ABSTRACT: Part of an early medieval cemetery was excavated on the SE edge of the terp of Oosterbeintum, which held remains of both cremations and inhumations. The cremation features, urned burials, a bustum grave, Brandgruben, ash stains and disturbed traces of the cremation ritual, produced evidence of 10 to 21 children's cremations and 23 to 27 of adults. The wood types alder and oak were most often used as fuel for the cremations; ash and birch were also regularly used. Eight inhumated skeletons were of children, three were of adolescents and 35 of adults. The average age at death of the inhumed humans was 29.5 years. Women and men were equally represented among the inhumed adolescents and adults. In one individual, the osteological sex determination (male) contradicts the archaeological sex determination (female). The average stature of men measured 1.74 m, that of women 1.58 m. One of the inhumed individuals was an achondroplastic dwarf of unknown gender with an estimated stature between 1.25 and 1.30 m. Tree-trunk coffins of oak were used in eight inhumations. The number of grave goods was modest, both with cremations and inhumations. There was one weapon grave, and a possible second one. Three inhumation graves of women and one cremation grave of a child had a rich content of grave goods. The cremations are dated between AD 400 and 750, the inhumations between AD 450 and 750.

The cemetery contained eight animal graves: an inhumation grave of a c. 6 year old stallion, six inhumation graves of male dogs and a Brandgrube with the burnt remains of a lamb or kit, and a teal. Four Carolingian ditches, a 10th/11th and a 15th century well disturbed the cemetery to a slight degree.

The remains of northern vole, natterjack toad and several mite species allowed the reconstruction of an unendiked landscape.

KEYWORDS: Friesland, terp, early medieval cemetery, AD 400-750, cremations, inhumations, achondroplastic dwarf, charcoal, tree-trunk coffins, grave goods, horse burial, dog burials, mites.

1. INTRODUCTION

1.1. Research objectives

In the autumn of 1987, S. de Haan of Twijzelerheide found an urn containing a human cremation (burial C in the catalogue) in the side of a ditch in the terp of Oosterbeintum (fig. 1). The ditch borders a terp remnant which is protected as a listed archaeological monument (fig. 2). The find was reported to the Fries Museum, Leeuwarden, after which inspection revealed that the ditch had been significantly deepened as part of a recent reallocation scheme and that the sides were now calving. The crown of an unburnt human skull (grave B in the catalogue) and a concentration of unurned cremated remains (grave D in the catalogue) were found during this inspection. The finds pointed to an early medieval cemetery.

The calving of the ditch side and the lowered water table meant that the remains of the cemetery were endangered. The Ministry of Welfare, Health and Cultural Affairs (W.V.C.) therefore granted permission for the part of the cemetery that adjoined the ditch to be excavated. The aim of the excavation was to establish the nature and the extent of the archaeological remains, to assess the state of preservation of the features and to salvage the finds in the most seriously threatened part of the cemetery (de Langen, 1988: pp. 146-147; Kramer, 1989: p. 161).

This partial excavation of the Oosterbeintum cemetery was expected to make an important contribution to the study of habitation and the funerary ritual in the northern Netherlands and Ostfriesland during the early Middle Ages. Searching through published reports, archives and museum collections produced 117 early medieval cemeteries in this region (Knol, 1991a; 1991b; 1993a: pp. 150-155). By far the majority were in terpen. Often only a few grave goods had been collected or preserved.

In most cases, any clear description of the find conditions is lacking. A little more is known about a few cemeteries. In 1904/1905, P.C.J.A. Boeles had an extensive record made of the graves in the cemetery of Hogebeintum, which was being destroyed by commercial soil-quarrying (Boeles, 1906; 1951: pp. 209-214; Knol, 1993a: pp. 159-163). The Biologisch-
Archaeologisch Instituut had excavated three cemeteries, whose remains were documented: at Godlinze, excavated in 1919 (van Giffen, 1920), in the terp De Bouwerd near Ezinge, excavated in 1934/35 (Hijszeler, unpublished; Boersma, 1980; Knol, 1993a: p. 163) and at Paddepoel, excavated in 1964 (van Es, 1970: pp. 232-239; Knol, 1993a: pp. 163-165). In a few churchyards in the northern Netherlands and Ostfriesland excavations had been performed in which the oldest graves dated from the 9th or even 8th century. These were at Dokkum (Halbertsma, 1960; 1970), Groningen-Martinitkerk (Casperie, 1983; Lanting, 1990a; 1990b) and Emden (Haarnagel, 1955).

Very little is known about funerary custom during the first 900 years of habitation in the coastal part of the northern Netherlands, from the 5th century BC to around AD 400. On the basis of a few cremations, it is assumed that cremation was practised during this period (Knol, 1993a: pp. 155-156). The above-mentioned observations and excavations show that from the 5th century AD, the northern Netherlands saw the use of cemeteries, where communities buried all or some of their dead. The earliest cremation burials in these cemeteries date from the end of the 4th and the beginning of the 5th century. Shortly after, inhumation graves began to occur as well, of which at least some involved tree coffins. In Westergo and Oostergo (Friesland) such mixed cemeteries continued into the 8th century, after which only inhumation graves are known. In Groningen and Ostfriesland, cremation of the dead continued into the early 9th century (Knol, 1993a: pp. 165-169).

In the early encounters, skeletal remains were seldom retrieved, so that little is known about the gender, age and health of the buried or cremated individuals. The recovered remains of cremated bodies were limited almost entirely to those found in urns. A sample of cremated remains without an urn from Hogebeintum (FM inv. Nos 28-158bis) and a few charcoal deposits from profiles at Godlinze (van Giffen, 1920: plate II) already pointed to the existence of cremation features other than urned burials.

In this new investigation of an early medieval cemetery, such aspects might be given closer attention. Studies of wood and charcoal might provide insights into the use of wood in the early medieval funerary ritual, both for the cremations and the inhumations. The grave goods of the cremation and inhumation graves usually were not numerous, but varied. It was clear that cemeteries of this kind could also include burials of horses or dogs (Müller-Wille, 1971; Boersma, 1980). A careful excavation of part of the cemetery of Oosterbeintum offered the opportunity to test earlier ideas about the early medieval funerary ritual and to add new evidence.
The excavation also presented an opportunity to apply to a cemetery the study of mite remains. These might yield interesting evidence about the method of burial if they included species specific to corpses, such as *Uroseius hunzikeri* (Schweizer, 1961). The possibility of identifying mites characteristic of burials could mean a new application for mite research. If a funerary context were no longer demonstrable, such remains might be used as indicators of a grave.

The excavation was carried out in 1988 and 1989 by the Biologisch-Archaeologisch Instituut (B.A.I.), now renamed Vakgroep Archeologie, of the University of Groningen (V.A.R.U.G.), in collaboration with the Archaeological Institute of the Vrije Universiteit, Amsterdam (A.I.V.U.), and the Fries Museum, Leeuwarden (FM). The day-to-day supervision of the excavations was in the hands of archaeologist E. Knol, the draughtsman G. Delger and the field technician K. Klaassens. Employees of the Fries Museum assisted in the fieldwork. The uncovered features and remains were studied by a large team of researchers. E. Knol and G.J. de Langen analysed the field drawings; E. Knol sorted the finds and studied the grave goods; E. Kramer, who had initiated the rescue excavation, made an inventory of earlier finds from this site; H.T. Uytterschaut studied the human skeletal remains from the inhumation graves; M.L.P. Hoogland studied the human remains from the cremation burials; W. Prummel dealt with the animal bones; W.A. Casparie studied the wood remains and charcoal; and J. Schelvis identified mites from a number of graves and younger features, and scanned the combs for lice and nits.

The present article is the report of the excavation and the study of the features and the recovered material. The results of this project are first described in terms of the various disciplines (chapters 2-12), after which the catalogue lists the finds from each individual grave (chapter 13). There the reader will also find the arguments for each grave’s dating, based on radiocarbon analysis, datable grave goods and transections.


1.2. The location of Oosterbeintum

Oosterbeintum lies in the province of Friesland, east of Hogebeintum between Blija and Genum. In the civil parish of Ferwerderadeel, it is one of the many dwelling mounds that man has built from the Iron Age onwards. Such dwelling mounds are nowadays called *terp* in Friesland, while in the province of Groningen the originally Frisian word *wierde* has remained in use. The once extensive *terp* of Oosterbeintum has largely disappeared as a result of soil-quarrying in the early 20th century (Kramer, in print). This was done for commercial reasons: the *terp* soil was exported as fertile topsoil to the poor sandy and peaty areas of the northern Netherlands. This digging had revealed a 5th-century grave in the southeast section of the *terp*. Since commercial digging had also taken place at the site of the excavation, this grave probably belonged to the excavated cemetery. In the catalogue it is described as grave A. The plot indeed is locally known as the *Ald Tsjerkhof* (Old Churchyard). Only the rim of the *terp* was not dug away (figs 3 and 4). In the southwest, this remainder still bears a farmhouse. The early medieval
cemetery lies in the southeastern part of the terp, in the plot that is cadastrally known as Blijja, section B, lot 57 (fig. 2).

Oosterbeintum is situated in the wide salt-marsh zone of Oostergo. This runs from where the river Boorne empties into the Middelzee, along the east side of that estuary and then along the Wadden Sea coast to the mouth of the Lauwers. Behind this salt-marsh zone lay a low-lying basin that to the east and south merged into extensive mires (peat bogs) (fig. 5). The salt-marsh zone was closely studded with terpen, of which many were inhabited in the early Middle Ages (de Langen, 1992; Knol, 1993a).

Apart from the cemetery excavated in 1988/1989, graves were also found during the construction in 1906 of a road across the terp (fig. 2:3). These did not contain any grave goods and hence remain undated (Boeles, 1907; Knol, 1993b). Possibly this was the site of a second cemetery, whose date is unknown. In view of similar small cemeteries elsewhere in Friesland, a (late-) Carolingian date is most likely (Knol, 1993b). In a radius of 4 km around Oosterbeintum, early medieval

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**Fig. 4.** Oosterbeintum. The southeastern edge of the terp. Photograph by G. Delger, V.A.R.U.G.

burials were also encountered in the terpen of Blija-Vaardeburen, Blija-Sijtsma terp, Ferwerd-Burmania I, Ferwerd-Burmania II, and Hogebeintum (Knol, 1993a: p. 153).

1.3. Excavation method and processing of finds

The excavation area was laid out in the autumn of 1988 over a length of 48 m, at 1.5 m from the ditch, alongside the spots where the urn (grave C), the skull (grave B) and the cremation remains (grave D) had turned up in the side of the ditch (fig. 6). The width of the trench varied between 7 and 8 m (figs 2, 7 and 71). The trench was made 48 m long because the exact location of the cemetery was still unknown. The topsoil was carefully removed with a mechanical digger. This layer was found to be very thick. F.J. Tilma of Blija, former owner of the field, informed us that the part of the terp where the excavation was sited had been partially dug away in the early 20th century. The resulting difference in elevation did not interfere with its use as grassland. In World War II the land was turned over to arable farming and the excavated part was made up with soil from a higher part of the terp to facilitate cultivation.

Traces of the cemetery were encountered over a length of 35 m midway along the excavated trench (fig. 7). This central area was manually excavated with shovels down to the undisturbed natural. But first the eastern and western ends of the excavation, which were devoid of funerary features, had been mechanically deepened to drain the site of rain and groundwater. The central part of the area was thus adequately protected from flooding. The excavation was carried out in thirteen levels of 35 by 7-8 m, with a vertical interval of about 10 to 25 cm. Records were kept of the vertical sections on the north and south sides of the excavation (figs 8 and 9). Finally, in the spring of 1989, the 1.5 m wide strip between the ditch and the excavated cemetery, which originally had been left standing, was excavated as well.

Terp soil consists of raised material. Since the grave pits and the cremation features were filled with the same soil, the features are difficult to read. The topmost graves had been disturbed by the commercial digging; possibly graves had been destroyed. The outlines of grave pits and Brandgruben usually were not apparent until the contents, skeleton or cremation, became visible. In salvaging, the long bones of the skeletons were found to be very brittle; in the graves along the ditch, roots of reeds were entangled with the ribs (fig. 10). The condition of tree-trunk coffins was very poor.

The human and animal skeletons were carefully uncovered, while a look-out was kept for grave goods. The graves were measured, drawn to a scale of 1:20, and photographed. The features lay at differing depths and therefore were recorded in different levels. After this, the skeletal remains and the grave goods were lifted. The wood remains, mostly parts of tree coffins, were recovered as far as possible. If a grave contained traces of a disturbed cremation, that part of the grave contents would be removed and sieved. The bones were washed, dried and investigated. The grave goods were washed and if necessary restored. The metal items were found to be in poor condition. Their treatment was limited to blowing them clean of sand and clay with compressed air and consolidation with Archaeoderm. With the aid of X-ray photography, a reconstruction drawing of the object was then made (see fig. 59 and the catalogue). Restoration of the metal objects was not attempted, since the rusted bronze and iron often contained remains of textiles.

The cremation features consisted of urns with
Fig. 7. Oosterbeintum. The central part of the excavated area, showing the traces of the early medieval cemetery. The younger features have been omitted. Drawing by G. Delger, V.A.R.U.G.
Fig. 8. Oosterbeintum. Section along the northern edge of the excavation. From top to bottom, the parts fit together from west to east. Legend: 1. Arable; 2. Post-Carolingian raised layer; 3. Carolingian raised layer; 4. The cemetery terp; 5. The virgin soil beneath the terp; 6. Mussel shells; 7. Find number. The coordinates B-Y correspond with those in fig. 12. Drawing by G. Delger, V.A.R.U.G.
Fig. 9. Oosterbeintum. Section along the southern edge of the excavation. From top to bottom, the parts fit together from west to east, being shown in mirror image. Legend: 1. Arable; 2. Post-Carolingian raised layer; 3. Carolingian raised layer; 4. The cemetery terp. 5. The virgin soil beneath the terp; 6. Mussel shells; 7. Find number. The coordinates C-Y correspond with those in fig. 12. Drawing by G. Deiger, V.A.R.U.G.
fragments of burnt human bone, and of pits, large and small, containing charcoal, burnt bone, burnt clay and other finds. The contents of the urns and pits were collected as completely as possible. In this procedure, it was impossible to avoid taking a small amount of the surrounding terp soil as well. Terp soil by definition is disturbed soil, so that occasionally contamination with material of a different origin and age may occur. The contents of the pits and urns were sieved and investigated.

Apart from the graves there were innumerable unstratified finds and finds from various younger features. These were mainly pottery and kitchen waste. A number of graves and some younger features were sampled for the presence of mites.

For the dating of the graves and other features in the cemetery, seventeen samples were taken for radiocarbon dating by the Centre for Isotope Research Groningen (table 1). Four samples were of wood from coffins, ten were charcoal samples from cremation graves, two were charcoal samples from silted-up pits, and the final one comprised a number of mussel shells. All combs and comb fragments were scanned for the presence of fleas, lice and nits.

All finds were numbered serially in the order in which they were uncovered in the field. The stray finds too were incorporated in this system. This has resulted in discontinuous numbering of the graves. Sometimes objects were retrieved under different find numbers, before later being found to belong to a single grave. In this publication, all items from graves are mentioned...
under the number of the grave. In the catalogue they are listed grave by grave with a serial number (e.g., S.1 Fragment of tweezers from grave 5). The find numbers, when differing from the grave numbers, are quoted in brackets in the catalogue. In the field drawings, in the further documentation and in the Fries Museum, the finds will be found either under their grave number or field number. The field drawings, colour slides, photos and field journals are in the archive of the Biologisch-Archeologisch Instituut (now: Vakgroep Archeologie, Rijksuniversiteit Groningen, Faculteit der Letteren). All finds from the excavation (skeletal remains, grave goods and samples) were deposited in the Fries Museum under the numbers 1988/XI 1-473 and 1989/VI 474-643.

2. THE STRUCTURE OF THE TERP

The surface of the Pleistocene sand deposit at the site of the excavation lies 3.70 m below NAP (Dutch datum). This sand is overlain by a peaty layer c. 0.80 m thick. This is overlain by salt-marsh deposits, which start with a crumbly clay layer at 2.90 m below NAP. At c. 1.20 m below NAP these are followed by a sandy layer. These salt-marsh sediments were deposited by a creek then running between Oosterbeinentum and Hogebeinentum (Griede, 1978: pp. 113-116). The sandy layer is topped by a large number of sandy storm-tide bands from the Dunkerken IB period (c. 500-200 BC), which start between 0.60 and 0.80 below NAP. The base of the *terp* at the site of the excavation lies between 0.20 and 0.40 m below NAP.

On this natural substrate, which even in pre-Roman times must have borne a settlement (Kramer et al., in prep.), a *terp* was built during or at the end of the Roman Period, which was at least half a metre high. Water-abraded sherds of soft earthenware from the Roman Period (fig. 11) are the basis for this dating. This raised layer is visible along the greatest length of the northern section (fig. 8, unit 3), and the western half of the south section. As a result of erosion on the southwest side of the *terp*, the remaining *terp* layer locally was a mere 10 to 20 cm thick (fig. 9, unit 4).

In the eastern half of the excavation, numerous silted-up pits appeared in the bottom levels (fig. 12). They have been left white in the eastern part of the drawn sections (figs 8 and 9). They contain charcoal particles (table 1) and offal. Two pits each contained less than 1 g of burnt human bone (find Nos 468 and 622). From one pit came the remains of an oak plank with a feather-and-groove joint (fig. 13). Grave 473 from the 5th-8th century cuts one of these pits. This suggests that this pit was filled up even by the 6th-7th century. Radiocarbon dates are available for two other silted-up pits (table 1). The charcoal samples were small, which means that the datings have a large standard deviation. They do not rule out that the pits antedate the cemetery. On the other hand, the datings leave open the possibility that the charcoal derived from the earliest pyres, which would mean that these pits were still open in the 5th or 6th century. The pits may have been dug to extract clay for the construction of the *terp*. Subsequently the pits will have silted up. On the Halligen off the Holstein coast, clay for raising the *terp* was dug from pits that then were left to silt up, even in historical times (Halbertsma, 1944: p. 15).

Graves are visible both in the northern and the southern section (figs 8 and 9, unit 4). The cemetery therefore presumably extended further to the north and south. The cemetery is dated from about AD 400 up to about 750 (chapters 3.1.5 and 3.2.2). In the southern section it is evident that the cemetery was affected by erosion. Storm surges destroyed the top of the mound. The material from the sandy storm-surge deposits was redeposited: new storm-surge deposits can be seen in the section above the raised body of the *terp* into which the graves had been dug (fig. 9, the top of unit 4; fig. 14). The burials were all but exposed by this erosion. Grave 428 from the first half of the 6th century, and ash stain 611 lay immediately beneath this disturbance. Erosion at the edge of *terp* so far has seldom been studied, but for the contemporary inhabitants it must have been quite a common phenomenon.

After the cemetery phase, the *terp* was further raised at least twice. The first instance dates from the Carolingian period: judging by the pottery in the younger ditches, between AD 750 and 800 (fig. 9, unit 3). In the northern section this layer is absent, possibly as a result of the quarrying in the early 20th century. After this Carolingian phase the *terp* was raised still further, especially on its east side (figs 8 and 9, unit 2). Mussel shells from this layer at the eastern end of the south profile have a radiocarbon date that after calibration comes to the 8th or 9th century. The raised layer thus stems from the late Carolingian period or, if the shells were older than the layer itself, even more recent times. These raised layers correspond with extensions to the Oosterbeinentum *terp* after the cemetery phase. Tenth- to twelfth-century features were dug into these layers (see...
The early medieval cemetery of Oosterbeintum (Friesland)

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Table 1. Radiocarbon dates from Oosterbeintum produced by the Centre for Isotope Research Groningen. The calibration (by the Seattle/Groningen method) is given for confidence levels of 68.3% (1σ) and for 95.4% (2σ).

<table>
<thead>
<tr>
<th>Grave No.</th>
<th>Find No.</th>
<th>Sample</th>
<th>Wood</th>
<th>GrN-</th>
<th>Date BP</th>
<th>Date cal. AD</th>
<th>Date cal. AD</th>
</tr>
</thead>
<tbody>
<tr>
<td>424</td>
<td>424</td>
<td>Outside trunk coffin</td>
<td>Quercus</td>
<td>16539</td>
<td>1390±25</td>
<td>648-666</td>
<td>630-674</td>
</tr>
<tr>
<td>483</td>
<td>483</td>
<td>Trunk coffin</td>
<td>Quercus</td>
<td>19341</td>
<td>1545±35</td>
<td>448-486</td>
<td>436-602</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>498-516</td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>503-560</td>
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</tr>
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<td></td>
<td></td>
<td></td>
<td>572-594</td>
<td></td>
</tr>
<tr>
<td>605</td>
<td>605A</td>
<td>Trunk coffin</td>
<td>Quercus</td>
<td>19342</td>
<td>1645±25</td>
<td>396-432</td>
<td>344-358</td>
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<tr>
<td>605</td>
<td>605B</td>
<td>Chip lying near trunk coffin</td>
<td>Corylus</td>
<td>19343</td>
<td>1545±35</td>
<td>448-486</td>
<td>436-602</td>
</tr>
<tr>
<td>66</td>
<td>66</td>
<td>Um?</td>
<td>Betula</td>
<td>19441</td>
<td>1690±50</td>
<td>262-282</td>
<td>242-450</td>
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<td>330-418</td>
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<td>131</td>
<td>131</td>
<td>Um</td>
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<td>390-610</td>
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<td>267</td>
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<td></td>
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<td>97A</td>
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<tr>
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<td>Quercus</td>
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<td>1510±50</td>
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<td>442-644</td>
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<tr>
<td>611</td>
<td>611</td>
<td>Trace of cremation Mussels in the profile</td>
<td>Alnus, Betula</td>
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<td>1590±80</td>
<td>406-556</td>
<td>262-282</td>
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<td>Silted-up pit</td>
<td>Alnus, Betula</td>
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<td>1260±35</td>
<td>576-592</td>
<td>330-636</td>
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<td>Silted-up pit</td>
<td>Fraxinus, Alnus, Betula</td>
<td>19541</td>
<td>1640±100</td>
<td>260-280</td>
<td>210-640</td>
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<td>Silted-up pit</td>
<td>Fraxinus, Alnus, Betula</td>
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<td>1640±70</td>
<td>344-358</td>
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</table>

Chapter 8). Large *terp* extensions from the 9th to 12th centuries have been documented at Leens (van Giffen, 1940), Heveskesklooster (Boersma, 1988), and Leeuwarden (de Langen, 1992).

The commercial quarrying destroyed all of the cemetery north of the ditch. Therefore it can no longer be established whether the cemetery was laid out on the southeast edge of the village *terp* of Oosterbeintum or on a separate cemetery *terp* that was incorporated into the village *terp* through later additions. Separate cemetery mounds have been demonstrated at Termunterzijl (Westendorp 1819), Godlinze (van Giffen, 1920), Ezinge-De Bouwerd (Boersma, 1980) and Paddepoel (van Es, 1970; Knol, 1993a: pp. 155-158) and suggested at Ulrum-De Capel (Knol, 1995) and Lellens (Cuijpers et al., 1995).
Fig. 12. Oosterbeimum. The distribution of raised-up pits and ditches at the lowermost level of the excavation. The find numbers relate to locations of C-samples. Drawing by G. Delger, V.A.R.U.G.
3. THE GRAVES

The excavated part of the cemetery covers a zone running SW-NE, an area of some 220 m² (fig. 7). About 27 m² of this area is disturbed by younger features. Because this site was used for burials for several centuries, many graves cut each other. Numerous cremation features were disturbed in the digging of inhumation graves.

3.1. Cremation

A large number of human cremations were found in the cemetery of Oosterbeintum. The cremation features were varied and not always easy to interpret (see 3.1.3; fig. 15). There were 21 distinct urned burials and one shattered vessel without remains of a pyre or cremation (grave 210). A large pit was interpreted as a bustum grave and five smaller features as Brandgruben. One Brandgrube contained nothing but burnt animal bone. Moreover, there were 71 urnless traces of the cremation rite, whose interpretation is uncertain. These will here be called 'ash stains'. Finally, the fill of 17 inhumation graves contained remains of what evidently were disturbed cremation pyres. These cremation features, 116 in all, will be discussed below.

3.1.1. The distinctness of the cremation features and the recovery of their material

The cremation features were poorly visible in the terp soil. A pit containing a cremation burial, with or without
Fig. 15. Oosterbeinum. Survey drawing of the cemetery of Oosterbeinum, with the features relating to cremation shown in black. Drawing by G. Delger, V.A.R.U.G.
Table 2. Some characteristics of the samples of the cremation traces in Oosterbeintum. If several samples belong to the same feature, then they are counted together (the other field numbers in brackets). Cremated bones (crem.) in g; charcoal (char.) in ml; m = male; f = female; (f) = probably female; age in years; child? = possibly a child. 0-3? = child. 0-3?? = perhaps a child. Owing to bad weather some traces were not sampled. Nor did ash stains 645-655 receive a field number. One of these must be identical to sample 3xx. This makes the number of ash stains 71 instead of 72. The total number of cremation features is 116 (22 (probable) urns, 5 Bustum grave, 5 Brandgruben, 71 ash stains and 17 disturbed traces of cremation). The number of human cremation features is 115, since Brandgrube 97 only contains animal remains.

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Table 2 (continued).

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an urn, would not become apparent until the burial itself was hit upon. The upper parts of the pits usually remained unobserved. Only of feature 611 did most of the pit shaft become visible, because it is in the southern section (figs 9 and 22). The upper part of this feature was recognizable by a few scattered charcoal particles. The pyre remains in the bottom of the deep shaft were quite distinct.

Many cremation features were not discovered until their contents appeared in the level in the course of rabotage. As soon as a pit or other feature containing cremation material was encountered, as much material as possible was retrieved from it. From the top of the feature, some material will have been lost through rabotage. Any pyre remains lying outside the urn were collected separately from those inside the urn.

The amount of remains in features without urns is often small. Most contain upwards of 5 g of burnt human bone, with exceptions up to 49 g. The amount of charcoal ranges from 0 to 260 ml (table 2). A few urnless cremation features contain far more material. These are graves 5 with 1137 g of burnt human bone and 1 ml of charcoal, 519 with 320 g of burnt human bone and 50 ml of charcoal, grave 527 with 86 g of burnt human bone and 55 ml of charcoal, grave 183 with 1 g of burnt human bone and 95 ml of charcoal, and grave 97 without human bone but with 34 g of burnt animal bone and 28 ml of charcoal (table 2). These may have been Brandgruben. Finally, one feature, No. 160, was identified as the pit of a so-called hustum grave (see 3.1.3). The top layers in the pit were not recognized and hence not sampled. After this rectangular pit was spotted, all of the remaining contents were collected in layers.

Pyre remains were encountered in the fill of a few inhumation graves. Evidently, traces of the cremation rite had been disturbed in the construction of these graves. Material was collected from some of these cremation remains. Urned burial 438 too had been disturbed by the construction of an inhumation grave (No. 433).

At the B.A.I., all the material taken from cremation graves was soaked in water with a dash of hydrogen peroxide ($H_2O_2$) and subsequently passed through a sieve with a 1.5 mm mesh. The residues were dried and sorted into cremation material (burnt bone and charcoal), grave goods, and unburnt fragments of animal bone. The charcoal was separated from the cremated bone by means of flotation. The voluminous material from the hustum grave was sorted by students of the Archaeological Institute of the Vrije Universiteit Amsterdam in the course of a seminar.

With cremation features of all types, the investigated material (table 2) is only part of what survived in the soil. It has already been noted that material from the top of the features failed to be collected because the feature was not yet evident. Further losses occurred in the rinsing and sieving, because particles with a diameter less than 1.5 mm passed through the sieve and some of the charcoal fell apart under the jet of water.

3.1.2. Method of research on the human cremations

The possibilities for research on cremated remains depend on the degree of fragmentation of the material.
This is dependent both on the various steps in the funerary ritual and on post-depositional processes. To gain an impression of the degree of fragmentation, the material is sifted on two sieves to separate out three fractions: with diameters over 10 mm, between 10 and 3 mm and less than 3 mm. The weight ratio between the first two fractions provides an index for the degree of fragmentation.

The fragments from the class greater than 10 mm are separated into six categories: neurocranium, viscerocranium, axial skeleton, diaphyses of long bones, epiphyses of the long bones and undeterminable. Then weight, colour and average size are determined. With these data it can be judged whether a particular category is underrepresented or completely absent, while the colour and fragmentation patterns are indications of the temperature of the fire.

The epiphyses, dental elements and skull sutures can provide clues to the age of the cremated body. Fragments of the pelvis and the skull may allow sex determination of the individual. The criteria for age and sex determination follow those of the Workshop of European Anthropologists (WEA 1980).

3.1.3. The cremation features

The urned burials
An 'urned burial' here means an earthenware vessel containing remains of a cremated human body and possibly grave goods and other remains of the pyre, such as charcoal and burnt clay (fig. 16). The pyres of these urned burials may have been located within the excavated part of the cemetery (see under Ash stains, section 3.1.3), in the unexcavated part of the cemetery or outside the cemetery. We could imagine that there was one cremation site used by all, or that there were several of such places (Sigvaldus, 1994). After the cremation, the dead person's ashes, burnt grave goods and charcoal were gathered into an urn, which subsequently was interred at the bottom of a narrow shaft in the cemetery.

Of the 21 urns, six were intact (those from graves C, 63, 140, 267, 438 and 583). Of six, only the rim was damaged (those from graves 14, 131, 133, 356, 372 and 421). In four cases all that remained was a base with a cremation (graves 31, 78, 227 (two bases!) and 376). Five urns were completely shattered (graves 66, 168, 409, 515 and 521). Only three damaged urns were found in the upper levels (level 3: grave 14; level 4: graves 66

Fig. 16. Oosterbeintum. Urned burial 267 in situ. Scale in cm. Photograph by G. Delger, V.A.R.U.G.
The early medieval cemetery of Oosterbeintum (Friesland)

Temminck's stint

Presumably all were individual cremations. However, no bumt (with 75 ml of charcoal) was observed among the sherds. Some of the ums contained bumt clay from the base of the pyre. The sex of six of the adults could be determined. The sex of four, the age could not be determined on the basis of the pelvis and the pars petrosa of the skull. These were five women and one man (tables 2 and 5). There were no umed cremations (calidris minuta or C. temminckii) for such a pyre. Experiments have shown that a pyre of neatly stacked logs produces the most efficient use of firewood (Sigvallius, 1994). There are anthropological parallels for such a pyre (Wahl & Wahl, 1991). The wide colour variation of the cremated remains (see 3.1.7) is indicative of less complete combustion than in the other cremation burials. The great amount of charcoal (see 3.1.6) points in the same direction. Presumably the pyre collapsed into the pit prematurely, halting the process of incineration.

Two ums are made of urned burials. The two urns are of hand-made, undecorated earthenware (table 3). Pottery was also found in the bustum grave (a small Anglo-Saxon pot) and in Brandgruben 183 (shards of a small pot) and 527 (shards of three small pots). The amount of burnt human bone in the ums varies between 4 and 1224 g with an average of 286.3 g (table 8). Urn 66 contained only 4 g of burnt bone, but this grave was badly disturbed. Only part of the urn was recovered. Urn 438 too contained just 4 g of burnt bone, but this was a child's cremation.

The amount of charcoal in and around the urns ranged between 0 and 492 ml (table 2). Charcoal was absent from urns 133 and 515 and possibly from urns 376 and C. Ten of the 21 urns contained very little charcoal (less than 1 ml, table 2). This presumably means that the ashes for these urned burials were collected with as little charcoal as possible. The urned burials 131, 267, and 421 contain quite a lot of charcoal: 83, 16 and 492 ml, respectively. However, most of this lay outside the urns. Here, charcoal from the pyre was thrown, or fell, into the shaft after the urn was deposited. This could mean that the pyre was quite close by. In the other graves with more than 1 ml of charcoal (grave 66 with 50 ml, 372 with 100 ml, 409 with 40 ml, and 438 with 75 ml of charcoal), the urn was so badly damaged that it could no longer be established whether the charcoal had been within or outside the urn. Some of the ums contained burnt clay from the base of the pyre.

Among the 21 urned cremations, fifteen were of adults and two of children. Of the four, the age could not be determined. The sex of six of the adults could be determined on the basis of the pelvis and the pars petrosa of the skull. These were five women and one man (tables 2 and 5). There were no urned cremations with evidence of more than one body (table 2). Presumably all were individual cremations.

A possible 22nd urned burial is represented by the large pot of Anglo-Saxon ware (No. 210) which was found shattered beside the child's grave 247. The delvers of this early-medieval child's grave hit upon the vessel and put the sherds to one side. However, no burnt bone or charcoal were observed among the sherds.

Grave goods in the urned burials were quite scanty (table 3). In the only man's grave just a fragment of hand-formed pottery turned up. In woman's grave 409 two clinchers and a blob of molten glass were found, in woman's grave 372 a small metal tube and a buckle. Grave 372 further contained a small pot, a ceramic spindle whorl and 13 burnt wing bones of the little or Temminck's stint (Calidris minuta or C. temminckii).

In the child's grave 438 a silver wire ring was found and an unburnt fragment of a small comb which must have been added after the cremation; and in the child's grave 583 three to five burnt knucklebones. Finds appeared in two graves of adults of unknown gender: two molten glass beads in grave 168 and probably a comb (unburnt) in grave 66. Grave 267, of an individual of unknown age, contained two buckles, an unidentified iron object and the remains of a possibly burnt comb (table 3; catalogue). The grave goods suggest that grave 168 was that of a woman.

The addition of unburnt grave goods as in child's grave 438 (and possibly grave 66) is also known from Hogebeintum. Cremation grave 35 of that cemetery contained ten unburnt knucklebones, and urn 41 an unburnt comb and two obelisk-shaped pendants made of antler (Knol, 1987, 1988).

The bustum grave 160

This grave was a rectangular pit measuring 1.76 by 0.86 m, of which the bottommost 0.43 m survived (figs 17-20). The top part must have disappeared in the commercial quarrying. Therefore the original depth of the pit is unknown. In the uppermost level at which the pit was observed, level 2, only the russet-coloured sides were visible. The pit was then taken to be an inhumation grave. Ten cm deeper, a great deal of charcoal came to light. It became clear that the pit was connected with the cremation ritual. From this level down, the entire contents of the pit were sieved. Near the top, in the NW corner of the pit, a small vessel of Anglo-Saxon ware was found, which showed traces of secondary burning.

The sieving produced 5630 ml of charcoal, 1041 g of cremated human bone and 4300 g of burnt clay with small particles of burnt bone that could not be separated from it. The remains were those of an adult woman. The pit further contained a molten string of beads, a knob of a cruciform brooch, a bronze bangle, a clincher fragment and burnt bones of small birds. Among these are seven bones of at least two little or Temminck's stints (Calidris minuta or C. temminckii) and two of dunlin (Calidris alpina). Six other fragments of burnt bird bones may belong to the same birds (see 4.3).

This feature is interpreted as the pit underlying a pyre, also referred to by the Latin name of bustum (Bechert, 1980; Werner, 1989). In this type of cremation the pyre was erected over a pit, which served to ensure good air supply (Wahl & Wahl, 1981). Figure 20 shows a reconstruction of such a pyre. Experiments have shown that a pyre of neatly stacked logs produces the most efficient use of firewood (Sigvallius, 1994). There are anthropological parallels for such a pyre (Wahl & Wahl, 1991). The wide colour variation of the cremated remains (see 3.1.7) is indicative of less complete combustion than in the other cremation burials. The great amount of charcoal (see 3.1.6) points in the same direction. Presumably the pyre collapsed into the pit prematurely, halting the process of incineration.
Table 3. Oosterbeintum. Survey of finds associated with cremations. Age of humans in years.

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</table>

**Urn graves of men**

63 Adult

140 Adult

372 Adult

409 <45-55

421 Adult

**Urn graves of women**

C Adult

14 Adult

31 Adult

66 c. 25

133 Adult

168 40

376 Adult

**Urn graves of adults of unknown sex**

13 35-40

31 Adult

66 c. 25

133 Adult

168 40

376 Adult

**Urn graves of children**

131 9-15

227 15-21

438 Child

583 c. 17

**Urn graves, sex and age unknown**

78 -

267 -

356 -

515 -

521 -

**Probable urn grave**

210 -

**Bustum grave of a woman**

160 Adult

**Brandgrubben - sex unknown (no grave goods in 97)**

5 Adult

183 0-3?

519 35

527 2-5

**Ash stain, sex unknown (only ash-stains with grave goods are listed)**

D -

70 -

75 Adult

76 -

146 -

193 Child?

195 -

269 -

317 2-4

388 -

399 -

496 2-4

528 Adult?

536 Child?

568 -
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Following the cremation, the pit was filled in with clay.

The fill of bustum grave 160 was found to contain six other animal bones apart from the burnt bird bones: three of sheep/goat, two of pig, one of sheep/goat or pig and two of the northern vole (Microtus oeconomus). These remains will have been accidentally exposed to the fire (chapter 4.9).

Brandgruben

Four features (Nos 5, 97, 519 and 527) containing burnt bone (between 34 and 320 g) and comparatively little charcoal (between 1 and 55 ml) are interpreted as Brandgruben, buried cremations without an urn (table 2). Feature 183 with 95 ml of charcoal and 2 g of burnt bone is also believed to be a Brandgrube, despite the slight amount of bone. The remains were placed in a shaft without an urn. The ashes may have been buried in a container of perishable material (linen, leather, wood), but alternatively they may have been cast into the shaft. Graves 5 and 519 contained cremations of adults. Grave 527 was that of a child 2 to 5 years of age; grave 183 that of an infant less than 3 years old (table 2). Brandgrube 97 contained no human burnt bone and hence was not a grave proper. Apart from charcoal and burnt clay, it was found to contain eleven burnt bones of teal (Anas crecca), 40 burnt bone fragments of a sheep or goat, and 242 burnt mammalian bone fragments, possibly of the same animal.

Brandgrube 5 contained the remains of a burnt comb, a buckle, a pair of tweezers, remains of four nails and an unidentified iron object. Brandgrube 183 contained a secondarily burnt cup of wheel-thrown pottery, an angle brace and a fragment of a nail or clincher. Brandgrube 519 held the remains of a knife, a burnt comb fragment, and a small piece of iron. In Brandgrube 527 were found a ceramic spindle whorl, remains of a small, burnt, wheel-thrown pot, a base sherd, and a very fragmented, small pot of lightly fired ware (table 3). This last-named pot was too small to contain the entire contents of the grave (burnt human bone, charcoal and pottery), and hence is unlikely to have been an urn.
### Table 4. Oosterbeintum. Survey of stray metal and glass finds that probably originate from graves in the cemetery. For specification of the various items see the legend to table 3.

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**Ash stains**

All in all, 71 traces of the cremation ritual were described in the field as 'ash stains' (figs 21-22). These are patches of varying sizes, containing slight amounts of cremation material (burnt bone, charcoal and/or burnt clay). The ash stains 645 to 655 received their field number only during the working-out phase. Of the 71 ash stains, 57 were sampled. One of the samples erroneously was given an incomplete find number (3xx), and was not recorded in the field drawing. The feature from which sample 3xx derives is among Nos 645-655 in the field drawing. Of 15 features (32, 126,
Fig. 17. Oosterbeintum, *bustum* grave 160. View of the pit beneath the pyre (160) in Level 4, seen from the north. Bottom right: the Anglo-Saxon pot. Top right: the dwarf's grave 273 transects pit 160. Photograph by G. Delger, V.A.R.U.G.

Fig. 18. Oosterbeintum, *bustum* grave 160. Level 7 viewed from the southwest: horizontal and vertical section of the bottom part of the pit belonging to *bustum* grave 160. Photograph by G. Delger, V.A.R.U.G.
The early medieval cemetery of Oosterbeintum (Friesland)

Fig. 19. Oosterbeintum, bustum grave 160. Perspective drawing of the pit beneath the pyre. On its south side, the pit was transected by grave 273 and on its east side by the much younger circular ditch. In its northwest corner, the pit contained a small pot of Anglo-Saxon ware. The contents of the pit were sieved layer by layer. Drawing by M. Weijns, V.A.R.U.G.

Fig. 20. Oosterbeintum, bustum grave 160. Reconstruction of the pyre above the pit with the body awaiting cremation. Drawing by J.M. Smit, V.A.R.U.G.

Fig. 21. Oosterbeintum. Ash stain 193, seen from above. Photograph by G. Delger, V.A.R.U.G.

132, 437, 518 and ten from the series 645-655) no material could be sampled owing to bad weather conditions (table 2). The amount of cremated human bone ranges from 0 to 49 g. A total of 40 ash stains each contained less than 2 g of burnt human bone. The amount of charcoal from the sampled ash stains ranges from 0 to 260 ml (tables 2 and 10).

The interpretation of these ash stains is not obvious. The slight amount of human cremation in most of them makes it unlikely that these represent burials of cremated bodies. Still, this might be the case with ash stain D, which contained 49 g of burnt bone of a person of unknown age, or with ash stain 229 containing 38 g of burnt bone of a child. These might therefore be Brandgruben. Other ash stains with burnt bone of children (table 2) might also be Brandgruben, but there is no certainty about this. The larger ash stains could in fact have been indistinct bustum graves. In ash stains 317 and 496, fragments of what may have been Anglo-Saxon pottery were encountered, and in ash stain 528 the base of an urn (table 3). Possibly these were severely disturbed urned burials. But for most ash stains this can be ruled out.

A possible explanation for these ash stains is that they are the bases of postholes for structures supporting the pyres. Some pyre remains (burnt bone, charcoal, burnt clay, grave goods) fell into the holes and thus created ash stains. Groups of four or six postholes with a few pyre remains (cremated bone, charcoal) in early-medieval cemeteries are often interpreted as the uprights of four- to six-post frames (Hässler, 1983: pp. 18-50; Bärefänger, 1988: pp. 109-113; van Vilsteren, 1989; Feindt & Fischer, 1994: pp. 31-34). If pyre frames were constantly being erected in the same small area, then the form of the individual pyres will be difficult to reconstruct. Therefore also unconnected patches with a little cremation material (not part of a distinct four- or six-post structure) are regarded as postholes of pyre frames (Schön, 1988: p. 193). There are anthropological parallels of pyres supported by posts set into the ground (Wahl & Wahl, 1983). This may also have been the case at Oosterbeintum. In clay soils, postholes are virtually indistinguishable. The only thing that would remain of such pyres would be the ash stains. If at Oosterbeintum we assume simple four-post structures, then the 71 ash stains may represent at least 18 (71 divided by 4) pyres.

