to be derived from a probable chapel of St Pancratius/Pancras established by Willibrord.

Laarberg: the part of the Utrecht Hill-Ridge promontary by Rhenen facing the Vallei.

Lanxmeer: district of Culemborch, 26 km downstream of Kesteren.

Leigraaf: drainage channel between the Oudewaard and the Marsch polders following the course of the Rhine before 1134. Along it are the remains of Kasteel, later Huys, ter Leyde.

Leyde: site of a Mediaeval castle on an old channel of the Rhine north of Kesteren. Probably founded in the First Millennium.

Lienden: village 5 km downstream from Kesteren, south-west of Rhenen.

Limes: line of Roman fortresses, later also trading stations, established by Emperor Hadrian and following the south bank of the Rhine.

Loenen: settlement 17 km ESE of Kesteren on the north bank of the Waal in an area prone to dike breaks in recent historical times. West of Valburg, east of Andelst and Herveld South. The Celtic name is derived from a Roman canalized river Loen running north to the Nijburg, which is pronounced like the Lancaster Lune.

Lorsch: site of abbey founded in 764 in the German state of Hessen. It possessed many estates in the northern Netherlands.

Manen: former hamlet west of Ede 14 km NE of Rhenen, now a district of Ede.

Maneswaard or Manenswaard: polder downstream of Wolfswaard and north of Opheusden.

Mariënweerd: Norbertine Abbey established in the 1130s on a river polder SW of Beesd 31 km

WSW of Kesteren.

Marsch: Rhine polder north-west of the Oudewaard south and southwest of Rhenen, north of Kesteren and east of Lienden.

Maurik: village 13 km downstream from Kesteren with remains of a Roman fortress.

Medel: till recently a hamlet west of Echteld, now part of Tiel 11 km west of Kesteren.

Monster (South Holland): on the coast north of the Nieuwe Waterweg/New Waterway, the present mouth of the Rhine.

Naaldwijk (South Holland): inland of Monster

Nijburg: fortress SW of Heteren, SE of Randwijk originally established at the junction of a south-north river, the *Loen* with the Early Mediaeval course of the Rhine, south-west of Heteren, south-east of Randwijk. Around the year 1000, it was held by Count Balderik, the second husband of Athela of Renkum.

Nijmegen (Guelderland): city 29 km SE of Kesteren, south of the Waal.

Nude: district 5 km east of Rhenen with slightly higher alluvial ground at the southern end of the Vallei west of modern Wageningen to the border with the Province of Utrecht, before 1134 extending further south. The ridge, a levée, was formed by overflow from an Iron Age channel of the Rhine called the *Fecht/Vecht* or Lake. The name meant 'damp'.

Odijk: village on the Utrechtse Oude Kromme Rijn/Utrecht Old Crooked Rijn about 30 km WNW of Rhenen.

Ooyhuizen: former hamlet between Randwijk and Opheusden. Before 1134 it stretched further north as, *Dodanhusan* to the foot of the Wageningse Berg. It lies west of the south-north stretch of the Roman Lake Canal.

Opheusden: village 5 km upstream from Kesteren. In several First Millennium documents, Heusden, the early form of the name, was miscopied as Leusden.

Oudewaard: Rhine polder downstream of the Manenswaard north of Kesteren, south of the Grebbeberg, the southern promontory the Utrecht Hill-Ridge.

Paveien: former settlement 26 km downstream of Kesteren, before 1130 part of the parish of Beusichem; now district of Culemborch.

Podding/Pottum: hamlet 4 km SW of Kesteren on the Linge west of Ochten.

Randwijk: village 12 km upstream from Kesteren, south-east of Wageningen. Before 1134 it lay north of the Rhine, which ran from de Nijburg to Indoornik before 1134. It is downstream of Heteren and upstream of Opheusden.

Ravenswaaij: village 19 km downstream from Kesteren.

Rhenen: city on the southern promontory of the Utrecht Hill-Ridge. In 855 (g45), it is mentioned as *villa Hreni* but was of sufficient importance to be visited by King Otto in 944 (g85).

Rietveld: many places are called Rietveld, identity uncertain.

Runeresborch: unidentified.

Rijswijk: village 17 km downstream from Kesteren.

Spees: an area between Opheusden and Kesteren where a dike across the Betuwe joins the Rhine Dike at the upstream end of the Oudewaard.

Spijk: probably Spijk in West Betuwe 46 km WSW of Kesteren, the far limit of Guelderland with South Holland.

Tiel: town 14 km WSW of Kesteren.

Traiectum/Trecht: Roman *castrum* on the south bank of the Rhine south of Rhenen and north of modern Kesteren. The name *Traiectum* applied to Trecht and Utrecht, and, after the year 1000, to Maastricht.