Finds supporting the assumption that the ash stains represent the sites of pyres are the nails that were found in ash stains 70, 75, 76, 146 and in the disturbed cremation graves or ash stains Nos 295, 410, 420 and 460. Ten nails that were stray finds in the terp may derive from disturbed ash stains. Nails are known also from urns 409, 421 and 515, bustum grave 160 and Brandgruben 5 and 183. These nails either were used in building the frames or were present in the demolition wood or driftwood used as fuel (see 4.2).

In the case of 22 ash stains, a certain or probable age of the body could be established (tables 2 and 5). Sixteen ash stains contained bones of children or what presumably were children. Six contained adult bone material. In none of the ash stains was there evidence of more than one body. The certain age determinations were based upon the emergence and wear of dental elements and on the epiphyses; the presumed children were identified on the basis of the general condition of
the skeleton: the bones of children are more porous and delicate than those of adults. If we assume four-post frames, then these 22 ash stains represent four to sixteen cremations of children and two to six of adults (table 6).

From the distribution of the ash stains with children's remains we can identify the sites of at least two pyres for children. These are the ash stains 197, 198, 199 and 317 with the remains of a young child (presumably under 3 years of age (3x) and 3 years ± 1 year); and ash stains 582 and 496, also with the remains of a young child (aged 2 years ± 8 months and 3 years ± 1 year) (fig. 23). Clear-cut clusters of ash stains with remains of cremated adults were not observed (fig. 24). There are two reasons why individual pyres are difficult to identify from the distribution of the ash stains. On the one hand, the pyres were built time and again in virtually the same spots. On the other hand, much material has been lost through decay.

Grave goods were very rare in the ash stains, presumably because they were collected to be put in the actual graves (table 3). Ash stain 193, presumably with the remains of a child, contained a fragment of a brooch; ash stain 568 (body of unknown age), a bronze shoe buckle. In the presumed child's grave 536 a fragment of a bronze object came to light; in ash stain 388 (child), a drop of molten bronze. Ash stain 269 (age unknown) revealed a fragment of a burnt comb. Ash stain 399 (age unknown) held one or two molten beads, and ash stain D a ceramic spindle whorl with traces of burning. On the basis of the grave goods, ash stains 193, 399 and D are likely to relate to women (see 3.2.6). In ash stain 76 lay an unburnt piece of waste antler. This was probably unconnected with the cremation.

Disturbed burials or ash stains
Pyre remains, consisting of cremated bone and/or
### Table 5. Oosterbeintum. The distribution of the anthropological age of the cremated bodies. The remains of a child of 0-2 years with an adult in sample 460 and an adult with a child of 0-3 years in sample 100A, both disturbed traces of cremation, raise the total to 117 individuals in the 115 features of table 2 with human remains.

<table>
<thead>
<tr>
<th>Age</th>
<th>(Probable) urn</th>
<th>Bostum grave</th>
<th>Brandgrube</th>
<th>Ash stain</th>
<th>Disturbed trace of cremation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speculative 0-3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>Speculative 1-5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Speculative child</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Presumed child</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>0-2 months</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>0-1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>0-3</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>2-4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>2-5</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>4-8</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>3-12</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>9-15</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Child</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Total children</td>
<td>2</td>
<td>-</td>
<td>2</td>
<td>16</td>
<td>3</td>
<td>23</td>
</tr>
<tr>
<td>±17</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>15-21</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>18-30</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>30-40</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>±40</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>&gt;45-55</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Adult &lt;2 g</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Adult &gt;2 g</td>
<td>9</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td>Total adult</td>
<td>15</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>4</td>
<td>28</td>
</tr>
<tr>
<td>Indet. &lt;2 g</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>28</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>Indet. &gt;2 g</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>No sample or no cremation in the feature</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>17</td>
<td>6</td>
<td>23</td>
</tr>
<tr>
<td>Total indet.</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>49</td>
<td>12</td>
<td>65</td>
</tr>
<tr>
<td>Empty</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>1</td>
<td>4</td>
<td>71</td>
<td>19</td>
<td>117</td>
</tr>
</tbody>
</table>

### Table 6. Oosterbeintum. Cremations. Numbers of children and adults in distinct cremation burials (urns, bostum grave and Brandgruben) and in ash stains (presumably pyre traces). The minimum number of individuals represented by the ash stains is the number of ash stains divided by four (pyre frame posts), rounded up to an integer. The maximum number of individuals equals the number of ash stains.

<table>
<thead>
<tr>
<th>Crem. burials</th>
<th>Ash stains</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assuming the minimum number of individuals in the ash stains:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Adult</td>
<td>18</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>6</td>
</tr>
<tr>
<td>p=0.0384 (Fisher exact probability test): difference significant.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assuming the maximum number of individuals in the ash stains:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>Adult</td>
<td>18</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>$\chi^2=11.092$ (df=1); p smaller than 0.005: difference significant.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Fig. 23. Oosterbeintum. The distribution of the ash stains with remains of cremated children. The location of Nos 159 and 3cx was not recorded. Drawing by G. Delger, V.A.R.U.G.
Fig. 24. Oosterbeinum. The distribution of the ash stains with remains of cremated adults. The inhumation graves with disturbed cremations are shaded. Drawing by G. Delger, V A R U G.
charcoal, in some cases with burnt clay or burnt grave goods, turned up in 15 human inhumation graves and two animal graves (tables 2 and 3). In the delving of these inhumation graves, an urned burial, a Brandgrube or an ash stain was cut (or more than one of these); severely disturbed or dispersed, it was incorporated in the fill of the inhumation grave. What originally were urned burials, Brandgruben or ash stains then become hard to distinguish. Grave 100 contained wheel-thrown pottery, and in grave 353 some hand-made pottery came to light (table 3). These types of pottery both occur as urns in the cemetery: these sherds may be the remnants of disturbed urned burials.

The amount of cremated bone in the disturbed cremation features varied from 0 to 87 g, the amount of charcoal from 0 to 490 ml (table 2). In five of the fifteen cases of cremation remains mixed into inhumation burials, an age determination of the cremated bodies was possible. Two inhumation graves contained the cremated remains of an adult, and one those of a cremated baby. The two others (Nos 100 and 460) each contained remains of an adult and a child (table 2). Double cremations or double burials of cremated remains have not been encountered among the urned burials, the Brandgruben or the bustum grave (table 2). The cremated adults and children from the inhumation graves 100 and 460 may derive from double cremations; however, it seems more likely that graves 100 and 460 each cut through two cremations.

Five of the 17 disturbed cremations in inhumation graves were associated with burnt grave goods (table 3). The disturbed cremation remains in grave 100 (probably an urned burial) included a fragment of a small knife, a brooch and a molten glass bead. The disturbed cremation in grave 460 was accompanied by a burnt Stückarmfibel. With the disturbed cremation remains in inhumation grave 295 a fragment of a brooch was found. This disturbed cremation further contained a large nail; grave 460 a nail and a small iron buckle. Another nail and buckle lay in grave 420. Grave 410 contained two nails. Fragments of (molten) metal turned up in graves 100, 295 and 460 (table 3). Possibly the cremated bodies in graves 100, 295 and 460 were of women (in the case of graves 100 and 460 this could apply equally to the adult or the child) (see 3.1.7).

Items similar to those in the inhumation and cremation graves were found scattered throughout the excavation. These are brooch fragments, beads, a glass cup, small knives, iron plaques, nails and drops of molten bronze (table 4). Some of them show traces of burning. The majority of these objects will derive from disturbed cremation burials and ash stains. The unburnt specimens may come from disturbed inhumation graves.

### 3.1.4. The age distribution of the cremated individuals

The 116 cremation features provide evidence of 11 to 23 children’s cremations and 24 to 28 of adults (table 7). The difference between the minimum and maximum numbers of individuals is caused by the estimated number of persons represented in the ash stains (see 3.1.3, Ash stains). Among the 23 traces of children there are 16 of children under 5 years of age. Two features (the disturbed burials or ash stains in graves 100 and 460) each contained evidence of two individuals, an adult and a child. For 66 of the cremation features, no age determination of the cremated individual is available. This does not take into account the empty possible urn 210 and Brandgrube 97 with only animal material. Among these 66 features, there are only 12 for which an age determination could have been possible, since they each contained more than 2 g of burnt bone. From 31 features less than 2 g of burnt human bone was collected, 8 were devoid of burnt bone, and 15 were not sampled (tables 2 and 5).

Four children were found in distinct cremation burials (with or without urns) and four to sixteen in what probably are pyre remains (ash stains). For the adults, these figures are eighteen and two to six, respectively.

---

Table 7. Oosterbeintum. Numbers of children and adults in inhumations and cremation traces. For the difference between maximum and minimum number of cremations, see table 6.

<table>
<thead>
<tr>
<th></th>
<th>Inhumations</th>
<th>Cremations</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assuming the minimum number of individuals in the ash stains</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child</td>
<td>8</td>
<td>11</td>
<td>19</td>
</tr>
<tr>
<td>Adult</td>
<td>38</td>
<td>24</td>
<td>62</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>46</strong></td>
<td><strong>35</strong></td>
<td><strong>81</strong></td>
</tr>
</tbody>
</table>

$\chi^2=1.470 \text{ (df}=1)\text{}; p \text{ greater than } 0.15: \text{ difference not significant.}$

<table>
<thead>
<tr>
<th></th>
<th>Inhumations</th>
<th>Cremations</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assuming the maximum number of individuals in the ash stains</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child</td>
<td>8</td>
<td>23</td>
<td>31</td>
</tr>
<tr>
<td>Adult</td>
<td>38</td>
<td>28</td>
<td>66</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>46</strong></td>
<td><strong>51</strong></td>
<td><strong>97</strong></td>
</tr>
</tbody>
</table>

$\chi^2=7.312 \text{ (df}=1); p \text{ smaller than } 0.01: \text{ difference significant.}$
Table 8. The average weight of the human remains in the various cremation features. The traces without a sample and the disturbed traces in inhumation graves are not included.

<table>
<thead>
<tr>
<th></th>
<th>All ages combined</th>
<th>Adult only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( \bar{x} )</td>
<td>( n )</td>
</tr>
<tr>
<td>Urns</td>
<td>286.3</td>
<td>21</td>
</tr>
<tr>
<td>Bustum grave</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brandgraben</td>
<td>386.3</td>
<td>4</td>
</tr>
<tr>
<td>Ash stains</td>
<td>4</td>
<td>56</td>
</tr>
<tr>
<td>All traces combined</td>
<td>107.6</td>
<td>82</td>
</tr>
</tbody>
</table>

Table 9. Oosterbeintum. Distribution of the cremation features over the periods of use of the excavated part of the cemetery, on the basis of radiocarbon dates and grave goods.

<table>
<thead>
<tr>
<th>Dates</th>
<th>Urns</th>
<th>Probable urn</th>
<th>Bustum</th>
<th>Brandgraben</th>
<th>Ash stain</th>
<th>Disturbed traces of cremation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narrow date</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>350-450</td>
<td>1</td>
<td>-</td>
<td></td>
<td>1</td>
<td>-</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>400-550</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>500-625</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>600-725</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>675-750</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Broad date</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>350-650</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>500-750</td>
<td>11</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>350-750</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>70</td>
<td>2</td>
<td>76</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>71</td>
<td>17</td>
<td>116</td>
</tr>
</tbody>
</table>

Children occur more frequently in what are assumed to be pyre remains than adults. The latter are more numerous in the cremation burials. Both differences are statistically significant for \( \alpha = 0.05 \) (table 6).

Children were cremated in the excavated part of the cemetery. Presumably their ashes were seldom gathered for burial. If some of the ash stains with children's remains were Brandgruben after all (see 3.1.3, Ash stains), then the proportion of children buried in the investigated part of the cemetery was greater. The ashes of children could also have been buried outside the excavated part of the cemetery, or at a higher level, where they became subject to decay or destruction. Presumably some of the adults whose ashes were buried in this part of the cemetery had been cremated elsewhere.

3.1.5. The dating of the cremation burials

On the basis of ten radiocarbon dates (from seven urned burials and three Brandgruben, table 1; fig. 25), the pottery and the grave goods (chapter 4), a more or less close dating was obtained for 21 of the 22 urned burials, the bustum grave, three of the four Brandgruben with human remains, one of the 71 ash stains and 16 of the 17 disturbed ash stains (table 9). The datings point to the 5th, 6th, 7th and possibly early 8th centuries. In comparison with the other features, a comparatively large number of the disturbed ash stains could be dated. This is because the inhumation graves whose construction disturbed the ash stains, are better datable than the cremation features (see 3.2.2). Many disturbed cremation remains in this way obtained an ante quem date.

Three cremation features in the cemetery contained grave goods dating from the 5th or possibly the late 4th century. These are the broken urn from grave 66, a secondarily burnt, small bowl of wheel-thrown pottery of Orsoy type in Brandgrube 183 and a Stützarmfibel with the disturbed cremation burial in grave 460. This means that the earliest cremation burials in the excavated part of the cemetery took place in the early 5th century or even the late 4th century.

The heyday of cremation appears to have been in the 5th century. Presumably this is only apparent. The disturbed traces especially are likely to stem from the 5th century. These are better dated than the other cremation features (see above), while their ante quem dating puts them among the older features. In the 6th century there seem to have been relatively fewer
cremations (table 9). The difference however is not great. The many approximately dated and undated graves necessitate caution.

3.1.6. The firewood

Research possibilities and limitations

Although the landscape around Oosterbeintum was exceedingly poor in trees and presumably unwooded over large stretches, the early medieval funerary rite required a considerable amount of wood. This goes both for cremation and for inhumation (see 3.2.5). This raises various questions: what types of wood were used for the cremation rite; were particular types of firewood preferred, and where did the wood come from? To what extent was freshly felled wood, stored wood, structural timber or waste wood used? To find answers to these questions, the sampled charcoal was identified as to wood species, and various dendrological traits and use features were recorded.

The material, charcoal, does impose some limitations on the investigation. In the first place, little is known about what aspects of the early-medieval funerary rite required the use of wood. In the case of cremations, the charcoal only represents types of wood destined for the fire: firewood, possibly a cremation platform and any wooden grave goods. Besides, such remains have not been preserved separately. Nor do we know in what way, following the cremation, the burnt bone remains and the remaining charcoal lumps were gathered and deposited in an urn or pit. Presumably, only a minority of charcoal lumps were preserved. Secondly, wood will survive burning only to a limited degree. In fact, a truly efficient cremation fire will leave no charcoal but ashes, which can no longer be identified. We must reckon that many cremations produced nothing but ashes. Thirdly, wood species differ in their resistance to burning. Softwoods such as birch, alder, hazel, willow and poplar will more easily be completely consumed than hardwoods such as oak and pine. Therefore these latter species are likely to be overrepresented in the lists of identified species. Branchwood and chips will more
easily burn away than thick logs. This too will affect the identification results. Fourthly, it is found that in carbonization, part of the identifying characteristics of wood are lost, so that some wood types soon become difficult to identify or can no longer be distinguished from others - such as alder/birch or willow/poplar. On the other hand, wood from e.g. oak, pine and ash can often be identified even in severely burnt condition. Despite these limitations, it is still possible to study the considerable wood consumption associated with the early medieval funerary rite.

Presumably, most of the wood for cremations came from the undiked clay landscape that surrounded Oosterbeintum in the 5th-10th centuries. The use of wood will reflect to some degree the tree vegetation of the area. This will be more extensively discussed below. Part of the wood may have been supplied over a longer distance, e.g. from the Pleistocene sandy ridges of Dantumadeel, some 10-15 km to the southeast, in as far as these were not yet overgrown with peat. Nor can the use of imported wood be ruled out.

Charcoal from 39 cremation features was investigated: 59 samples in all (table 10). For each sample the total volume of charcoal was determined, the volume per identified wood type and of the residue, all expressed in millilitres (ml). The data were arranged by grave. Some graves and other features provided more than one sample, from different spots in the feature, e.g. in and around the urn, and from different layers and locations in the bustum grave. The table shows the archaeological context of the samples. Of some graves a fairly close dating was possible, based on the type of urn. In this way, three phases have been distinguished: early (c. AD 400-525), middle (c. AD 500-625), and late (c. AD 600-750).

The charcoal in the samples comprised chunks, small pieces and dust. The total volume per sample varied greatly, as did the volumes per identified wood species. For this reason, the identified amounts are not given in percentages, since that might create a misleading picture. Small samples of a few ml have far less informative value than larger samples. The smallest crumbs and the dust were not identified because this usually proves futile. The unidentified part of the sample is mentioned in the table under the heading of 'Residue' (table 10).

The identified wood species
In the 39 analysed cremation features, 13 wood species were identified (tables 10 and 11). Alnus (alder) and Quercus (oak) are the most voluminous by far, followed by Fraxinus (ash) and Betula (birch). The other wood types are present in fairly small amounts. In frequency too, i.e. the number of graves in which a type of wood was encountered (a maximum score of 39), oak and alder are found to head the list, followed by ash and birch. Most of the features contained more than one type of wood. Eight contained a single species, in most cases oak. In 16 features with various wood species there was one dominant type; this mostly was alder (tables 11 and 12).

The alder was an important but certainly not the only supplier of firewood for the cremations. Oak is also present in many features. However, the latter, being harder, is most probably overrepresented. In a few cases, Populus (poplar) was used as firewood, given its low frequency in relation to the recorded volume of charcoal.

Not every type of wood represents a single tree species; for instance, with Quercus charcoal, the distinction between pedunculate and sessile oak cannot be made. Salix comprises a great number of willow species. The genera Ulmus, Acer, Alnus, Betula, Sambucus and Populus (elm, maple, alder, birch, elder and poplar) each cover several species. These are difficult to tell apart by the wood alone, and charring renders this impossible. In the cases of Euonymus, Fagus, Fraxinus, Corylus and Pinus (spindle tree, beech, ash, hazel and pine) we are dealing with a single species.

Acer campestre-type, common maple-type. Originally a species of the more fertile soils, it may be quite common locally on clayey soils. 'Acer spec.' suggests that we might also be dealing with sycamore maple, Acer pseudoplatanus. However, this tree was probably not native to the Netherlands. Therefore it seems unlikely that the charcoal found here should be of sycamore maple rather than common maple.

Alnus, alder. Very common tree of damp to wet sites, which certainly occurred in many places in the clay region, but also on marshland. The wood which is not very durable, particularly in moist conditions, is only moderately useful for outdoor use, but in the Middle Ages it was used as timber and structural material. Besides, alder wood was used for utensils and as fuel from the Neolithic onwards.

Betula, birch. This tree will have been scarce in the wet salt-marsh, but in the settlements on the terpen and maybe also on the peat bogs and in abandoned fields on the Pleistocene soils it was probably quite common. The tree was hardly if at all used for timber and structural wood. Birch wood was probably used for utensils and furniture. The tree evidently also served as a provider of firewood.

Corylus, hazel. This tree presumably occurred only rarely on the clay soils of this region. Branches were used especially for wattle and for cask hoops.

Euonymus, spindle tree. Use of this shrub has been rarely if at all recorded, apart from a few small utensils. It occurs mainly in woodland and in hedgerows. The branches might have served for wattle, but possibly the spindle tree had also a ritual use.

Fagus, beech. The beech will have occurred rarely or not at all in the environs of Oosterbeintum. Its presence in the charcoal spectrum is probably attributable to a burnt utensil.
Table 10. Oosterbeintum. Results of analysis of charcoal from the cremation features with more than 5 ml of charcoal. Data for each separate sample and totalled for each cremation feature. Volumes in ml. Frequency: the number of features for which each type of wood has been demonstrated (total number of features = 39). 1. Quercus (oak); 2. Fagus (beech); 3. Ulmus (elm); 4. Acer sp. (maple type); 5. Acer campestre type (common maple type); 6. Fraxinus (ash); 7. Euonymus (spindle tree); 8. Alnus (alder); 9. Corylus (hazel); 10. Betula (birch); 11. Sambucus (elder); 12. Salix (willow); 13. Populus (poplar); 14. Pinus (pine); 15. Bark; 16. In cinders; 17. No wood; 18. Residue; E. Early; M. Middle; L. Late.

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Table 10 (continued).

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Total volume for each type of wood

| Total volume for each type of wood | 990 | 1.3 | 15 | 3.5 | 0.1 | 309.6 | 1 | 1207.6 |
| Frequency for each type of wood   | 31  | 1   | 1  | 3   | 1   | 16    | 1 | 31     |

Table 11. Oosterbeintum. Charcoal spectrum of the cremation burials. Single wood species: number of features with only the mentioned wood species. Predominant wood species: number of features in which the mentioned wood species is predominant.

<table>
<thead>
<tr>
<th>Wood Species</th>
<th>Volume (ml)</th>
<th>Frequency (max. score 39)</th>
<th>Single wood species</th>
<th>Predominant wood species</th>
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<td>Quercus</td>
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<td>Fagus</td>
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<td>Acer sp.</td>
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<td>Acer campestre type</td>
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<td>Fraxinus</td>
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<td>Enonunos</td>
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<td>Almus</td>
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<td>Corylus</td>
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<td>Betula</td>
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<td>Sambucus</td>
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*Fraxinus*, ash. This tree, often with a tall, straight trunk, mainly occurs on moist to wet, rich soils, undoubtedly also near Oosterbeintum. The tough wood is very suitable for timber, masts, long handles, etc. Apparently it was also used to a limited extent as firewood.

*Pinus*, pine. This conifer almost certainly did not occur in the clay region around Oosterbeintum. Its principal habitat in the early Middle Ages was on and close to peat bogs. Remains of pine charcoal found in cemeteries could derive from reused staves of (imported) pine wood casks. Yet the growth characteristics of the Oosterbeintum charcoal make it more likely that it originated in the peatland area.

*Populus*, poplar. This tree presumably occurred quite commonly on various moist to wet, young soils around Oosterbeintum. The wood is not very durable; it is rarely encountered in medieval archaeological contexts, although it was probably made into utensils of many kinds. Possibly waste from woodworking was used as firewood.

*Quercus*, oak. Because of its great durability and its good technical properties, oak is the principal wood species used for timber and many kinds of objects. The oak was fairly certainly cultivated, among other things for tree-trunk coffins (see 3.2.5). In the early Middle Ages, there will have been few oaks growing naturally in the environs of Oosterbeintum, although oak can...
The ear/y medieva/ cemetelY ofOosterbeintum (Fries/and) 28 1

grow on quite wet soils. Presumably a considerable part of
the oak wood we encounter was cultivated for various
purposes, including the building of structures that
featured in the cremation rite. Chips fairly certainly
served as firewood. The occurrence of clinchers and
nails among cremation remains probably indicates the
presence of wreckage among the firewood, which would
imply oak wood of uncertain provenance.

Salix, willow. The various native willow species
growing in moist to wet sites around Oosterbeintum,
were rarely if at all used for timber. The wood is not very
durable. Osier was mainly used for wickerwork, probably
even on a large scale. There is no evidence to suggest
that there were osier beds near Oosterbeintum or that
wickerwork was used in the cremation rite. Branch
wood of willow will burn rapidly, leaving very little
identifiable residue. For this reason it cannot be excluded
that willow wood was more extensively used than is
suggested by its minimal representation among the
charcoal.

Sambucus, elder. This is mostly Sambucus nigra, the
black elder, a shrub which no doubt was present in and
around Oosterbeintum. The wood is not very durable;
as firewood it was insignificant. The branches are
hollow, which makes for a variety of practical uses. In
the Middle Ages, elder wood was used for various small
utensils.

Ulmus, elm. Although the elm commonly occurs in
large parts of Europe, and without doubt was present
also on the clay soils in the Middle Ages, it is only rarely
found in archaeological contexts. This is also the case at
Oosterbeintum. The attractive, but not very durable
wood is easy to work, which makes it suitable for
furniture and numerous other uses. Here too, we may be
dealing with a burnt household item.

**Characteristics of the used wood**

In over half of the samples, charcoal remains with
wormholes were found, which means that infested
wood was used as fuel. This may have been stored
timber or demolition wood, but we cannot rule out that
even the living wood was affected. Evidence of
infestation was found especially in alder wood
(sometimes a great deal of it), birch wood (sometimes
a great deal of it), and to a lesser extent in wood of hazel,
poplar, ash and maple. Only in the case of alder and
birch are we most probably dealing with old wood,
stored or demolition wood, because here a few instances
of fungal hyphae were also observed. The oak charcoal
was virtually devoid of wormholes. Among these wood
types, oak is the most durable and the most resistant to
infestation.

There were no clear indications of weathering on the
firewood. Therefore it is impossible to tell to what
extent the seriously affected firewood might have
originated from, for instance, demolished houses. Still,
clinchers and nails in the cremation features point to
waste, wreckage or demolition wood (see 4.2). Quite a
lot of the charcoal was very poorly preserved: in those
cases it was impossible to see whether the wood showed
traces of weathering or infestation.

Generally, wood of fairly thick trees was used for the
cremations, with a diameter of 20 cm or more. Branch
wood was also used, of - among others - birch (**bustum**
grave 160, ash stain 611), alder (**bustum** grave 160,
**Brandgrube** 183) and ash (urned burial 438). Twisted,
Table 12. Oosterbeintum. The volume of charcoal samples, the number of wood species recorded, and the occurrence of features with only one wood species or predominant wood species.

<table>
<thead>
<tr>
<th>Feature (grave)</th>
<th>Volume (ml)</th>
<th>Number of wood species in the sample</th>
<th>Single wood species</th>
<th>Predominant wood species</th>
</tr>
</thead>
<tbody>
<tr>
<td>66</td>
<td>85</td>
<td>4</td>
<td></td>
<td><em>Alnus/Betula</em></td>
</tr>
<tr>
<td>131</td>
<td>83</td>
<td>3</td>
<td></td>
<td><em>Quercus/Fraxinus</em></td>
</tr>
<tr>
<td>267</td>
<td>16</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>372</td>
<td>100</td>
<td>3</td>
<td></td>
<td><em>Fraxinus</em></td>
</tr>
<tr>
<td>409</td>
<td>40</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>421</td>
<td>492</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>438</td>
<td>75</td>
<td>3</td>
<td></td>
<td><em>Alnus</em></td>
</tr>
<tr>
<td>160</td>
<td>5630</td>
<td>6</td>
<td></td>
<td><em>Quercus/Alnus</em></td>
</tr>
<tr>
<td>37</td>
<td>28</td>
<td>2</td>
<td></td>
<td><em>Alnus</em></td>
</tr>
<tr>
<td>183</td>
<td>95</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>519</td>
<td>50</td>
<td>4</td>
<td></td>
<td><em>Quercus</em></td>
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<td>55</td>
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</tr>
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<td>76</td>
<td>38</td>
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<td></td>
</tr>
<tr>
<td>159</td>
<td>70</td>
<td>2</td>
<td><em>Quercus</em></td>
<td></td>
</tr>
<tr>
<td>193</td>
<td>63</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>194</td>
<td>33</td>
<td>1</td>
<td><em>Alnus</em></td>
<td></td>
</tr>
<tr>
<td>195</td>
<td>111</td>
<td>3</td>
<td><em>Betula</em></td>
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</tr>
<tr>
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<td>45</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3xx</td>
<td>58</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>317</td>
<td>55</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>388</td>
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<td></td>
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<tr>
<td>396</td>
<td>110</td>
<td>3</td>
<td></td>
<td><em>Alnus</em></td>
</tr>
<tr>
<td>445</td>
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<td><em>Corylus</em></td>
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</tr>
<tr>
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<td>3</td>
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<td><em>Alnus</em></td>
</tr>
<tr>
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<td>155</td>
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<td><em>Quercus</em></td>
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<tr>
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</tr>
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<td>120</td>
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<td><em>Quercus</em></td>
<td></td>
</tr>
<tr>
<td>536</td>
<td>190</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>581</td>
<td>44</td>
<td>2</td>
<td></td>
<td><em>Alnus</em></td>
</tr>
<tr>
<td>611</td>
<td>18</td>
<td>2</td>
<td></td>
<td><em>Quercus/Alnus</em></td>
</tr>
<tr>
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<td>150</td>
<td>5</td>
<td></td>
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<td>340</td>
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<td></td>
<td><em>Alnus</em></td>
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<tr>
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</tr>
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<td></td>
<td><em>Alnus</em></td>
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<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>468</td>
<td>45</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>622</td>
<td>18</td>
<td>2</td>
<td></td>
<td></td>
</tr>
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<td>631</td>
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<tr>
<td>351</td>
<td>18</td>
<td>1</td>
<td><em>Quercus</em></td>
<td></td>
</tr>
</tbody>
</table>

Stunted birch was found in the disturbed cremation 353 (sample 293). The lumps of hazel charcoal from urned burial 421 (sample 367), ash stain 388 and disturbed cremation 445 also came from gnarled, stunted trees. Possibly this material all came from a single batch of firewood. This would imply that these cremations are contemporaneous. AD 575-700 was the dating arrived at for urned burial 421; features 388 and 445 are undated and would in that case have the same date. The features in which this hazel wood was found are fairly far apart. Given its growth form, the pine that was used for urned burial 438 (samples 433 and 438) is native, poorly grown wood. These are not remains of, for instance, staves, but more probably waste material from the settlement. Presumably, the elm wood from urned burial 421 (sample 367) also was local wood. The ash wood from urned burial 372 is from a well-developed and rapidly grown trunk.

The oak charcoal from disturbed cremation 100, ash stain 159, *bustum* grave 160, ash stain 580 (identical with ash stain 526), and from the silted-up pit 631, in view of its shape and growth pattern, probably derives from planking. None of these charcoal samples were from worm-eaten wood. Nor were any such traces observed in the oak charcoal from *Brand grube* 527 and from ash stains 526, 532 and 535. These charcoal pieces
The early medieval cemetery of Oosterbeintum (Friesland) detected the remains of planks. Plank remains from the grave 160 (Oosterbeintum) and from the vessel 61, where the use of planks is often noted. The analysis of the charcoal samples from these features is presented in Table 13.

### Table 13. Oosterbeintum. Wood species in the charcoal samples from the urns. Volumes in ml. M. Middle; L. Late.

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>131</td>
<td>131</td>
<td>40</td>
<td>5.5</td>
<td>1.3</td>
<td>4.3</td>
<td>.</td>
<td>.</td>
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<td>.</td>
<td>.</td>
<td>11.1</td>
<td>29</td>
<td>M/L</td>
</tr>
<tr>
<td>267</td>
<td>267</td>
<td>5</td>
<td>0.1</td>
<td>0.7</td>
<td>.</td>
<td>0.1</td>
<td>0.3</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>1.2</td>
<td>3.8</td>
<td>L</td>
</tr>
<tr>
<td>409</td>
<td>409</td>
<td>40</td>
<td>.</td>
<td>.</td>
<td>0.1</td>
<td>0.3</td>
<td>4</td>
<td>0.7</td>
<td>.</td>
<td>.</td>
<td>7.1</td>
<td>33</td>
<td>M</td>
</tr>
<tr>
<td>421</td>
<td>421</td>
<td>42</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>18</td>
<td>.</td>
<td>2</td>
<td>.</td>
<td>.</td>
<td>20</td>
<td>22</td>
<td>M/L</td>
</tr>
<tr>
<td>438</td>
<td>438</td>
<td>45</td>
<td>.</td>
<td>.</td>
<td>3</td>
<td>21</td>
<td>.</td>
<td>1</td>
<td>.</td>
<td>.</td>
<td>25</td>
<td>20</td>
<td>L</td>
</tr>
</tbody>
</table>

The bustum grave 160 contained a large quantity of charcoal and other cremation remains. The charcoal was sampled in several batches. The abundance of charcoal in this grave provides an opportunity for a more detailed study of the use of wood. The bustum grave was used only once. In one corner an Anglo-Saxon vessel was found (No. 61). The date of the bustum grave lies between AD 400 and 525, in the early phase of the cemetery (see 3.1.5).

The bustum pit was sampled at three levels: first at level 5/6, at level 6/7 and at the bottom (fig. 19). Three samples were taken from this last level: C, D and E. Sample D contained a minimal amount of charcoal. The cremation remains and the vessel (sample No. 61) were sampled in three parts, because initially this was thought to be a separate burial. The contents of the pot, the soil around the pot, and the soil among the bones of inhumation grave 273 which here cut into the bustum grave, were sampled separately. The pot was found not to represent a separate burial. The charcoal of the three samples from vessel 61 will ultimately derive from the bustum grave.

Although the differences in charcoal composition of the analysed samples are not extreme, the contents of the bustum grave are not homogeneous (table 10). Probably the charcoal ended up in the pit in distinct batches. Alnus and Quercus are common types of wood in all layers and samples. Betula is prominent in level 5/6 and sample C. Populus is prominent in sample C but less so in E. In the other samples these two wood types are scarcely present at all. Fraxinus is clearly evident in samples C and E; at higher levels this type of charcoal was almost absent. Corylus, be it in very low values, occurs only in the higher levels, especially the top. Here it is Quercus which is comparatively scarce.

The charcoal analysis of the bustum grave revealed that in the cremation rite various wood types were used together. Sample C, by far the largest sample, illustrates this most clearly. Given the concentrated occurrence of Fraxinus, Corylus, Betula and Populus, the bustum seems to represent not only a mixture of firewood, but also shows that distinct batches of these wood types were deposited on the pyre. This suggests that in the course of cremation, objects and/or structures were put on the fire. It is also possible that the pyre was built from layers of different wood types, and that as the burning pyre collapsed the layers slid down. The top layer would then have consisted mainly of alder and birchwood.
middle layer contained mainly oak. The bottom layer, finally, consisted of alder, oak and ash, and on one side (160°C) a great deal of birch and poplar. The samples from within and around vessel 61 are so small that their analysis provides no new evidence. The charcoal found around the pot (sample 61A) is similar to sample 160C from the bottom of the bustum pit.

The wood from the cremations at the cemetery of Hogebeintum

The charcoal spectrum from Oosterbeintum may be compared with that from the cemetery of Hogebeintum, about 3 km west of Oosterbeintum, which is also dated to the 5th-8th centuries. It also featured both cremation graves and inhumations in tree-trunk coffins. The cemetery was discovered in 1904 and 1905 during commercial soil-quarrying on the terp. The archaeological material was salvaged and the urns with their contents taken to the Fries Museum at Leeuwarden. Out of over 50 urns, 26 contain enough charcoal lumps to allow wood identification (table 14; Casparie, 1991).

Although table 14 for Hogebeintum is arranged in a similar way to table 10 for Oosterbeintum, and the results largely correspond, they are not immediately comparable. Of Hogebeintum only charcoal from urns was available; other features were not sampled in 1904/1905. Most urns from Hogebeintum contained more than one wood species; in most cases there were three types. The wood spectrum comprises seven species (table 15). Alnus clearly predominates on the points of 'charcoal volume', 'frequency' (24 of a maximum score of 26), 'predominant wood species' and 'single wood species'. Quercus and Fraxinus were regularly used, as they were at Oosterbeintum (table 12). The main difference between the two spectra is the comparatively high incidence of Betula at Oosterbeintum.

At Hogebeintum as at Oosterbeintum, Alnus evidently is the usual, but definitely not the only fuel in the cremation rite. The lower ratio of Quercus to Alnus at Hogebeintum may result from the lesser use of oak in cremations there. Yet it is not certain that this was indeed the case. It is tempting to attribute the comparatively frequent use of Betula at Oosterbeintum to the more frequent burning of birchwood household items there than on the larger terp of Hogebeintum. Presumably the sampling differences are the real reason for the higher score of birch at Oosterbeintum. The high incidence of Betula at Oosterbeintum is largely accounted for by the presence of birch charcoal in ash stains. Nonetheless, birchwood at Oosterbeintum must also have been used as firewood, given its values in bustum grave 160 and ash stains 166, 159+263 (table 10).

Part of the alder wood seems to have been old wood. The charcoal of Alnus contained many wormholes; some of it may derive from waste or demolition wood, as can also be said of Oosterbeintum's alder.

The provenance of the firewood

The charcoal spectra of Oosterbeintum and Hogebeintum (tables 11 and 15) are dominated by the wood types that are found especially in damp to wet landscapes and that grow well on clay soils: Alnus, Fraxinus, Ulmus, Salix, Populus and Sambucus. Quercus, Acer and Euonymus will also do well on such soils (see the heading, The identified wood species in this section). At Oosterbeintum these two groups, with 55.6 and 32.2% respectively, make up almost 88% of the total of 3093.3 ml of analysed charcoal. The picture at Hogebeintum is not significantly different. It is clear that the firewood for the pyres was mainly made up of wood types that grew well in the surroundings of Oosterbeintum and Hogebeintum. Therefore it is safe to say that most of the firewood was of local provenance: particularly from the young, Holocene clay soils.

Betula (10.6% of the analysed charcoal volume) and Corylus (somewhat over 1%) were far less common on clay soils like those around Oosterbeintum. Presumably, these trees mainly grew in the raised settlements or on the Pleistocene soils. Pinus is likely to have come from peaty soils, maybe close to the Pleistocene region, not very far from Oosterbeintum.

For the early medieval cemetery of Liebenau near Nienburg on the Weser (Germany), Feindt & Fischer (1994) come to the conclusion that the firewood used there was mainly of local provenance. This cemetery was used from c. AD 350 to 850. Although with over

Table 14. Hogebeintum. Charcoal spectrum of 26 cremation graves of the 5th/8th-century cemetery. Single wood species: number of features with only the mentioned wood species. Predominant wood species: number of features in which the mentioned wood species is predominant.

<table>
<thead>
<tr>
<th>Wood species</th>
<th>Volume (ml)</th>
<th>Frequency (max. 26)</th>
<th>Single wood species</th>
<th>Predominant wood species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quercus</td>
<td>116.0</td>
<td>16</td>
<td>.</td>
<td>1</td>
</tr>
<tr>
<td>Fraxinus</td>
<td>183.0</td>
<td>11</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Acer sp.</td>
<td>0.5</td>
<td>4</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>Malus type</td>
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<td>.</td>
<td>.</td>
</tr>
<tr>
<td>Alnus</td>
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<td>24</td>
<td>5</td>
<td>19</td>
</tr>
<tr>
<td>Betula</td>
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<td>.</td>
<td>.</td>
</tr>
<tr>
<td>Pinus</td>
<td>18.0</td>
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<td>.</td>
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</table>
Table 15. The wood species in the charcoal from the urns of Hogebeintum, Beetgum-Besseburen and Friens. Volumes in ml. Centuries AD in Roman figures. FM No. Inventory number of the Fries Museum.

<table>
<thead>
<tr>
<th>Grave No.</th>
<th>FM No.</th>
<th>Total</th>
<th>Quercus</th>
<th>Acer sp.</th>
<th>Malus</th>
<th>Fraxinus</th>
<th>Alnus</th>
<th>Beidata</th>
<th>Pinus</th>
<th>Residue</th>
<th>Urn type</th>
<th>Dating</th>
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<td></td>
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<td></td>
</tr>
<tr>
<td>2</td>
<td>28-158</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>70</td>
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<td>-</td>
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200 cremation and inhumation burials it was considerably larger than the excavated part of Oosterbeintum, it was quite comparable in many other respects. The firewood of Liebenau was gathered in nearby woodlands: open woodland of forest verges, coppices, hedgerows and thickets in the nearby river valley, as well as from the sand-drift area in which the cemetery itself was situated. Imported wood types were not found there.

On the basis of their charcoal and wood identifications, Feindt and Fischer were able to draw conclusions about the vegetation of the surrounding landscape and the land-use around the cemetery. Given the highly varied landscape around Liebenau, it is obvious that the wood spectrum differs considerably from that of Oosterbeintum.

The wood types found at Oosterbeintum and Hogebeintum and their composition offer no clues as to the nature, composition and extent of any stands of trees in the clay region. Moreover, part of the charcoal may well have come from utensils imported from further afield, and not derive from local wood at all. This at any rate applies to Fagus.

Elaborate palaeobotanical studies of the salt-marsh landscapes in the coastal zone of the northern Netherlands and Lower Saxony have been performed by, among others, Behre (1970; 1974; 1986; 1990), van Zeist (1974) and van Zeist et al. (1976). The still undiked, early medieval clay region near Oosterbeintum shares many features with those salt-marsh landscapes. These studies show a landscape dominated by halophytes. The salt tolerance of the plants is a basic feature of the vegetation. These authors believe that salinity is the principal reason for the presumed lack of tree growth in the not yet fully desalinated landscape. The wood use in the funerary rite, however, does suggest the nearby presence of wood stands, which at any rate provided the firewood.

The clay landscape near Oosterbeintum will have included spots that were already sufficiently desalinated and offered a home to stands of trees. Without doubt these were the better-drained and therefore more
desalinated soils, such as the marsh ridges and natural levees along the many creeks and gullies. Yet they still had damp to wet or maybe even waterlogged soils. These stands contained mainly alder and ash, with oak and elm in the somewhat drier spots. Maple, spindle tree and elder might also occur. The poplar probably was a pioneer species on young natural levees. The willow grew mainly on the wetter, poorly drained soils, but also within the settlements, as did the elder (table 11). This was mostly young wood, which grew well on the rich soils and could thus meet a large part of the wood requirement. No detailed study was made of where such soils would have occurred near Oosterbeintum, since the investigation focused on the cemetery. On the whole, the clay region lacked abundant tree growth, as was already remarked at the start of this paragraph. Real forest, as found on the Pleistocene uplands, was absent even after the clay soils became desalinated.

The proportion of branch wood in the charcoal is fairly small; at any rate quite a lot of the wood came from fairly thick trees with diameters of 20 cm or over. In view of the stated limitations of this charcoal study, no figures can be put on the proportions of branch to trunk wood in the cremation rite. Therefore it is impossible to tell whether coppicing was practised around Oosterbeintum.

Part of the firewood was reused wood, which may have been demolition material. This suggests that most timber too, particularly alder, ash and oak timber, was obtained in the vicinity. Another possible source of reused wood is the oakwood wreckage of ships of unknown provenance (see 4.2). Anyhow, the landscape cannot have provided an abundance of wood, so much has by now become clear. This is borne out by the use of sod walls for early medieval dwellings in the clay region of the northern Netherlands; for instance, at Torp near Den Helder (van Es, 1973), at Wijnaldum (Besteman, Bos & Heidinga, 1992: p. 53), at Foudgum (de Langen, 1992: pp. 173-186) on the Tuinsterwierden terpen near Leens (van Giffen, 1940) and at Heveskesklooster (Boersma, 1988). Obtaining enough wood for its various uses therefore must have been an important activity for the region’s inhabitants in those days. The use of a wide array of wood types in the cremation rite can be seen as reflecting the relative dearth of wood in the region.

However, it seems unlikely that the custom of cremating the dead was abandoned for lack of wood. After all, Oosterbeintum and Hogebeintum saw only a few cremations taking place each year (two on average, see chapter 7). Compared to the wood requirements for heating and cooking and other everyday use, the consumption of wood in the cremation rite will have been of minor significance. It is fairly certain that cremation could be practised without the availability of proper woodland. Still it is unclear how people provided for everyday wood requirements.

3.1.7. The cremation rite

The features of the cremation rite comprise 21 or 22 urned burials, five Brandgruben of which four contain human ashes and one only animal remains, a bustum grave and 71 ash stains, which may represent the supports of at least 18 pyres. Besides, 15 inhumation graves and two animal graves contain remains of disturbed cremation burials or pyre traces.

The number of bodies cremated or buried in the excavated part of the cemetery, insofar as remains have been recovered, is between 64, if all ash stains come from only 18 pyres, and 117, if the ash stains all derive from individual bodies (Nos 100 and 460 are counted twice: these contained remains both of an adult and a child). The removal of the top layer of the original terp in the early 20th century is likely to have destroyed traces of the cremation rite. There is evidence for 11 to 23 cremated children and 24 to 28 cremated adults (tables 5 and 7). Osteological investigation showed that there were at least one man and six women among the adults. Also there are eight cases of grave goods pointing to women. Archaeological evidence for men is lacking. The virtual absence of male-specific grave goods also in the inhumation graves makes men’s graves difficult to demonstrate (3.2.7). It is far from certain that men were less often cremated.

The urned and unurned burials contained an average of 286.3 and 386.3 g of human cremated bone, respectively. The bustum grave contained 1041 g of cremated human bone, and the ash stains an average of 4 g (table 8). Under optimum conditions the cremation of an adult woman will leave between 970 and 2630 g of ashes (on average, 1711 g; 226 female cremations) and of an adult man between 970 and 2630 g of ashes (on average, 1842 g; 167 male cremations) (Herrmann, 1976; Wahl, 1982: pp. 24-26). Hence only part of the cremated remains of each body were eventually buried.

On the whole, the ashes were very fragmented, especially the material from the Brandgruben, the ash stains and the disturbed cremations; the material from the urned burials somewhat less so. In several urns (63, 140 and 267) the protective effect of the urn was obvious. No bias was evident in the distribution of the human remains over the various parts of the skeleton. This indicates that the cremated remains were gathered indiscriminately. Possibly they were fragmented even further by crushing before being buried in the cemetery (Sigvallius, 1994).

The odd exception aside, the colour of the burnt human bone is a milky white, which is indicative of a pyre temperature of 650-700 °C. Parabolic heat cracks (Hitzerissen) were found in small numbers, which shows that a temperature of 800 °C was rarely attained. The evenness of the colour and fragmentation patterns point to a consistent cremation method throughout the cemetery. One exception is the bustum grave 160 whose cremated remains display a wide variation in colour. This is indicative of less complete combustion than in
The ear/y medie val cemetery of Oosterbeintum (Friesland)

The other cremated remains. The cause of this incomplete combustion is that the pyre collapsed into the pit before it was meant to.

The grave goods of the cremated dead were not very rich and consisted of dress accessories, tools and toys. The nails that were found in various cremation features may come from: the pyre structure itself or from waste wood, demolition timber or wreckage.

3.2. Inhuma tion

3.2.1. Introduction

The number of excavated inhumations is 47. These occupied 46 or 45 inhumation graves (table 16). Grave 485 certainly and grave 374 almost certainly contained two individuals. The other inhumation graves were single graves. Of the 47 bodies, 15 were intact (graves 241, 295, 374A, 398, 405, 410, 420, 433, 435, 451, 458, 460, 473, 605 and 624). Seventeen were slightly damaged, which means that part of the skull or part of a limb was lost or that the skeleton had been crushed flat (graves 60, 100, 247, 248, 273, 335, 342, 353, 362, 374B, 393, 402, 424, 428, 461, 570 and 606). Seven inhumations were seriously damaged, often by subsequent burials. In these burials (graves 192, 360, 422, 483, 485A, 485B and 501) major parts of limbs had been destroyed. Seven inhumations were very severely disturbed, to the extent that most of the skeleton was missing (graves B, 15, 98, 270, 299, 474 and 482). To

Fig. 26. Oosterbeintum, grave 474. The burial consists only of an upright skull facing north. Photograph by G. Delger, V.A.R.U.G.

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<th>Postu legs</th>
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<td>CR</td>
<td>S</td>
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<td>S,S</td>
<td>16-18</td>
<td>-</td>
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</table>
this last category can be added burial A, which was discovered in 1914 and whose skeletal remains were not recovered. In the disturbed burials, any grave goods may have been partly or entirely lost. Because of their poor state of conservation some grave goods could no longer be salvaged. The most severely disturbed burial was No. 474: only the skull survived, which owing to the disturbance had ended up in an upright position (fig. 26). In fact we may here be dealing with a separate skull burial.

As far as possible, several parameters were recorded for each skeleton burial: the orientation of the grave, the depth of the grave, the presence of a tree-trunk coffin or other casing for the body, the posture of the skeleton and a list of any preserved grave goods. Study of the skeletal remains provided evidence on the sex, the age, the stature and the pathology of the dead person. The grave goods in many cases provided a dating for the burial. Gender-specific grave goods could provide an archaeological gender determination, which could be compared with the anthropological sex determination. Correspondence or failure to correspond of these two gender determinations may indicate the extent to which certain grave goods are gender-specific, the reliability of the two determinations, or a difference between the biological sex and the social and psychological gender of the person. The grave goods may further offer clues about the social status of the dead person.

Three soil samples from grave pits, namely 295 (1.5 kg), 398 (find No. 394) (1.0 kg) and 485 A/485B (0.3 kg) and the contents of a small vessel (No. 401) from grave 420 (0.8 kg) were scanned for mites and other invertebrates. Since this was the first study of mites in a funerary context, it was a guess how many mite remains the samples might yield. Despite careful sampling and extraction, the number of mites in the samples proved disappointing. Only sample 485, taken from the fill of the double grave 485 A/485B, was found to contain identifiable remains of mites. Among the fourteen identified specimens, there were four species of moss mite (*Scheloribates laevigatus*, *Trichoribates novus*, *Liebstadia similis* and *Humorobates rostrolamellatus*). In sample No. 401, four further unidentifiable moss mites were encountered. None of these species are specific for burials. Thus the study of mites in grave pits failed to yield any indicators for burials. The fact that mites had been preserved in grave pits 401 and 485 A/485B means that this type of research is potentially useful. In future cemetery excavations, it would be advisable to take larger samples for this type of research, allowing more mite remains to be studied.

3.2.2. The dating of the inhumation burials

The dating of the skeleton graves is primarily based upon the chronology of the grave goods. For graves 424, 483 and 605 we have radiocarbon datings of the remains of tree-trunk coffins. The calibrated dates for graves 483 and 605 are in the 5th/6th century, while grave 424 dates from the 7th century (tables 16 and 17; fig. 27). From grave 605 there also is a radiocarbon date for a chip of hazel wood, which points to the 5th/6th century (table 1: 605B). In view of its dating, this chip could belong to grave 483, which overlies grave 605.

Thirty of the 47 skeleton graves contained grave goods that dated the burials (table 18 and catalogue). The grave goods are described in section 3.2.7. Their datings will be discussed in chapter 4. The inhumation graves contain no grave goods from the first half of the 5th century. Still, the radiocarbon dating of the tree-trunk coffin of grave 605 does largely fall within that period. The earliest grave goods are cruciform brooches of Midlum type (AD 475-525), the youngest grave goods are equal-armed brooches of the type van Bellingen 5.3 (AD 625-750). This evidence indicates that the period in which the cemetery was used for inhumations ran from about AD 450 to 750.

Transsections too provide clues about the age of the graves, especially if one of either is dated. Gravestones 360, 393 and 342 offer a good example. Grave 360, which is dated by the brooches it contains to the second half of the 5th or early 6th century, is cut by grave 393, which in turn is cut by the child’s grave 342. Graves 393 and 342 each contain a strap-shaped, equal-armed brooch, of a type that dates from between AD 625 and 750. The child’s grave 342 is cut by a pit in which the bases of two
Table 17. Oosterbeintum. The 47 inhumations arranged according to increasing depth relative to NAP. A body’s depth is roughly the average of that of head (H), pelvis (P), foot (F) or other (O). In the last column the date in years AD is given. Grave A (AD 450-525) was found in 1914, 4.5 m below surface level. The 1914 surface level relative to NAP is not known. Grave B (AD 450-750) was found in the ditch alongside the excavation (depth unknown).

<table>
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<th>F</th>
<th>O</th>
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urns were found with some cremated remains (grave 227). The urn bases typologically date the cremation burial to the first half of the 8th century at the latest. On the grounds of these datings and transections it may be assumed that grave 393 dates from the middle of the 7th century, grave 342 from the late 7th or early 8th century, and the cremation burial from the first half of the 8th century. Graves 393 and 342 will have been dug within a short space of time. Investigation of the transections produced two new datings and a closer determination of several other dates.

The catalogue presents the closest possible datings, based on radiocarbon dates, grave goods and transections. The transections are discussed in the catalogue. Nineteen graves have a fairly close dating, to within 75-150 years. Of these, nine fall in the period AD 400-550,
five within AD 500-625, four in the AD 600-725 period and one between AD 675 and 750. Five other graves belong to the ‘earlier’ (AD 450-650) and eight to the ‘later’ period of the cemetery (AD 500-750). Fifteen graves are altogether undatable. Their date is given as AD 400-750. Because of the small proportion of closely dated graves, the impression that the number of inhumations decreases through time is not reliable (tables 16, 17 and 19).

3.2.3. The orientation of the graves

The orientation of the grave, i.e. the point of the compass along which the body had been positioned, or the directions in which the head and the feet pointed, could be established for 39 of the 47 inhumation burials. The largest group, a total of 17 graves, lay with the head oriented between W and SSW. Eight bodies lay with their heads between E and NNE, six pointed between S and ESE, and four to directions between N and WNW. Graves in which the body axis lay between W-E and SSW-NNE totalled 25, and thus were more numerous than those with the body oriented between S-N and ESE-WNW, which were ten in all (table 20; fig. 28). In referring to the orientations of the graves, the direction of the head is always given first, followed by that of the feet.

Of the 39 inhumation burials with known orientations, 18 were dated to within 150 years (table 20). Thirteen dated from the 5th or 6th century (AD 400-500 and 500-625), and five dated from the 7th or 8th century (AD 600-725 or 675-750). Of the thirteen 5th/6th-century graves, twelve lay in directions between W-E and SSW-NNE; the other lay NNW-SSE. Of the five 7th/8th-century graves, two lay in directions between W-E and SSW-NNE and three between S-N and ESE-WNW. This difference in orientation of the body axis between the two periods is found to be statistically significant ($p = 0.0441; \alpha = 0.05$). In the 5th and 6th centuries, the orientations between W-E and SSW-NNE predominated. Most of these graves, eight, lay with the head in directions between W and SSW; the other four lay the other way around, with the head towards E and NNE. In the 7th and 8th centuries varying orientations occurred (table 20). One of the cremation features of the 5th/6th century fits in with the orientation of the inhumation graves of the same period, between W-E and SSW-NNE. This is the bustum grave 160, dating from AD 450-525, which was oriented SSW-NNE or NNE-SSW.

Other inhumation graves dated to within 150 years, contemporary with the cemetery of Oosterbeintum (AD 400-750) and with known orientations are very rare in the coastal part of the northern Netherlands. There are six from the cemetery of Hogebeintum (HB), three from the cemetery of Godlinze (GL) and two from the cemetery of Ezinge-De Bouwerd (EB). Four graves date from the 5th/6th century, one from the 6th/7th century, and six from the 7th/8th century. Two graves of the 5th/6th century lie SW-NE (HB 47 and HB 125), the other two lie S-N (HB 129 and HB 132). The 6th/7th-century grave lies S-N (HB 73). Five graves of the 7th/8th century lie S-N (HB 48, GL 50, GL 101, EB 8 and EB 15). The sixth grave of this period lies W-E (GL 78) (van Giffen, 1920: p. 69; Knol, 1993a: table 15). These orientations however were determined with less accuracy than those of the Oosterbeintum cemetery. The compass was divided into no more than eight sectors, while in the case of Oosterbeintum sixteen possible directions were distinguished. The preferred directions, between W-E and SSW-NNE, among 5th/6th-century graves at Oosterbeintum is not shared by the graves of Hogebeintum (at Godlinze and Ezinge-De Bouwerd no graves from this period were excavated). If the S-N graves of Hogebeintum were in fact SSW-NNE according to the Oosterbeintum division of the compass, this would imply some correspondence in orientation for the 5th/6th-century graves of Oosterbeintum and Hogebeintum. The occurrence of graves with varying orientations at Oosterbeintum in the 7th/8th century is paralleled by graves of the same period from Hogebeintum, Godlinze and Ezinge-De Bouwerd. Most of these have a S-N orientation.

For the period AD 400-750 as a whole, there seems to be a great deal of variation in the orientation of graves in the cemeteries of the northern Netherlands and neighbouring Ostfriesland (van Es, 1968: pp. 19-20; Knol, 1993a: pp. 169-176). Possibly, further research of closely dated graves will yet reveal regional or chronological regularities in the orientation of graves, as we see at Oosterbeintum.
Table 18. Oosterbeintum. Survey of finds in the inhumation graves. For specification of the various items see the legend to table 3. Age of humans in years.

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Osteologically and archaeologically male

Osteologically and archaeologically female

Osteologically male, archaeologically female

No osteological sex identification

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3.2.4. The position of the graves with respect to sea-level datum (NAP)

Since the original surface of the cemetery had been removed, it was impossible to ascertain the true depth of the burial pits. Therefore the depth of the graves with respect to sea-level datum (NAP) is given. Since in most graves the bottom of the grave pit could not be distinguished either, the elevations of the top of the skull, the upper edge of the pelvis and the feet were recorded (see category d in the catalogue). These points are in a more or less fixed relation to the bottom of the pit, although the type of casing for the body (tree-trunk coffin, mat, hide, cloth) will have affected the depth at which the skeletal remains were found.

The depths - with respect to NAP - of the skeletons and hence of the grave bottoms, were highly variable (see table 17 and the catalogue). The most low-lying skeleton lay at 0.80-0.90 m below NAP, the highest at c. 0.00-0.10 m below NAP. The highest point of the original surface will have been at least 0.50 m above the uppermost skeletons, and thus will have been more than 0.40-0.50 m above NAP. Table 21 separates the inhumation graves of the various periods into three depth classes (0.00-0.30 m, 0.30-0.60 m, and 0.60-0.90 m below NAP). It would appear that the deepest graves are all older ones. Yet there also is an undated deep

Table 19. Oosterbeintum. The distribution of the inhumations and traces of cremations over the various periods. The cremations are those used in table 9.

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<tr>
<th>Date AD</th>
<th>Number of inhumations</th>
<th>Number of cremations</th>
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<td>400-550</td>
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<td>500-625</td>
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<tr>
<td>600-725</td>
<td>3</td>
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</tr>
<tr>
<td>675-750</td>
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</tr>
<tr>
<td>350-650</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>500-750</td>
<td>13</td>
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Table 20. Oosterbeintum. Orientations of inhumation graves in the various periods. The direction first mentioned is of the head, followed by that of the feet.

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<td>AD 350-650 500-750 400-750 Total</td>
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<td>- 2 2 - 4</td>
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<td>SSW-NNE</td>
<td>1 - - - 2</td>
<td>- - 1 1 - 3</td>
</tr>
<tr>
<td>S-N</td>
<td>- - 1 - 1</td>
<td>- - 1 1 - 2</td>
</tr>
<tr>
<td>SSE-NNW</td>
<td>- - - - 1</td>
<td>- 2 - - 2</td>
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<td>SE-NW</td>
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<td>- - - - -</td>
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<tr>
<td>E-W</td>
<td>2 1 - - 3</td>
<td>- - 2 2 - 5</td>
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<tr>
<td>ENE-WSW</td>
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<td>- - - - -</td>
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<tr>
<td>NE-SW</td>
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<td>Total</td>
<td>8 5 4 1 18</td>
<td>4 7 10 21 39</td>
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<td>1 1 3 5 6</td>
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<tr>
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<td>5 8 15 28 47</td>
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Summary

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<th>400-625 600-750</th>
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<tr>
<td>W-E/SSW-NNE</td>
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<td>S-N/ESE-WNW</td>
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Table 21. Oosterbeintum. The inhumations classified according to date AD and to depth relative to NAP.

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<td>600-725</td>
<td>450-750</td>
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<td>Well datable</td>
<td>450-750</td>
<td>500-750</td>
<td>450-650</td>
<td>Total number</td>
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<tr>
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<td>335</td>
<td>501</td>
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<td>360</td>
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<td>483</td>
<td>474</td>
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</tr>
<tr>
<td></td>
<td>485 B</td>
<td>483</td>
<td>474</td>
<td>5</td>
</tr>
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<td>1</td>
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<tr>
<td></td>
<td>15</td>
<td>8</td>
<td>5</td>
<td>47</td>
</tr>
</tbody>
</table>

3.2.5. Tree-trunk coffins and other body casings

Eight inhumation graves revealed traces or probable traces of hollowed-out trunk coffins (table 22; fig. 30). Seven coffins contained adult individuals (two men and five women), the eighth held a subadult individual 16-18 years old. Remains of coffins were observed in none of the children’s graves. Whether coffins were indeed used more for women’s graves than for men’s is not certain because of their small number and poor state of preservation.

The conservation of the tree-trunk coffins of Oosterbeintum was poor. From grave 424 half a coffin base was recovered and remains of coffins were retrieved from graves 483 and 605. These three coffins were all found to be of oak, *Quercus*. Graves 60, 335, 428, 461 and 624 revealed wood remains of tree-trunk coffins or bark impressions in the clay or on metal, which are indicative of tree-trunk coffins. Sampling these traces was impossible. Those in graves 60, 428, 461 and 624 most probably were also of oak. The wood imprints on iron objects in grave 335 are too vague to allow identification. The oldest grave with bark impressions of a tree-trunk coffin is grave 60, which dates from the late 5th or early 6th century. Figure 25 shows the calibrated radiocarbon dates.

The grave with two individuals (No. 485) contained unidentified botanical material underneath the skeletons, possibly a mat of some kind. The bodies may have been wrapped in this material. This need not imply that the 36 other individuals were buried without any casing. Any coffins or shrouding will have completely decayed. In the middle of the cemetery, where the graves lay higher with respect to NAP, no coffin remains were uncovered. The greater elevation of the middle of the cemetery with respect to the water table probably meant that conditions here were less favourable to conservation
Fig. 29. Oosterbeintum. The depth of the inhumation graves below NAP. Drawing by G. Delger, V.A.R.U.G.
than at the south side of the cemetery.

Early medieval coffins made of oak trunks have been regularly found in the coastal part of the northern Netherlands. They are known from Aalzum, Dokkum, Ezinge-De Bouwerd, Groningen-Martinkerk, Hogebeintum, Lutjehuizen, Lutje Lollum, Marsum, Oosterwijwerd, Paddepoel IV and Wetzens (Knol, 1993a). Those from Hogebeintum (graves 12 and 48) and Groningen-Martinkerk have been studied dendrologically (Casparie, 1991). The tree-trunk coffins of Oosterbeintum and Hogebeintum can be dated to the 5th-8th centuries AD on the basis of radiocarbon datings and datable finds from these cemeteries. An oak coffin from the terp of Dokkum, 8 km ESE of Oosterbeintum, can be dated to between c. AD 800 and 950 (Lanting, 1992: p. 174). A good 30 datings have so far come available from the tree-trunk coffin underlying the Martinikerk in Groningen. These indicate that the cemetery was used from the 7th or 8th to the 9th or possibly just into the 10th century (Lanting, 1990; 1992). The heyday of the use of the tree-trunk coffins, as the calibrated datings suggest, was in the 8th century. Tree-trunk coffins were used not only in the northern clay regions. They have a wide distribution throughout the Netherlands. Tree-trunk coffins made from Fraxinus, ash, have been found in the low-lying western Netherlands (pers. comm., Paulien van Rijn, RING/R.O.B.).

Characteristics of tree-trunk coffins
For the tree-trunk coffins of the cemeteries of Oosterbeintum, Hogebeintum and Groningen, oak trees with a diameter of 70-75 cm were used. Most probably, coffins were always made from trees with such diameters. A trunk section of a good 2 m length was used, which had a volume of 900-950 l and a weight of about 850 kg. First a lengthwise section would be split off to make the lid, after which the remainder would be hollowed out. It is estimated that about 80-90% of the wood was removed, an apparently wasteful use of wood; but the chips will have been used as firewood. If they were used for cremations, these chips might form a link between the inhumation and cremation rites. But no such link has been demonstrated. They could of course have been put to other uses, such as cooking and heating. After being hollowed out, a tree-trunk coffin with its lid would still weigh a good 100 kg.

The oak trees: some dendrological characteristics
Oaks to be used for tree-trunk coffins differ in several respects from oaks destined for structural timber. This applies both to growth characteristics and to the dimensions of the trees. The differences are strongly linked to the use of the wood and most probably reflect differences in arboriculture. For tree-trunk coffins, a stout trunk is the prime requisite. In structural timber, strength, a straight grain, workability and a good trunk length for large spans are of major importance. Mostly oaks with trunk diameters of 20-25 cm were selected for the uprights of houses. For larger structures, such as barns and farmhouses, oaks with trunk diameters of 30-35 cm would be required. For massive structures such as timber churches, posts were mostly made of trunks 40-45 cm across. In the early Middle Ages, this tends to be the maximum diameter for timber. Oak planks were often also made from trunks 40-45 cm thick.

Since the load-bearing capacity of the wood was an important matter, builders usually preferred oaks that had not grown too fast and had a fairly compact grain; this is found especially in oak wood with an average growth-ring width of about 2.2 mm or a little over. This implies an annual increment of the trunk's diameter of about 0.45 cm. Such trees occur mainly in dense forest stands. In the course of some 90-150 years they attain a trunk diameter of 40-45 cm. Oaks over 200 years old are only rarely found. Dutch forests, especially in the Late Middle Ages, would also include somewhat thicker, more slowly-grown oaks. These might reach an age of well over 200 years, as is evident from the dendro-chronological study of shipwrecks.¹³

For tree-trunk coffins, however, almost always fast-grown oaks were selected, with comparatively much summer wood, indicating a high rate of growth in that season. Their average growth-ring thickness varies between 2.5 and 3.6 mm. Observations on a few coffin remains from Oosterbeintum, Hogebeintum, Dokkum and Groningen-Martinkerk indicate that though it may appear fairly solid, this summer growth in fact is not very hard. This fast-grown wood is less suitable for structural timber.¹⁴

Oaks like those used for coffins do not naturally occur in the forests of the northern Netherlands. The original, virgin forest had long gone by the early Middle Ages. Such rapid growth will occur on very fertile soil in free-standing trees, which can develop a spreading crown and need not compete with other trees for space and light. Such trees may attain the required trunk diameter of 70-75 cm in 100-150 years. This means that for optimum growth the stands have to be tended for 100-150 years: thinning, weeding and manuring, protection against pests, etc. Besides, local growth conditions must be stable throughout the period. This means little variation in the hydrology of the soil, no risk from flooding by the sea, and no forest clearance in the vicinity. Frequent pruning and pollarding was to be avoided, since this would cause the trunk to grow irregularly. Gnawing by wildlife and livestock, as incurred by free-standing trees in woodland pastures and hedgerows, has the same effect. Trees intended for coffins must be protected against such interference, which implies that the stands had to be managed.

These free-standing trees had features unfavourable for timber: the trunk was too short and too irregular in circumference, because the tree would start branching quite low down. Generally just one coffin could be made from a tree. The wood presumably was less
Arboriculture
In order to supply tree-trunk coffins on demand, people must have kept a store of them. The oaks are likely to have been specifically cultivated for the production of coffins; this is supported by the dendrological and use features. So far, nothing is known about their cultivation, but probably it did not differ fundamentally from what is known from traditional forestry. Taking into account these aspects as well as the space requirements and the necessary soil quality, a rough outline of the industry will be sketched below.

The turnover time of a plot of oak trees is assumed to be 125 years; the average felling age of the oaks, 100-150 years. The free-standing trees require a spacing of at least 30 m. Production per hectare per 125 years then will be 10 trees. Irrespective of whether saplings were planted or use was made of natural regrowth, the care of the crop involved thinning, prevention of gnawing, weeding, the removal of slow-growing and stunted trees, and 125 years of maintaining the soil quality. The effective harvest is a guess: here it is assumed to have been 75 percent. Moreover, supervision was needed to protect the trees against repeated pruning, shredding, pollarding and coppicing.

It is unclear where the soils suitable for such cultivation might be found. Several soil types in the northern Netherlands can be ruled out. Most of the coversand and driftsand soils were too poor in nutrients to allow 125 years of rapid growth. Also the peat bogs can be excluded: the nutrient content and hydrology of peat would render this cultivation impossible. Till soils are suitable, but most of these had long since been taken up by ploughland. It may be assumed that little or no space was left for this slow-growing crop. The other soils are the Holocene clay deposits, which lay in the undiked, regularly sea-flooded regions. Being fresh clay deposits, they were in the early Middle Ages subject to pedological changes, highly dynamic in terms of landscape and ecology, and by nature lacking forests and poor in trees. It is hard to imagine that such unstable soils would allow a consistent forestry regime in the northern Netherlands. All in all, it is impossible to point to a region in the northern Netherlands where the production of tree-trunk coffins might have been localized.

Possibly the oaks for tree-trunk coffins were cultivated in the nimidas, the sacred forests which may have been present in the northern and eastern Netherlands (Blok, 1974: p. 61). There is mention of such forests in a list of objects of pagan worship, attributed to the evangelist Liudger (724-809), which is incorporated in a Vatican document. The evangelist was charged with the destruction of such sanctuaries.

A notable aspect of burial in tree-trunk coffins is the long production time before the end product - the tree-trunk coffin - could be supplied. Over 80% of the delivered tree trunk, a costly item indeed, was thrown away; a matter of secondary importance, but to our eyes amazingly wasteful.

Through calculating the estimated population numbers of Oosterbeintum and neighbouring Hogebeintum, an attempt has been made to estimate coffin requirements and the area needed for the cultivation of coffin oaks. In an average population of between 19 and 29 people at Oosterbeintum and 63 at Hogebeintum (Knol, 1993), a total of around 87 people, with a life expectancy of 28 years, an average of three people will die each year, according to Donat & Ullrich (1971). Only some of the dead, and definitely less than half, since cremation was predominant, were buried in tree-trunk coffins. Let us say: one in three. Then the average demand for tree-trunk coffins would have been one a year. In 125 years, 125 oaks would be needed, which taking into account the estimated production loss of 25% implies a land requirement of 16.5 hectares.

How widespread was the use of tree-trunk coffins in the clay regions of the northern Netherlands, and how large was the area needed to grow this wood? On the basis of the population numbers for the region, a rough estimate can be made. Knol (1993a) mentions a total of 232 settlements for the regions of Westergo and Ostergo in the early Middle Ages B (AD 525-725). While the Oosterbeintum cemetery was in use, also a (smaller) number of settlements from the early Middle Ages A (AD 350-525) were still occupied. Mapping thus showed a total of about 250 settlement sites. The two settlements of Oosterbeintum and Hogebeintum then represent c. 2.250 - 0.8% of the total population, which in this way can be put at about 11 000. Terpen without finds were left aside in Knol’s maps. Now let us assume that these 250 known settlements made up half of the actual number of settlements. In that case the population of Ostergo and Westergo can be put at c. 22 000. This would mean that Oosterbeintum and Hogebeintum represent 0.4% of the entire population.

For a population of 22 000 people, with a life expectancy of 28 years and a third of the dead being buried in tree-trunk coffins, the coffin requirement can be estimated at 250 a year. This requires a permanent growing area of over 4100 hectares.

3.2.6. The human remains from the inhumation graves

Skeletal material from 46 of the 47 inhumation graves (table 16) was available for analysis. What survived of burial A was only a few grave goods (see catalogue). Of these 46 skeletons 32 are complete or almost complete. The others are badly damaged, usually as a result of disturbance by subsequent graves or younger features. From grave 474 only the skull has survived; from graves 270, 273, 299, 374B and 461 only the postcranial
skeleton. For each of the 46 skeletons an attempt was made to determine the age, gender and stature. Also traces of trauma, pathology and other unusual features were investigated. Since the cemetery remained in continual use, a few detached human bones had found their way into the body of the terp. These are listed in the catalogue (Nos 58, 129, 156, 167, 274, 301, 302 and 347), but otherwise will not be discussed.

The age of the buried individuals
The age determination of young individuals, based upon the eruption of dental elements and the fusion of the epiphyses with the diaphyses, is fairly straightforward and reliable. For individuals over the age of 25, these methods are of no use, since all permanent teeth will have emerged, and all epiphyses will have fused. For the age determination of individuals older than 25 years the degree of abrasion of the chewing surface of the teeth and molars (Brothwell, 1965), changes to the surface of the symphysis of the pubic bone and the fusion of the cranial sutures are used. These criteria produce less close and less reliable age determinations than those for individuals under 25 (table 16). For adults, use may be made of the 'complex method' (Acsádi & Nemeskéri, 1970) and of histological age determination (Kerley, 1965; Uytterschaut, 1985). For these methods the bone material needs to be cut through longitudinally or transversally. Since further damage to the skeletal material of Oosterbeintum was to be avoided, these methods were not used.

For all 46 skeleton graves the body's age could be determined with varying degrees of accuracy (table 16). Eight skeletons were found to be of children aged between 4 and 10 (figs 31 and 32), three of subadult individuals (aged 16-18, 17-19 and 19 years). The 35 other skeletons belonged to adults, most of whom lived to be 20-50 years old; indeed a few in the over-45 category may have lived beyond the age of 50 (table 23). People probably seldom if ever lived to the age of 55 or beyond. The majority (21) of the individuals died between the ages of 30 and 55 (table 23). The average age of the people buried in inhumation graves at Oosterbeintum was about 29.5 years (the adults were reckoned on average to have lived to the age of 35).

The gender of the buried individuals
The sex of the bodies was determined primarily from the pelvis. This bone provides very reliable clues about

<table>
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</tr>
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</tr>
<tr>
<td>Adult</td>
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</tr>
<tr>
<td>Total</td>
<td>46</td>
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</table>

Average age for 46 individuals, on the basis of median age per category: c. 29.5 years. Life expectancy for the 32 individuals aged over 15 (the 'adult' excluded): 36.9 years.
the sex of skeletons (90-95% accuracy). Also the skull and jawbone display sexual dimorphism, be it that the differences between the sexes are less marked here than in the pelvis. A further criterion is provided by the long bones, the thighbones in particular, which in men tend to be longer and heavier and have more pronounced muscular attachments than in women. However, there is a considerable degree of overlap in bone length between the sexes, which means that a sex determination on the basis of this criterion alone is not possible. The overlap between the sexes as regards the width of joints is less marked than that of bone length, so that these widths do allow some distinction to be made.

For all characteristics of the pelvis and the skull, any individual is graded on a scale from -2 (very female) to +2 (very male). These grades are multiplied by a weight factor of between 1 and 3. This ‘WEA’ method is based on studies of a large number of individuals of known sex (WEA, 1980; Haverkort & Pasveer, 1993: pp. 22-25). The sum total of these values determines whether the individual skeleton is classed as male or female. Sex determination of children’s skeletons is still virtually impossible, since the sex-specific features are still undeveloped and, moreover, there is hardly any reference material.

For 30 of the 38 subadult or adult individuals an osteological sex determination could be performed (table 16); the other eight skeletons were too incomplete. Fifteen skeletons were found to be female and fifteen male. For eleven of those identified as women and for four of the men it was possible also to carry out an archaeological gender determination, on the basis of grave goods. In the other women’s and men’s graves no gender-specific items were uncovered, so that the osteological identification could not be corroborated by an archaeological one (table 16). All eleven osteologically female graves with grave goods contained one or more brooches, beads, and/or a spindle whorl (table 18). These are regarded as female attributes. Hence the osteological sex determination matched the archaeological one for these eleven (women’s) graves.

Masculine attributes are harder to identify. Various grave goods (small knife, buckle, pin) occur both in osteologically male and female burials. A spearhead, a Schmalsax, a large knife, and pyramidal knobs of bronze or antler may have been masculine attributes. Such items were found with three of the ten osteologically male burials that held grave goods (burials 15, 335 and 435) and in none of the women’s graves (table 18; catalogue). For the men’s graves of Oosterbeintum, the osteological sex determination thus is found to be more effective than the archaeological one.

Grave 398, however, is an exception to the rule of matching osteological and archaeological gender identifications. A skeleton with masculine features is accompanied by typically feminine grave goods: two brooches, forty beads and a bracelet. This difference between the two gender determinations has three possible causes: 1. The osteological sex determination of burial 398 is among the less than 5% incorrect ones, the dead person actually being a woman whose skeleton had very masculine features; 2. Brooches, beads and bracelets are not exclusively feminine attributes and in rare cases may also occur in men’s graves; 3. The person in grave 398 was intermediate in the bipolar male-female system: biologically a man but dressing and behaving like a
Table 24. Oosterbeintum. Inhumations. Age and gender distribution of the adolescent and adult individuals. Age in years.

<table>
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<td>1</td>
<td>6</td>
</tr>
<tr>
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<td>1</td>
<td>-</td>
<td>2</td>
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<tr>
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<td>1</td>
<td>14</td>
<td>6</td>
<td>32</td>
</tr>
<tr>
<td>Adult</td>
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<td>-</td>
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<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>14</td>
<td>1</td>
<td>15</td>
<td>8</td>
<td>38</td>
</tr>
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</table>

Woman; another possibility is that this person was even biologically intermediate between male and female (Birke & Vines, 1987). We can no longer trace the true explanation. Yet it is certain that this individual (after death) wore the same apparel as eleven of the fifteen women. Grave 398 will in the following be discussed as a separate category: ‘man/woman’. If, despite the complexities of grave 398, beads and brooches were feminine attributes, grave A too must have belonged to a woman. By these same standards, the children’s graves 248, 343, 362 and 402 were of girls.

The osteological and archaeological gender determinations, which identified 15 women’s graves, 14 men’s graves (including one of a subadult individual) and one of a man/woman, show that the cemetery was one in which men and women were interred in equal numbers. This at any rate goes for the excavated part of the cemetery. For fourteen women, eleven men and one man/woman also the age was determined (table 24). The age distributions of men and women do not differ significantly. This means that men and women of similar age categories were buried in the cemetery. The inhumations show no evidence of increased mortality among young women due to problems of pregnancy and childbirth.

Stature of the buried individuals

Body stature was determined on the basis of the length of femurs, tibiae and fibulas. The lengths of the excavated bones were measured and entered into the regression equations of Trotter & Gleser (1958) to obtain an estimate of body length. In this way the stature of seven adult men, the man/woman and nine adult women could be determined. The seven men were between 1.68 and 1.79 m tall, with an average of 1.74 m; the nine women between 1.50 and 1.62 m, with an average of 1.58 m. The man/woman from grave 398 was 1.75 m tall (according to the regression equation for men). Estimates were made of the lengths of an individual of uncertain sex and of a dwarf (table 16).

The posture of the skeletons

The skeletons displayed a wide range of attitudes of the legs (crouched, flexed, one leg flexed, extended or crossed) the torso (supine, on the side) and the arms (stretched along the body, bended alongside the body, crossed over the chest or the waist, hands joined in the lap).

Fourteen of the 35 individuals whose leg positions could be recorded lay crouched (a so-called Hockergrab; fig. 33), seven lay in a semi-crouched posture with flexed legs or with one leg stretched and the other flexed, eleven bodies lay with both legs extended (fig. 34) and three lay with crossed legs (fig. 35). Twenty-one of the 36 individuals whose torso position could be recorded lay on their backs, nine on their left side and six on the right side (table 25). The somewhat larger number of skeletons on the left side than on the right will be a matter of chance. The attitude of the arms was particularly variable. Often the position of the left arm differed from that of the right. Of the 74 arms whose position could be recorded (of 37 individuals) there were 33 stretched beside the body, 20 were crossed over the chest, 13 lay hand in lap, and 8 were doubled up at the elbow. The combination of both arms stretched along the body (12 instances) was the most frequent, followed by 6 pairs of crossed arms. Other combinations were observed between 1 and 5 times (table 16).

Of the fourteen crouched burials, three lay in a supine position and eleven on the side. Eight of the eleven skeletons with stretched legs lay on their backs, a ninth lay on its right side, and in two cases the torso’s position was unclear. Six of the seven skeletons with one or both knees flexed lay on their backs; the seventh
The early medieval cemetery of Oosterbeintum (Friesland) 303

Fig. 33. Oosterbeintum, grave 398. Skeleton with flexed knees, estimated age: 35-45 years; stature 1.75 m. Grave goods: a bowl, beads, a bracelet, two brooches. Osteologically a man, archaeologically a woman. Photograph by G. Delger, V.A.R.U.G.

On its left side. In terms of torso position, the flexed-knee skeletons correspond more closely with the extended burials ($p = 0.825$; difference not significant for $\alpha = 0.05$) than with the crouched ones ($p = 0.009$, difference significant for $\alpha = 0.01$). The flexed posture thus in fact is a stretched posture in which one or both knees were bent. Crouched burials are significantly more often associated with the torso lying on the side than with a supine posture; on the other hand, stretched or flexed legs significantly more often occur with a supine body ($\chi^2 = 10.720, \alpha = 0.01$). Of the skeletons with crossed legs, two lay on their backs and one on the left side.

Eleven of the thirteen arms with hands in the lap and twelve of the twenty arms crossed over the chest occurred with a supine body; the remainders with bodies lying on their sides (table 16). However, the difference between side and supine posture as regards attitude of the arms was not significant ($\chi^2 = 5.2057; \text{df} = 3; \alpha = 0.05$). The arm positions thus are virtually unrelated to that of the torso. The same goes for the position of the arms in relation to that of the legs ($\chi^2 = 5.7270; \text{df} = 6; \alpha = 0.05$).

Fig. 34. Oosterbeintum, grave 570. Skeleton of a woman with extended legs; estimated age: over 45; stature 1.62 m. Photograph by G. Delger, V.A.R.U.G.
Five of the seven children whose leg positions are known lay in a crouched posture; the two others lay stretched (table 25). Of the 28 subadults and adults whose leg positions were known, nine lay crouched. Nine others lay with legs extended and seven with flexed knees. The final three lay with crossed legs. The difference in leg position between the children’s burials and those of the subadults and adults was not statistically significant ($\chi^2 = 3.800; \text{df} = 2; \alpha = 0.05$, flexed and extended taken together). Nor was there a significant difference in torso position between the children’s burials and those of the subadults and adults ($\chi^2 = 6.626; \text{significant for } \alpha = 0.05$). The conclusion must be that for children’s burials the same positions for the legs and torso were adopted as for subadults and adults.

Nor is there evidence of any difference between the sexes as regards the torso position. Both among the men and women the supine position was predominant. The man/woman too was supine. Nor was there much difference in leg position between the two sexes. The man/woman lay in a crouched posture (table 25).
Table 25. Oosterbeintum. Inhumations. The posture of the 47 individuals of whom (some) skeletal material was extant. The position of the spine and legs is indicated.

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<th>Crouched</th>
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<th>Extended</th>
<th>Cross-legged</th>
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<tr>
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</tr>
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<tr>
<td>Total</td>
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<td>7</td>
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</tr>
<tr>
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<td>2</td>
<td>3</td>
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<tr>
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<td>-</td>
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</tr>
<tr>
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<td>7</td>
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Why the corpses were buried in these different postures is unknown. Probably there was no strict protocol for the posture and the attitudes of the limbs of a body entering the grave. From the Oosterbeintum cemetery it appears that in the coastal region of the northern Netherlands, crouched bodies were being buried right into the 8th century AD. This has also been observed at other sites, including Hogebeintum (Knol, 1993a: p. 155). The crouched posture was not, as was assumed by Halbertsma (1954; 1963; 1984), limited to the late Iron Age and the Roman Period. It was not cramped burial pits that prompted crouched burials, since various crouched bodies lay in large pits (burials 100, 295, 393 and 398). Nor does it seem likely that flexed knees are associated with too small a pit or coffin. None of the tree-trunk burials are crouched bodies. Various skeletons with flexed knees lay in large pits without any trace of a coffin.

*The dwarf*

Burial 273 contained the skeleton of a dwarf (fig. 36). This skeleton lacks the skull, a large part of the pelvis, the sacrum, the sternum, both shoulder blades, the right-hand coracoid, the right-hand fibula, a few vertebrae and ribs, and some small bones of the hands and feet. Almost half of the jawbone is present. Only two teeth were recovered.

Since a large part of the pelvis and the skull are absent, a sex determination for this individual is impossible. All epiphyses of the long bones are fused with the diaphyses. This means that the midget reached adulthood. The hardly worn molar suggests that this
Fig. 36. Oosterbeintum, grave 273. Skeleton of an adult achondroplastic dwarf; estimated age: 25-35 years; stature 1.24-1.28 m; sex uncertain. Photograph by B. Deddens, Laboratorium voor Anatomie en Embryologie, R.U.G.

Dwarfism on average occurs in one out of 77,000 people. Its most common form is achondroplasia. This is a congenital defect, in which the ossification of cartilage is impeded. This results in a shortening of the limbs. The bones in arms and legs, notably the humerus and femur, are worst affected in such midgets. The bones of the arm, notably the humerus, are usually very bent. The tibia often is too long for the accompanying fibula. The skull and backbone in achondroplasia often have normal dimensions. Still, in such dwarfs the base of the skull is often shortened, which results in an extra rounded and protruding forehead and a lowered bridge of the nose. The intellectual development of such people is normal. The elbow may stretch up to 150°; normally this is 175°. The average stature of people with achondroplasia is 1.25-1.30 m.