Tricht: village 26 km WSW of Kesteren on the north bank of the Linge.

Tuil: (1) 1st millennium Celtic settlement west of Ede. (2) village 31 km SW of Kesteren in West Betuwe.

Utrecht: city 38 km ENE of Rhenen. The name also applies to the bishopric of *Traiectum* and the modern province west of the Vallei and north of the Rhine.

Valburg: village 17 km E of Kesteren.

Vallei: a north-south marshy valley between the hill-ridges of Utrecht and the Veluwe district of Guelderland. Originally a Celtic name, *Falithe*, meaning damp places.

Vecht: prehistoric meander of the Rhine north of the Early Mediaeval Rhine. The Romans exploited it as part of the *Lacus/Lake* canal connecting the Waal with the Rhine and the the harbour of Wijk by Rhenen. The early references are often misidentified as the Vecht in Utrecht Province.

Velp: village north-east of Arnhem on the east side of the Veluwe, 30 km E of Rhenen.

Waal: southern branch of the Rhine running along the south side of the Betuwe.

Wageningen: city 8 km upstream from Rhenen west of the Wageningse Berg, where an earlier settlement had existed; originally called Nieuw-Wageningen when established after 1134 as a port on the Rhine. The Duke of Guelder granted it city rights in 1263.

Werkhoven: village about 27 km WNW of Rhenen on the Oude Kromme Rijn, 'Old Crooked Rhine'.

Wijk by Rhenen: the port and industrial area of Rhenen at the foot of the Heimeberg/Grebbeberg. Seemingly the site of the present St Cunera Church was also considered as Wijk (u49 777/866 §1). Wijk bij Duurstede 20 km downstream is not mentioned in documents until the Second Millennium.

Wijk bij Duurstede: 19 km downstream from Rhenen (and from Wijk bij Rhenen).

Woerden: Mediaeval settlement east of Zetten on the south-north river Loen canalized by the Romans. Confused with Woerden in Utrecht Province 57 km WNW of Rhenen.

Wolfswaard: polder south-west of Wageningen, north-west of the Klaverwaard, before 1134 on the north bank of the Rhine, named after its Mediaeval iron industry, 'wolf' being pig iron.

Zandwijk: former village east of Tiel, now part of Tiel. It was separated by the Waal, which before 1134 turned north between the two settlements. Now the Waal flows along the south side of both settlements.

Zetten: village 11 km east of Kesteren.

Zoelen: village 15 km west of Kesteren.

Zuyder Zee: marine inlet south of Friesland, north of Utrecht Province and Guelderland, the southern part now reclaimed as Flevoland and North-East Polder, the northern part. now fresh water, of Lake Yssel.

Zwin inlet: on the border between Zeeland (Netherlands) and Belgian Flanders.

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Noten

¹ Recorded in the Anglo-Saxon Chronicle by William of Malmesbury and by the abbey of Quedlinburg, both cited by Wikipedia.

² This provided the first clue: p.60 in Maas & Jochems 2009, citing Verhulst 1965.

³ Wikipedia gives most of this outline. Some additional details are in Aryan F.V. Engelen (Ed.), J. Buisman et al. 1995. Duizend jaar weer, wind en water in de Lage Landen: tot 1300. 1. Van Wijnen, xxx. 656 pp. ISBN 9051940750, 9789051940756.

⁴ Like the lake in the south of the Vallei, the fresh-water lake further north seems to have been called Almere before becoming the salt-water Zuider Zee in 1134. In this reconstruction of events, Almere is used only of the lake in the south Vallei, called by the Romans *Lacus Flevo*. The names *Almere* and *Flevo* are now applied to parts of the former Zuyder Zee and of the new Dutch province of Flevoland reclaimed from the Zuyder Zee. The Romans called the peninsula in the lake, now the Kraats district of Bennekom, *Insula Flevum/Insula Flevo*. Wikipedia and most historical works follow the misapprehension that Almere is an Early Mediaeval name of the Zuyder Zee.

⁵ Assuming a lake 10 km long, 10 km wide and 1 m deep: $(10\,000)^2\text{ m}^3$.

⁶ Unless Roman tiles at the foot of the Wageningse Berg were carried there by the surge up the Rhine Valley. They were more likely from *Dodanhusan/Ooyhuizen*

⁷ Hohorst is usually equated with Heiligenberg near Leusden. The distances travelled with his body in 1010 for burial in *Traiectum* prove otherwise.

⁸ Loenen was brought to Christianity by Boniface about 720.

⁹ Trecht had held royal and imperial mintage rights since at least the 6th Century. Dutch (EU) coinage is still minted in Utrecht.