As far as could be ascertained, the dwarf of Oosterbeintum bore the marks of achondroplasia. Whereas the vertebrae and ribs were of normal size, the long bones are much shortened (fig. 37). The humerus is very curved. Yet the length of the tibia corresponds with that of the fibula. From X-ray photos it became evident that the cortex of the bones was well developed. This indicates normal muscular activity and exercise. Most of the long bones have comparatively wide joints, which especially laterally and medially protrude further than they would in a normal bone (this is known as metaphysial flaring). The surface of the proximal joint of the femur is irregular and shows deformations indicative of osteoarthritis (fig. 37).

The chance of finding a body with achondroplasia in a small cemetery like that of Oosterbeintum is very small. Skeletal remains of midgets from the early Middle Ages and earlier periods have been found in Gotland (Sweden, AD 800-1000; Larje, 1985); at Koksijde (Belgium, AD 400-900; Susanne, 1970), Dorchester (Britain, AD 250-350; Davies et al., 1985), Egypt.
The early medieval cemetery of Oosterbeintum (Friesland) 307

(Badarian Period (Neolithic), and first dynasty; Bleyer, 1940), and an acromesomelic dwarf from the Upper Palaeolithic at Cosenza (Italy, 11150 ± 150 BP; Frayer et al., 1988). The skeleton from Koksiije is exceptionally well preserved and as good as complete. It is a typical example of an achondroplastic dwarf. The upper arm was found to be much more shortened than the forearm. Susanne (1970) states that this feature should be added to the list of characteristics of achondroplasia. The Oosterbeintum skeleton too shows this feature. The individual in Gotland presumably suffered from a mild form of achondroplasia (Larje, 1985). The finds from Egypt also are achondroplastics. The almost complete midget skeleton from Dorchester was that of a young woman with an estimated stature of 1.30 m. She, however, was not an achondroplastic, but a mesomelic dwarf, in which, as the name suggests, the growth defect occurs in the middle part of the bones. In this form of dwarfism the upper arms and the thighs are of normal length, whereas the forearm and the lower leg are much shortened (Rogers, unpublished).

Other pathologies and unusual features

Of the 37 adult burials with parts of the postcranial skeleton, eight display osteophytes (= growths) along the edges of the joint surfaces of one or more vertebrae (table 26). These bony growths result from non-infectious, age-related degenerative processes in the cartilage of the joint (Rogers et al., 1987; Waldron, 1991: p. 109). All eight skeletons with osteophytes on the vertebrae are of individuals over 35: four were aged 35-45; one 40-50 and three over 45 (table 26; fig. 38). They are three men and five women. One of these women and two other women have one or more interconnections of vertebrae (ankylosis) in the spinal column (fig. 39). Of these three women, one was aged between 30 and 45 years, the two others were over 45. In all, five women

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Number of individuals 8 3 4 2 6 8 7 2 1 4

Fig. 38. Oosterbeintum, grave 424. Vertebra with osteophytes. Photograph by Fries Museum, Leeuwarden.
and five men showed spinal osteophytes and/or ankylosis. Of the individuals in the age categories 30-45, 35-45, 40-50 and over 45 (whose spine was still present, 16 out of 17), ten (63%) displayed these phenomena. In modern populations these bone alterations tend to be diagnosed in individuals in their forties or older. At Oosterbeintum, the individuals with these phenomena in the age categories 30-45 and 35-45 may still have been under 40. However, if they were

Fig. 39. Oosterbeintum, grave 374B. Vertebrae with ankylosis. Photograph by Fries Museum, Leeuwarden.

between 40 and 45, their age at the onset of disease did not differ from that in modern populations. Among the people of Oosterbeintum these phenomena seem to occur equally among men and women.

The skeletons of four individuals aged between 35 and 45 (one man) and over 45 (one woman and two men) had osteophytes not only on the vertebrae but also in the hand and (in one case) in a foot as well (table 26; catalogue).

The long bones of two persons aged over 45, one a man and the other of unknown sex, were thin and porous as a result of osteoporosis (fig. 40). Through lowered levels of sex hormones after middle age, the density of bone is reduced. The skeleton of a man over 45 showed traces of a fracture (trauma). His left collarbone had broken during life. Presumably the fracture remained untreated, since the two sections had come to overlap during the healing process (fig. 41).

Eight of the 41 skeletons whose teeth were still present showed signs of caries. Caries even affected the younger age categories, as evidenced by the teeth of the youth of 19 and two women aged 25-35 (table 26). Of the 31 individuals aged over 25 whose teeth survived, seven (23%) had caries. This is a small proportion set against modern western figures for this age group. The reason for this low incidence of caries must be the much harder, less refined food, which required much more chewing. The teeth were worn away before caries got a chance. Teeth worn down to the root were found in seven individuals: four women, two men and the man/woman of burial 398, all of them at least 35-45 years old (fig. 42).

Two skeletons, that of a man aged over 45 and that of the man/woman of burial 398, aged between 35 and 45,
display traces of an abscess on the jaw (table 26; fig. 43). On the sides of the teeth of six individuals, three women, two men and the man/woman of burial 398, massive accretions of tartar were observed (table 26). This occurred in the age categories of 25-35 years (one of the four preserved skulls), 30-40 years (the sole preserved skull), 35-45 years (three out of five preserved skulls) and over 45 years (one of the seven skulls).

From four skeletons it is evident that the respective individual was not quite straight-limbed. Skeleton 424 presumably had a curved spine. The thighbone of skeleton 60 is bent in an anterior-posterior manner, which presumably rendered the thigh somewhat too short. Skeleton 460 has a deformed metatarsal, and skeleton 605 a bent fibula (table 26; catalogue).

In skeletons 100 and 270, the proximal part of the ulna is more developed than normal. In the latter skeleton, this also goes for the distal part of the humerus. Evidently the elbows of these people had thickened, maybe as a result of heavy labour. Skeleton 451 had one unusually sturdy foot. The right-hand fibula of skeleton 420 shows a bony growth, probably an ossified tendon.

The teeth too showed a few peculiarities. In the left upper jaw of skeleton 485A there is a small extra tooth between the P2 and the M1. In skeleton 405 the M3 is beginning to emerge, while the M1 is retarded. In
3.2.7. The variation in burial finds

'Burial finds' in this study are all finds associated with a burial that are not part of the skeleton or the coffin. These include the grave goods, worn by or laid beside the dead body, as well as any object that accidentally ended up in the grave, for instance because another grave was destroyed in the delving of the burial pit. Unfortunately the two categories are not always easy to distinguish. The nails and potsherds (table 18) prompt the suspicion that they are not grave goods dedicated to the buried person, but instead belong to disturbed cremation graves. The burial finds are listed in table 18 together with the graves to which they belonged.

Burial finds in the inhumation graves of Oosterbeintum are fairly scanty (table 18). This corresponds with earlier observations in the Frisian region (van Giffen, 1920; Schmid, 1972; Knol, 1993a: pp. 211-213). In Frankish cemeteries, such as those at Rhenen (Ypey, 1973), Wageningen (van Es, 1964) and Lent (van Es & Hulst, 1991), burials are found with larger amounts of grave goods. The dearth of burial finds at Oosterbeintum is illustrated by the fact that 17 of the 47 inhumation burials were entirely devoid of durable grave goods. These are five men’s graves (out of fourteen), four women’s graves (out of fifteen), four children’s graves (out of eight), the two subadults’ graves of unknown gender (the 19-year-old youngster was reckoned among the men) and three graves of adults of unknown gender (out of seven). The man/woman’s grave did contain finds.

The presence of drops of molten bronze, metal slag and potsherds in various graves is probably fortuitous. The most likely explanation is that they derive from cremation graves whose remains became mixed in with the inhumation burial when the pit was dug. The grave goods proper of the inhumation graves include: spearhead; strike-a-light; Schmalzax; small knife; unknown iron object; tweezers; buckle; brooch; bracelet; knobs of metal or antler; textile fabrics; pins of metal or antler/bone; metal mountings of a small bag or case; piece of lead; chatelaine with wolf-tooth amulets; comb; pendant; spindle whorl of antler, bone or pottery; knucklebone; beads; amber; bowl; and possibly a hazelwood object (table 18). The typology and dating of the grave goods follow in chapter 4. Here we briefly deal with the variation in grave goods associated with the inhumation graves.

Buckles, small knives and pins occur both in men’s and women’s graves. Strike-a-light, spearhead,
Schmalsax and buttons of metal or antler occur exclusively in men’s graves, but it in only three of the nine men’s graves (15, 335, and 435). The number of grave goods in men’s graves is slight (table 18). Eleven of the fifteen women’s graves with finds contained true grave goods. Eight contained one or more brooches, often of different types. Beads are found in six women’s graves. All six strings of beads were made with glass beads; two included amber beads, and the string from burial 428 a rock-crystal bead. The number of beads found in individual women’s graves ranges from 2 to 9. Burial 428 also contained an unidentified piece of amber, possibly part of a different ornament. Tools were found in four out of five women’s graves: spindle whorls in burials 241, 424 and 606, and a small knife in burial 374B and possibly one in burial 60. Other grave goods that emerged were a chain with wolves’ teeth (maybe a chatelaine), a buckle, pins of metal or bone/antler and a knucklebone (table 18). Grave 398 of the man/woman yielded a small long brooch, a cruciform brooch of Midlum type, 37 glass and three amber beads, and a bracelet. A remarkable item in this grave is an earthenware bowl, as was found in none of the men’s or women’s graves; such a bowl is known from child’s burial 248 too (table 18).

The seven adults’ graves whose osteological sex could no longer be determined owing to disturbances were all poor in grave goods (table 18), which too may be the result of disturbance. Burial 98 contained a small knife, burial 422 a fragment of a double-sided comb. From burial A, hit upon in the commercial quarrying of the terp, there remain two brooches (again a small long brooch and a cruciform brooch of Midlum type), a comb and 26 glass beads. The archaeological gender determination here would be ‘probably female’. No grave goods were found with two subadult individuals whose gender remained obscure.

Grave goods were found in four of the eight children’s burials: in burial 248 a bowl and five beads (four of glass and one of amber); in grave 342 a brooch and a long string of 61 glass beads (fig. 44), in grave 362 a string of at least 15 small glass beads; and in grave 402 two amber beads and a pendant of antler, which may have been an amulet (see 4.3; table 18). These grave goods suggest that these four children were girls.

Among the men’s and women’s graves there are a few which have a markedly richer inventory than the other graves of their respective categories. Among the men’s graves this is grave 335 of a man in his thirties, and grave 435 of a 19-year-old youth. The former contained a spearhead beside the left arm, a Schmalsax on the left hip, a buckle on the abdomen and behind the pelvis the remains of a small knife, tweezers and a strike-a-light with a piece of flint. The body in grave 435 had at the hip a sheath with a large knife and an awl-like object. Härke in a study of funerary practice in early medieval England demonstrated that large knives, like swords, could be interpreted as masculine attributes (Härke, 1989). Maybe we are here dealing with a Frisian example of such a grave.

Comparatively rich women’s graves are burials 374B, 428 and 360. Grave 374 produced a chatelaine with two wolf canines. The teeth may have been amulets (see 4.2). Further this grave contained a knife, two brooches and two glass beads. Grave 428 too contains a remarkable find: a bead of rock-crystal, besides two beads of glass. Further finds in this grave were two brooches and a knucklebone (as well as a piece of slag). Grave 360 held the greatest number of brooches in a single grave (three), as well as a metal pin. The man/woman in burial 398 also was accompanied by comparatively rich grave goods.

Fig. 44. Oosterbeintum, grave 342. Grave of a 9-year-old child with 61 glass beads and an equal-armed brooch. Drawing by H.R. Roelink, V.A.R.U.G.
3.3. Animal graves

3.3.1. Introduction

In the cemetery of Oosterbeintum seven inhumation graves of animals were uncovered among the human graves and the traces of human cremations. Besides, one cremation burial was found to contain nothing but animal remains (see 3.3.4).

The inhumations are one horse and six dogs. The horse and five of the six dogs were definitely males, as, presumably, was the sixth dog. All lay in separate graves. To date them, there is only the general dating of the cemetery: between AD 400 and 750. Only dog 432 can possibly, but far from certainly, be dated by a human grave: the woman's grave 295, which is dated to AD 450-700. The dog's grave was positioned parallel to the woman's legs; the dog lay with its back turned towards the woman. The animal graves were all without grave goods, as for instance the remains of a bridle or saddle.

The descriptions of the horse and the dogs follow the same pattern (in as far as evidence is available): posture and orientation, completeness of the skeleton, gender, age, skull shape, height at the withers, and build of the body and the legs (in the horse, according to Müller, 1985; in the dogs, according to Wendt, 1978 and Ohman, 1983), pathology and peculiarities.

By 'completeness' is meant the completeness of the skeleton after washing, drying and numbering of the bones. Missing parts may have been lost in the process of cleaning, through incomplete excavation, disturbance of the grave, disintegration through decay, or removal of body parts during the animal's lifetime or after its death. The effects of these factors are not always easy to tell apart. Following the descriptions of the animals, the meaning of the graves will be discussed. The measurements of the skeletal elements of the horse and the dogs are listed in tables 28 and 30.

3.3.2. The horse grave

**Description**

The horse (grave 430) lay with his legs drawn up, on his right side (fig. 45). His head lay towards WSW. The skeleton is virtually complete, including the first four tail vertebrae. Since the horse had large canines in the upper jaw, it is definitely a stallion. He was an adult: the complete set of permanent teeth is present and all epiphyseal sutures have fused, including those of the vertebrae. The premolars and the molars are slightly worn. The bean-shaped folds of the I's are almost worn away, those of the other incisors of the lower jaw are still clearly visible. The canine of the lower jaw is sharp. These dental features indicate an age of about 6 years (Habermehl, 1975: Abb. 25-26).

The height at the withers was calculated from the regression equations drawn up by May (1985) on the basis of the data of Vitt (von den Driesch & Boessneck, 1978).
Table 28. Oosterbeintum. Measurements of skeletal elements of horse 430, after the system of von den Driesch (1976). All measurements are in mm.

<table>
<thead>
<tr>
<th>Cranium</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Width foramen magnum (36)</td>
<td>30.1</td>
<td></td>
</tr>
<tr>
<td>Height foramen magnum (37)</td>
<td>34.6</td>
<td></td>
</tr>
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<table>
<thead>
<tr>
<th>Mandibula</th>
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<tr>
<td>Length of the cheektooth row (6)</td>
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<td>173.4</td>
</tr>
<tr>
<td>Length of row of molars (7)</td>
<td>84.9</td>
<td>84.6</td>
</tr>
<tr>
<td>Length of row of premolars (8)</td>
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</tr>
<tr>
<td>Height behind M1 (22a)</td>
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<td>108.0</td>
</tr>
<tr>
<td>Height before M2 (22b)</td>
<td>76.7</td>
<td>75.7</td>
</tr>
<tr>
<td>Height before P3 (22c)</td>
<td></td>
<td>55.5</td>
</tr>
<tr>
<td>Length M1</td>
<td>25.2</td>
<td>24.6</td>
</tr>
<tr>
<td>Width M1</td>
<td>16.8</td>
<td>17.1</td>
</tr>
<tr>
<td>Length M2</td>
<td>24.5</td>
<td>25.5</td>
</tr>
<tr>
<td>Width M2</td>
<td>15.7</td>
<td>15.9</td>
</tr>
<tr>
<td>Length M3</td>
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<td>29.5</td>
</tr>
<tr>
<td>Width M3</td>
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</tr>
<tr>
<td>GLP</td>
<td>93.5</td>
<td>93.8</td>
</tr>
<tr>
<td>LG</td>
<td>56.1</td>
<td>56.3</td>
</tr>
<tr>
<td>BG</td>
<td>46.2</td>
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</thead>
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<td>BT</td>
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<td>BPC</td>
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<table>
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</tr>
<tr>
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<td>215.7</td>
</tr>
<tr>
<td>Bp</td>
<td>52.4</td>
<td>54.6</td>
</tr>
<tr>
<td>Dp</td>
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</tr>
<tr>
<td>SD</td>
<td>33.3</td>
<td>33.5</td>
</tr>
<tr>
<td>Bd</td>
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<td>50.5</td>
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<tr>
<td>Dd</td>
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<tr>
<td>SB</td>
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<tr>
<td>LA</td>
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<tr>
<td>LAR</td>
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Table 28 (continued).

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<tr>
<th>Femur</th>
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<tr>
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<td>394.6</td>
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<td>DC</td>
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<td>40.9</td>
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<tr>
<td>Bd</td>
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<td>94.6</td>
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</table>

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<td>GL</td>
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<td>352.4</td>
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<tr>
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<td>77.8</td>
</tr>
<tr>
<td>Dd</td>
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<td>50.6</td>
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</table>

<table>
<thead>
<tr>
<th>Metatarsus III</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GL</td>
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<td>263.9</td>
</tr>
<tr>
<td>GL1</td>
<td></td>
<td>255.4</td>
</tr>
<tr>
<td>Bp</td>
<td>55.4</td>
<td>53.6</td>
</tr>
<tr>
<td>Dp</td>
<td></td>
<td>43.6</td>
</tr>
<tr>
<td>SD</td>
<td>30.8</td>
<td>30.9</td>
</tr>
<tr>
<td>Bd</td>
<td></td>
<td>50.6</td>
</tr>
<tr>
<td>Dd</td>
<td></td>
<td>40.0</td>
</tr>
</tbody>
</table>

1974). According to this calculation, the stallion's height at the withers was between 135 and 139 cm (table 29). Vitt classifies this as a medium-sized horse. The height at the withers corresponds with that of a large pony or a small modern horse.

Given the comparative lengths of the upper leg, the lower leg and the metatarsus (table 28), the Oosterbeintum horse was an ordinary horse for all-round use (Müller, 1985: p. 24). The long bones are of average thickness, which is also an indication that the horse was used for various purposes (Müller, 1985: p. 25). The Oosterbeintum horse was of the same type as the horses of the early medieval cemeteries in Thuringia and Sachsen-Anhalt (Müller, 1985).

A few of the lower thoracic vertebrae have osteophytes on the vertebral body. These osteophytes were too small to have caused the horse any discomfort. The horse did not wear an iron bit, at any rate not in the last six weeks before his death. The front premolars (fig. 46) do not display the abrasion which is caused by the wearing of an iron bit and is clearly visible to the unaided eye (Clutton-Brock, 1974: fig. 2; Anthony & Brown, 1989). Normal tooth wear will erase such traces within six weeks (Anthony & Brown, 1989). Nor does the mandible display the constriction which occurs if a rope is bound around the muzzle for leading the horse (Peške, 1990). The thoracic vertebrae show no fractures; hence the horse was not overburdened as a riding horse (Müller, 1985: pp. 31-32 and Tafel III.5 and 7).

The right-hand radius and ulna have fused at the point of the proximal joint of the radius, whereas the
Table 29. Oosterbeintum, horse grave 430. Height of the withers, after May (1985).

<table>
<thead>
<tr>
<th>Skeletal element and measurement</th>
<th>Length (mm)</th>
<th>Height of the withers (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L</td>
<td>R</td>
</tr>
<tr>
<td>Humerus GL1</td>
<td>285.4</td>
<td>286.5</td>
</tr>
<tr>
<td>Radius GL</td>
<td>-</td>
<td>337.6</td>
</tr>
<tr>
<td>Metacarpus III GL</td>
<td>225.2</td>
<td>225.2</td>
</tr>
<tr>
<td>Femur GL</td>
<td>395.1</td>
<td>394.6</td>
</tr>
<tr>
<td>Tibia GL</td>
<td>352.4</td>
<td>352.4</td>
</tr>
<tr>
<td>Metatarsus III GL</td>
<td>-</td>
<td>263.9</td>
</tr>
</tbody>
</table>

left-hand ulna and radius are not fused. The meaning of this difference is not yet clear. The skeleton as recovered had just the first four tail vertebrae, while a normal horse has 13 to 20 of these (Schmid, 1972). If the other tail vertebrae were not overlooked in the excavation, then we must conclude that the tail was either bobbed in the horse’s lifetime or cut off after its death (for the latter possibility: cf. Oexle, 1984: p. 150; Müller-Wille, 1971: I 218 and I 200; see also dog 404).

**Interpretation of the horse grave**

Horses were quite often buried in cemeteries in early medieval Europe (Müller-Wille, 1971; Oexle, 1984). From Western and Central Europe, at least 750 instances are known. They were buried together with one or more people, occupied a separate grave, or shared a grave with other horses and/or other animals. Oexle (1984) demonstrated that the continental Merovingian horses (5th-7th century) were riding horses or warhorses, accompanying buried or cremated people. That these horses were riding horses was revealed by their bridles, which initially were often buried with the horses, but from the early 7th century on were usually put in the graves of their riders (Oexle, 1984: p. 123). The horses usually were stallions, most of them in the prime of life at the moment of their death, aged between 5 and 15. Most horses were between 134 and 140 cm tall at the withers; the smallest were 125 cm, the tallest 157 cm (Nobis, 1964-1965; Kleinschmidt, 1967; Hemmer & Jaeger, 1969; Nobis, 1973; Kaufmann, 1976; Müller, 1980; Müller, 1985; von den Driesch & Boessneck, 1980; Amberger & Kokabi, 1985; Boessneck, 1987; von den Driesch & Peters, 1987; May & Bitzan, 1990; Springhorn, 1991). The horse from the Oosterbeintum cemetery thus neatly fits in with the other horses buried in early medieval cemeteries. The same goes for the two stallions of the double horse grave with a dog from Ezinge-De Bouw erd (Boersma, 1980), whose heights at the withers were calculated as around 147 cm (Prummel, 1993a).

Among the Frisians and the Saxons, many horses were buried in horse graves, i.e. not together with a human. Most of these burials are devoid of grave goods (Müller-Wille, 1971; Steuer, 1978; Oexle, 1984; Prummel, 1993a). In the coastal region of the northern Netherlands, horses have been excavated at Ezinge-De Bouw erd (Boersma, 1980; Prummel, 1993a), Antum, Dokkum-Berg Sion, Lutje Lollum and Zweins-Kingmatille (Knol, 1993a: table 17). In the province of Drenthe, horse burials have been found at Zweeloo, where there were six horse burials in a separate part of the cemetery, and at Wijster-Looveen, with two rows of horse burials: one of 29 or 30 horses and one of 6 or 7 horses (van Es, 1967; Müller-Wille, 1971; van Es &

Features of the skeleton indicate that the stallion of Oosterbeintum was a riding horse or charger. Presumably it was killed on the occasion of a burial or cremation, perhaps that of the horse’s owner, before being buried in a separate grave in the cemetery.

3.3.3. The dog burials

Description

Dog 201: The dog lay on its right side with its head towards ENE. Its grave was badly disturbed by the later circular ditch (chapter 8). This means that some skeletal elements were lacking. Notably the skull, the mandible, the shoulder blades, and the pelvis are incomplete. The spine and the upper and lower legs are more or less complete. Of the feet most bones are lacking. Nine tail vertebrae were retrieved: numbers 2-9 and one from the base of the tail (numbers 15 or beyond). This skeleton did include a baculum; hence it was a male dog. All epiphyses had fused; however, this does not take more than 20-24 months. The only surviving incisor is somewhat less worn than the incisors of dog 201. The age is therefore estimated as a little over 7 years (Habermehl, 1975). The dog was between 60 and 63 cm (table 31). The leg bones of this dog are as long as those of the larger specimens of the ‘S-Gruppe’ of Haithabu (Wendt, 1978: pp. 39-57). Given the relative lengths of the upper legs and the forelegs (table 30), dog 404 was of normal type. In this type, the bones of the upper legs (humerus and femur) are at least as long as the bones of the forelegs (radius andibia). Dogs in which the radius andibia are longer than the humerus and femur are of the greyhound type (Öhman, 1983: p. 180).

The first toe of the hind leg shows the condition of an ordinary, non-inbred dog. A normal first toe consists of a rudimentary metatarsus I and a horny claw at the side of the distal end of metatarsus II. Phalanges are absent (Kadletz, 1932: Abb. 284.1). In inbred strains, deformities of the first toe occur, in extreme cases producing two thumbs instead of one. A less radical deformity is the fusion of metatarsus I with the osseous primum (Kadletz, 1932: Abb. 284-285). Of this dog, both metatarsi I were retrieved, which had not fused with the osseous primum. A few thoracic vertebrae show a slight development of osteophytes. The dorsal processes of some thoracic vertebrae had almost fused together. The tail may have been docked at the fourth vertebra or cut off at burial.

Dog 408: The dog lay on its left side, with legs drawn up, and oriented ESE-WNW. Of the skull only a few parietal fragments were found. These, together with an I or I, show that the head was there originally. The scapulae and the two halves of the pelvis are very incomplete, the left and right humerus, radius, ulna, femur, tibia and fibula are fairly complete. Major parts of the dog’s feet are lost, of the front legs in particular. The phalanges are especially poorly represented. The tail too is incomplete: only two tail vertebrae have been found: numbers 2 or 3 and one from the tip of the tail (number 15 or beyond).

This skeleton did include a baculum; hence it was a male dog. All epiphyses had fused; however, this does not take more than 20-24 months. The only surviving incisor is somewhat less worn than the incisors of dog 201. The age is therefore estimated as a little over 7 years (Habermehl, 1975).

The height at the withers of this dog was between 65 and 69 cm (table 31), which made this dog one of the largest at Oosterbeintum (table 32). The leg bones are as long as those of the larger dogs of the ‘S-Gruppe’ of Haithabu (Wendt, 1978). Given the relative lengths of
Table 30. Oosterbeintum. Measurements of skeletal elements of the dogs 201, 404, 408, 432, 477 and 480, after the system of von den Driesch (1976). All measurements are in mm.

<table>
<thead>
<tr>
<th>Dog</th>
<th>201</th>
<th>404</th>
<th>408</th>
<th>432</th>
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<tr>
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<td>Length Basion-Synsphenion (4)</td>
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<td>-</td>
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<td>-</td>
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<td>Length M²-P² (15)</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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</table>
the upper legs and forelegs, the dog was of normal type (Öhman, 1983).

The right-hand metatarsus III had not fused with the os tarsale primum (fig. 47). The left-hand metatarsus I is absent. Yet the left-hand os tarsale primum is present, which shows no sign of fusion with the metatarsus I. These phenomena point to a normal, non-inbred dog.

The middle six thoracic vertebrae and the 5th, 6th and 7th lumbar vertebrae have osteophytes on the underside of the vertebral body (fig. 48). The right-hand front leg (radius) and the left-hand hind leg (tibia and fibula) showed signs of inflammation, just above the carpus and tarsus (fig. 49). The tail had not been docked.

Dog 432: The dog lay with legs drawn up, on its right side (fig. 50). Its head pointed to the west. Apart from foot bones of the front legs and of the left hind leg, the skeleton is complete, including most of the tail (tail vertebrae 1, 5, 7, 9, 10-17).

Given the presence of a baculum (fig. 51), the dog was definitely a male. All epiphyses have fused. The dog had its complete set of permanent teeth. The premolars and molars of the upper and lower jaw are severely abraded. The lower jaw on the left has a few defects of the teeth, which are more or less age-related: the P4 has been lost and its socket has closed up. The crown of P3 has broken off. The two roots were still present in the jawbone. The only surviving incisor, an I1, is very severely worn. The advanced wear of the canines and the incisors indicates an elderly dog, at least 8 years old (Habermehl, 1975: Abb. 108).

The total length of the jawbone (von den Driesch,

<table>
<thead>
<tr>
<th>Skeletal element</th>
<th>Length (mm)</th>
<th>Height of the withers (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L</td>
<td>R</td>
</tr>
<tr>
<td><strong>Dog 201</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Femur</td>
<td>219.0</td>
<td>220.2</td>
</tr>
<tr>
<td><strong>Dog 404</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humerus</td>
<td>189.0</td>
<td>188.7</td>
</tr>
<tr>
<td>Radius</td>
<td>183.8</td>
<td>183.1</td>
</tr>
<tr>
<td>Femur</td>
<td>204.3</td>
<td></td>
</tr>
<tr>
<td>Tibia</td>
<td>203.4</td>
<td>204.2</td>
</tr>
<tr>
<td><strong>Dog 408</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humerus</td>
<td>204.1</td>
<td>204.4</td>
</tr>
<tr>
<td>Radius</td>
<td>197.1</td>
<td></td>
</tr>
<tr>
<td>Femur</td>
<td>221.8</td>
<td>223.7</td>
</tr>
<tr>
<td>Tibia</td>
<td>222.0</td>
<td>222.9</td>
</tr>
<tr>
<td><strong>Dog 432</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humerus</td>
<td>190.6</td>
<td>189.0</td>
</tr>
<tr>
<td>Tibia</td>
<td>208.4</td>
<td>209.7</td>
</tr>
<tr>
<td><strong>Dog 477</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humerus</td>
<td>191.0</td>
<td>189.9</td>
</tr>
<tr>
<td>Radius</td>
<td>189.8</td>
<td>191.4</td>
</tr>
<tr>
<td>Ulna</td>
<td>222.7</td>
<td>223.1</td>
</tr>
<tr>
<td>Femur</td>
<td>205.4</td>
<td>205.0</td>
</tr>
<tr>
<td>Tibia</td>
<td>214.7</td>
<td>212.4</td>
</tr>
<tr>
<td><strong>Dog 480</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humerus</td>
<td>204.1</td>
<td>202.6</td>
</tr>
<tr>
<td>Radius</td>
<td>204.1</td>
<td>205.4</td>
</tr>
<tr>
<td>Ulna</td>
<td>238.6</td>
<td></td>
</tr>
<tr>
<td>Femur</td>
<td>224.3</td>
<td>224.8</td>
</tr>
<tr>
<td>Tibia</td>
<td>232.0</td>
<td>233.1</td>
</tr>
</tbody>
</table>

Table 32. Oosterbeintum. The principal features of the dogs from the cemetery. Doli = Long-headed (dolichocephalic); S = Slender-legged; Norm = Normal proportions of upper and lower leg; Grey = Leg proportions as of of a greyhound; Lipp = Lipping along the edges of vertebral bodies; If = Inflammation; TI = Tooth loss; - = indeterminable. A stop is a concave depression in the skull of dogs at the transition point from the neurocranial to the facial part of the skull.

<table>
<thead>
<tr>
<th>Dog No.</th>
<th>Head shape</th>
<th>Stop in skull</th>
<th>Sex</th>
<th>Age (in years)</th>
<th>Height of the withers (in cm)</th>
<th>Build (Wendt)</th>
<th>Build (Ohman)</th>
<th>Pathologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>201</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>9-10</td>
<td>67-68</td>
<td>S</td>
<td>-</td>
<td>Lipp</td>
</tr>
<tr>
<td>404</td>
<td>-</td>
<td>-</td>
<td>Male</td>
<td>3-4</td>
<td>60-63</td>
<td>S</td>
<td>Norm</td>
<td>Lipp</td>
</tr>
<tr>
<td>408</td>
<td>-</td>
<td>-</td>
<td>Male</td>
<td>&gt;7</td>
<td>65-69</td>
<td>S</td>
<td>Norm</td>
<td>Lipp</td>
</tr>
<tr>
<td>432</td>
<td>-</td>
<td>+</td>
<td>Male</td>
<td>8</td>
<td>c. 62</td>
<td>S</td>
<td>Norm</td>
<td>Lipp</td>
</tr>
<tr>
<td>477</td>
<td>-</td>
<td>+</td>
<td>Male</td>
<td>1.5</td>
<td>62-64</td>
<td>S</td>
<td>S</td>
<td>Lipp</td>
</tr>
<tr>
<td>480</td>
<td>-</td>
<td>+</td>
<td>Male</td>
<td>9-10</td>
<td>67-69</td>
<td>S</td>
<td>S</td>
<td>Lipp</td>
</tr>
</tbody>
</table>

1976: fig. 23:1), left 161.6 mm, right 161.0 mm, points to a dog of dolichocephalic type (long-headed, from the Greek dolichos, long, and kephale) (Evans & Christensen, 1979: table 2:4, p. 119: dolichocephalic 163 mm, mesaticephalic 134 mm, brachicephalic 85 mm). The P₃ is in the normal, aligned position. The skull has a distinct stop, a depression in the skull at the transition from the neurocranium to the facial part of the skull, producing a marked ‘step’ in the dog’s profile (fig. 50). The height at the withers was c. 62 cm. This made it one of the smaller dogs of the Oosterbeintum cemetery (tables 31 and 32). In terms of leg-bone length, this dog too corresponds with the larger dogs of the ‘S-Gruppe’ at Haithabu. Given the relative lengths of the upper leg
Fig. 49. Oosterbeintuin, dog grave 408. Left: right-hand radius; right: left-hand tibia; both with traces of inflammation. Scale 1:2. Photograph by R.J. van Ewyck, C.F.D., R.U.G.

Fig. 50. Oosterbeintuin, dog grave 432. The stop (the step in the skull's profile) and the baculum (beside the lower end of the femur) are clearly visible. Photograph by G. Delger, V.A.R.U.G.
and the foreleg (see dog 404), dog 432 was of the normal type. The stop, a depression in the skull at the transition from the neurocranial to the facial part of the skull, also points to this (Öhman, 1983).

All thoracic and lumbar vertebrae, the sacrum and the first two tail vertebrae, to a fairly marked degree have osteophytes on the vertebral centre. The loss of a tooth in the left-hand lower jaw has already been mentioned. The tail had not been docked and was at least 17 vertebrae long (fig. 51).

In the dog’s abdominal cavity the contents of its rectum were found, resembling a coprolith 4.7 cm long. It contained bone fragments of mammals of the size of a sheep, goat or pig. The rectal contents were examined for mites and parasites; the outcome was negative.

Dog 477: The dog lay on its right side, with its head to WSW. As with horse 430 and dogs 404, 408 and 432, the legs were drawn up. It is the most complete skeleton. Just a few bones from the carpi and tarsi and a few phalanges are lacking. Eleven tail vertebrae were recovered, Nos 5-7, 9-11, 15, and one beyond No. 15.

This dog too was a male, given the presence of a baculum. The sutures in the skull are still fairly open (fig. 52). The permanent teeth were already in place. Eleven tail vertebrae were recovered, Nos 5-7, 9-11, 15, and one beyond No. 15.

This dog too was a male, given the presence of a baculum. The sutures in the skull are still fairly open (fig. 52). The permanent teeth were already in place. Eleven tail vertebrae were recovered, Nos 5-7, 9-11, 15, and one beyond No. 15.

The height of the skull (von den Driesch, 1976: fig. 37: 38), 62.2 mm, indicates that this dog too was of the dolichocephalic (long-headed) type (Evans & Christopher, 1979: table 4-2, p. 119. Cranial height: dolichocephalic 61 mm, mesaticephalic 60 mm, brachycephalic 54 mm). The skull has a somewhat less pronounced stop than that of dog 432. The P_3 is straight, as is normal, whereas the P_4 and the M_2 are somewhat askew. The height at the withers of this young dog is estimated at 62-64 cm (table 31). As with the other dogs, the length of its leg bones corresponds with that of the largest dogs of Haithabu (Wendt, 1978). The relative lengths of upper leg and foreleg indicate that dog 477 had some features of a greyhound (Öhman, 1983). Yet its skull did not have a greyhound’s long, slender, globular profile without a stop.

The os tarsale primum of the right hind leg is not fused with the metatarsus I. This indicates a normal, non-inbred dog. The tail of this dog was undocked and at least 16 vertebrae long.

Dog 480: This dog lay on its left side, its head to the NNW. The front legs were drawn up, the hind legs extended (fig. 54). Apart from the left scapula and the bones of the left front foot, the skeleton is complete. There are nine tail vertebrae: numbers 1-6, 8 and two from the series 15-19 (fig. 55). The dog was definitely a male dog since a baculum was present (fig. 56). All epiphyces had fused. The dog had its permanent set of teeth. The premolars and the molars of both jaws are all severely abraded (fig. 57), as are the canines of the lower jaw. The latter had been abraded by the P’s. This process will most damage the tooth midway between its point and the gum. The tooth will easily break off at this point, which is what in fact happened to the right-hand
Fig. 52. Oosterbeintum, dog grave 477. Skull, seen from the left (A) and from above (B). In B the open sutures are clearly visible. Scale 1:1. Photograph by R.J. van Ewyck, C.F.D., R.U.G.
Fig. 53. Oosterbeintum, dog grave 477. Left part of the mandible with slight wear on the teeth (for an example of advanced wear, see fig. 57). Scale 1:1. Photograph by R.J. van Ewyck, C.F.D., R.U.G.

Fig. 54. Oosterbeintum, dog grave 480. Dog with extended hind legs. Photograph by G. Delger, V.A.R.U.G.
canine in the lower jaw. The tip of the right-hand canine in the upper jaw is quite badly worn; that on the left much less so. The I1s and the I2s are distinctly worn, the I3s also on the lip side. This indicates a scissor-like bite. The dog’s age is judged to be at least 9-10 years (Habermehl, 1975: Abb. 109).

This animal, like the dogs of burials 432 and 477, had a large head with a straight muzzle. The greatest length of the mandible, c. 176.4 mm, points to a dog of the dolichocephalic type. The P3s are set straight in the jaw, while the P4s and M1s are a little askew (see also dogs 404 and 477). Dog 480 was the largest Oosterbeintum dog. Its height at the withers is estimated at c. 67-69 cm (tables 31 and 32). The size of this dog too puts it at the upper end of the range of the ‘S-Gruppe’ dogs of Haithabu (Wendt, 1978). His forelegs (radius and tibia) are longer than the upper legs (humerus and femur), which means that this dog can be classified as a type of greyhound (Ohman, 1983).

The left-hand os tarsale primum was recovered, which had not fused with the metatarsus I. Dog 480 therefore was another ordinary, non-inbred specimen. The breastbone elements 2, 3, 4 and 5 all in varying degrees display exostoses. Maybe the breastbone and the surrounding tissues had been inflamed.

The abdominal cavity still contained the contents of the dog’s intestine. These included the remains of a fetal piglet of a c. 92 days’ gestation (full term is 115 days). Parts of the skull, the spine, the front legs and the pelvis were identified (fig. 58). The fetal age was calculated from the length of the diaphysis of the humerus, 29.5 mm (Gjesdal, 1972: table 4; see also Prummel, 1989a: table 7). The dog will have eaten the fetal piglet shortly before his death. The piglet may have become available as dog food after a spontaneous abortion or the death of a sow in farrow. Besides the bones of the fetal piglet, there were seven small splinters of mammalian bone, also remains of the dog’s dinner.

**Interpretation of the dog burials**

Like the horse burials, dog burials too are a well-known phenomenon in early medieval cemeteries. Still, dog burials are much less common than horse burials. In all, 360 dogs from 271 graves or cremations of the 5th to the 11th/12th century are currently known (from the 9th century on, continuing only in Scandinavia). Dog burials virtually all accompany human burials or cremations (151 dogs with 133 burials or cremations). Separate dog burials, like those of Oosterbeintum, are much less common. Including those from Oosterbeintum, we know of just 25 dogs (from 19 graves) that do not share a grave with a human and/or horse (Prummel, 1992a).

The largest group of dogs on the European continent, 35, are from Thuringian cemeteries (Müller, 1980; 1985; Wamsler, 1983). These dog burials date from the 5th to the 8th century AD. Most dogs of the 5th to 7th century accompanied one or more horses. In the 7th and 8th century especially, the Thuringians buried dogs
The early medieval cemetery of Oosterbeintum (Friesland)

Secondly, there are the dogs of the Saxons, 28 dogs in all (Müller-Wille, 1971; Rötting, 1977; Hornig, 1989). Twelve of these were in independent dog burials, all dating from the 7th-8th century. Fourteen dogs came from horse burials, of which seven dated to the 5th-7th century; the others dated from the 7th-8th century. The remaining two dogs were found in human graves of the 7th-8th century. The combination of human, horse and dog is not documented for Saxon cemeteries. Six dogs were uncovered in Anglo-Saxon cemeteries, of which four in human graves and two with a horse and a human. Some thirteen dogs are known from Langobardic cemeteries, both in Austria and former Czecho-Slovakia, in the 5th and early 6th centuries, and in Italy in the 6th and 7th centuries (Müller-Wille, 1971; Novotný, 1974; Rybóvá, 1979; 1980; Riedel, 1990). Five dogs lay buried in horse graves, six in human graves and two in graves with horse and human. In the course of the 7th century the Langobards dropped the custom of burying dogs in their cemeteries.

From the coastal region of the northern Netherlands,
ten to twelve dogs are known, of which the majority lay in graves of their own. These are the six of Oosterbeintum and up to three dogs from Hogebeintum. One, possibly two dogs lay in horse graves: the double horse grave of Ezinge-De Bouwerd and possibly a single horse grave in the same cemetery (Boersma, 1980; Prummel, 1992a). Of a twelfth dog, a male dog from Rasquert, the relation to other burials is uncertain (Boersma, 1967). The dogs of Oosterbeintum cannot be more closely dated than to AD 450-750. The same date applies to the dog(s) of Hogebeintum. The double horse grave of Ezinge-De Bouwerd is dated to the 7th-8th century (Boersma, 1980).

The numbers of dogs in Frankish and Alemannic cemeteries, fourteen and eight, are small in comparison to the many horse burials at these cemeteries (Müller-Wille, 1971; Oexle, 1984). The Frankish dogs were buried with human and horse (two dogs of the 5th-7th century and two of the early 8th century), with a human (five dogs of the 5th-7th century), with a horse (one dog of the 5th and two of the 7th century), or (probably) alone in a grave (two dogs of the 5th-7th century) (Müller-Wille, 1971; Oexle, 1984; Salin, 1959: pp. 19-20). Five Alemannic dogs lay in human graves of the 6th, the 7th (three) and the 5th-7th century. Two others were buried together with three humans and two horses in a 7th-century grave. The final Alemannic dog lay in a grave of its own dated to the 7th century (Müller-Wille, 1971; Kleinschmidt, 1967; Koch, 1977). The inhumation of dogs among the Alemanni and Franks ended in the late 7th or early 8th century. In the Frankish cemetery of Kleinlangheim in the north of Bavaria there appeared the grave of a wolf with a height at the withers of 75 cm (Boessneck & von den Driesch-Karpf, 1967).

In Sweden, especially in the area around Stockholm and Uppsala, dogs were added to inhumations and cremations from the 5th to the 11th century. From the Migration period (400-550) we have nine dogs, from the Vendel period (6th-8th century) 77 dogs, and from the Viking period (9th-11th century) 129 dogs (Öhman, 1983; Sten & Vretemark, 1988; Prummel, 1992a). All of these dogs accompanied a human as well as one or more horses. Here often large numbers of dogs were buried or cremated with a person (up to 11 dogs in one grave). Across the Gulf of Bothnia, in the Eura region of SW Finland, dogs were buried with people in the Vendel period (one instance) and the Viking period, continuing until c. 1050-1150 (18 dogs). With the exception of one dog which lay in a grave of its own, these were dogs in human graves (Fortelius, 1982). Twelve dogs have been found in Denmark, one dating to AD 550-800 and eleven from the 800-1050 period (Müller-Wille, 1971).

The distribution of the dogs in Merovingian cemeteries on the European continent more or less coincides with that of the horses (Oexle, 1984: figs 6-8). In areas with large numbers of horse burials in certain periods we also see substantial numbers of dogs in the same periods. Still there are differences between these distributions. Alemannic dog burials of the 5th and early 6th centuries have so far been lacking, while there are horse burials of that time. In Frankish cemeteries of the 7th century the dogs are markedly fewer than the horses. In the Carolingian period the distributions of horse and dog burials in western Europe are parallel. Then horses and dogs virtually disappear from Frankish and Alemannic cemeteries, while their numbers in Saxon and Frisian cemeteries remain substantial (Oexle, 1984: figs 6-8; Müller-Wille, 1971: Abb. 21; Prummel, 1992a).

This parallel distribution in space and time of the dog and horse graves suggests that the buried dogs and horses served a similar function, that of grave goods. The dogs, including those of Oosterbeintum, will have been killed and buried at the time of a funeral. This may have been either for a man or a woman. Indeed dogs occur in inhumations and cremations both of men and of women (78 and 21 respectively, among the 216 human graves containing one or more dogs). Four other graves with one or more dogs contained both one or more men and one or more women. The gender of the bodies in the other 109 graves is unknown.

For 215 of the 360 dogs of the early Middle Ages, reliable data on the animal's sex, age and/or size are known. Apart from the dogs from the coastal region of the northern Netherlands (i.e., Oosterbeintum (see table 32), Hogebeintum (only the sturdy skulls were preserved in the Fries Museum) and Ezinge-De Bouwerd (sex unknown, age 2.5 years, 65-67 cm tall) (Prummel, 1992a)), these are mainly the dogs of the Thuringians and those from Sweden. The Thuringian dogs include a large number of males (with a baculum). All of these dogs were large specimens. Their height at the withers varied between 62 and 68 cm; their age between 6 months and 6-8 years (Müller, 1980; 1985). Müller suggests that many bacula were lost in careless excavation. Many Swedish dogs too were definitely males (with bacula). The height at the withers ranged from less than 40 cm to 60-75 cm (Öhman, 1983; Sten & Vretemark, 1988). For the size of the dogs of the Saxons, the Franks and the Alemanni we only have clues, such as excavators referring to 'large dogs'. One of the Anglo-Saxon dogs was described as a 'lapdog'.

For the continent (Thuringia, coastal region of the northern Netherlands, and probably also the lands of the Saxons, Franks and Alemanni) we may assume that especially, if not exclusively, male dogs of considerable size were buried in the early medieval cemeteries. This applies both to the dogs that were buried alone and for those buried together with people and/or horses. The age of the dogs was varied.

During life, these large dogs will have been used especially in defending livestock against wolves, and in warfare. Documentary sources reveal that large dogs in particular fulfilled these functions (Paul, 1981: pp. 23-48). A dog that defended the herd should be able to pursue and kill a wolf. This is mentioned in the Lex Frisionum, the law of the northern Netherlands, which
remains of animals (see 4.9), may have ended up in the clothing, personal utensils, and purposely added gifts to objects were found both in the cremation features and complement in the inhumation graves. The finds provide evidence about what was buried or burnt with the body, such as clothing, personal utensils, and purposely added gifts to accompany the dead. Several finds, including many remains of animals (see 4.9), may have ended up in the objects then drawings were made of the metal objects. Then drawings were made of the metal objects.

4.1. Introduction

Objects were found both in the cremation features and in the inhumation graves. The finds provide evidence about what was buried or burnt with the body, such as clothing, personal utensils, and purposely added gifts to accompany the dead. Several finds, including many remains of animals (see 4.9), may have ended up in the cremation features or added gifts to the inhumation graves.

4.2. Metal objects

Soil was removed from the metal objects by means of sandblasting at the laboratory of the R.O.B. (Amersfoort). The cleaned clumps of rust were then subjected to X-ray photography at the Department of Radiodiagnostics of the University Hospital of Groningen; this usually clarified the original shape of the object. Then drawings were made of the metal objects. They were not restored, since this would destroy any adhering textile remains.  

was codified in the 9th century (Eckhardt & Eckhardt, 1982). In warfare dogs were used to attack the enemy. One may imagine that the bloodthirsty males were particularly suited for this task. The burial in early medieval cemeteries of (decoy?) red deer and birds of prey trained for falconry may mean that like these the dogs were also used in hunting (red deer: Schretzheim (Koch, 1977: p. 181), Basel-Bernerring (Kaufmann, 1976) and Rullsdorf (Hornig, 1989); birds of prey: Quedlinburg, grave 41 (Müller, 1980: p. 111); Alach (Timpel, 1990) and various cremation graves in Sweden (Sten & Vretemark, 1988)).

The undifferentiated build of the dogs of Oosterbeintum is very compatible with the task of taking part in warfare and attacking wolves. The association of a male dog with a (male) horse and a human in early medieval cemeteries, in separate or combined graves, supports the hypothesis that the dogs were employed in warfare. This function may have been in part symbolic, with dogs as emblems of power (Alkemade, 1992).

3.3.4. Brandgrube 97: sheep or goat and teal

*Brandgrube* 97 contained the remains of a cremated sheep or goat and a cremated teal (*Anas crecca*) (3.1.3).

The remains include elements of all parts of the bodies (catalogue), which means that complete animals had been cremated. The sheep or goat died before it was 5 to 7 months old (the phalanges 2 were proximally unfused). Hence a lamb or kid had been cremated. The teal was an adult bird.

No human remains were found in this feature. Cremation graves of animals without human remains are known from Scandinavian early medieval cemeteries. Of 308 cremation graves in North Spånga near Stockholm (Sweden) containing one or more animals, nine did not contain any human remains. The species represented in these cremation burials are dog, horse, sheep and cattle (Sigvallius, 1994).

The cremation of the lamb or kid and the teal in *Brandgrube* 97 probably took place on the occasion of a human interment or cremation. In the latter case, the human and animal cremations were performed separately. *Brandgrube* 97 will have had the same function as the horse and dog burials: some sort of complement or offering to a human burial. It is not known with which grave it might have belonged.

4. THE GRAVE GOODS

4.1. Introduction

Objects were found both in the cremation features and in the inhumation graves. The finds provide evidence about what was buried or burnt with the body, such as clothing, personal utensils, and purposely added gifts to accompany the dead. Several finds, including many remains of animals (see 4.9), may have ended up in the cemetery by chance. Datable grave goods offer clues about the age of the graves and the duration of the cemetery's use (chapter 5). Finally, the grave goods may provide evidence regarding the gender and social status of the dead person and the demography of the population that used the cemetery (chapters 6 and 7).

The nature and quality of the grave goods are strongly dependent on the type of funerary rite. In the cremations many grave goods were burnt together with the body, which severely damaged them. Some disappeared altogether or became unrecognizable. Some of the grave goods may have been left at the site of the pyre. Cremation features have been found to contain remains of burnt pottery, metal, glass, amber and antler (tables 3 and 4). Also some unburnt objects were encountered in the cremation features: earthenware urns which contained the dead person's ashes, antler combs that were buried with the ashes (urns 483 and 66) and maybe additional pottery and spindle whorls, of which it is not always clear whether they were secondarily burnt. Most objects are in poor condition as a result of cremation and decay in the soil. Clothing has completely gone. Items of iron, bronze and antler are mostly just fragmentary, while glass objects have melted. A great deal of charcoal from the pyres was found (table 2). A few unidentifiable wooden artefacts were spotted among the charcoal. Nothing had survived of any cinerary containers in the *Brandgruben* (3.1.3).

With the inhumations, (remains of) objects of stone, metal, leather, woven fabrics, pottery, glass, amber, bone, antler, wood and an unidentified botanical substance have been preserved (table 18). Only the grave goods of flint, pottery, glass, amber, bone and antler are well preserved. The metal (iron, bronze, lead) has severely corroded, owing to the commercial quarrying of the topsoil and the recent, effective drainage of the *terp* body. Apart from a few fabric fragments in the corroded copper or iron of brooches, all textiles have decayed. The oxides had completely permeated some fragments and thus prevented their disintegration. In this way also part of a leather sheath was preserved in the form of rust (grave 435). In a few graves, remains of tree-trunk coffins came to light. There is also evidence of wooden artefacts. Several of the grave goods still occupied their original place with respect to the body, allowing inferences about their function.

4.2. Metal objects

Soil was removed from the metal objects by means of sandblasting at the laboratory of the R.O.B. (Amersfoort). The cleaned clumps of rust were then subjected to X-ray photography at the Department of Radiodiagnostics of the University Hospital of Groningen; this usually clarified the original shape of the object. Then drawings were made of the metal objects. They were not restored, since this would destroy any adhering textile remains. 16
The spearhead
Beside the left arm of the man in inhumation grave 335 there lay an iron spearhead with a hollow shaft and a slender oval blade. The spearhead corresponds to Böhner’s type A4 (Böhner, 1958: pp. 148-150). At Krefeld-Gellup this type is dated to the 6th century (Pirling, 1974: p. 140).

The Schmalsax
The same grave (No. 335) contained an iron Schmalsax on the left hip. This is a short sword with a single cutting edge that was used for hewing or stabbing. The sax has a wooden hilt which partly survived in the rust. Böhmer classifies such swords as type A2, which he dates to AD 525-600 (Böhner, 1958: pp. 136-138).

Large knife and awl in a leather sheath
In the inhumation grave of another man, No. 435, an elongated iron object was found on the left hip. X-ray photos show that this consists of a large iron knife and an awl-like iron object. They were contained in a sheath of leather which had been partially preserved by the rust. The sheath also contained an undecorated bronze nail, which may have been fixed to a wooden part of the sheath. A clearly datable parallel to this combination has not been found.

Small iron knives
In five inhumation graves (male burials 15, 335 and 460, female burial 374B and adult burial 98), one disturbed cremation feature (100), two urns (515 and 519) and stray finds in the terp (439 in inhumation grave 393) and 511; possibly from disturbed cremation features), simple small knives of iron were found. Grave 60 may have held a fragment of an eleventh small knife. Any typology must be based upon the curve of the back of the knife, since the prong with which the knife was attached into the hilt has usually broken away and the cutting edge has been altered by sharpening. The knives from Oosterbeintum can be classified into three groups (fig. 59):

A. The knives with a straight back and a curved

![Diagram](image)

Fig. 59. Oosterbeintum. Examples of the three identified types of knife. A. With a straight back and curved cutting edge (grave 374B illustrated); B. With a curved back and curved cutting edge (grave 15 illustrated); C. With a distinctly angled back and a straight cutting edge (grave 511 illustrated). Scale 1:2. Drawing by H.J.M. Burgers, A.I.V.U.
The early medieval cemetery of Oosterbeintum (Friesland)

Ahrens (1983) performed an elaborate analysis of the 123 knives from that part of the cemetery of Ketzendorf in northern Germany that was used in the second half of the 8th and the early 9th century. All three types of knife occur there. Ahrens even distinguished subtypes, which did have a chronological value for this cemetery. Yet he warns that his findings are not necessarily applicable to other cemeteries. The number of knives in the cemetery of Oosterbeintum is too small to allow a similar analysis.

**Tweezers**

In a man’s inhumation grave, No. 335, a bronze, tweezer-like object was found together with a small iron knife, a strike-a-light and two metal buttons. In *Brandgrube 5* (of an adult) lay a fragment of bronze tweezers, burnt on the pyre. Such simple tweezers were used throughout the early medieval period.

**Buttons**

Two possibly bronze knobs of indistinct shape were found in a man’s inhumation grave (No. 335). Presumably they were fixed to a belt and served to attach a pouch holding a small knife, a pair of tweezers and a strike-a-light. Similar buttons of antler were found in male inhumation burial 15.

**Buckles**

Fourteen buckles were found, four of bronze and ten of iron. Inhumation grave 485A, of a man, contained a bronze buckle. On the foot of the woman in inhumation grave 393 lay a small buckle of bronze. A bronze buckle lay on the abdomen of the woman in grave 360. In ash stain 568 another bronze buckle was uncovered.

The bronze buckle in grave 485A is fairly thick, flat and kidney-shaped. At the attachment of the tongue, the buckle is somewhat narrower. The X-ray photo did not show any evidence of a decoration or an unusually shaped tongue. Such a buckle was also found in grave 145 at Rittersdorf. Böhner (1958, 179) dated this to the period AD 450-525. Siegmund (1989, *Abb. 16*) dates such buckles to between AD 440 and 485. Simple bronze buckles may also date from the period AD 525-600. An argument for an early date for this buckle could be that the grave also contained a sherd of Anglo-Saxon ware.

The bronze buckle from grave 393 is kidney-shaped and is triangular in section. The position of the buckle on the foot of the skeleton suggests that it was used on footwear or leggings. The other foot of the body had been disturbed. Small buckles with this function are well known from early medieval graves (Clauss, 1982; Kock, 1990: pp. 165-168; Knaut, 1993: p. 92). The bronze buckle from grave 360 is annular. Nothing is known about its function and dating.

The bronze buckle from ash stain 568 has a small mounting plate, whose shape shows up distinctly in the X-ray photo. This buckle is markedly smaller than the other bronze buckles or the iron buckles and may have belonged to footwear. The shape of the buckle and the mounting plate do not reveal anything about its date.

Iron buckles were found in male inhumation burials B, 335 (two specimens) and 435, in *Brandgrube 5*, in urns 372 and 267 (two specimens) and in the disturbed cremation features 420 and 460. All are of simple design and not closely datable. Given the other grave goods, the buckles from grave 335 date from the 6th century. The urn in burial 372 dates from the second half of the 7th century, the urn in grave 267 from the late 7th or early 8th century. One of the buckles from grave 335 (find No. 335.3) in view of its position in the grave probably belonged to a belt. The function of the other iron buckles remains obscure.

**Brooches**

In inhumation graves, in disturbed cremation features, in what may be disturbed inhumation or cremation features and as unstratified finds in the *terp*, thirty brooches or parts of brooches were found. Among them, at least six different types can be distinguished.

Disturbed cremation 460 contained a fire-damaged bronze *Stützarmfibula mit stabförmigem Bügel*. The brooch is decorated with a circle and-dot motif and along the arm it bears some chevrons in niello. Good parallels for the niello decoration are known from the Elbe-Weser coastal region (Böhme, 1974: p. 52). Other *Stützarmfibulae* have been found especially in the Dutch river area (Böhme, 1974: *Karte 10*; van Es & Verwers, 1977; Haalebos, 1990; Hulst, 1992). Böhme assumes that these brooches, like the *Zwiebelkopffibulae*, were worn by men. In the Elbe-Weser coastal region they also occur in women’s graves. *Stützarmfibulae* are dated to the first half of the 5th century (Böhme, 1974: pp. 51-52).

Four inhumation graves, A, 60, 360 and 398, each contained one bronze cruciform brooch of Midlum type. Graves 60 and 360 were both osteologically and archaeologically women’s graves, grave A was archaeologically female and the body in grave 398 was osteologically a man’s and archaeologically a woman’s (3.2.6). Reichstein (1975, 42) described 25 specimens of this type, including four Dutch ones: two from the cemetery of Hogebeintum, one from Oosterbeintum (grave A) and a fourth from Midlum. This last one gave...
the type its name. In the depot of the Fries Museum another brooch of this type was recently discovered, which had been found in the Hogebeintum cemetery in 1907 (Fries Museum inv. No. 1987-1-28). Three Frisian specimens, one from Wijndalum, one from Oosterbeintum, and one from an unknown findspot, are in a private collection (Zijlstra, 1991a: fig. 3-5c; 1991: fig. 21; 1994: fig. 8-44).

With the three new Midlum-type brooches from Oosterbeintum, eleven of this type are now known from Friesland, of which eight are in the Fries Museum and three in a private collection. The type is fairly frequent in eastern England (14 specimens). Two more were found in Schleswig-Holstein, and three in Denmark (Reichstein, 1975: p. 42). Reichstein (1975, 108) believes the Midlum type to be one of the late forms of the cruciform brooches. He dates these to the second half of the 5th and maybe the early 6th century. His dating of the English brooches is not based on large numbers of finds. Since the late forms display similarities to the so-called 'animal style', Hines uses the first occurrence of this style as a starting point of the late forms of the cruciform brooches: AD 475. Foran enddate he mentions AD 525 (Hines, 1984: pp. 7-28). In this study, Hines' dating is adopted. Apart from these brooches of Midlum type, a number of cruciform brooch fragments were found that are not attributable to any type: those in grave 60, the disturbed cremation feature in grave 100, and bustum grave 160, and the stray find 365. For these fragments, a date in the 5th or early 6th century is most likely.

Three inhumation graves in which a brooch of Midlum type was found (A, 360 and 398) also contain one or two 'small long brooches'. These are small, bronze, bowed brooches, modelled on the larger cruciform brooches (Böhme, 1986: p. 556). Whereas the latter were mostly used to fasten a cloak, the small long brooches served for fastening the undergarment. In grave 360 a large cruciform brooch lay below the chin, while there were small long brooches on either shoulder. In grave 47 of Hogebeintum these brooches are shown on these same parts of the body (Knol, 1993a: fig. 61). In grave 398 a small long brooch lay below the chin and a cruciform brooch aside of the chest. Presumably it had slid sideways, having originally lain on the chest. It is not known how the brooches lay on the body in grave A. So far no typochronological study has been made of the small long brooches on the continent.

The Angles and the Saxons introduced brooches of this type into England. The great variation in forms among the English small long brooches was investigated by Leeds (1945). His classification has been criticized, but has not yet been improved upon. In England these brooches are dated from the early 5th to the late 6th century (MacGregor & Bolick, 1993: p. 125). Those of Oosterbeintum do not fit into Leeds' classification, although they are closely related to the English brooches. There is also a link with continental forms which are dated to the latter half of the 5th and the early 6th century (Böhme, 1986: p. 556 and fig. 72). This dating corresponds with that of the cruciform brooches of Midlum type. The small long brooches of Oosterbeintum will be of the same period: second half of the 5th and early 6th century.

Inhumation grave 428, of a woman, contains a variant of the small long brooch. Yet the bow is ribbed and the headplate is not rectangular but consists of two inward-curling spirals and thus is kidney-shaped. This must be an early form of the Domburg brooch, with a kidney-shaped headplate. Quite a lot has been written about this type of brooch but unfortunately most finds lack a datable context. On typological grounds, Werner (1955) dates these brooches to the 6th century. Given the presumed date of the other finds at Domburg, Roes (1954) was inclined to date such stray finds in terpen to the 7th and 8th centuries. Van Es (1967) and Capelle (n.d.) without specific arguments adopt this dating for such brooches from the cemeteries of Wijster and Domburg. The brooches from Wijster came from graves without closely datable grave goods (van Es, 1967: graves 10 and 19). The settlement at Domburg may have existed as early as the 6th century. In any case the earliest coins date from the end of that century (Blok, 1974: p. 30). Hence this dating may also apply to the Domburg brooches.

The brooch from Oosterbeintum has a more distinct headplate decoration, with inward-curving spirals, than the Domburg brooches themselves. Presumably the Domburg brooch is a Frisian variant of the 'small long brooch', which evolved in the 6th century and continued into the 7th (see also Botman, 1994). The later brooches of this type have smooth, kidney-shaped headplates. The brooch from inhumation grave 428 may be regarded as an early, 6th-century form of the Domburg type. This dating fits in with that of the annular brooch from the same grave. Brooch fragment 136, a stray find, is probably also part of a small long brooch.

Seven bronze annular brooches with iron tongues were found. Women's inhumation graves 60 and 295 contained such brooches, and pairs of such brooches accompanied the women in inhumation graves 374B and 428. A stray find, maybe from a funerary context, is a lump of rust with the impression of an annular brooch (find No. 119). The annular brooches are decorated with bulges, grooves and dots. At the spot where the tongue is attached to the ring, the latter is narrower. These brooches were found close to the neck, on the collarbones, or at the chin. These ornaments were typically worn on both collarbones. These simple annular brooches often occur in graves in Anglo-Saxon Britain. They are dated throughout the early Anglo-Saxon period, which spans the second half of the 5th century up to around 700 (Leeds, 1945: pp. 48f; see also West, 1985: p. 142 and fig. 262; MacGregor & Bolick, 1993: p. 82). Brooches similar to those from Oosterbeintum have been found in 6th-century inhumation graves at Spong.
Hill (graves 19 and 24 in Hills, Penn & Rickett, 1984: pp. 67-68; figs 78, 80 and Pl. XII). On the basis of other grave goods, grave 24 can be dated to the first half of the 6th century (Hills, Penn & Rickett, 1984: p. 14).

Annular brooches are known also from the Netherlands. In Friesland especially, quite a number have turned up (Knol, 1993a: pp. 67-68 and fig. 59). Further inland on the continent, annular brooches are rare. Also because of the accompanying grave goods, the annular brooches from Mithilhaussen (Thuringia) have been regarded as Anglo-Saxon imports (Behm-Blancke, 1959; Vierck, 1970: pp. 355-363. Another is known from a rich grave at Speyer (Polenz, 1988: Taf. 160.10). On the basis of the cruciform brooch, inhumation grave 60 of Oosterbeintum is dated to the final quarter of the 5th or the first quarter of the 6th century. These parallels suggest that all annular brooches from Oosterbeintum may date from about AD 475 to 700.

Three strap-shaped, equal-armed brooches of bronze were found in inhumation graves 342 (child), 393 (woman), and 501 (woman). All three consist of a slightly widened bow with a few grooves at either end. The one from grave 393 is so badly corroded that its 6th century (Hil Is, Penn & Rickett, 1984: p. 14).

An undecorated headplate fragment (stray find 224) must belong to a Domburg-type brooch or to an equal-armed brooch, van Bellingen type 7.1 (van Bellingen, 1988). The dating in either case is 7th century. Fragments of brooches that could no longer be attributed to a particular type were found in inhumation grave 483 (a woman's), in ash stain 193 (presumably a child's ashes), in disturbed cremation feature 295, and unstratified in the terp (from a possibly disturbed burial: No. 155).

Wire ring with spiral knob
A wire ring with a spiral knob probably belongs with the urned cremation of a child (No. 438). This was made from a length of silver wire, the ends of which were twisted into a knob. Such rings are known from as early as the Roman Period and occur throughout the early Middle Ages (Böhner, 1958: p. 118; Capelle, n.d.: figs 438 and 439). Judging by the comb in urn 438, a 7th-century date seems likely for the ring of Oosterbeintum. At nearby Hogebeintum a number of such rings were found together with a 7th-century gold brooch and a string of glass beads (Knol, 1993a: fig. 77).

 Bracelets
Inhumation grave 398 (osteologically a man's, archaeologically a woman's grave), female burial 295 and bustum grave 160 (with the remains of a woman) each contained a simple bangle of bronze. These cannot be closely dated. The bracelets were made of bronze wire, the ends of which were entwined. The occurrence of a similar bracelet in grave 47 of Hogebeintum suggests a date in the last quarter of the 5th or the first of the 6th century (Knol, 1993a: fig. 61). In a broadly dated grave, No. 23, of the 6th/7th-century cemetery of Holywell, England, a similar ornament was found, which was worn as a foot bangle (Lethbridge, 1931: p. 17).

Given the other grave goods in burial 385, this bracelet must date from the last quarter of the 5th, or the first quarter of the 6th century. In view of the annular brooches found in grave 295, this grave will date from between the second half of the 5th and the 7th century. The bustum grave is dated to the latter half of the 5th or the early 6th century.

Pins
A thin bronze pin with an eye lay at the throat of the woman in inhumation grave 360. The head of the pin had broken off. A thread had been wound around the end of the pin. Its position at the throat suggests that the pin served to fasten a garment. This type of pin is difficult to date. The other grave goods in burial 360 date the pin to the last quarter of the 5th or the first quarter of the 6th century. A thin needle or pin lay in grave 435.

Chatelaine
At the side of inhumation grave 374 lay an object that presumably belonged with female burial 374B and not with the overlying child's grave 374A. It consists of a rusted iron ring with a clump of rust in which a link of a chain is visible. Adhering to the clump of rust there is a perforated upper canine of a wolf. On one side, the rust clump showed an imprint of wood. Close beside the ring and the rust clump lay a second perforated upper canine from presumably another wolf (this canine was somewhat larger than the first). X-ray photos of the rusty clump revealed that it contained more links of the iron chain. The iron ring and the chain of links presumably were parts of a chatelaine. This is a chain worn around the waist, whose ends hang down at the hip. A variety of small objects such as amulets and small tools will be fastened to the chatelaine. Attached to the Oosterbeintum chatelaine were at any rate a ring and the
two wolves’ canines. Presumably the latter served as amulets. Other items of more perishable material, such as wood, leather, horn or cloth, may also have hung from the chain.

Presumably the chatelaine had slid down to the side of the burial pit, where it rusted into a clump. The wood of which an imprint was found in the rust was almost certainly no oakwood, but possibly coniferous wood. Therefore it was not part of a tree-trunk coffin. Probably a wooden object lay beside the chatelaine, maybe even attached to it.

Chatelaines with iron or bronze chains are known from various early medieval cemeteries. The German ones are dated to the late 6th and the 7th centuries (Böhner, 1958: pp. 125-126; Taf. 24; Koch, 1967: p. 42, Taf. 62.7/10, 25; Stoll, 1939: 2.1; Taf. 15.8; Veeck, 1931: pp. 58-59; Taf. P1, K 17 and 43/44). Such chatelaines are found also in Anglo-Saxon cemeteries (Meaney, 1981: p. 141 and fig. IVdd; Lethbridge, 1931: pp. 62-64). Amulets of perforated animal teeth are a well-known feature in the early Middle Ages (Arends, 1978: pp. 137-165 (although he mentions very few teeth of wolf or dog from the continent); Meaney, 1981: pp. 131-139 (wolf/dog: pp. 134-136)). Anglo-Saxon England produced a few perforated canines of wolf or dog attached to chains or necklaces (Meaney, 1981: p. 135). Meaney suspects that most of the canine teeth referred to as ‘dog’ in the literature on Anglo-Saxon cemeteries were in fact teeth of wolves.

Among the early finds from Oosterbeintum there is an undatable perforated first incisor from the upper jaw of a horse. This too had probably served as an amulet (Fries Museum inv. Nos 28bis-250; Kramer & Prummel, in prep.). The perforation is in the root of the tooth. It is unknown whether this tooth came from a funerary context. A similar amulet (also the first incisor from the upper jaw of a horse) was found in the excavation on the Monniketerp at Tzummarum, near Barradeel (B.A.I. find No. 1961 42-33), dated to AD 700-1100. The horse-tooth amulet from Tzummarum is definitely not from a funerary context. In that excavation, layers of raised material and a sunken hut were found (Elzinga, 1961). The root of the horse’s incisor from Tzummarum had been trimmed. Non-perforated horse teeth that possibly were amulets have been found in Anglo-Saxon graves (Meaney, 1981: pp. 131-132). A child’s grave from Hogebeintum contained a tooth which presumably was an amulet (Knol, 1988: pp. 124-125). The tooth has a drilled hole, which may have held a small hook.17

A wolf’s tooth worn on the body was believed to ward off bogeys, to prevent teething ailments, and to render horses indefatigable (Pliny NH XXVIII. 1xxviii.257). The longest tooth of a black dog was thought to protect against the three-day fever (Pliny NH XXX.xxx.98; Meaney, 1981: p. 135).

**Bronze mounting**

In a woman’s inhumation grave (No. 60), an amount of sheet bronze lay on the hip, together with several bronze rivets and the corroded remains of what probably was a small knife. This mass was seen also to contain textile remains. A possible explanation of these finds is that they were part of a pouch with a bronze mounting, which contained a knife and maybe other items.

**Nails**

From graves and unstratified in the terp, 43 iron nails and fragments of iron nails were recovered. Of these, twenty-two (Nos 5 (four specimens), 70, 75 (four specimens), 76, 146, 160, 183, 295, 409 (two specimens), 410 (two specimens), 420, 421, 460 and 515) derive from cremation features (table 3). Ten were found in inhumation graves without evidence of disturbed cremations: 335 (two specimens), 393 (seven specimens) and 433 (table 18). Ten were found without a context in the terp soil (93, 153, 156, 191, 222, 228 (three specimens), 230 and 529) (table 4). These may come from disturbed cremation features. In the younger raised layer 9, another iron nail was found (field No. 21). Apart from the stray find 191, all iron nails, whole and fragmentated, are large ones.

Seventeen of the 42 large nails were definitely clinchers. A clincher has an ordinary nail’s head at one end. The shaft is longer than the thickness of the wooden parts to be joined. Around the protruding part of the shaft a perforated plate is placed, and then a second, flat head is created by hitting the round head with one hammer and the protruding point and platelet with another. Clinchers were found in male inhumation burial 335 (two specimens), female burial 393 (seven specimens), urned burial 515, female urned burial 409 (two specimens), tustum grave 160, Brandgrube 183 and the disturbed ash stain in grave 295. Also the stray find 156 and the find from the younger raised layer 9 were clinchers. The clinchers of Oosterbeintum have on one side a thick, round to square head and on the other side a thin plate. The plates in grave 335 are distinctly diamond-shaped (see catalogue). The length of the shaft varies between 3 and 7 cm.

The other 25 large nail fragments may also derive from clinchers. Of these only the head remains, with all or part of the shaft. The heads are either thin and flat or thick and square, or irregularly shaped. The nail fragments 460, 5 (four specimens), 70, 75 (four specimens), 76 and 228 (three specimens) have thin, flat heads. These may well have been plate-end clincher heads. The larger nail fragments 410 (two specimens), 93, 146, 230 and 433 have thick heads. These may have been the rounded heads of clinchers. Yet they may also have been the heads of large ordinary nails. The six other fragments are too small for identification.

Clinchers are regularly found in early medieval contexts. They were used in shipbuilding. With these clinchers, the planks of the hull of the vessel were attached to each other in lashpale fashion (Müller-Wille, 1970: pp. 28-41; 1976: pp. 20-23; van Es &
Clinchers were necessary to resist the forces exerted on the hull of a ship without a supporting frame (van Holk, 1986). In excavations of such ships, e.g. in ship burials, hundreds or thousands of clinchers are found (Müller-Wille, 1970: pp. 33-35). Most clincher plates are diamond-shaped, like those in grave 335. Also the flat heads of other clinchers of Oosterbeintum may originally have been diamond-shaped clincher plates. The severe corrosion has obliterated their original shape.

Clinchers with shaft lengths similar to those of the Oosterbeintum cemetery, between 3 and 7 cm, have been found in the ship burial of Sutton Hoo. In this vessel, five types of clincher were described according to their size and place in the ship. In terms of shaft length, the Oosterbeintum clinchers can be described under four headings: those connecting the strakes end to end (shaft length 2.6 cm), those connecting the strake ends to the bows (shaft length 3.0-3.2 cm), those interconnecting the strakes laterally (shaft length 4.2 cm), and those used for repairs (shaft length c. 8 cm). The largest clinchers from Sutton Hoo connected the strakes to the beams, with 16.4 cm shafts; this type was not found in the cemetery of Oosterbeintum (Bruce-Mitford, 1975: p. 364, fig. 279).

Objects of antler and bone have been preserved (Roes, 1963; Tempel, 1969; Miedema, 1983). Besides finished items there were also many pieces of antler with cutmarks. Such a waste piece was found in ash stain 76. It was not burnt and probably unrelated to the cremation; it will have been a stray object in the terp soil. Outside the graves a few other waste or semifinished pieces of antler were found (fig. 60: 481 and 579). These finds indicate that items of antler were locally manufactured. Postcranial skeletal elements of red deer have rarely been found in the coastal area: presumably many antlers were imported from the sandy Pleistocene region (van Giffen, 1913; Clason, 1970; Knol, 1983).

**Combs**

The combs are all of antler. They belong to the so-called composite combs: a row of antler plates were sandwiched between two coverplates of antler with small bronze or iron rivets. After assembly the teeth were sawn into the plates. All the antler is thought to be of red deer. Elk
antler has not been demonstrated, though it may be present. It is less suitable for comb manufacture than red-deer antler (Ambrosiani, 1982).

Inhumation burial A, with feminine grave goods, contained a triangular comb with a case. This type of comb is well known from the Migration Period, and on the continent is dated to the late 4th and the 5th centuries (Thomas, 1960: pp. 99-101; Böhme, 1974: pp. 122-126; Miedema, 1983: pp. 221-222). In England these combs are dated to the 5th and 6th centuries (West, 1985: pp. 126-127). Given its association with a cruciform brooch of Midlum type in grave A, this comb is likely to date from the final quarter of the 5th century or the first quarter of the 6th.

The small 7th-century urn 438 with a flat base contained part of an unburnt small comb, which had been added after the cremation. The comb has curved coverplates with a linear decoration, a straight row of teeth and straight, unprojecting end tooth-plates. Boelles (1951: p. 337) puts this type of comb in the 7th century and the first half of the 8th. According to van de Kamp-Hilt (1966) this type of comb occurs exclusively in the north of Friesland. It could even be a local type. Such combs, but with tooth plates projecting in the way of ‘wings’ at either end are dated to the 6th and 7th centuries (West, 1985: p. 126, pl. 73.2; Düwel & Tempel, 1970: pp. 357-358). The comb from urn 438 probably dates from the 7th century.

Brandgrube 5 contained some remains of a small comb, cremated with the body. It had narrow, straight coverplates, decorated with a simple linear design. The pattern is very similar to that on the comb fragments from Godlinze, illustrated by van Giffen (1920: pl. VII). These combs probably date from the 7th or 8th century. Such a comb was also encountered in a plain, hand-formed urn from Dokkum-Berg Sion of the 6th or 7th century.

In a ditch cutting across inhumation grave 422, and probably belonging to this grave, there appeared three fragments of a comb with two rows of teeth. The coverplates are straight and have rounded corners. At least one is decorated with a few incisions; the ends are straight. Such combs have been found at West Stow (England). These are dated to the 6th and 7th centuries (West, 1985: pp. 127-128, types 1A/2B).

Two small fragments of cremated antler with a linear decoration from urn 267 presumably derive from a burnt comb. A small piece of unburnt antler with an incised design from cremated burial 66 presumably derives from a comb coverplate. As with urn 438, an unburnt comb may have been added to the ashes in urn 66. Ash stain 269 contained a fragment of a burnt composite comb: a piece of tooth plate, a piece of coverplate with linear decoration, and a rivet.

The combs and fragments of combs from features A, 438 and 422 have been examined for remains of ectoparasites such as fleas, lice and nits. None of these were found. A third of all examined combs from Dutch excavations have been found to contain such remains (Schelvis, 1994). In view of the small number of combs, we cannot conclude that the people cremated or buried in this cemetery were free of this vermin. This negative outcome is more probably due to the poor conditions for conservation and the fragmented state of the combs.

Pendant
In the child’s inhumation grave No. 402, a round, plano-convex pendant of red-deer antler and two amber beads lay at the neck of the body. Within the perforation, there is green staining from the copper wire with which the pendant had been fastened around the neck or onto a garment. No datable parallel is known. It is possible that the pendant was an amulet, like the well-known decorated discs of stag antler (mostly the base with the rose of a shed antler) (Arends, 1978: pp. 475-619; Hottentot & van Lith, 1990; Knol, 1988; Salin, 1959: pp. 57-61).
These amulets were believed to give the wearer the swiftness, strength and longevity of a stag. The amulet was also meant to enhance fertility (Arends, 1978: pp. 247-262; Meaney, 1981: pp. 139-142). Apothecaries were selling powdered stag antler as a remedy even in the 19th century. Antlers have served as a trade sign for pharmacies well into 20th century (Knol, 1988).

Pyramidal buttons
The severely disturbed inhumation grave 15, of a man of whom only parts of the pelvis and a piece of the lower leg were found, contained both a knife and two buttons of antler, presumably of red deer. The buttons are roughly pyramidal in shape. One bears an iron attachment of some kind; indeed both may have had one. The buttons were probably fixed to a belt worn around the waist. Maybe they served to attach the sheath with the knife. Bronze pyramidal buttons with such a function are known (Menghin, 1983: pp. 150-151). The bronze buttons of indistinct shape from inhumation grave 353 may also be reckoned to this category. These buttons are likely to have fixed a pouch containing a knife, a strike-a-light and tweezers to a belt (see 4.2: Buttons).

Bronze pyramidal buttons from the Trier area are dated to the 6th and 7th centuries (Böhner, 1958: pp. 187 (Welschbillig grave I) and 194; Taf. 38.3d and Taf. 40.4). The pyramidal buttons from grave 15 may date from this same period.

Pins
In two inhumation graves, pins of red-deer antler came to light: one in grave 241 (a woman’s) and one in grave 460 (a man’s).

The pin in grave 241 is small and of simple design. It was discovered as the skeleton was being washed, so that its position on the body is unknown. The pin has an eye in a non-thickened head: maybe it was a sewing needle. Pins of this kind cannot be closely dated (Miedema, 1983: pp. 221-222).

The pin in grave 460 was long and thin, with a widened head without an eye. Given its shape, it may even have been a thin awl. This pin lay at the man’s stomach. It may have served to fasten the cloak. An identical pin is known from a presumably 7th-century woman’s grave at Marisletta (Tromsöysund) in Norway (Sjøvold, 1974: Pl. 27g). These pins however are of such simple design that they lack all dating characteristics. AD 450-750 is the closest we can get to a date for the pin from grave 460.

Spindle whorls
Three inhumation graves of women each contained a simple, undecorated spindle whorl of antler or bone. Those in graves 241 and 424 were made from the head of a femur (caput femoris) of cattle. The spindle whorl from grave 606 was made from a beam of red-deer antler. It has the same semispherical shape as the spindle whorls made from a caput femoris of cattle. This type of spindle whorl has a long tradition. They were used in the Netherlands as early as the Roman Period, as demonstrated by the finds in the settlement of Paddepoel (Knol, 1983). Close dating is not possible. Röber (1991) believes them to be typical of the Frisian coastal area. However, in the Pleistocene sands further inland such bone objects would not be preserved.

In Friesland, the perforated heads of cattle thighbones from the terpen have been regarded since the late 19th century as a part of a draught horse’s harness that was fastened under the belly, the so-called oesdop (Boeles, 1943; Schoenmaker n.d.; van Vilsteren, 1987: pp. 67-68). The type of ‘oesdop’ traditionally used in Friesland is made of wood and has roughly the same shape as a perforated caput femoris of cattle. Yet perforated capita femoris do not occur among the remnants of horses’ harnesses found in early medieval horse and/or human burials (Müller-Wille, 1971: pp. 135-138; Martin, 1976: pp. 32-35 and 55-60; Melzer, 1991: pp. 13-20; Werner, 1992). This makes it quite unlikely that the capita femoris from the women’s graves 241 and 424 are parts of horses’ harnesses.

Arends (1978, 181-246) suggests that spindle whorls in graves may have served as amulets. The spindle whorl in grave 606 presumably hung from the woman’s belt. The woman in grave 424 may have held hers in the left hand. These spindle whorls were not necessarily amulets. The spindle whorl in grave 241 suggests that a distaff was put beside the dead woman as an amulet: the whorl was found at her left shoulder (see 4.7 on ceramic spindle whorls).

Knucklebones
In two graves one or more knucklebones were found. These are astragali of sheep or goat which were used as gaming pieces, in divination, or in fortune-telling. In inhumation grave 428, of a young woman aged 25 to 35, lay a heavily use-worn knucklebone with a faint marking of two dots on the medial side, indicating the value of this face. Urned burial 583, of an adolescent aged about 17, contained remains of three to five cremated knucklebones (one or two left-hand knucklebones and two or three right-hand ones), whose charring no longer allowed identification of any use-wear or markings. Unstratified in the terp lay one other knucklebone marked with two distinct dots (No. 426). The dot designs do not provide any dating evidence.

In classical antiquity, knucklebones were used in various games and for consulting the gods (Rohlf, 1963; Nollé, 1987). Even in modern times children use knucklebones in games, often in the form of metal and plastic imitations. The knucklebones at Oosterbeintum did not lie in children’s graves, but in those of young people, at least one of them a young woman. At Oosterbeintum it seems that knucklebones were used by young adults, as a pastime or in fortune-telling.

Finds of knucklebones in urns are known from at least two other sites in Friesland (Knol, 1987). These
are Hogebeintum, with five urns containing four to twelve knucklebones, and Driesumerterp with one knucklebone in an urn. The cremation burials Hogebeintum 35 and 89 were of persons aged 18-30; graves 70, 89 and 102 of children aged 5-9, 13-14 and 10-14 respectively. The urn grave at Driesumerterp was of a woman over 18-21 years of age. The spindle whorl in the same urn also points to a woman (Knol, 1987).

**Burnt sandpiper bones**

In two cremation features, the *bustum* grave 160 and the urn 372, both of them women’s cremations, burnt remains of little or Temminck’s stint (*Calidris minuta* or *C. temminckii*) and dunlin (*C. alpina*) were encountered among the charcoal and ashes (see figs 61 and 62). Sandpipers are small waders which will have occurred in large numbers along the shore of the saltmarsh near Oosterbeintum (Prummel & Knol, 1991).

The finds from the *bustum* grave 160 are six wing bones (ulna, carpometacarpus) and one from a leg (tarsometatarsus) of at least two little or Temminck’s stints and two wing bones (carpometacarpus) of at least one dunlin. Six other small fragments of burnt bird bone could no longer be identified. Their size corresponds with sandpiper bones, particularly the radius. They might be radius fragments of the identified little or Temminck’s stints or dunlin. Urn 372 was found to contain thirteen burnt wing bones (humerus, radius, ulna, carpometacarpus) of at least two little or Temminck’s stints (Prummel & Knol, 1991).

These burnt sandpiper bones were not burnt by chance, for instance among washed-up wreckage used for the pyres. Dead sandpipers are seldom seen among the flotsam on the shoreline. Nor is it likely that such large numbers of bird bones accidentally present in the soil were unintentionally burnt in the fire. Some unburnt bird bones were present in the *terp* of Oosterbeintum at the time of the cremations; this is demonstrated by unburnt remains of a dunlin in urned burial 438, of a redshank in *bustum* grave 160 and of a golden plover in ash stain 315 (table 33) (see also Prummel, 1991).

Complete sandpipers or parts of these birds were burnt on the pyre together with the dead bodies. The bones from the wings may come from severed wings. Wing feathers could have adorned the clothes or headdress of women. This is suggested by the fact that the ulna and the carpometacarpus, the bones to which the flight feathers are attached, are better represented than the humerus, the upper arm bone. The wing may have been cut off just below or through the humerus. Yet the tarsometatarsus shows that also an entire bird was cremated. In three cremation graves in North Spån-ga, near Stockholm (Sweden) also cremated remains of wading birds were found. These were a rail (*Rallidae* sp.), a golden or silver plover (*Pluvialis apricaria* or *P. squatarola*) and a ruff (*Philomachus pugnax*) (Sigvallius, 1994). She suggests that these birds were cremated with bodies because a link was perceived between them and dead people’s souls. This may have been the case also
with the burnt sandpiper wings and complete sandpipers of Oosterbeintum.

4.4. Wooden objects

The shape of certain charcoal pieces from four cremation features suggests that they were utensils bestowed upon the cremated. They are remains of oak wood in ash stain 193, birch wood in ash stain 195, maple wood in disturbed ash stain 295 and willow wood in urn 421. What sort of objects they were can no longer be established.

The *Schmalsax* in a man's inhumation grave, No. 335, had a wooden hilt. An unknown object of coniferous wood must have come from inhumation grave 374B, of a woman. With male inhumation 605 a remnant of an unidentified object of hazel wood was uncovered. The wooden items that accompanied the dead in the grave or on the pyre must have been much more numerous. For instance, the spearhead in grave 353 will have had a wooden shaft, and all knives will have had wooden handles. The spindle whorls will have been fixed onto wooden distaffs. All of these have entirely decayed.

From the nearby early medieval cemetery of Ho-gebeintum a few wooden cups and a small bench of alder wood are known. These finds came to light in the commercial quarrying of the *terp* in the early 20th century. Presumably the wooden objects at Oosterbeintum too were still in fairly good condition around the turn of the century. The digging away of the topsoil and, in recent decades, drainage are responsible for the loss of the wooden objects.
4.5. Textile remains

Remains of textiles were preserved in the corrosion on eleven metal objects (figs 63-65). These are three cruciform brooches of Midlum type (60, 360, 398), two small long brooches (360, 398), four annular brooches (60, 374B, 428 (two specimens), one pin (360) and a buckle (485A). These textile remains have not yet been studied in detail. Early medieval textile remains are known not only from the coastal region of the northern Netherlands, but also from the inland province of Drenthe and the neighbouring coastal region of northern Germany (Schlabow, 1974; Tidow & Schmid, 1979; Hundt, 1982; Vons-Comis, 1988).

4.6. Beads and other items of glass, amber and rock crystal

A total of at least 208 beads were found in twelve inhumation graves (the women's graves 60, 295, 360, 374B, 428, 501 and A, the grave of a man/woman 398, and children's graves 248, 342, 362 and 402), in urned burial 168, in the bustum grave 160, in ash stain 399, in disturbed cremation feature 100 and stray finds 250 and 292.

At least 195 of these were made of glass of various colours, twelve of amber and one of rock crystal (tables 3, 4 and 12). None of the beads of Oosterbeintum are closely datable within the early medieval period. The minute beads from grave 362 are very similar to those from the 5th-century Frankish grave I at Neerhespen, Belgium (Lodewijx, 1991: pp. 30, 41 ff.).

There is a striking variation in the length of the strings of beads. Some are long, with 26 (A), 40 (398) or 61 (342) beads; some are of medium length with at least 15 (362) or 19 (160) beads, while in the other graves just one to nine beads were found. This difference does not correlate with the dead person's age or the dating of the grave. Five strings (295, 360, 428, 398 and 248) held beads of different materials: glass with amber or crystal. The others appear to consist of beads of a single material: glass or amber. Still, they may also have held beads of some perishable material such as wood or unbaked clay. The strings of beads were probably not worn around the neck, but attached to clothing, strung across the chest in one or more strands.

Unstratified in the cemetery a piece of molten glass was found, which may have been a glass cup that melted during a cremation (175). The fragment is undatable. Urned burial 409 contained a small lump of transparent glass. The nature of this object is unknown. An amber object, either partially worked or an item of unknown type, was encountered with female inhumation 428.

Glass beads could have been obtained through trading centres such as Dorestad, but they may in fact have been produced in the northern Netherlands. There is evidence of glass working at Wijnaldum (Sablerolles, 1994). Rock crystal is certain to have been imported. The amber was probably gathered on the Wadden Isles (Kars & Wevers, 1983; Waterbolk & Waterbolk, 1991).
4.7. Ceramic items

The pottery can be divided into two categories: the cinerary urns, and the grave goods that accompanied interments and cremations (bowls, pots, spindle whorls). Besides, the terp produced many unstratified potsherds of an uncertain nature (urns, grave goods or scattered domestic waste).

A few urns are made of imported, wheel-thrown pottery. Such pottery can be dated through comparison with pottery from other sites. The majority of the urns, however, are of poorly datable hand-formed ware. There are small numbers of the characteristically decorated Anglo-Saxon ware, which can be dated through comparison with finds from the Elbe-Weser coastal region and East Anglia. Most urns of hand-formed pottery, however, are very simple in shape and decoration. Boeles (1951: pp. 249-253) dubbed this ‘Anglo-Frisian ware’. It is also documented under the name of ‘Hessens-Schortens ware’ (Tischler, 1956: pp. 79-91).

**Wheel-thrown pottery**

Cremation graves 63 (man) and 409 (woman) contained urns of wheel-thrown pottery. Small sherds of wheel-thrown ware, probably deriving from shattered urns, turned up in inhumation graves 100, 241, 424 and 428. *Brandgruben* 527 and 183 produced a small cooking pot and a burnt bowl of wheel-thrown pottery as grave goods. Unstratified in the terp, some more sherds of wheel-thrown ware were found, which may derive from broken urns (fig. 66; find Nos 36, 43, 349, 502, 518+675, 558, 564, 568, and 592).

The burnt carinated bowl in *Brandgrube* 183 was of an early type. The originally grey surface had largely turned orange in the heat of the pyre. The bowl has a smooth surface, on which a rouletted design is faintly visible in the upper part. In discussing such a bowl found at Orsoy, Böhner presents a survey of these small 5th-century bowls (Böhner, 1949: pp. 187-189: figs 9.2 and 11). A similar bowl appeared in grave 172 of the cemetery of Wageningen, accompanied by a possibly 5th-century pedestal bowl of *terra nigra* ware (van Es, 1964: pp. 239-240 and 262). Our small bowl most resembles the one in Böhner’s fig. 11.2. It probably dates from the first half of the 5th century.

The pots from urned burial 63 and *Brandgrube* 527 are rough-textured Frankish cooking pots. Sherds 558, 564, 568, and 592 derive from five or six pots of this ware (fig. 66). Böhner (1958: pp. 53-56) dates this type of cooking pot from the Trier area to the period 525-700. According to Ament (1976: fig. 20) the production of these vessels had ended by AD 675. In the Rhineland they date from between 530 and 640 (Siegmund, 1989: fig. 17). These pots are known from the cemeteries of Wageningen (van Es, 1964: fig. 89) and Rijnsburg (Wimmers, 1986). A likely date is between 500 and 675.

The urn in burial 409 is a large orange crock with a handle, which strongly resembles Böhner’s type D6a. This type dates from the 6th century (Böhner, 1958: p. 53, Taf. 5.1). One sherd of a brown, carinated pot was found in ash stain 518. A few other sherds of the same vessel (find No. 675) appeared unstratified in the excavation. The pot is too fragmentary for a typological identification. Its base has a remarkable feature: a sort of footing had been created with an incised groove. This pot will date from the 6th or 7th century.

**Hand-formed, Anglo-Saxon ware**

Five pots of Anglo-Saxon ware came to light in the (presumed or certain) urned burials 210, 372 (woman), 515 and 521, and the *bustum* grave 160. Only the pots
from graves 515 and 521 were definitely urns in which cremated remains were buried. Sherds of this striking ware were found in ashes stains 317 and 496, in inhumation graves 393, 451 and 485A and unstratified in the terp (fig. 67; find Nos 137, 234, 307, 326, 355, 422, 546, 573 and 631). Two of these (422 and 451) might even be of somewhat older, situla-type vessels. The Anglo-Saxon pottery is famous for its elaborate and varied decoration with stamps and linear decoration. The most important study of the typology of this Anglo-Saxon ware still is that by Plettke (1921). He completed this work in 1914, shortly before being killed in battle. The study is based on the profusion of urns from the Elbe-Weser coastal region.

A Schalenurne was encountered in a corner of bustum grave 160. Van Es (1967: p. 324, type VIII A) puts these small pots in the 4th and 5th centuries. The surface of this pot is rough-textured. Such pottery is reckoned to the youngest group of the Anglo-Saxon style and dates from the late 5th or the 6th century (Knol, 1993a: pp. 54-55). The pit further contains a knob of a cruciform brooch: the grave presumably dates from the latter half of the 5th or the early 6th century.

The broken urn of cremation 210 is a large biconical, narrow-mouthed pot. Its surface is smooth and adorned with vertical and horizontal lines. It belongs to Plettke’s type A7, which he dates to the 5th century (Plettke, 1921: p. 45).

Urned burial 372 contained not only the base of a hand-formed urn (see under Miscellaneous hand-made pottery) but also a small drinking bowl of rough-textured pottery decorated with dots and lines. Maybe this bowl represents a transitional form between the true Anglo-Saxon ware and the younger, undecorated hand-formed ware of the 6th/7th century. Grave 372 probably dates from the latter half of the 7th century. Urn 515 is a hand-formed, biconical pot decorated with vertical lines. The decoration is that of Plettke’s type A7.

Urn 521 is a pedestal urn of rough-textured, hand-formed pottery with an elaborate design of lines, stamp impressions and elongated indentations. Although large parts of the pot are missing, the design can be reconstructed; the four sides are decorated in different ways. Similar pots are known from the cemeteries of Beetgum (Fries Museum, inv. Nos 46A-1004 and 46A-1056 (Knol, 1993a: fig. 75:6 and 13) and Rijnsburg (R.M.O. Leiden, inv.No.h1913/11.74; Hallewas, 1986: fig. 3.4; Wimmers, 1986: No. 336). Wimmers dates the Rijnsburg vessel to the 7th century. Pedestal urns are a type of ‘glass-imitating vessel’ (Mainman, 1983; Knol, 1993a: pp. 218-219). The presumable date of urn 521 is the latter half of the 6th or the early 7th century.

Miscellaneous hand-made pottery
This plain pottery, which was produced from the 5th into the early 9th century, is difficult to date closely within this long period for lack of find associations with datable components such as a brooch or charcoal. Undecorated pots with flat bases and simple rims date from the 5th and 6th centuries (Eagles, 1979: pp. 83-85). Narrow-mouthed pots, wide-mouthed pots and neckless, flaring bowls occur side by side. The true narrow-mouthed bottle forms date from the 6th and 7th centuries (Okrusch, Wilke-Schiegris & Rotting, 1986, Hauptgruppe II). Wide-mouthed pots have been found in settlements at Den Burg (van Es, 1969: figs 2-3), Eursinge (Lanting, 1977: fig. 13 Nos 16 and 19) and Odoorn (van Es, 1979: Type II). They too are dated to the 6th and 7th centuries.

The latter part of the 7th century saw changes to the base of the wide-mouthed forms. It became more convex, and through a transitional stage with a lenticular base on which the pots stood unsteadily, it is probably as early as the late 7th century that pots with a more or less globular base evolved. These are the earliest Kugeltopf vessels. This later development is clearly demonstrated in the excavations at Leens (van Giffen, 1940), Hessens (Haarnagel, 1959) and Oldorf (Stilke, 1993). The intermediate form is known as an Eitopf (ovoid pot), which was first defined for Nordfriesland (Schleswig-Holstein), where it is dated to the latter half of the 8th and the first half of the 9th century (La Baume, 1953). La Baume also reckoned a small pot from Hallum (Friesland) with a virtually globular base among the ovoid pots. The scettas with which it was filled show that it probably dates from just before AD 720 (Boeles, 1951: pp. 375, 525-526 and pl. 37.3; Grierson &
Blackburn, 1986: p. 187; Knol, 1995). Probably the evolution of the ovoid pot into the Kugeltopf occurred earlier in Friesland than it did in Nordfriesland. The ovoid pots remained in use in Friesland throughout the 8th century. In the second half of the 8th century, true Kugeltopf vessels with entirely globular bases were also manufactured. Kugeltopf vesseIs of the latter half of the 8th century and the 9th century have a moulded rim profile. Examples are found at Dorestad (van Es & Verwers, 1980) and Leeuwarden (de Langen, n.d.).

The texture of the pot, i.e. the temper, also provides chronological clues. Pottery of the 5th century is perfectly smooth, owing to its fine temper. That of the 6th century is somewhat rougher, but still fairly smooth. Seventh-century pottery is rather coarse, owing to fragments of the crushed granite temper emerging here and there. Pottery of the 8th century is very coarse: the temper of granite grit protrudes over the entire surface.

A third source of evidence for dating an urn is the radiocarbon analysis of charcoal from the pyre, found within or near the urn (table 1; fig. 25). Unfortunately, the charcoal samples 66, 267, 131 and 421 were very small, so that the standard deviations of the outcome and the ranges of the calibrated dates are considerable. In the interpretation of these radiocarbon datings, two points should be taken into account. First, the firewood may have been felled long before the time when it was used for the pyre. This applies in particular to timber from broken-up ships or wreckage, which may have been cut decades before the cremation and the burial of the urn. This limitation does not apply if wood was cut especially for the cremation. Secondly, there is the question of whether heartwood or sapwood was used for the pyre. The date of sapwood does not differ much from the moment of felling; but the use of heartwood for a radiocarbon dating will always produce too early a date. In the case of slow-growing oakwood, the heartwood may be up to some decades older than the sapwood. With the fast-growing and early-maturing species birch and elder, the difference will be less marked. Therefore as much as possible these wood species were selected for the radiocarbon dating of cremation features (table 1). The outcome of the radiocarbon datings must be adjusted by at least 25 years for the presence of heartwood or re-used timber in the charcoal samples (table 1 and fig. 24). For a discussion of these problems the reader is referred to Knol (1993a: pp. 58-61).

The oldest pots with a smooth, undecorated surface and a flat base are the urns of cremations 131, 438 and 583 (children), 133 (adult) and 421 (woman). Most have a fairly narrow mouth. Pottery from Brandgrube 527 and inhumation grave 483 also belongs to this type. In view of what was said above, these pots will date from the 6th or 7th century, or even the late 5th century. The comb from urn 438 and the sherds of wheel-thrown ware from Brandgrube 527 fit in with this dating. Charcoal from urn 438 indeed dates this urn to the 7th century. Brandgrube 527 has a much wider radiocarbon date: from the late 5th to the early 7th century. Charcoal sample 367, which was taken from above urn 421, dates from the second half of the 6th or the first half of the 7th century. If the charcoal was part of grave 421, the urn will date from the same period.

Among the smooth-textured, undecorated pottery with a flat base and wide mouth are the urns 66 and 168 (adults) and 140 (woman). Given the radiocarbon dating of the charcoal, urn 66 may date from the 5th or even the late 4th century. Urm 140 already is somewhat more coarsely tempered and will be of the 7th century. The excavation failed to produce any additional dating evidence for these urns.

Base fragments of smooth-textured pots with flat bases were found in urned burials 31, 372 and 376 (adults), 78 and 356 (ages unknown), Brandgrube 527 (base fragment 527.3) and ash stain 528. The shape of the mouth of these pots, wide or narrow, can no longer be ascertained. Presumably they date from the 6th and 7th centuries. Yet it cannot be ruled out that some of these flat bases belong to Anglo-Saxon vessels of the latter half of the 5th or early 6th century. In any case this does not apply to the base from urned burial 372: charcoal from this grave was dated to the second half of the 7th century.

The urns from urned burials C, 14 (both of adults) and 227 (of a child, two pot bases) and the pots that were grave goods in inhumation graves 241 (a woman's) and 420 (a man's) will, given their fairly rough surface, date from the 7th century. Their bases are not quite flat, but somewhat convex. Pots C, 14 and 420 are definite ovoid pots.

The youngest urn in the cemetery is that from burial 267. This is a Kugeltopf with a thick rim and coarse temper. In the rim there is a crack with a small hole on either side of it. This is an ancient repair (see for instance Stilke, 1993: pp. 158-159). The pot must date from the 8th century. The somewhat everted rim is in accordance with such a date (Stilke, 1993). The urn strongly resembles the small, sceatta-filled pot from Hallum, which is dated to the early 8th century (see above). The radiocarbon date of the charcoal from this urn (oak, alder and birch) has a wide range: between the 3rd and the early 7th century.

SherdS of undecorated hand-formed pottery, unstratified within the terp body, could not be directly linked to any funerary feature. They are a mixture of narrow- and wide-mouthed pots (fig. 68). Compared with the cinerary urns, they include a larger proportion of wide-mouthed vessels, which means that not all of these sherds are likely to derive from disturbed cinerary urns. Wide-mouthed pots are more common in settlements than narrow-mouthed ones.

Small bowls

Beside the head of the man/woman in inhumation grave 398 and beside that of the child in inhumation
grave 248 there was an earthenware bowl. These bowls are poorly datable (van Es, 1969: Typ I, p. 219). Grave 398 is dated by brooches to the last quarter of the 5th or the early 6th century. The bowl from grave 248 is undated. Groenewoudt (1987: p. 236 and figs 10.1 and 15.15) describes such bowls from a 7th-century context.

*Spindle whorls*

Ceramic spindle whorls were found in urned burial 372 of a woman, in *Brandgrube 527* of a child aged 2 to 5, and in ash stain D (age and gender unknown). The spindle whorls from features 527 and D are biconical in shape (Röber, 1991: type 3). The spindle whorl from grave 372 is rounded biconical (Röber, 1991: type 4). The one from feature D is severely damaged by fire; it must have been on the cremation pyre. The spindle whorl 372 also shows signs of burning; on the one from feature 527 this is less evident. The spindle whorls are not closely datable. According to Röber (1991), all of the types he describes occur throughout the early Middle Ages, with type 3 predominating in the 6th and 7th
centuries and type 4 in the 8th. Associated finds date the spindles whors from features 372 and 527 to the 6th or 7th century. It seems unlikely that the young child’s spindles whorl was a tool. It may have been added to the child’s ashes as an amulet (see 4.3: Spindle whors of bone and antler). The deposition of spindles whors in graves continued right into the 9th century in the coastal regions of the northern Netherlands and neighbouring northern Germany (Röber, 1991; Knol, 1993a: fig. 72).

### 4.8. Stone items
A strike-a-light of flint was found in a man’s inhumation grave, No. 335. Together with a small knife and a pair of tweezers, it must have hung in a pouch from the man’s belt. A crushed cylindrical bead of rock crystal with a diameter of 19 mm accompanied a female inhumation, No. 428, as did a stone of unknown function. It is evident that objects of stone, which is virtually imperishable, were seldom bestowed upon the dead.

### 4.9. Faunal remains
Faunal remains have been found in many of the graves and other features of the cemetery. They are divided into burnt and unburnt remains. To decide whether or not they were involved in the funerals we have to compare them with faunal remains from the body of the terp and from later features that were clearly unrelated to the cemetery. The faunal remains of Oosterbeintum, apart from the inhumation burials of horse and dogs, can be divided into 12 categories (table 33):

1. Those from the ‘body’ of the terp, i.e. the layers of sods and dung raised before AD 400 to build the part of the terp on which the cemetery was laid out. From these layers 447 unburnt and 2 burnt faunal remains have been recovered. The unburnt remains probably date from the late Roman period (4th century) because there are few finds of older pottery in the terp. The burnt remains may originate from unrecognized, disturbed cremation graves which date from the 5th to the 8th century;

2. From a pit in the base of the terp 78 unburnt remains were recovered. Date as of category 1: 4th century;

3. In nineteen of the 47 human inhumation graves a total of 90 faunal remains were discovered, 86 unburnt and 4 burnt. The unburnt remains either have the same origin as those of category 1, dating from the 4th century AD, or they ended up in the graves at the funeral and thus are contemporaneous with the cemetery. However, the two groups are indistinguishable. In conclusion, the date of the unburnt material is 4th-8th century. The few burnt faunal remains may originate from unrecognized, disturbed cremation burials and date to the 5th-8th century AD;

4. A total of 532 unburnt and two burnt faunal remains accompanied the horse burials and five of the six dog burials. The unburnt material will date to the 4th-8th century (apart from the 85 remains of a fetal pig and seven unidentified bone fragments in the stomach of dog 480, which are contemporaneous with the dog burial). Date of the burnt material: 5th-8th century; total number of remains: 534;

5. Apart from human ashes, the soil in and around six of the 23 urns contained a total of 107 unburnt faunal remains and 224 burnt bone fragments. The unburnt faunal remains probably belong to the terp body and date to the 4th-8th century. Among the burnt bone fragments there are at least fourteen of animal origin: a sheep/goat rib fragment and thirteen fragments of *Calidris minut a* or *C. temminckii*. The other 210 fragments are unidentified mammalian remains, 27 of them are fairly certainly of animal origin. 183 fragments could include human cremation remains. The burnt remains date to the 5th-8th century; total number of remains: 331;

6. The bustum grave 160 contained 206 unburnt and 21 burnt faunal remains. Origins and dates of the unburnt and burnt material as those of category 5; total number of remains: 227;

7. The five Brandgruben contained 105 unburnt and 293 burnt faunal remains. All burnt faunal material originates from Brandgrube 97. It consists of eleven burnt bones of an *Anas crecca* and 40 burnt bone fragments of a lamb or kid. The 242 burnt mammalian bone fragments probably are of the same lamb or kid. Dates of the unburnt and burnt material as those of category 5; total number of remains: 398;

8. A total of 378 unburnt faunal remains were found in 66 of the 71 ash stains. Date as in category 5, 4th-8th century;

9. In 9 of the 17 disturbed cremation graves or ash stains, a total of 348 unburnt faunal remains were found. Date as in category 5: 4th-8th century;

10. Features postdating the cemetery yielded a total of 1763 remains, of which 1760 were unburnt and three were burnt. The latter presumably originate from the cemetery (5th-8th century). Date of the unburnt material presumably 9th-11th century. However, older origins (from the 4th century on) are possible;

11. A sample of shell fragments from a 10th/11th century well (find No. 125). After sieving with a 1.5 mm mesh, a residue of 131.1 g remained. In a subsample of 19.8 g four species of mollusc were identified. Calculation produces an estimate of 1165 shell fragments in the sample as a whole;

12. On the dump, a total of 51 unburnt faunal remains were found. Date 4th-11th century. (For details of the contents of individual features in the cemetery, see the catalogue.)

### The burnt or calcined material
The faunal materials affected by fire vary in colour from partly black (burnt) to completely white (calcined), according to the temperatures that the bones were
Table 33. Oosterbeintum. Faunal remains other than the horse and dog burials and artefacts. Categories: 1. In terp body; 2. In pit in lower part of terp body; 3. In human inhumation graves; 4. In animal inhumation graves; 5. In ums; 6. In Brandgruben; 7. In ash stains; 8. In disturbed traces of cremation; 9. In features younger than the cemetery; 10. In a 10th/11th-century well; 12. Stray finds; NR. Number of remains; NR-C. Number of cremated remains among NR.

<table>
<thead>
<tr>
<th>Category of faunal remains</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<tr>
<td>Domestic mammals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Canis familiaris</em>, dog</td>
<td>3</td>
<td>1</td>
<td>-</td>
<td>-</td>
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<td>-</td>
</tr>
<tr>
<td><em>Felis catus</em>, cat</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Equus caballus</em>, horse</td>
<td>4</td>
<td>2</td>
<td>2</td>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Sus domesticus</em>, pig</td>
<td>21</td>
<td>3</td>
<td>3</td>
<td>88</td>
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<td>2</td>
</tr>
<tr>
<td><em>Bos taurus</em>, cattle</td>
<td>151</td>
<td>43</td>
<td>34</td>
<td>-</td>
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</tr>
<tr>
<td><em>Ovis aries</em>, sheep</td>
<td>17</td>
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<td>4</td>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Ovis aries/Capra hircus</em>, sheep/goat</td>
<td>60</td>
<td>10</td>
<td>14</td>
<td>62</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>Wild mammals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Apodemus</em> sp.</td>
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<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td><em>Arvicola terrestris</em>, water vole</td>
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<td>-</td>
<td>1</td>
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<tr>
<td><em>Microtus agrestis</em>, field vole</td>
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<td>-</td>
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<tr>
<td><em>Microtus oeconomus</em>, northern vole</td>
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<td>-</td>
<td>7</td>
<td>-</td>
<td>88</td>
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</tr>
<tr>
<td><em>Micromys sp.</em></td>
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<tr>
<td><em>Cetacea</em>, whales etc.</td>
<td>-</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td>Domestic birds</td>
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<td><em>Gallus domesticus</em>, domestic fowl</td>
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<td>Wild or domestic birds</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td><em>Anser anser</em>, greylag goose</td>
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<td>-</td>
<td>-</td>
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<td>-</td>
</tr>
<tr>
<td><em>Anas platyrhynchos</em>, mallard</td>
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<td>-</td>
<td>-</td>
<td>3</td>
<td>1</td>
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</tr>
<tr>
<td>Wild birds</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><em>Gavia stellata</em>, red-throated diver</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td><em>Cygnus columbianus</em>, Bewick’s swan</td>
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<td>-</td>
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<td>-</td>
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</tr>
<tr>
<td><em>Anas crecca</em>, teal</td>
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</tr>
<tr>
<td><em>Aythya</em> sp.</td>
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</tr>
<tr>
<td><em>Pluvialis apricaria</em>, golden plover</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td><em>Calidris minutillaemminckii</em>, little</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>13</td>
<td>7</td>
</tr>
<tr>
<td>or Temminck’s stint</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>13</td>
<td>7</td>
</tr>
<tr>
<td><em>Calidris alpina</em>, dunlin</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>2</td>
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<tr>
<td><em>Numenius arquata</em>, curlew</td>
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<td>-</td>
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<tr>
<td><em>Tringa</em> cf. <em>totanus</em>, cf. redshank</td>
<td>-</td>
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<td>Amphibians</td>
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<td></td>
<td></td>
</tr>
<tr>
<td><em>Bufo calamita</em>, natterjack toad</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td>Fish</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Clupea harengus</em>, herring</td>
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<td>1</td>
<td>-</td>
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<td>-</td>
</tr>
<tr>
<td><em>Anguilla anguilla</em>, eel</td>
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<td>-</td>
<td>-</td>
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</tr>
<tr>
<td><em>Pleuronectidae</em>, flatfishes</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td><em>Liza ramada</em>, thin-lipped grey mullet</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td><em>Gasterosteus aculeatus</em>, stickleback</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Molluscs</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td><em>Littorina littorea</em>, periwinkle</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td><em>Succinea</em></td>
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<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><em>Hydrobia ulvae</em></td>
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<td>-</td>
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</tr>
<tr>
<td><em>Gastropod</em></td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Cerastoderma edule</em>, cockle</td>
<td>2</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Mytilus edulis</em>, mussel</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>Total identified</td>
<td>288</td>
<td>64</td>
<td>67</td>
<td>0</td>
<td>162</td>
<td>45</td>
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</table>

NR-C. Number of cremated remains among NR.
### Cremated remains

<table>
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<tr>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>1-12</th>
<th>in graves</th>
</tr>
</thead>
<tbody>
<tr>
<td>NR</td>
<td>NR-C</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>NR-C</td>
<td>NR</td>
<td>%</td>
</tr>
<tr>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>13</td>
<td>.2</td>
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<tr>
<td>5</td>
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<td>79</td>
<td>-</td>
<td>12</td>
<td>340</td>
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<td>2</td>
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<td>-</td>
<td>2</td>
<td>38</td>
<td>.7</td>
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</table>

#### Domestic mammals
- Canis familiaris
- Felis catus
- Equus caballus
- Sus domesticus
- Bos taurus
- Ovis aries

#### Domestic birds
- Gallus domesticus
- Anser anser
- Anas platyrhynchos

#### Wild birds
- Gavia stellata
- Cygnus columbianus
- Pluvialis apricaria
- Calidris minutuneminscii

#### Amphibians
- Bufo calamita

#### Fish
- Clupea harengus
- Anguilla anguilla
- Pleuronectidae
- Liza ramada
- Gasterosteus aculeatus

#### Molluscs
- Littorina littorea
- Succineidae
- Hydrobia ulvae
- Gastropod
- Cerastoderma edule
- Mytilus edulis

#### Total identified
- 88 | 51 | 134 | 55 | 1726 | 1 | 960 | 39 | 3757 | 64.6 | 81 | 2.2
Table 33 (continued).

<table>
<thead>
<tr>
<th>Category of faunal remains</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<td>Unidentified</td>
<td>NR NR-C</td>
<td>NR NR-C</td>
<td>NR NR-C</td>
<td>NR NR-C</td>
<td>NR NR-C</td>
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<td>11</td>
<td>3</td>
<td>11</td>
<td>3</td>
<td>11</td>
<td>3</td>
</tr>
<tr>
<td>Bird remains</td>
<td>-</td>
<td>-</td>
<td>8</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Fish remains</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td>-</td>
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<td>Mollusc remains</td>
<td>-</td>
<td>-</td>
<td>8</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total unidentified</td>
<td>161</td>
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<td>14</td>
<td>23</td>
<td>4</td>
<td>372</td>
</tr>
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<td>Total</td>
<td>449</td>
<td>2</td>
<td>78</td>
<td>90</td>
<td>4</td>
<td>534</td>
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</table>

exposed to. These fires may have been those of the pyres of the cemetery. An alternative explanation is that these faunal remains came from the cooking fires in the houses on the terp and were accidentally embedded in the terp soil and the features of the cemetery. The low proportion of burnt or calcined bone in the terp (categories 1 and 2) and the younger features (category 10) argue against the latter explanation. In one way or another, the burnt or calcined bones are the result of cremations at the cemetery.

There are three possible ways in which animals or parts of animals might end up in the cremation fire:

a. Dead animals were hidden among wood or other fuel for the pyre. This might hold for the two burnt bones in Microtus oeconomus from the bustum grave (table 33: 6);

b. Animals or parts of animals were purposely put on the fire, as a gift to the deceased or for other reasons relating to the funeral. Two, possibly three, groups of animal remains may be reckoned to this category:

1. The burnt and calcined remains of Calidris minut a or C. temminckii and Calidris alpina found in the bustum grave and in urn 372 (figs 61 and 62; 4.3; Prummel & Knol, 1991);

2. The probably complete lamb or kid and the teal of Brandgrube 97 (3.3.4);

3. Parts of sheep/goat, cattle and pig and possibly other mammals (among the unidentified mammalian remains) were put on the cremation pyres (table 33). The burnt or calcined bone fragments of sheep/goat and pig from urns 63, 66, 131, 168 and 356 and bustum grave 160 could derive from such parts of animals. The few burnt/calcined remains of cattle and pig and possibly other mammals from the terp body, the human and animal inhumation graves and the younger features (categories 1-4 and 10) could also originate from parts of animals put on cremation fires, if they derive from unrecorded (disturbed) cremation graves or ash stains;

c. Animal bones may have been accidentally exposed to the cremation fire at spots where a pyre was erected.

In conclusion, there is evidence that animals or parts of animals were intentionally put on the cremation pyres of Oosterbeintum. This holds for Calidris minut a or C. temminckii, Calidris alpina (the bustum grave and urn 372), a lamb or kid and an Anas crecca (Brandgrube 97) which were cremated. Parts of sheep/goat, pig and cattle were possibly placed on the pyre (see b.3). However, these remains cannot be distinguished from remains of these species that unintentionally ended up in the fires (see c).

The unburnt faunal remains

The unburnt faunal remains are presumably unrelated to the cemetery. For the faunal remains in the terp soil (category 1) this is obvious. They originate from animals kept and consumed at farms on the terp of Oosterbeintum before c. AD 400. The unburnt faunal remains from funerary features (inhumation graves and cremation features – i.e. categories 3-9) will be kitchen refuse from farms on the terp either from the period before or from that during the use of the cemetery. This is inferred from the similar ranges of species in the material from the cemetery features and that of the 4th century kitchen refuse (table 34). The larger number of smaller species in the cemetery material results from the sieving of samples of grave soil. Even the high proportion of sheep/goat remains in the cemetery features in comparison to those of the 4th century kitchen waste (table 34) is a result of this procedure. Cattle bones, being large, are more readily seen in the clay soil of the terp than sheep/goat bones. In hand-collected material from terp soil sheep/goat is often underrepresented (Hopman, 1993).

Early medieval funerary practice in Europe often involved the burying of animals or parts of them in inhumation or cremation graves (Müller-Wille, 1971; Oexle, 1984; Prummel, 1992a; Prummel, 1993a; Sigvallius, 1994). In western and central Europe this custom was virtually restricted to horses and dogs. Many domestic and wild animal species were killed for cremation and inhumation burials in Sweden; sheep, dog, horse and cattle being the most numerous species. Dog and horse were buried or cremated as complete animals; sheep, cattle and other animals mostly in parts (Sigvallius, 1994). Teeth of cattle and horse predominated
in the unburnt faunal remains found in cremation graves in Sweden (Sigvallius, 1994).

This is not the case with the unburnt faunal remains in the inhumation or cremation graves of Oosterbeintum. The custom to present meals to the deceased, as was usual in a Roman context (Lauwerier, 1988), did not exist with the Germanic tribes (Sigvallius, 1994). Neither is there any evidence that funerary meals were held beside the open grave, the waste of which was thrown into the grave. Although parts of animals as occasional grave goods cannot be excluded, it is much more probable that the unburnt faunal remains in the human and animal graves were either already in the terp soil in which the graves were dug or were scattered early medieval waste. This interpretation is the basis of discussions in chapter 9. The unburnt material from younger features (category 10) will be kitchen refuse from 9th-11th century farms, or perhaps older material incorporated into these features.

5. A SPATIAL AND CHRONOLOGICAL ANALYSIS OF THE CEMETERY

This chapter presents a spatial and chronological analysis of the use of the cemetery. This analysis was difficult because only part of the cemetery was excavated, far from all features were datable, and presumably many traces had been lost altogether.

This part of the terp of Oosterbeintum (or the separate cemetery terp) came into use as a burial ground in the first half of the 5th, or possibly even the late 4th century. The earliest dated graves in the cemetery are two cremation burials: Brandgrube 183 and the disturbed cremation grave in the fill of grave 460. The early burials are usually simple graves without urns. This fits in with other evidence about funerary custom in the coastal region of the northern Netherlands from the 5th century BC up to around AD 400 (e.g. two Brandgruben from the second half of the 1st century AD at Heveskesklooster, Boersma, 1988). The disturbed urned burial 66, given its radiocarbon date, also may date from the first half of the 5th century AD.

The second half of the 5th century saw a change in funerary rite. Apart from cremations, we now also find inhumations. The earliest inhumation burials are graves 485A and 485B, from the second half of the 5th century. The inhumation graves A, 60, 360, 398, 410, 422 and 605 date from the second half of the 5th or the early 6th century. The urned burials 210, 372, 515 and 521 with urns of Anglo-Saxon ware, and the bustum grave 160 date from the same period. In the 6th and 7th centuries, cremations and inhumations still occur side by side. Inhumation graves 241, 335, 428, 483 and 570 and urned burial 409 also date from the 6th century. Four inhumations (342, 393, 424 and 501) and five urned burials (227, 267, 372, 421 and 438) date from the 7th century (tables 9 and 19). In the late 7th or early 8th century, this part of the terp ceased to be used as a cemetery. The burial with the youngest dating is urned cremation 267. It may date from the early 8th century.

The inhumation and cremation burials are not quite evenly distributed over the centuries when the cemetery was in use (tables 9 and 19). However, these differences are probably due to chance. After all, large numbers of graves are undatable or have datings that cover 150 or 200 years (see 3.1.5 and 3.2.2). From 450 up to the late 7th or early 8th century, cremation and inhumation were practised side by side. The inhumation graves from the 5th and early 6th centuries lie predominantly with the head to the southwest. For the inhumations of the rest of the 6th century and the 7th, no predominant orientation could be identified.

The graves dating from the various periods are fairly evenly distributed around the excavated part of the cemetery. The whole excavated area came into use in the 5th century and continued to be used into the 8th century (fig.69). The distribution of men’s and women’s graves over the cemetery too is fairly even (fig. 70).

Yet there do seem to be mixed-period clusters of burials, which belong together in space. Through time, people who in some way belonged together may have been buried in close proximity. Five possible clusters can be identified (fig 71):

1. The first cluster is around inhumation grave 360, a woman’s. With this seem to be associated the inhu-
Fig. 69. Oosterbontum. Dating of the features in the cemetery, as given in the catalogue of graves, a. AD 400-450; b. AD 450-525; c. AD 525-600; d. AD 600-700; e. AD 675-750. The dated cremation graves disturbed by later inhumations are shaded. Drawing by G. Delger, V.A.R.U.G.
Fig. 70. Oosterbeintum. The distribution of men's and women's graves in the cemetery. Drawing by G. Degeer, V.A.R.U.G.
Fig. 71. Oosterbeinum. The five apparent clusters of graves. Drawing by G. Dejöer, V.A.R.U.G.
mation graves 393 (woman), 295 (woman), 342 (child) and 432 (dog), and the cremation graves 97 (two animals), 183, 227 and 229;

2. Around inhumation grave 410 (a man's) lies a second cluster, made up of the inhumation graves 335 (man), 374A (child), 374B (woman), 422 (adult), the ash stains 650 and 354, and dogs 408 and 477;

3. A third cluster can be distinguished around inhumation grave 606 (a woman's). This comprises the inhumations 570 (woman), 393 (woman), 273 (adolescent), 100 (inhumation grave of a man and disturbed cremation) and 60 (woman) as well as the *bustum* 160 and ash stains 496, 533, 571 and 649;

4. Inhumation grave 398 of a man/woman may have formed a fourth cluster with the inhumation graves 270 (man), 247 (child), 362 (child), 428 (young woman), 435 (young man), 451 (man), 460 (man), 461 (woman), 353 (child), the dogs 480 and 201 and the horse 430. To this could belong the cremation features 194, 269, 361, 376, 388, 396, 437, 445 and 655;

5. The inhumation graves 424 (woman), 473 (woman), 624 (adolescent) and dog 404 constitute a fifth cluster. These are accompanied by cremation features 31, 32, 78, 130, 131, 132, 133, 146, 281, 525, 526, 527, 528, 532, 535, 581 and 583.

The remaining inhumation and cremation graves lay more widely scattered about the cemetery.

The clusters may represent families or other groups, which placed their dead together. All include graves of women as well as children and/or adolescents. Men's graves were found in at least three of these five clusters; the gender and age of most cremated bodies is unknown. Four of the five clusters include the remains of children. Four also contain one or more animal burials. Unfortunately, the five clusters do not lie so far apart that they can be clearly separated. Hence it remains uncertain whether there were in reality five families or other groups. More distinct clusters of burials have been found in the German early medieval cemetery of Ketzendorf (Ahrens, 1983).

The burial of bodies and cremations in the cemetery of Oosterbeintum presumably came to an end (partly) as a result of the Christianization of the northern Netherlands. This took place in the 8th century. Cremation and the inclusion of grave goods in burials was strictly prohibited by the Church. From then on, the dead were buried in cemeteries around the newly established churches. The numerous small burial grounds in the northern Netherlands with their rows of predominantly east-west oriented graves, devoid of grave goods and hence undatable, may have been Carolingian cemeteries around churches (Knol, 1993a: pp. 169-176; Knol, 1993b). The small cemetery without grave goods that was found at Oosterbeintum in the construction of a road (see 2.1) could have been such a churchyard. Tradition has it that there once was a chapel at Oosterbeintum (Yska, 1972: p. 12; van Dijk, 1987: p. 261). However, there is no documentary or archaeological evidence of this chapel.

6. THE SIZE OF THE COMMUNITY THAT USED THE CEMETERY

On the basis of the number of burials found in the excavated part of the cemetery, an estimate can be made of the size of the community that buried its dead there. This is done by applying the formula compiled by Acsádi & Nemeskéri (1970): 

\[ P = 1.1 \left( \frac{D \cdot t}{e} \right) \]

where \( P \) is the average population size, \( D \) the number of burials, \( e \) the average life expectancy, and \( t \) the duration of use of the cemetery (Donat & Ulrich, 1971: p. 237). The formula assumes that none of the dead were buried outside the cemetery.

Problems in applying this formula to the cemetery of Oosterbeintum are that the interpretation of the 71 ash stains and the 17 disturbed cremation traces is uncertain and that through erosion, digging and quarrying, graves have been lost altogether. Therefore this estimate of the population of Oosterbeintum is a tentative one.

In the excavated part of the cemetery 73 certain human burials have been uncovered: 47 skeleton graves, 21 urned burials, four *Brandgruben* and one *bustum* grave. The ash stains represent between 18 and 71 cremations (see 3.1.3); the disturbed cremation features represent at least 19 cremations. The number of human burials in the excavated part of the cemetery thus amounts to between 110 and 163. On the basis of 110 graves, an average life expectancy of 28 years and a use period of 350 years, the average size of the community that buried or cremated its dead in the excavated part of the cemetery is calculated at 9.7 individuals. For \( D = 163 \) graves, Acsádi and Nemeskéri's formula produces an average of 14.3 inhabitants.22

The excavated part of the cemetery covers about 180 m². The area of the cemetery as a whole is unknown. Presumably there were more graves both to the north and the south of the excavation. If we assume that two thirds of the cemetery has been excavated and that in this part three quarters of the burials were extant, this means that the excavation brought to light about half of the original number of graves. The average size of the community that used the cemetery between AD 400 and 750 then must have been between 19 and 29 individuals. With an average of six occupants per farm, as Heidina assumed for Carolingian-period farms in the Veluwe region (Heidina, 1984: p. 196; 1987: p. 173), the *terp* of Oosterbeintum between 400 and 750 probably bore three to five farms.23
Fig. 72 Oosterbemium. Survey drawing of the younger features with the associated find numbers. Drawing by G. De Goede, V.A.R.U.G.
7. THE SOCIAL STRUCTURE OF THE COMMUNITY THAT USED THE CEMETERY

In the variation among funerary rites and grave goods within a cemetery, the archaeologist will look for evidence of the social status of the dead and their relatives living in the settlement. This is based on the assumption that differences in the social status of the dead will be expressed in the funerary rites and the grave goods accompanying the body. Variations in social status may be differences in wealth, prestige and authority. These may in part coincide with differences in gender and age.

Two problems crop up here. The first is that apart from social status also gender and age differences and cultural, ethnic and religious distinctions may have played a part in the funerary ritual, affecting the presence and nature of any grave goods (Sigvallius, 1994). The second is that in the Oosterbeintum cemetery the conditions for preservation were poor. The grave goods accompanying cremations were particularly scanty. This will largely be due to the poorer chances of survival of grave goods in cremation graves than with inhumations (tables 3 and 18).

The number of bodies cremated at the cemetery of Oosterbeintum between AD 450 and 750 is likely to have been greater than the number inhumed in that period. The number of children appears to be greater among the cremations (11 to 23 individuals out of 35 to 51 remains with established age) than among the inhumations (8 out of 46). If the ash stains are assumed to represent the smallest number of individuals, the difference is not statistically significant; using the largest number, the difference is significant ($\alpha = 0.01$, table 7). Possibly the cremated children included more very young children: at least 15 of the 23 children’s remains were of children younger than five years (3.1.4, table 5). Among the eight interred children, three were under the age of five (3.2.6, table 23). For children under five, cremation may have been preferred. Among the inhumed adults there were as many men as women. The same is likely to have held for the adult cremations. Thus gender distinctions seem to have played no role in determining the type of funeral.

Among the inhumation graves of men, two are comparatively rich in grave goods. These are the 6th-century weapon grave 335 of an adult man in cluster 2 and grave 435 of a youth aged 19 in cluster 4. Among the inhumation graves of women there are a few with unusual or unusually much jewellery: 374B of an adult woman belonging to cluster 2, 428 of a fairly young woman in cluster 4, and 360 of a more elderly woman in cluster 1. Also the inhumation grave of the man/woman, No. 398 in cluster 4, yielded a large number of personal ornaments. Among the cremation graves, only a child’s urned burial, No. 438, belonging to cluster 2, contained an unusual item: a silver ring.

Despite these differences, the grave goods in the excavated part of the cemetery do not suggest a high degree of social stratification in the community that buried or cremated its dead here. A remarkable figure in early medieval Oosterbeintum must have been the dwarf, and the man/woman too may have played a special role (see 3.2.6). It is clear that not everyone was supplied with similar kinds of grave goods.

Comparatively rich graves are found in clusters 2, 4 and 1. Here also six of the seven animal graves are found. Cluster 2 may have been the burial site of the most eminent or richest family. This cluster includes two of the six dog burials. However, cluster 4 also has quite richly endowed graves. Moreover, the horse burial seems to be part of this cluster. So far, it has not been possible to say anything more specific about the social structure of the terp-dwellers' community.

8. THE CAROLINGIAN AND YOUNGER FEATURES

The cemetery was transected by a number of younger
Fig. 74. Oosterbeintum, ditch 105. Carolingian finds. Scale of pottery and quern 1:4; other finds 1:2. Drawing by H.J.M. Burgers, A.I.V.U.
settlement features (fig. 72). A few date from the Carolingian period (8th/9th century), others are even more recent (up to the 15th century). A few features failed to produce any clues whatsoever about their age. There was no evidence of a distinct pattern among the younger features. In the construction of the latter, some of the graves were badly disturbed. A brief description of these features follows below.

Ditch 128 (fig. 73; find Nos 128, 122, 129 and 603) lay in the western part of the excavation and had a depth of up to 0.75 m below NAP. The ditch branched to the west and contained a few sherds of early medieval, hand-formed pottery, a wall fragment of Carolingian, wheel-thrown relieband ware, and a number of animal bones. The fabric of the relieband vessel is similar to that of type VIII from Dorestad, though at Dorestad, relieband decoration is not normally associated with this fabric. An early Carolingian dating of the pot (8th century) seems justified (W.A. van Es, R.O.B./A.I.V.U., pers. comm.).

Ditch 180 (find Nos 180, 181, 264, 549, 550, 589, 600, 609 and 627), to the east of ditch 128, contained many animal bones and a wall fragment of early-medieval, hand-formed ware (No. 627). The deepest point of the ditch lies at 0.70 m below NAP.

Ditch 105 (fig. 74; find Nos 105, 179, 226, 271, 272, 615 and maybe 370) could be pursued over a distance of 9 m in a northeasterly direction, having emerged from the south profile. The ditch had a depth of up to 0.20 m below NAP and contained two rim sherds of wheel-thrown pottery. One belongs to Dorestad type W IIIA-12 and dates from the 8th or 9th century. The other belongs to Dorestad type W IXA (Prof. W.A. van Es, R.O.B./A.I.V.U., pers. comm.) and dates from the 7th or 8th century (van Es & Verwers, 1980). The ditch further contained a rim sherd and a wall fragment of Kugeltopf pottery, a skate made from a horse's radius, unworked animal bones and a composite comb with curved coverplates showing a linear fork design. The fork design is also known from 9th-century combs in Scandinavia (Tempel, 1969: design H 104, Formengruppe 2b). The coverplates are trapezoid in section, which is known also from a comb from Godlinze (van Giffen, 1920: pl. VII.1a). This comb is likely to date from the 8th or 9th century. The comb did not contain any remains of fleas, headlice or their eggs. The ditch also produced a fragment of a basalt quern. All datable finds considered, the ditch must date from the Carolingian period. Since it lies at a higher level than the cemetery, a 9th-century date seems the most likely.

Ditch 261 (find Nos 220, 261 and 504) intrudes into the cemetery from the south and had a depth of up to 0.41 m below NAP. The south profile showed that the ditch was dug into the layer raised in the Carolingian period. The ditch was found to contain a small wedge of iron (fig. 75; find No. 220).

The elongated pit No. 20 (fig. 76; find Nos 20, 34 and 51) in the eastern part of the excavation produced a few sherds of Pingsdorf ware, a small sherd of Kugeltopf ware, a quern fragment and a number of animal bones. The pit dates from the 10th or 11th century.

Pit 125 (fig. 77; find Nos 47, 57 and 125) is a dung-filled, round well which cuts through all levels down to 2.50 m below NAP. The well contained sherds of Pingsdorf ware and of 10th/11th-century Kugeltopf pots. A soil sample from this well was found to contain large numbers of mites and shells (chapter 9).
Fig. 77. Oosterbeintum, well 125. Finds from the 10-11th century. Scale of pottery 1:4. Drawing by H.J.M. Burgers, A.I.V.U.

Fig. 78. Oosterbeintum, well 489. Finds from the 14-16th century. Scale of pottery 1:4, other finds 1:2. Drawing by H.J.M. Burgers, A.I.V.U., and J.M. Smit, V.A.R.U.G.
Pit 489 (fig. 78; find Nos 17, 50 and 489) also was a round well which extended down through all levels into the sand at 3.90 m below NAP. A pot base and a sherd of stoneware date this well to the 15th century. The other contents were a nail, 5 cm long with a wide, round head; a bone handle; a spoon of wood of silver-fir (*Abies*), which is not indigenous in the Netherlands; and several animal bones. The handle was made from a young sheep’s metacarpus. The distal epiphysis was still open. Through use it had become polished smooth. At one end, the handle had been sawn off. The bone cavity contains rust, possibly from an iron tool. The wooden spoon was presumably imported from the upper-Rhine region. A dating between AD 1450 and 1550 is reasonable, as is indicated by the find of about a dozen of spoons of the same type and wood species at Groningen-Waagstraat (Casparie & Helfrich, 1995: p. 31).

In the undatable pit 35, 1586 bones of the natterjack toad, *Bufo calamita* were found. Because of its deep level, the pit may well antedate the 8th/9th century. Pit 37 contained a rim sherd of a Carolingian *Kugeltopf* vessel (fig. 79) and some animal bones.

In the middle of the cemetery there was a circular ditch, 0.7-1.2 m wide, with a diameter of 6 m (fig. 72). This feature appeared in the field, but it vaguely, as a ditch 0.25 m deep (fig. 80). The ditch contained a few animal bones. It is evident that only the bottom of the ditch was observed in the excavation. The quarrying had removed the upper part of the circular ditch. The ditch transected several of the graves and the younger ditch 261, but was itself not cut into by any features. Hence the circular ditch must postdate the 8th century.

Four unstratified sherds of wheel-thrown pottery are probably unrelated to the cemetery. The pot base 349 is Merovingian or Carolingian. Sherd 502 may be Carolingian. The small, undecorated fragments 36 and 43 are of Carolingian, Badorff-style pottery. Eight sherds of 9th/10th-century *Kugeltopf* ware came to light as stray finds in the *terp* (fig. 81). These were mostly tempered with crushed granite. Two contained temper of crushed shell. One stray sherd, found on the tip, bore...
Fig. 81. Oosterbeintum. Late Kugeltopf sherds found scattered throughout the terp with their find numbers. Find Nos 27 and 251 are shell-grit tempered, the others are stone-grit tempered. Date: 10-13th century AD. Scale 1:4. Drawing by H.J.M. Burgers, A.I.V.U.

Fig. 82. Oosterbeintum. Quern fragments found in the terp outside the graves. Find Nos 20, 22, 322, 615. Scale 1:4. Drawing by H.J.M. Burgers, A.I.V.U.
The early medieval cemetery of Oosterbeintum (Friesland)

9. ANIMALS ON AND AROUND THE TERP

9.1. Introduction

The total number of faunal remains from the various features of Oosterbeintum amounts to 6555, 5812 remains of vertebrates and molluscs (table 33) and 743 remains of mites (tables 35-37). Artefacts are not included in the number of vertebrate remains. The unburned material, which was definitely not involved in the funerary ritual (4.9), can be divided into three overlapping periods: '4th century', '4th-8th century', and '8th century and later'. The faunal remains provide information on animal breeding, hunting, fowling, fishing and the wild fauna in these periods. Wolf and red deer, which are represented by artefacts, will also be discussed in this respect.
The sampling method of the features was variable. The animal remains from the human inhumation graves (category 3), the body of the terp (categories 1-2) and some of the younger features (category 10) were hand-collected. The soil from the animal graves was partly sieved (category 4). All cremation features (categories 5-9) as well as the contents of some of the younger features were sieved (categories 10-11). All sieving was done with a 1.5 mm mesh. This difference in sampling strategy is reflected in the numbers of remains and the species composition of the various types of feature. Collecting by hand results in low numbers of remains and over-representation of larger species such as cattle. Sieving results in higher proportions of remains of smaller species (mice, birds, fishes, molluscs, amphibians and unidentified mammalian bone remains) (tables 33 and 34). Paraffin-flotation was carried out on the younger feature 125 (category 11), a well, to extract the mite remains.

9.2. The vertebrates
Identification rates are high for the material of the 4th century and that from the 8th century onwards (67 and 98%), but low for the material of the 4th-8th centuries (31%) (table 34). This low identification rate is due to the small size of the sieved material from the graves.

Domestic animals
Cattle, sheep, pig and horse are represented by remains in all three periods of the terp of Oosterbeintum (table 34). Goat has not been attested and was probably absent. Cattle and sheep were the most abundant species. The high percentage of remains of sheep/goat in the 4th-8th century material (63%) is probably caused by the large proportion of material sieved for this period. There is no evidence for an increase of sheep/goat from the 4th to the 8th century. On account of its higher carcass weight, cattle probably provided most of the meat in the three periods. Pig and horse are less well-represented in the material. Remains of dog and cat are rare. These animals were probably not eaten, and for this reason may be underrepresented. A single bone of domestic fowl was found in an 8th-century or later feature. Domestic fowl was absent or rare in the northern parts of the Netherlands (Knol, 1983; Prummel, 1987) and Germany (Reichstein, 1991) in the first seven centuries of our era. Wild or domestic goose is recorded in 4th-8th-century features and wild or domestic duck in 4th- and 4th-8th-century features (table 34).

Cattle, sheep and pig will have been kept for traction (cattle), milk (cattle, sheep), wool (sheep), meat, fat, hides and bristles (cattle, sheep, pig). The salt marsh provided good conditions for sheep and cattle. Cattle must have access to fresh water on the higher places of the terp. The proportion of pig remains for the 4th century at 8% is high, if we take into account that the surroundings of the terp were poor in the optimum feeding ground for pigs, woodland. Pig, being an omnivorous animal, will have been fed on waste. Its rapid reproduction made it a safe and quick producer of meat.

The dog may have been a companion, hunting dog, war dog or defender of livestock against wolves (see 3.3.3). The cat was still rare in the first centuries of our era. Its function will have been to kill mice. The horse was a saddle horse, charger, draught animal and status symbol (3.3.2). It was definitely not used for ploughing in the 4th-8th centuries, since the equipment needed to plough with a horse was not available. The domestic chicken and maybe domestic goose and duck were kept for meat, eggs and feathers.

Wild mammals
Wild mammals are represented by wolf (Canis lupus), red deer (Cervus elaphus), an unidentified cetacean and several species of mice (tables 33, 34). The wolf is represented by two perforated canines, presumably of separate animals, attached to a chain (chatelaine) in inhumation grave 374 (4.2). That the wolves were killed near Oosterbeintum is not certain. However, wolves definitely visited the terp area, where they endangered the livestock.

Red deer is represented by fragments of antler with cut marks and by antler artefacts. No postcranial remains were found. The waste antler demonstrates that antler was processed locally. All antler artefacts were found in inhumation or cremation graves (4.3).

A bone fragment, possibly a rib fragment, of a large cetacean was found in a postmedieval pit (find No. 164). It shows no obvious marks of being worked.

Four species of mice were identified in sieved samples from the cemetery. An Apodemus species, presumably the wood mouse, A. sylvaticus, turned up in 4th-8th-century material (ash stain 196). The wood mouse is a common species in the Netherlands. It is highly adaptive and inhabits many places, although it avoids wet places. It may have lived in the higher parts of the salt marsh and in houses (Corbet & Harris, 1991, pp. 220-229; Wammes, 1992). The water vole, Arvicola terrestris, was attested in a 4th-8th-century context (inhumation grave 295). The channels in the tidal flats and the lower parts of the salt marsh will have offered good conditions for this species (Corbet & Harris, 1991, pp. 212-218). The higher parts of the salt marsh also may have been frequented by the species (Reichstein, 1982; Pelzers, 1992).

Two species of Microtus were found in 4th- and 4th-8th-century material. They are the northern (or root) vole, Microtus oeconomus, and the field vole, Microtus agrestis. Remains of the northern vole were very numerous in bustum grave 160 (table 33). Two fragments were affected by the cremation fire. Other features in which it was demonstrated are the body of the terp, inhumation grave 295 and ash stain 431. The field vole was encountered in bustum grave 160. Both species,
Table 34. Oosterbeintum. Uncrernated faunal remains in three partly overlapping periods: 4th century: terp body (categories 1-2 in table 33); 4th-8th century: inhumation and cremation graves (categories 3-9 in table 33); 8th century and later: younger features (category 10 in table 33). NR. Number of remains; % is proportion among total number of remains (identified as well as unidentified remains); %dom is proportion among the remains of domestic mammals.

<table>
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<th>Date in centuries AD</th>
<th>4th %</th>
<th>4th-8th %</th>
<th>8th and later %</th>
<th>4th %dom</th>
<th>4th-8th %dom</th>
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</tr>
<tr>
<td><em>Gallus domesticus</em>, domestic fowl</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Wild or domestic birds</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Anser anser</em>, greylag goose</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Anas platyrhynchos</em>, mallard</td>
<td>1</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Wild birds</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Gavia stellata</em>, red-throated diver</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><em>Cygnus columbianus</em>, Bewick’s swan</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><em>Anas crecca</em>, teal</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Aythya sp.</em></td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Pluvialis apricaria</em>, golden plover</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Calidris minutuatemminckii</em>, little</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>or Temminck’s stint</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Calidris alpina</em>, dunlin</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Numenius arquata</em>, curlew</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><em>Tringa cf. totanus</em>, cf. redshank</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Amphibians</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Bufo calamita</em>, natterjack toad</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1586</td>
<td>90</td>
</tr>
<tr>
<td>Fish</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Clupea harengus</em>, herring</td>
<td>1</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Anguilla anguilla</em>, eel</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Pleuronectidae</em>, flatfishes</td>
<td>4</td>
<td>1</td>
<td>16</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Liza ramada</em>, thin-lipped grey mullet</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Gasterosteus aculeatus</em>, stickleback</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Molluscs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Littorina littorea</em>, periwinkle</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><em>Succinea</em>idae</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Hydrobia</em>idae</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Gastropod</em></td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Cerastoderma edule</em>, cockle</td>
<td>2</td>
<td>0</td>
<td>7</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Mytilus edulis</em>, mussel</td>
<td>4</td>
<td>1</td>
<td>110</td>
<td>7</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total identified</td>
<td>351</td>
<td>(67)</td>
<td>516</td>
<td>(31)</td>
<td>1725</td>
<td>(98)</td>
</tr>
</tbody>
</table>
Table 34 (continued).

<table>
<thead>
<tr>
<th>Date in centuries AD</th>
<th>4th NR</th>
<th>%</th>
<th>4th-8th NR</th>
<th>%</th>
<th>8th and later NR</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unidentified</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mammalian remains</td>
<td>125</td>
<td>24</td>
<td>1127</td>
<td>67</td>
<td>35</td>
<td>2</td>
</tr>
<tr>
<td>Bird remains</td>
<td>1</td>
<td>0</td>
<td>9</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Fish remains</td>
<td>47</td>
<td>9</td>
<td>21</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Mollusc remains</td>
<td>1</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total unidentified</td>
<td>174</td>
<td>(33)</td>
<td>1161</td>
<td>(69)</td>
<td>35</td>
<td>(2)</td>
</tr>
<tr>
<td>Total</td>
<td>525</td>
<td>100</td>
<td>1677</td>
<td>100</td>
<td>1760</td>
<td>100</td>
</tr>
</tbody>
</table>

1 The 85 remains of a fetal piglet in the stomach of dog 480 not included.

especially the northern vole, prefer moist habitats. For the northern vole such habitats are essential for survival.

Nowadays, the northern vole is absent in the coastal part of the province of Friesland. It lives in small numbers in the peat areas of this province and in low-lying areas in the western part of the Netherlands (Lange, 1991; Ligtvoet, 1992). The population of the northern vole in the Netherlands is a disjunct remnant of its occurrence throughout western Europe at the end of the Pleistocene. The building of dikes along the coast of Friesland since the 12th century resulted in dry vegetation in the coastal areas, which are unattractive to the northern vole. Modern arable farming in the area, which needs low water tables, has reduced the habitat of the northern vole even more. It is unknown when the northern vole disappeared from the northern coastal area. The field vole is rare nowadays in the coastal area of Friesland (Lange, 1992). Early medieval conditions will have been much better for this species.

**Wild birds**

Nine species of wild bird have been attested in the cemetery. Gavia stellata, the red-throated diver, appeared in one of the younger features (tables 33 and 34). It will have been caught in winter, when small numbers of the species visit the coastal waters of Friesland (de Bruin & de Vries, 1976; SOVON, 1987: pp. 44-45). Gavia stellata was found in Feddersen Wierde (Reichstein, 1991). Cygnus columbianus (bewickii), Bewick’s swan, has been identified in a younger feature (tables 33 and 34). This swan species is a winter visitor to Friesland in fairly large numbers (de Jong, 1976). It must have been caught in winter.

Two species of duck were found, Anas crecca, teal, in 4th- and 4th-8th-century features (fig. 85) and as a complete calcined individual in Brandgrube 97 (3.3.4), and an indefinite Aythya species in a 4th-8th-century feature (urn 31). The teal is present in Friesland the year round. In winter their densities are high, in summer they are low (SOVON, 1987: pp. 116-117). Aythya fuligula, tufted duck, A. ferina, pochard, and A. marila, scaup, one of which is represented in the material, are winter visitors to Friesland (SOVON, 1987: pp. 128-133).

The golden plover, Pluvialis apricaria, is represented in a 4th-8th-century context (cremation feature 315). The subspecies apricaria formerly bred in small numbers in the marshes of Friesland. The subspecies altifrons is a migrant and winter visitor in high densities along the coast of Friesland (Eenshuistra, 1976). As early as the 16th century at least, the golden plover was caught with a long and narrow single net along the coast of Friesland in winter. The birds were lured with a whistle and decoys (Eenshuistra, 1973a). The golden plover has been identified in sites in the Netherlands of various periods, e.g. the Roman castellum at Velsen (Prummel, 1987), early medieval features of Wijnaldum (Prummel, 1991) and a 17th-century cesspit at Harlingen (Prummel, not dated [1992b]). It yields a reasonable amount of meat.

![Fig. 85. Oosterbeintum. Right carpometacarpus of a teal. Anas crecca. The bone is an accidental inclusion in inhumation grave 605. Date 4th-8th century AD. Scale 1:2. Photograph by R.J. van Ewyck, C.F.D., R.U.G.](image-url)
The Calidris species, *minuta*, little stint, or *temminckii*, Temminck’s stint, and *alpina*, dunlin, have been found in cremation contexts of the cemetery (160 and 372). They played a role in the cremation rite. These species are common (*minuta*), very rare (*temminckii*) and abundant (*alpina*) along the Frisian coast. *Calidris minuta* and *temminckii* are migrant birds. Their greatest densities are in autumn. The numbers of *Calidris alpina* decrease in numbers in June (Timmerman & Timmerman-Kloppenburg, 1977a; SOVON, 1987: pp. 228-231, 236-237). They could have been caught with fixed nets on the tidal flats or the salt marsh. This kind of net was in use to catch stints and other birds along the Frisian coast up till the early 20th century (Eenshuistra, 1973b).

*Numenius arquata*, curlew, was encountered in one of the younger features (tables 33 and 34). The species is a resident along the coast of Friesland and is very numerous in winter (Eenshuistra, 1977; SOVON, 1987: pp. 252-253). *Tringa totanus*, redshank, which is the *Tringa* species probably represented in a 4th-8th-century context, is a very common species in Friesland, especially in the clay area along the coast. Here it breeds in great numbers (Timmerman & Timmerman-Kloppenburg, 1977b). The excavated *Numenius arquata* and *Tringa* sp. may have been caught with plover nets or with fixed nets.

**Amphibians**

*Bufo calamita*, the natterjack toad, was encountered in feature 35, which may predate the 8th/9th century AD. The only faunal remains found in this pit are 1586 bones of at least 33 natterjack toads. Young as well as adult individuals are represented. The animals may have been killed in their migration by falling into this steep-sided well. The identification criteria used are the very sharp point of the tuber superior of the ilium and the shape of the frontoparietale, the sphenethmoid and the sacral vertebra (Engelmann et al., 1986: p. 133; Böhme, 1977).

The natterjack toad is not nowadays known as a species of the coastal clay areas of Friesland (Bergmans & Zuiderwijk, 1986) and Lower Saxony (Podloücky, 1978). However, Bergmans & Zuiderwijk (1986) note that these areas have not been well studied herpetologically. The species prefers sandy soils poor in vegetation, such as dunes, sand quarries, shallow pools and newly built dikes (Engelmann et al., 1986; Podloücky, 1978; Bergmans & Zuiderwijk, 1986: pp. 78-81). Bergmans & Zuiderwijk (1986) stress its salt tolerance and preference for a combination of dry sandy soils and low-lying moist areas. These conditions will have prevailed in the undiked areas along the coast of Friesland in the 9th-11th century, the higher parts of the salt marsh being relatively sandy alongside the wet tidal flats (Kno1, 1993a: pp. 28-30). The natterjack toad is a typical pioneer species. The unstable conditions of sedimentation and deposition of sods provided living conditions for the natterjack toad.

**Fish**

Five species of fish are represented at Oosterbeintum: *Clupea harengus*, herring, *Anguilla anguilla*, eel, *Pleuronectidae*, flatfish e.g. plaice and flounder, *Liza ramada*, thin-lipped grey mullet, and *Gasterosteus aculeatus*, stickleback. Herring was found in a 4th-century context. This is quite an early find of herring (Brinkhuizen, 1989: p. 276). Herring, eel, flatfish and mullet will have been caught for food. The stickleback will represent fishes that lived in water on or around the terp.

### 9.3. The invertebrates

#### 9.3.1. Molluscs

Five marine mollusc species have been identified (tables 33 and 34). The majority of mollusc remains originate from the younger feature 125. *Littorina littorea*, periwinkle, *Cerastoderma edule*, cockle, and *Mytilus edulis*, mussel, are edible species, which are common in the Wadden Sea (de Boer & de Bruyne, 1991). Most periwinkle shells are of small dimensions, the smallest of 5 mm height being certainly no refuse of consumed molluscs. The cockle and mussel shells are highly fragmented. This may mean that these shell fragments were naturally deposited in the clay with which the terp had been built and do not originate from consumed molluscs. However, shells in consumption waste can be heavily fragmented by being trodden on and by weathering processes. This is illustrated by the many cockle and mussel shell fragments of the Slavonic stronghold Stargard/Oldenburg in Ostholstein, Germany (Prummel, 1993b), which are of identical size to those of Oosterbeintum. The stronghold is situated on a 16 m high Pleistocene moraine.

*Hydrobia ulvae*, a small Gastropod up to 6 mm long, is a very common species of tidal flats of the Wadden Sea. Densities of many thousands per m² are encountered (de Boer & de Bruyne, 1991: p. 82). The shells will have been hidden in the salt marsh sods from which the terp was built. An unidentified species of *Succineidae*, very small Gastropods that live in mud flats, is represented by one shell.

#### 9.3.2. Mites (Acari)

Table 35 presents the absolute and relative numbers of individuals and species found in the sample from the 10th/11th-century well 125, arranged by taxonomical group. Also shown are the identification percentage, the ‘diversity’ (calculated with the aid of the Shannon-Wiener index \( H' = -\Sigma(P_i \cdot \log P_i) \)), in which \( P_i \) is the frequency of species \( i \) and the ‘richness’ (indicated by the parameter \( d_l = (N_{sp} - 1) \cdot \log N_{ind} \)), in which \( N_{sp} \) is the number of species and \( N_{ind} \) the number of individuals). The parameters of diversity and richness will allow comparison between large and small archaeological
mite samples. Their values are virtually independent of the numbers of individuals found (Cruz-Uribe, 1988).

**Oribatids**

The moss mites, Oribatida, both in terms of numbers of individuals and numbers of species, make up the bulk of this sample (tables 35 and 36). Since the identification rate is high (87%), this sample provides amply sufficient identified moss-mite remains to allow a reconstruction of the landscape. Just three species, Ceratozetes parvulus, Tegoribates latirostris and Scutovertex pilosetosus cannot be assigned to one of the ecological groups defined by Schelvis (1990). Since these three species were found only in small numbers (table 36), the eventual ecological grouping is based upon 84% of the recovered moss mites. This high percentage makes it very likely that a landscape reconstruction based on this analysis is a reliable one.

The proportions of each of the represented ecological groups were calculated by means of the weighted distribution method as described by Schelvis (1990). Figure 86 shows this schematically, with groups making up less than 1% of the total (II, III, IV and XI) lumped under the heading of ‘miscellaneous’.

From the predominance of groups XIII and XIV it is evident that, at the time when the well was in use, the landscape around Oosterbeintum must have been very open. The very high value of group XIV moreover shows that the influence of the sea was considerable.

**Gamasids**

The predatory mites make up 26% of the total mite fauna (table 35). This is a remarkably high value for an archaeological sample. Generally this value is around 10% (based on thirteen mostly medieval samples) (Schelvis, 1992). This difference becomes even greater if only the predatory mites in the narrowest sense, the Gamasina, are considered. As much as a quarter of the mite fauna of the well of Oosterbeintum was found to consist of these predatory mites, while the average...
frequency of such mites in archaeological samples is a mere 3.5% (Schelvis, 1992).

Investigation of specific predatory mite faunas in excrement of various domestic animals has resulted in a list of predatory mites that are found in the majority of samples, irrespective of the source of the excrement (Schelvis, 1992). These species can therefore be considered indicators of dung in a sample.

Among the predatory mites found at Oosterbeintum (table 37), such dung indicator species are *Androlaelaps casalis*, *Ameroeseus plumosus* and *Macrocheles matrius*. Hence the well is highly likely to have contained manure. The predatory mites in the sample do not belong to species with a known preference for the dung of particular animals. For this reason it is not possible in this case to identify the producer of the dung. Some observations by the author have, however, brought to light a few remarkable associations.

*A. casalis* occurs in grassland soils, in humus among plant roots, in birds’ nests, on rodent’s nests, and in hay and straw. Recently this species has been found in the manure mixed with straw on the floor of a henhouse. *A. plumosus* occurs in horse, cattle and rabbit droppings and in nests of ants, bumble bees and small mammals. *Neojordensia levis* has a preference for very moist surroundings and is found in riverbanks and wet marsh and grassland soils. The species is also known from coastal dunes. Recently *N. levis* has been found in brackish reed-land in the Marnewaard, Groningen. *Eualaelaps stabularis* is seldom found free-living in grassland and arable soils. This species prefers the pelt and nests of rodents and insectivores. Also it has been found in a store of chicken feed (Schweizer, 1961). Recently the species has been identified in the fur of a house mouse (*Mus musculus*).

*Proctolaelaps pygmaeus* occurs in various environments and has a preference for limy soils. This species too turns up in the nests of small mammals. For recent periods, it has not yet been identified in the Netherlands.

*Pergamasus crassipes* commonly occurs in very diverse environments, but has a preference for fairly moist surroundings. This species is regularly found in samples of all sorts of litter, manure and compost. *M. matrius* is found in chicken manure, old hay and the nests of rodents. In the Netherlands, this species has so far been identified only in the henhouse where also *A. casalis* was found. *Hypoaspis aculeifer* in terms of preferred biotope and occurrence in recent material largely corresponds with *P. crassipes*. Uropodina type A 11a so far has been found only in a subfossil condition: in a cesspit on the Martinikerkhof site in Groningen, dating to around AD 1600.

A remarkable point emerging from this survey of preferred biotopes and recent findspots of the predatory mites found at Oosterbeintum is the high frequency of mites associated with (among other things) small mammals and their nests. Four of the eight species are regularly found in this specialized habitat, while two are also found on the small mammals themselves. Remarkably, three species were found to be linked with poultry. The three other species, *N. levis*, *P. crassipes* and *H. aculeifer*, commonly occur in a variety of natural environments. All three have a preference for a moist to very wet environment.

**Other mites**

The majority of the other 16 mite remains were astigmatic mites (order Acaridida). Representatives of this order are found as subfossils almost invariably in one typical stage of development, the hypopus (fig. 87). These nymphs are wholly adapted to their phoretic way of life; i.e. they attach themselves to other animals, by which they obtain a means of transport. The feet and mouthparts of these hypopi are poorly or not at all developed, but...
they have a ventral sucking organ with which they attach themselves to passing insects. Because of this mobility they are of little use for archaeological interpretations. They lack the great advantage to archaeology of flightless mites, which reflect the ecological conditions in the immediate surroundings of the sampled spot.

Three remains are of prostigmatic mites (order Actinedida), a group of which so far no specimens have been found in archaeological contexts (fig. 88). These three mites belong to the family Cheyletidae, presumably the genus Cheyletus. Mites of this genus are mainly free-living predators, whose habitats include cereal stores and nests. Specimens of presumably the same species as those at Oosterbeintum have been found in a modern henhouse (fig. 89). The predatory mites A. casalis and M. matrius were found at the same spot.

Discussion

The reconstruction, on the basis of the moss mites, of the landscape around the terp of Oosterbeintum in the 10th/11th century (fig. 86) differs in several respects from that of Bornwird, less than 6 km away. The latter sample was also from a well, be it a 13th-century one (Schelvis, 1988). In terms of moss-mite species, the samples are quite similar. Of the 21 moss-mite species from Oosterbeintum, 17 (81%) were also found at Bornwird. These 17 species make up 97% of the individuals at Oosterbeintum. An important difference between the two samples is that at Bornwird more species of moss mite were found, namely 28. Of these 28 species, only 16 occur at Oosterbeintum too. These 16 species make up 67% of the moss mites found at Bornwird. However, the most important difference between the two samples is in the ecological groups to which the identified moss mites can be assigned. Although the same ecological groups are represented,
their proportions differ. The value of group XIV, typical of saline grassland, is much lower at Bornwird than at Oosterbeintum. This is almost certainly due to the desalinization after the diking of the region from the 10th/11th centuries onwards. On the basis of these two samples, it is hard to tell to what extent the differing distance to the contemporary coastal saltmarsh contributed to these different ecological conditions.

Among the predatory mites found at Oosterbeintum, many are associated with small mammals and their nests, or with poultry. One of these species is *E. stabularis*. Specimens of this species were also found in the barrel-lined well of Bornwird. These may derive from the fur of a mouse or shrew that drowned in the well (Schelvis, 1988). In view of the other predatory mites found in well 125, it seems more likely that the specimens of *E. stabularis* at Oosterbeintum derived from a mouse nest that was tipped into the well together with other settlement waste. Moreover, the predatory mites (and maybe also the astigmatic mites) seem to suggest that poultry was kept at the settlement. This is supported by a chicken bone from an 8th-century or later context (table 34). The three other species of predatory mite, which come from the natural environment, are comparatively large species which are constantly on the move and catch their prey by running. They probably ended up in the well chasing after their prey.

9.4. Conclusion

The farms on the *terp* kept the domestic animals normally found in Iron Age and early medieval *terp* settlements: cattle, sheep, horse, pig, dog and cat. Poultry was of minor importance. Birds of several kinds were caught, mainly in winter. Marine fish was caught locally. Two species of mouse, *Microtus oeconomus* and *Microtus agrestis*, and a toad species *Bufo calamita*, demonstrate the unstable, wet conditions around the site in the early Middle Ages. These species are extinct or rare in the now much drier area.

The oribatid mites found in sample 125 are indicative of a very wet and open environment with a considerable marine influence, even as late as the 10th/11th century. This wet environment is also reflected by some predatory mite species (Gamasida). Other gamasids indicate not only the presence of unidentified animal excrement in the well, but also the presence of nests of mice or shrews, as well as poultry-keeping at farms of this period.

10. SUMMARY

In 1988 and 1989, part of an early medieval cemetery was excavated on the edge of the *terp* of Oosterbeintum, which held remains of both cremations and inhumations. The original surface of the cemetery had disappeared as a result of soil quarrying in the early 20th century. The north side of the cemetery was cut off by a ditch, a road, and then another ditch. The excavation covered a strip 7 to 8 m wide and 48 m long. Features belonging to the cemetery were observed over a length of 35 m.

The cemetery lay in the SE corner of the *terp*. It did not become clear whether it had been laid out on a separate cemetery *terp* or on a spur of the settlement *terp*. The south side of the cemetery had been affected by erosion in antiquity. After it ceased to be used as a cemetery, this part of the *terp* was raised further on at least two occasions. The cemetery had been damaged by various younger features.

The cremation features comprised 21 or 22 urned burials, a *bustum* grave, 5 *Brandgruben*, including one which contained only animal remains, 71 ash stains and 17 disturbed traces of the cremation ritual. The urns, radiocarbon datings, and grave goods date the excavated cremation features from the early 5th to the 8th century AD.

Among the 21 urned burials, there were at least 14 of adults and 2 of children. In five cases the age could not be determined. What was left of a possible 22nd urned burial was a shattered urn without cremation or charcoal remains. Two urns were wheel-thrown, the others were hand-formed vessels, including three of decorated Anglo-Saxon ware. The others were undecorated. The undecorated pottery dates from the 5th to the 8th century. This is confirmed by radiocarbon datings.

Of the *bustum* grave only the bottom part was found. The pit contained a great deal of charcoal, the cremated remains of a woman, and burnt clay. The grave goods comprised a fragment of a brooch, a molten string of beads, a small Anglo-Saxon pot, and remains from at least two little or Temminck's stint and one dunlin. The charcoal came from oak, beech, elder, birch, poplar and hazel wood, which had been stacked up in batches on the pyre.

Three of the *Brandgruben* contained many cremation remains and little charcoal. Two cremations were of adults and one of a child. The fourth *Brandgrube*, with the remains of a child, was badly disturbed and contained far less material. The fifth *Brandgrube* contained burnt bone of two animals.

The ash stains were features filled with a scattering of cremated remains, burnt clay and sometimes burnt grave goods. They may have been poorly provided *Brandgruben*. It seems more likely that they were postholes of frames for the pyres. Among the 21 ash stains in which the age of the cremated bodies could be determined, 15 may have belonged to children and 6 to adults.

Disturbed remains of the cremation rite were encountered in 17 inhumation burials. In one case they were the remains of two individuals. The delving of the inhumation grave will have disturbed two cremation burials.

The cremation features produced evidence of 10 to
21 children’s cremations and 23 to 27 of adults. The uncertainty results from the ambiguous nature of the ash stains. Young children occur more often in the ash stains than they do in the proper burials. Apparently their remains were not always buried after cremation. Among the adults there are at least one man and six women. The grave goods indicate the presence of eight women. The number of individuals that were cremated and/or whose ashes were buried in the excavated part of the cemetery, lies between 63 if the ash stains represent 18 pyre frames, and 117 if all ash stains represent individual cremations.

For cremation, the predominant form of body disposal, the wood types *Alnus* (alder) and *Quercus* (oak) were most often used. *Fraxinus* (ash) and *Betula* (birch) also were regularly used as fuel. *Populus* (poplar) too was burned. The wood types *Fagus* (beech), *Ulmus* (elm), *Acer* spec. and *Acer campestre*-type (maple type), *Euonymus* (spindle tree), *Corylus* (hazel), *Sambucus* (elder), *Salix* (willow) and *Pinus* (pine) were much less used as firewood. In most cremation features more than one wood species was encountered. Most of the wood came from moist to wet habitats, almost certainly from the immediate surroundings of Oosterbeintum. Part of the fuel was waste or demolition wood. Presumably wooden artefacts were also burnt.

Although the landscape was largely treeless, it evidently produced enough wood to sustain the cremation ritual. The tree stands where firewood was gathered - in the unendiked saltmarsh landscape - will have been mostly on the well-drained and hence desalinated clay soils such as natural levees and beach cliffs.

A total of 47 inhumations were uncovered. Two skeletons definitely shared one grave and two others probably did so. The grave goods and the radiocarbon dates reveal that bodies were buried in the excavated part of the cemetery from the second half of the 5th to the 8th century.

In the 5th and 6th centuries, the preferred orientation for the inhumation graves seems to have been with the head pointing between W-E and SSW-NNE. In the 7th and 8th centuries, no preferred orientation is in evidence.

The inhumation graves deepest with respect to NAP lie on the south side of the cemetery. The part of the *terp* occupied by the cemetery slopes towards the south.

Skeletal material was preserved in 46 inhumations. In all, 32 skeletons were complete, though of one skeleton no more than a skull remained. Eight skeletons were of children aged between 4 and 10, three were of adolescents and 35 of adults, aged mostly between 20 and 50. The average age at death was 29.5 years.

Of 30 individuals the osteological sex could be determined: 15 women and 15 men. All eleven female skeletons with grave goods were accompanied by items typified as feminine attributes: jewellery and spindle whorls. Of the ten male skeletons with grave goods, three had items labelled as masculine (weapons, large knife, pyramidal buttons), six had items found with both men and women (buckles, knives, pins and small pots) and one had jewellery and a bowl. This last grave therefore is archaeologically a woman’s, whereas osteologically it is a man’s (a ‘man/woman’).

Body length could be calculated for seven men and nine women. The men measured between 1.68 and 1.79 m (average stature 1.74 m). The women measured between 1.50 and 1.62 m (average stature 1.58 m). The man/woman was 1.75 m tall (according to the regression equation for men).

Fourteen of the 35 individuals for which this could be determined lay in a crouched posture, usually on the side. The others lay with flexed knees or one flexed knee, or with extended or crossed legs. The arms lay stretched along the body, crossed over the chest or with the hands in the lap.

An achondroplastic dwarf of unknown gender was found, with an estimated stature of between 1.25 and 1.30 m.

No causes of death could be inferred from the skeletons. But several, mainly older people had suffered from osteophytes, ankylosis, caries, jaw abscesses and tartar. A few skeletal elements were curved. One collarbone had been broken and then healed.

Soil samples from a few graves were scanned for mites. No mites were observed.

The cemetery contained several animal graves: an inhumation grave of a c. 6 year old stallion, six inhumation graves of dogs and one *Brandgrube* with the burnt remains of a lamb or kid, and a teal. Five of the dogs were definitely males, the sixth presumably was also male. The dogs’ height at the withers was between 62 and 69 cm. The animals were probably killed and buried on the occasion of a funeral, to enhance the status of the dead person or the family. Unfortunately none of the animal graves could be associated with a particular human grave, so that we do not know to what burial the animals were assigned as grave goods.

The number of grave goods was modest, both with the inhumations and the cremations. There was one weapon grave, of a man with a *Schmalzax* and a spearhead. A grave of a youth contained a large knife and an awl. Three inhumation graves of women and one cremation grave of a child had rich or comparatively many grave goods. The grave goods in other graves consisted of dress accessories such as brooches, beads, and buckles; tools such as spindle whorls, knives, or a strike-a-light; toys (knucklebones); amulets in the form of wolves’ teeth or an antler pendant; and small pots. There are four instances of what probably were burnt wooden artefacts. Remarkably there are at least 17 clinchers that probably derive from ships’ timbers. This wood will have been reused as firewood or for constructing the pyre frame, a platform or a grave lining.

In the cemetery a few clusters of graves seem to be distinguishable, maybe reflecting family groups.

The total number of graves in the excavated part of
the cemetery lies between 109 and 162. On the basis of 109 graves, a life expectancy of 28 years (as inferred from the human remains) and a use period of 350 years, the average size of the community using this cemetery is estimated at 9.6 persons. For 162 graves, the estimate comes to 14.3 persons. If, as is assumed, only half of the graves of the cemetery were excavated, the average size of the community at Oosterbeintum in the early Middle Ages will have been between 19 and 29 individuals.

For eight inhumations, tree-trunk coffins of oak (Quercus) were used. The oldest of these dates from the second half of the 5th or the early 6th century. It is assumed that about one third of the inhumed dead were buried in tree-trunk coffins. Presumably the oak trees required for this were cultivated for the purpose. The growth form of the trees, with a diameter of 70-75 cm, is quite different from the timber used for construction. The presumed cultivation of oak trees 100 to 150 years old to supply the clay regions of Westergo and Oostergo would have required an area of over 4100 ha, as is shown by a very global estimate based on the assumed population of these regions. It is hard to tell where this arboriculture took place.

Scattered throughout the terp and accidentally ending up in graves, faunal remains of cattle, sheep, pig, dog, horse and cat were found. This will have been settlement waste. The following mouse species were identified: wood mouse, water vole, northern vole and field vole. Remarkable finds are the remains of northern vole and natterjack toad, which are now absent in the former salt-marsh region of Friesland. In the unendiked landscape they must have been very much at home.

Four ditches from the Carolingian period, a well of the 10th/11th century and a 15th-century well were found. These disturbed the cemetery to a slight degree. Mite analysis of the fill of the 10th/11th-century well allowed the reconstruction of an unendiked landscape. A circular ditch that came to light must also date from a late period.

The excavated features and finds (especially those of wood and metal) reveal the poor conditions for conservation in the plot that contains the cemetery and which is a listed monument. Both the commercial soil extraction in the early 20th century and the recent lowering of the water table have contributed to this. The state of conservation of the individual objects is far inferior to that of the finds from the early medieval cemetery of Hogebeintum, excavated in 1904/05. There, the excavated bronze artefacts were in excellent condition and even innumerable tree-trunk coffins had remained intact.

Not the whole cemetery was excavated. Presumably there are more graves to the south of the excavation and north of the road. The actual extent of the cemetery is unknown. Therefore it makes sense to continue the protection of the site. Maintaining the low water table, however, will endanger the conservation of the remaining features and objects.

11. ACKNOWLEDGEMENTS

The authors are much indebted to S. de Haan and family of Twijzelerheide, who reported the finding of the cemetery to the Fries Museum in Leeuwarden. The excavation was made possible by the wardens of the Dutch Reformed Church at Blija and by H. Hamstra and family of Oosterbeintum, who kindly granted permission to excavate on their land; H.J. Feensta and J. Hamstra and their families at Oosterbeintum and officers of the police station of Ferwerd, who kept a watchful eye on the site at night and at weekends; the machine driver G. Roorda of Vrouwenparochie, of the firm of K. Bija & Zoon BV at St. Anna Parchie, who operated the mechanical digger; G. Delger and K. Klaassens, field technicians of then B.A.I. (now V.A.R.U.G.); the late J.K. Boschker and D.M. Visserof the Fries Museum; H. Visser of Dokkum who joined the dig as a volunteer; and the students M.C. van Heuveln (B.A.I.) and C.A.C. Jansen (A.I.V.U.). G. Delger prepared the drawings in the field, compiled from these the survey drawings, and took the photographs and slides during the excavation. K. Klaassens took care of cleaning, numbering and restoring the pottery.

In working out the material, assistance was received from many people and institutes. The Centre for Isotope Research (R.U.G.) performed the radiocarbon datings. C.M. Haverkort restored the human skeletal material; R.J. Kosters and T.P. Jacobs (both of V.A.R.U.G.) sorted the faunal material; Professor C.J.P. Thijn (Radiodiagnostics, University Hospital Groningen), J.M. Cobben and A.J. van Essen (Medical Genetics, dept. of Genetics Advisory Centre, R.U.G.) produced and analysed the X-ray photos of the skeleton of the dwarf and confirmed the diagnosis of achondroplasia.


Professor W.A. vanEs(R.O.B./A.I.V.U.) and W.J.H. Verwers (R.O.B.) assisted in identifying the wheel-
Fig. 90. Oosterbeintum. Western part of the cemetery showing the location of the individual cemetery features. Drawing by G. Delger, V.A.R.U.G.
Fig. 91. Oosterbeintum. Central part of the cemetery showing the location of the individual cemetery features. Drawing by G. Delger, V.A.R.U.G.
Fig. 92. Oosterbeintum. Eastern part of the cemetery showing the location of the individual cemetery features. Drawing by G. Delger, V.A.R.U.G.
The early medieval cemetery of Oosterbeintum (Friesland)
stains. These were small pit-like features with a variable amount of cremated remains, charcoal and burned clay. The graves and stray finds are given in successive number, but as these were the original field numbers, the grave numbers are not consecutive. The grave goods have been given sub-numbers, e.g. 15.1 is an object in grave 15. If the item grave good had a different field number than the skeleton, then the original field number is given in brackets. Two samples of unburnt cremation above each other in two different levels were considered to be one unburnt cremation and taken together. The original field number of the other samples is given in brackets. The graves A, B, C and D were found before the excavation. The location of all features with their numbers is shown in figures 90-92.

The description of the graves is followed by plates with detailed drawings of the graves (1:40), drawings of the ums and grave goods (pottery and weapons 1:4, other items 1:2). Of most metal finds the drawings show the exterior and a reconstruction on the basis of X-ray photography. Some fragments are not illustrated (n. ill.). The measurements are in m and cm: l. Length; gr. l. Greatest length; h. Height; w. Width; d. Diameter; th. Thickness; app. Approximately.

The catalogue describes several aspects of every feature. If an aspect is not relevant for the feature then it is not mentioned. The aspects are:

a. The type of feature: inhumation; unburnt cremation; bustum, Brandgrube or other trace of unburnt cremation; horse grave; dog grave; stray find.

b. The location within the excavation given coordinates conform figures 90-92. Also the level in which the find was found is mentioned. The drawings of these levels are not published here, but are kept in the archives of the B. A.I. (now Vakgroep Archeologie).

c. If disturbed: the degree of disturbance: x. Moderate disturbance (some bones not articulated, urn slightly damaged); xx. Considerable disturbance (part of skeleton or urn destroyed); xxx. Severe disturbance (only some bones or urn in sherds).

d. Dimensions of the grave (length x width). With ash stais often only the diameter (d.) is given. The bottom of the grave was not recorded. The given depths with respect to sea-level datum: NAP) are the top of the skull, the top of the pelvis and the top of the feet.

e. The orientation of the grave: first the direction of the head, then of the feet: N. north; W. west; S. South; E. East.

f. Description of the coffin (inhumations) or the charcoal (cremations).

g. Skeletal remains.

h. Sex determination: the osteological (ost.) sex and the archaeological (arch.) sex inferred from the grave goods (see m.). Indeterminable sex is indicated by a dash (-).

i. Age (in years).

j. Estimated length of body (human) or height of the withers (animals) in m.

k. Pathology and details of the skeleton.

l. Posture of the skeleton.

m. Grave goods. The objects made of antler were probably all made from red deer antler. In most cases the position of beads in a string could not be reconstructed and their description is in random order. Unless otherwise stated, the beads are of opaque glass. The measurements are given in cm. The measurements of iron objects are mainly on the basis of the X-ray photo.

n. Location of the grave goods in the grave.

o. Cremation sample in the grave fill. Amount of human cremation given in g. Burnt animal bones. If an unburnt cremation is disturbed by an inhumation this is mentioned here fill.

p. Unburnt animal (and human) bones found in the grave fill.

q. Other particulars of the grave.

r. Dating of the grave. AD 400-450 should be read as: first half of the 5th century. None of the inhumation graves contained grave goods with a date before AD 450; therefore undatable inhumation graves have been dated AD 450-750. Undatable cremation graves are given the total range date of the cemetery: AD 400-750. All given dates are approximate.

A.

a. Inhumation.

b. Undatable, AD 450-750.

C.

a. Unburnt burial.

b. Found in the ditch along the excavation, autumn 1987.

C.

a. Undatable burial.

b. Found in the ditch along the excavation, autumn 1987.

D.

a. Ash stain.

b. Found in the ditch along the excavation, autumn 1987.
The early medieval cemetery of Oosterbeintum (Friesland)

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g. 49 g of human cremation (FM 1987 X/4).
m. D.1 Biconic spindle whorl, ceramic, d. 3.5, h. 1.8 cm, one side deformed by fire (Fries Museum Inv. No. 1987 X-4a).
r. Undatable, AD 400-750.

5.

a. \textit{Brandgrube}.
b. M.3, level 1.
d. 1.24, w. 20 cm.
f. 1 ml of charcoal.
g. 1137 g of human cremation.
h. Adult.
m. 5.1 Fragment of tweezers, bronze, remaining l. 3 cm, burnt.

5.2 Fragments of comb and case; fragments of a straight, small connecting plate, (red deer) antler, calcined.

5.3 Two fragments of a case (red deer) antler, calcined.

5.4 D-shaped buckle, iron, l. 2.6 cm.

5.5 Nail, bent, iron, l. 1.6, d. of head 1.8 cm.

5.6 Head of a nail, iron, l. 0.6, d. 1.3 cm.

5.7 Head of a nail, iron, l. 0.4, d. 1.8 cm.

5.8 Fragment of a nail, iron, l. 1.5 cm.

5.9 Unknown object, iron, l. 1.8, w. 1.6 cm.

p. Unburnt faunal remains: third phalanx of pig; 7 copper-stained bone fragments of small mammal; fragment of femur of mouse species; fragment of left humerus of \textit{Calidris alpina} (dunlin); 2 bird bone fragments; 2 caudal vertebrae of \textit{Pleuronectidae}; fish bone fragment; 13 shell fragments of \textit{Mytilus edulis} (mussel).

r. Undatable, AD 400-750.

14.

a. Urned burial.
b. J 5, level 2.
c. x, rim damaged.
f. 1 ml of charcoal.
g. 328 g of human cremation.
i. 35-40 years or older.
j. 1.57 m.
k. Femur a little bent in anterior-posterior direction. Some vertebrae have osteophytes. Tartar on teeth, 1 tooth with caries and two roots carious. Some teeth were worn down to the roots.

l. On the left side, arms crossed in the lap, hands upon each other, legs slightly flexed.
m. 60.1 Nine beads, glass: 1. Black with three reddish-brown lines, the middle line bearing white dots; 2. Blue translucent; 3. Purple translucent; 4. Green translucent with opaque reddish-brown lines; 5. Reddish brown; 6. Green with black lines, translucent; 7. Reddish brown with yellow crossing trails; 8. Blue, translucent; 9. Green, translucent (1-7 find No. 60; 8 find No. 60D; 9 find No. 60E).

60.2 Cruciform brooch, Midlum type, bronze, l. 8.5 cm (find Nos 60G & 60F). The corrosion contains fragments of textile. 60.3 A rod, bronze, l. 5.1 cm, probably the remains of the pin of the cruciform brooch 60.2.

60.4 A little spindle from the right side-knob of cruciform brooch 60.2, bronze l. 0.6 cm (find No. 60G).

60.5 Fragment of an annular brooch, bronze, d. c. 4 cm, decorated with little knobs, a bronze thread is wound round the brooch (find Nos 60 G & 60D). On the brooch are fragments of textile.

60.6 A mass of bronze plate and rivets with plain heads, bronze, l. app. 3 cm (find No. 60B). An iron item (knife or buckle?) is rusted onto the mass. The bronze fragments 60.7 and 60.8 are perhaps the mounting of a small bag.

60.7 A fragment of bronze plate 3x1.4 cm belonging to 60.6 (find No. 60D).

60.8 Two rivets with a plain head belonging to 60.6, bronze, d. 0.7 cm (find Nos 60B and 60H). On the mass are small fragments of textile.

60.9 Fragment of iron rust, with a flat piece (knife?), l. 1.4 cm.

60.10 Fragment of iron rust, a ring or buckle?, l. 1.2 cm.

60.11 Fragment of iron rust, l. 0.9 cm.

60.12 Fragment of iron rust, l. 0.9 cm.

60.13 Fragment of iron rust, l. 0.8 cm.

60.14 Fragment of iron rust, l. 0.6 cm.

60.15 Fragment of corroded bronze object, l. 3 cm (No. 60D).

60.16 Cruciform brooch, fragments of bow, type indeterminable, bronze with iron pin, remaining l. 3.2 cm (No. 60H).

n. 60.1 In the neck and on the chest.

60.2 On the chest.

60.3-60.4 Near 60.2.

60.5 On the left chest.
60.6-60.8 Between arms and pelvis.
60.9-60.14 At the left-hand phalanx.
60.15 Near the arms.
60.16 In the neck, perhaps from another grave.
o. In the grave, 2 g of cremation.
p. Fragment of thoracic vertebra of cattle (find No. 60). In a sample of grave fill: 17 mammalian bone fragments; humerus and tibia of mouse species; shell fragment of *Cerastoderma edule* (cockle).
r. On the basis of the cruciform brooch, Midlum type: AD 475-525.

63.
a. Umed burial.
b. M/L 4, level 4.
c. Below the urn are some remains of a pyre.
d. 50x30 cm.
f. 1 ml of charcoal.
g. 88 g of human cremation.
h. Ost. male; arch. –.
i. Adult.
j. 49 g of cremation.
k. K 6, level 4.
l. Dimensions not recorded.
m. 63.1 Urn, rough-walled pot, wheel-thrown pottery, h. 11.1 cm, d. 11.3 cm.
63.2 Wall sherd, hand-made pottery, later burned, gr. l. 4.7 cm. (n. ill.).
o. Burnt faunal remains: mammalian bone fragment.
p. Unburnt faunal remains: 2 mammalian bone fragments.
r. On the basis of the urn: AD 400-700.

66.
a. Disturbed cremation burial.
b. D 6, level 4.
c. xxx, urn in sherds (incomplete).
d. Scattered finds gr. d. 65 cm.
f. Sample 66 contains 50 ml of charcoal: 3 ml of *Quercus*, 1.5 ml of *Fraxinus*, 1.5 ml of *Alnus*, 35 ml of *Betula* and 10 ml residue.
Sample 127 contains 35 ml of charcoal; 3 ml of *Quercus*, 25 ml of *Alnus* and 7 ml residue.
g. Sample 66 (level 4) 4 g of and 127 (level 5) 1 g of cremation.
i. App. 25 years.
j. 61 Urn, wide-mouthed, hand-made pottery, h. >12.5, d. >14.5 cm.
66.2 Small fragment of (red deer) antler (fragment of a comb?), decorated with lines, l. 0.7 cm.
o. Burnt faunal remains: 6 bone fragments of a large mammal; 15 mammalian bone fragments.
p. Unburnt faunal remains: 2 bone fragments of large mammal; 9 mammalian bone fragments; incisor of mouse species; shell of *Littorina littorea* (periwinkle); shell fragment of *Mytilus edulis* (mussel); shell fragment of *Cerastoderma edule* (cockle).
r. The pot dates from the 4th or 5th century. A radiocarbon date (GrN-19441 1690±50 BP) gives a broad range from the 3rd up to the beginning of the 6th century (table 1). Probable date: AD 350-500.

70.
a. Ash stain, perhaps from grave 295.
b. K 6, level 4.
d. Dimensions not recorded.
e. 1 g of cremation.
f. 70.1 Head of a nail, iron, remaining l. 1.4, d. 2.1 cm.
g. Unburnt faunal remains: bone fragment of small mammal.
r. The feature lay above grave 295 and is either a younger trace or a disturbed trace in grave 295. Undatable, AD 400-750.

75.
a. Ash stain.
b. M 5, level 4.
c. 40x30 cm.
d. <1 ml of charcoal.
e. 1 g of cremation.
f. Adult.
m. 75.1 Head of a nail, iron, remaining l. 1.2, d. 2 cm.
75.2 Head of a nail, iron, remaining l. 1.3, d. 1.2 cm.
75.3 Head of a nail, iron, remaining l. 1.3, d. 1.2 cm.
75.4 Head of a nail, iron, l. 2.1, d. 1.2 cm.
p. Unburnt faunal remains: left 1, of horse; fragment of rib of cattle; bone fragment of mouse species; shell fragment of *Mytilus edulis* (mussel).
r. Undatable, AD 400-750.

76.
a. Ash stain.
b. M 4, level 4.
d. 30x20 cm.
f. 38 ml of charcoal: 6 ml of *Alnus* and 32 ml residue.
g. 1 g of cremation.
m. 76.1 Head of a nail, iron, l. >1, d. 2.5 cm.
76.2 Fragment of red-deer antler, unburnt, with cutmarks.
76.3 Fragment of a bead, glass.
p. Unburnt faunal remains: fragment of atlas and fragment of humerus of cattle; 5 mammalian bone fragments; shell of *Littorina littorea* (periwinkle); 2 shell fragments of *Mytilus edulis* (mussel).
r. Undatable, AD 400-750.

77.
a. Ash stain.
b. M 4, level 4.
d. 30x20 cm.
f. <1 ml of charcoal.
g. 2 g of cremation and one unburnt human M.
i. App. 40 years.
p. Unburnt faunal remains: bone fragment of mouse species.
r. Undatable, AD 400-750.

78.
a. Umed burial.
b. M 4, level 4.
c. xx, upper half of the urn lacking.
d. d. 20 cm.
f. <1 ml of charcoal.
g. 149 g of cremation.
m. 78.1 Base of hand-made urn, undecorated, h. >4.0, d. >10.5 cm.
. On the basis of the pot: AD 500-700.

81.
a. Stray find.
b. K 6, level 4.
m. 81.1 Sheet fragment, iron, l. 3.7, w. 3.0 cm.
r. Undatable, AD 400-750.

93.
a. Stray find.
b. M 5, level 5.
m. 93.1 Nail, iron, remaining l. 2.2 cm.
r. Undatable, AD 400-750.

97.
a. *Brandgrube*.
b. 15, level 4 (samples 88 and 97) and 5 (sample 97A).
d. 70x55 cm.
f. 28 ml of charcoal: 5 ml of *Quercus*, 4 ml of *Alnus*, 0.5 ml of *Pinus* and 18.5 ml residue.
g. Contains only cremation remains of animals (see o.).
m. 97.1 Small rim sherd of a wide-mouthed, hand-made pot, l. 2.5 cm.
o. Burnt faunal remains: 40 fragments of presumably one individual of sheep/goat: parietale, 3 fragments of vertebrae, 26 fragments of rib, fragment of radius, fragment of femur, fragment of right tibia,
right centrotarsale, 2 fragments of metatarsus, 2 first phalanges, second phalax, sesamoïd; 242 bone fragments of small mammal, presumably of the same sheep/goat; 11 fragments of presumably one Anas crecca (teal); 2 fragments of clavicula, fragment of right coracoid, 3 fragments of left scapula, 2 fragments of right scapula, fragment of left carpometacarpus, fragment of right tibiotarsus, fragment of left tarsometatarsus.

p. Unburnt faunal remains: fragment of second phalanx of cattle with dog gnawing marks; fragment of vertebra, 3 fragments of rib, fragment of scapula and fragment of humerus of sheep/goat; 39 bone fragments of small mammal; 2 shell fragments of Mytilus edulis (mussel); Gastropod shell fragment.

r. This feature lay above grave 393 which is dated AD 650-700. A radiocarbon date of Alnus from sample 97A, Gryn 19442 1640 ± 120 BP has a range from the 2nd to the 7th century (table 1) and offers no clue as to the date of this feature which probably dates to the youngest period of the cemetery, AD 675-750.

98.

a. Inhumation.
b. C 8, level 4.
c. xxx, merely fragments.
d. Depth 0.50 m -NAP.
e. W-E or E-W.
g. Scattered fragments of shafts from both femurs, a tibia and the right-hand humerus (find 98).
i. Adult.
j. 98.1 Fragment of a knife, perhaps type C, iron, remaining l. 5.8 cm.
p. Fragment of thoracic vertebra and fragment of left tibia of cattle.
q. Undatable, AD 450-750.

100.

a. Inhumation.
b. C 8, level 5.
c. x, feet are lacking, head is partly lacking.
d. 1.48x0.72 m; depth of skull 0.26, pelvis 0.20, feet 0.18 m -NAP.
e. N-S.
g. Skeleton (find No. 100).
h. Ost. male; arch. -.
i. 30-40 years.
j. 1.70 (calculated from the length of the radius, unreliable).
k. Supine, left hand in the lap, right arm folded double, legs crouched.
l. The disturbed cremation burials consist of burnt clay and 20 g of cremation of an adult individual, and 490 ml of charcoal and grave goods 100.1, 100.2, 100.3 and 100.4. Sample 100 contains 150 ml of charcoal: 18 ml of Quercus, 13 ml of Alnus, 1 ml of Betula, 2 ml of Sambucus, 1.5 ml of Populus and 1.5 ml residue. Sample 100a contains 340 ml of charcoal: 30 ml of Quercus, 20 ml of Fraxinus, 1.5 ml of Alnus, 4 ml of Corylus, 9 ml of Betula, 2 ml of Salix, 2.5 ml of Populus and 268 ml residue.
100.1 Fragment of a head of a cruciform brooch, unknown type, burnt, remaining l. 2 cm (Find No. 73).
100.2 Bead, molten glass, blue.
100.3 Fragment of a knife, perhaps type C, iron, remaining l. 6.2 cm. A small iron rod seems to adhere to this knife.
100.4 Small sherd of red, wheel-brown pottery (a. ill.). One sample, accidentally not labelled, is probably from the fill of grave 100. It contains 14 g of a child’s cremated remains. Age 0-3 years. The sample also contained unburnt human bones with traces of burning. If 100A was from grave 100, then the fill contained two individuals.

p. Caudal vertebra and second phalanx of cattle; left Pd, of sheep/goat; second phalanx of pig (find No. 100). Also a bone fragment of a large mammal (find No. 569). The sample of the fill of the grave contained: incisor of sheep/goat; 8 mammalian bone fragments; incisor of mouse species.

r. The cremation dates according to the brooch from the 5th century. The inhumation cut grave 570, which itself cut grave 606. Grave 100 has to be the youngest of these three graves, AD 550-750. The disturbed cremation burials are older, AD 400-600.
a. Stray find.
b. H 7, level 6.
m. 134.1 Fragment of molten bronze, l. 1.2 cm.
r. Undatable, AD 400-750.

135.
a. Stray find.
b. H 7, level 5.
m. 135.1 Fragment of molten bronze, l. 1.1 cm.
r. Undatable, AD 400-750.

136.
a. Stray find.
b. H 7, level 5.
m. 136.1 Fragment of a small long brooch, type unknown, bronze, remaining l. 2.9 cm.
r. AD 450-600.

140.
a. Ummed burial.
c. x, urn partly broken. Some pyre remains around the urn.
d. d. 35 cm.
g. 315 g of cremation.
h. Ost. female; arch. --.
i. Adult.
j. 140.1 Um, wide-mouthed, hand-made pottery, with three pierced lugs on the belly, otherwise undecorated, h. 140.0, d. 200 cm.
p. Unburnt faunal remains: 4 mammalian bone fragments.
q. On the basis of the pot: AD 500-700.

146.
a. Ash stain.
b. >M/N 4, level 6.
c. d. 20 cm.
d. <1 ml of charcoal.
e. 1 g of cremation.
f. 146.1 Head of a nail, iron, l. >2.2, d. 2.6 cm.
r. Undatable, AD 400-750.

153.
a. Stray find.
b. F 5, level 5.
m. 153.1 Nail, iron, l. 4.3, d. head 1.5 cm.
r. Undatable, AD 400-750.

155.
a. Stray find.
b. K 6, level 6.
m. 155.1 Fragment of the bow of a brooch, type unknown, bronze, remaining l. 2.1 cm.
r. AD 450-600.

156.
a. Stray find.
g. Part of the shaft right human tibia.
m. 156.1 Clincher, iron, l. 4.4, d. head 1.3 cm.
r. Undatable, AD 400-750.

159.
a. Ash stain.
b. Level 5, exact position not recorded.
c. 70 ml of charcoal: 25 ml of Quercus, 9 ml of Alnus and 36 ml residue.
d. 1.5 g of cremation.
e. Possibly a child, 0-3 years old.
f. Unburnt faunal remains: epistrophus of sheep/goat; 7 mammalian bone fragments, 2 shell fragments of Mytilus edulis (mussel); shell fragment of Cerastoderma edule (cockle).
r. Undatable, AD 400-750.
shell fragments of *Mytilus edulis* (mussel); 3 shell fragments.
Unburnt faunal remains in sample 86: left os incisivum and fragment of mandible of sheep/goat; mammalian bone fragment.
q. In the upper part of the *bustum* lay burnt fragments of a human pelvis and os pubis. These belonged to another, unknown grave.
r. The *bustum* was cut by grave 273. On the basis of the grave goods, the grave is dated to AD 450-525.

> 167.

a. Stray find.
b. H 5, level 6.
g. Human bones: skull fragments, costae and 8 teeth.
h. 35-45 years.
r. Undatable, AD 450-750.

> 168.

a. Urned burial.
c. xxx, some sherds of the urn.
d. 40x30 cm.
f. <1 ml of charcoal.
g. 660 g of cremation.
i. 40 years.
m. 168.1 Urn, wide-mouthed, hand-made pottery, h. >15.0, d. app. 15.5 cm.
168.2 Two glass beads, molten: 1. Blue translucent; 2. Blue.
o. Five burnt bone fragments of large mammal.
p. Unburnt faunal remains: bone fragment of large mammal; 2 mammalian bone fragments.
r. On the basis of the pot: AD 500-700.

> 175.

a. Stray find.
b. F 6, level 6.
m. 175.1 Fragment of a glass beaker, molten, l. 4.7 cm.
r. Undatable, AD 400-750.

> 183.

a. *Brandgrube*.
b. J 6, level 6.
c. xx, this is a wide zone with pyre remains, which are disturbed by grave 393. The feature is associated with the find Nos 183, 213, 216, 217, 243, 297 and 317.
d. 2x1.6 m, feature severely disturbed by inhumation graves.
f. 95 ml of charcoal: 1 ml of *Quercus*, 1 ml of *Fraxinus*, 34 ml of *Alnus* and 59 ml residue.
g. 1 g of cremation.
i. Probably a child, 0-3 years old.
m. 183.1 Bowl of *Orsoy* type, wheel-thrown pottery, decorated with a faint row of stamps, h. 9.7, d. 13.8 cm, traces of burning (find Nos 183, 213, 217, 243, 297 and 317).
183.2 Pieced, ironstrip, broken, l. 5.4, w. 1.3 cm. Perhaps an angle brace from a box (find No. 216).
183.3 Fragment of a cliche, iron, l. 2.6 cm (find No. 216).
183.4 Fragment of molten bronze, l. 1.4 cm (find No. 157).
n. 183.1 Was scattered throughout the feature.
p. Unburnt faunal remains from sample 183: 5 mammalian bone fragments; atlas and humerus of mouse species; shell fragment of *Mytilus edulis* (mussel); 3 shell fragments of *Cerasoderma edule* (cockle). Unburnt faunal remains from sample 213: right os carpi ulnare of cattle; bone fragment of large mammal.
r. On the basis of the pot: AD 400-450.

> 189.

a. Stray find.
b. I 7, level 6.
m. 189.1 Fragment of molten bronze, l. 0.9 cm.
r. Undatable, AD 400-750.

> 191.

a. Stray find.
The early medieval cemetery of Oosterbeintum (Friesland)

b. J 6, level 6.
d. d. 20 cm.
f. < 1 ml of charcoal.
g. < 1 g of cremation.
i. Possibly a child, 0-3 years old.
p. Unburnt faunal remains: 2 mammalian bone fragments; upper incisor of mouse species.
r. Undatable, AD 400-750.

198.
a. Ash stain.
b. J 6, level 6.
d. d. 20 cm.
f. < 1 ml of charcoal.
g. < 1 g of cremation.
i. Possibly a child, 0-3 years old.
p. Unburnt faunal remains: tibia of mouse species; 2 shell fragments of *Mytilus edulis* (mussel).
r. Undatable, AD 400-750.

199.
a. Dog burial.
b. J 7, level 7.
c. xx.
d. l. 0.68, w. 0.64 m; depth of skull 0.14, back 0.10 m - NAP.
e. ENE-WSW.
f. < 1 ml of charcoal.
g. < 1 g of cremation.
i. More than 8 years old.
j. Height at the withers 0.67-0.68 m.
k. Right P, lost; osteophytes on several thoracic and lumbar vertebrae.
l. The dog lay buried on its right side; the bones of its limbs were dispersed, the trunk bones lying in situ.
p. Two fragments of pelvis, fragment of left femur and fragment of right tibia of sheep/goat; P of pig.
r. Undatable, AD 400-750.

200.
a. Ash stain.
b. J 7, level 7.
d. d. 20 cm.
f. < 1 ml of charcoal.
g. < 1 g of cremation.
i. Possibly a child, 0-3 years old.
p. Unburnt faunal remains: mammalian bone fragment.
r. Undatable, AD 400-750.

201.
a. Uneed burial?
b. J 7, level 7.
c. xx.
d. l. 0.68, w. 0.64 m; depth of skull 0.14, back 0.10 m - NAP.
e. ENE-WSW.
f. Skeleton (find No. 201).
i. More than 8 years old.
j. Height at the withers 0.67-0.68 m.
k. Right P, lost; osteophytes on several thoracic and lumbar vertebrae.
l. The dog lay buried on its right side; the bones of its limbs were dispersed, the trunk bones lying in situ.
p. Two fragments of pelvis, fragment of left femur and fragment of right tibia of sheep/goat; P of pig.
r. Undatable, AD 400-750.

230.
a. Uneed burial?
b. J 7, level 7.
c. xx.
d. l. 0.68, w. 0.64 m; depth of skull 0.14, back 0.10 m - NAP.
e. ENE-WSW.
f. Skeleton (find No. 201) and probably find No. 90).
h. Ost. probably female; arch. female.
i. > 45 years.
j. 1.57 m (based on tibia and femur).
k. One tooth has cavities, eight are worn down to the roots.
l. Supine, left arm stretched, right hand in the lap, legs slightly flexed with the knees to the left.
m. 241.1 Hand-made pot, undecorated, h. 11.0, d. 11.5 cm (find No. 62).
241.2 Spindle whorl, bone (caput femoris of cattle), h. 3.5, d. 5.0 cm.
241.3 Needle, flat with a hole, point broken off, (red deer) antler, remaining l. 5.0 cm.
241.4 Small sherd of red wheel-thrown pottery, gr. l. 2.7 cm, (n.d.).
n. 241.1 To the right of the head.
241.2 At the left shoulder.
241.3 Unknown, found during the cleaning of the bones.
241.4 Unknown, found during the cleaning of the bones.
o. From within the pot as well as around it, 2 g of cremation (of a
child, 0–3 years) were retrieved. Most probably this derives from
a disturbed ash stain.
p. Two mammalian bone fragments (find No. 62).
r. The pot 241.1 dates from the 6th or 7th century. As grave 241 is
cut by grave 501, the earlier part of this period is the more likely:
AD 500-600.

246.
a. Ash stain.
b. The north section, not recorded on the drawing.
g. 1 g of cremation.
p. Unburnt faunal remains: 10 mammalian bone fragments; 2 ver-
tebrae of Pleuronectidae; pelvis and spina pinnae abdominalis of
Gasterosteus aculeatus (stickleback); 2 fish bone fragments;
3 shell fragments of Mytilus edulis (mussel).
r. Undatable, AD 400-750.

247.
a. Inhumation.
b. H 7, level 7.
c. x, skeleton crushed flat.
d. 0.84x0.56 m; depth of skull 0.27, feet 0.26 cm -NAP.
e. WSW-ENE.
g. Skeleton (find Nos 247 and 203).
i. Circa 6 years.
l. On the left side, arms stretched, legs crouched.

248.
a. Inhumation.
b. I 6, level 7.
c. x, skeleton crushed flat (find No. 248).
d. 0.80x0.48 m; depth of skull 0.21, pelvis 0.26, feet 0.26 m -NAP.
e. NE-SW.
g. Skeleton.
h. Ost. –; arch. possibly girl.
i. 4-5 years.
k. Black stain on tooth cap.
l. On the right side, arms stretched, legs crouched.
m. 248.1 Small bowl, hand-made ware, h. 5.8, d. 11.0 cm (find No.
218).
248.2 Five beads of glass and amber: 1. Reddish brown; 2. Amber;
3-5. Reddish brown.
n. 248.1 Above the head. The bowl was found a little outside the
grave contour of level 7, but is assumed to belong to grave 248.
The grave contours were quite clearly visible.
248.2 Unknown, found during the cleaning of the bones.
o. The bowl contained 0.1 g of human cremation, probably from a
disturbed ash stain.
r. None of the grave goods are datable, AD 450-750.
250. a. Stray find.  
   b. J 8, level 7.  
   m. 250. Glass bead, blue, with traces of burning, d. 0.9 cm.  
   r. Undatable, AD 400-750.

256. a. Ash stain.  
   b. K 5, level 7.  
   d. 30 cm.  
   g. 4 g of cremation.  
   i. Adult?  
   r. Undatable, AD 400-750.

265. a. Ash stain.  
   b. K 5, level 7.  
   d. d. 30 cm.  
   g. 4 g of cremation.  
   i. Adult?  
   r. Undatable, AD 400-750.

266. a. Ash stain.  
   b. K 4, level 7.  
   d. d. 25 cm.  
   g. 1 g of cremation.  
   f. 30 cm.  
   g. 4 g of cremation.  
   i. Adult?  
   r. Undatable, AD 400-750.

267. a. Umed burial.  
   b. K 5, level 7; sample 141 was taken from level 6.  
   d. 40x30 cm.  
   f. < 1 ml of charcoal.  
   g. Sample 267 contains 16 ml of charcoals: 0.3 ml of Quercus, 1.3 ml of Fagus, 2.1 ml of Fraxinus, 0.6 ml of Almus, 2 ml of Betula and 9.8 ml residue.  
   Sample 141 contains no charcoal after sieving.  
   g. 221 g of cremation.  
   m. 267.1 Urm, narrow-mouthed pot with almost round base, handmade ware, undecorated, h. 16.5, d. 16.0 cm. In the neck of the pot are two holes along a crack, indicating a repair.  
   267.2 Two small fragments of cremated (red deer) antler, decorated with lines (comb?).  
   267.3 Buckle, oval, iron, l. 3.6 cm.  
   267.4 Buckle, oval, iron, l. > 2 cm.  
   267.5 Four fragments of iron, probably of a knife and some small rods.  
   p. In sample 267: unburnt faunal remains: fragment of vertebra and first phalanx of sheep/goat; 2 bone fragments of large mammal; bone fragment of small mammal. In sample 141: unburnt faunal remains: fragment of right ulna of foetal cattle; 3 mammalian bone fragments.  
   r. The calibrated 14C date of the charcoal of Quercus, Betula and Almus has a wide range: from the 3rd until the beginning of the 7th century (table I). On the basis of the pot the grave is dated AD 650-725.  

269. a. Ash stain (two samples, 269 and 392).  
   b. J 7, levels 7 and 9.  
   d. 30x25 cm.  
   f. < 1 ml of charcoal.  
   g. Sample 269: 2 g of cremation, sample 392: 1 g of cremation.  
   i. 62 years.  
   m. 269.1 Fragments of a burnt comb with a connecting plate decorated with lines (antler), remaining l. 2 cm.  
   p. Unburnt faunal remains from sample 269: 6 mammalian bone fragments; 2 shell fragments of Mytilus edulis (mussel). Unburnt faunal remains from sample 392: mammalian bone fragments; 2 upper/lower premolars/molars of Microtus sp. (vole); 2 shell fragments of Mytilus edulis (mussel).  
   r. Undatable, AD 400-750.

270. a. Inhumation.  
   b. J 7, level 7.  
   c. xxx, some bone fragments.  
   d. Depth 0.20 m.  
   e. Fragments of right humerus, ulna and radius (find No. 270).  
   f. Ost. male; arch. –.  
   i. Adult.  
   k. Distal part of the humerus and proximal part of the ulna are sturdy.  
   r. The undatable grave cut grave 398 that was dated AD 450-525. Hence grave 270 dates from AD 500-750.

273. a. Inhumation.  
   b. H 5, level 4.  
   c. x, most of the head is lacking.  
   d. 1.20x0.60 m; depth of skull 0.11, feet 0.14 m - NAP.  
   e. N-S.  
   g. Skeleton, most of the skull is lacking (find No. 273).  
   i. 25-35 years.  
   j. 1.24-1.28 m.  
   k. Achondroplastic dwarf, osteoarthritis on proximal femur joint (fig. 37).  
   I. On the left side, arms stretched along the body, legs crouched.  
   p. Left first phalanx anterior of horse with cut-marks; shaft fragment of right metatarsus of cattle.  
   r. This grave cuts businum 160 and postdates the 5th century, AD 500-750.

274. a. Stray find.  
   b. F 6, level 7.  
   g. Human bone, fragment of a shaft of a long bone.  
   r. Undatable, AD 450-750.

281. a. Ash stain.  
   b. N 5, level 7.  
   d. 25x20 cm.  
   f. < 1 ml of charcoal.  
   g. 1 g of cremation.  
   p. Unburnt faunal remains: 2 mammalian bone fragments; fish bone fragment; shell fragment of Mytilus edulis (mussel).  
   r. Undatable, AD 400-750.

282. a. Ash stain.  
   b. N 5, level 7.  
   d. 20 cm.  
   f. < 1 ml of charcoal.  
   g. 2 g of cremation.  
   p. Unburnt faunal remains: fragment of cranium of sheep/goat; 10 mammalian bone fragments; fragment of mouse species; shell fragment of Mytilus edulis (mussel).  
   r. Undatable, AD 400-750.

283. a. Ash stain.  
   b. J 6, level 7.  
   d. 25 cm.  
   f. < 1 ml of charcoal.  
   g. 1 g of cremation.  
   r. Undatable, AD 400-750.

284. a. Ash stain.  
   b. J 6, level 7.  
   d. 60x30 cm.  
   f. < 1 ml of charcoal.  
   g. 1 g of cremation.  
   r. Undatable, AD 400-750.
The early medieval cemetery of Oosterbeintum (Friesland)
g. 2 g of cremation.
i. 3±1 years.
m. 317.1 Rim fragment, Anglo-Saxon ware, l. 2.6 cm, traces of burning.
317.2 Two small fragments of hand-made pottery (n. ill.).
p. Unburnt human bones of head of a radius, fragment of a rib and a carpus; male. Unburnt faunal remains: mammalian bone fragment; upper/lower premolar/molar of Microtus sp. (vole).
r. On the basis of the pottery: 400-550 AD.

335.
a. Inhumation.
b. M 5, level 7.
c. x, left leg was lacking from the knee down, skull broken.
d. l. 1.64, w. head 0.80, w. foot 0.48 m; depth of skull 0.20, pelvis 0.25, feet 0.20 m -NAP.
e. NE-SW.
f. In some of the corroded iron grave goods an impression of wood can be seen.
g. Skeleton without left lower leg (find No. 335).
h. Ost. male; arch. male.
i. 30-40 years.
j. 1.68 m.
l. Supine, left hand in the lap, right arm across the chest, legs extended.
m. 335.1 Spearhead with split socket and narrow oval blade, iron, l. 1.54 cm, blade w. 3.6 cm (find No. 333). The blade has traces of Langstreffendamast. The wooden handle had decayed.
335.2 Schmalax, iron with hilt of wood, l. 3.5, blade w. 2.9 cm. The end of the hilt was mounted with a small plate of iron (find No. 334).
335.3 Buckle, oval, iron, l. 4.5, w. 3.5 cm (find No. 334).
335.4 Mass of rusted iron, with knife type B, 1. app. 6 cm and two knobs, bronze?, one 2.7x1.3 cm and one 1.4x1.2 cm (find No. 334A).
335.5 Iron mass with buckle and fragment of knife, app. 4x4 cm (find No. 334A).
335.6 Flint, l. 3.5, w. 3.0, th. 1.3 cm (find No. 334B).
335.7 Iron mass with tweezers?, l. 3.5 cm (together with 335.8 and 335.9, find No. 334C).
335.8 Small nail, iron, l. 1.1 cm.
335.9 Two fragments of iron.
335.4-335.9 Appearance to be the remains of a small pouch, with knobs attaching it to a belt.
335.10 Clincher, iron, l. 7 cm (find No. 221).
335.11 Clincher, iron, l. 5 cm (find No. 221).
n. 335.1 Near left upper arm.
335.2 On the left hip.
335.3 On the spine.
335.4/5 Lumbar region, right.
335.6 Lumbar region, middle.
335.7/8/9 Lumbar region, left.
335.10/11 At the foot of the grave.
p. First phalanx of cattle.
r. The spearhead and Schmalax date the grave to AD 525-600.

342.
a. Inhumation.
b. K 5, level 8.
c. x, the lower part of the body was lacking. The grave was transported to the B.A.I. and is preserved as found in a wooden box with a glass lid.
d. l. 0.84, w. head 0.56, w. foot 0.40 m; depth of skull 0.24, pelvis 0.21 m -NAP.
e. SSW-NNE.
g. Skeleton (find No. 342).
h. Ost. --; arch. possibly girl.
i. 9 years.
l. On the right side, right arm possibly stretched, left hand in the lap. The size of the grave suggests that the legs were crouched.
342.2 Equal-armed brooch, Van Bellingen type 5.3, bronze, l. 4.0 cm.
n. 342.1 At the neck and on the chest.
342.2 Under the chin.
r. The brooch 342.1 dates from AD 625-750. Grave 342 cuts grave 393 which contains the same type of brooch. Above grave 342 urn-grave 227 (AD 600-725) was found, which means that grave 342 was older and probably dates to AD 675-700.

347.
a. Stray find.
b. K 5, level 8.
g. Human bones; distal part of right femur and proximal part of right tibia.
h. Ost. probable female; arch. --
i. Adult.
j. Undatable, AD 450-750.

351.
a. Stray find.
b. O/P 4/8, level 8, no exact location recorded.
f. Fragment of charcoal Quercus (18 ml, n. ill.).
r. Undatable, AD 400-750.

353.
a. Inhumation.
Disturbed cremation burials.
b. H 8, level 8.
c. x, the thighbones were dislocated.
d. 1x0.8 m; depth of skull 0.32, feet 0.35 m -NAP.
e. E-W.
g. Skeleton (find Nos 293 and 353).
i. 5-6 years.
k. Three black-stained tooth caps.
l. On the right side, with the arms stretched before the chest and the legs crouched.
o. The fill of the grave contained at least 82 g of cremation of an adult individual (samples 353 and 293) and 75 ml of charcoal: 20 ml of Quercus, 6 ml of Alnus, 1 ml of Betula, 1 ml of bark and 47 ml residue.
p. Unburnt faunal remains in samples of the fill of the grave (Nos 353, 293 and 366): Sample No. 353: 24 mammalian bone fragments; incisor of mouse species; shell of Littorina littorea (periwinkle); shell fragment of Mytilus edulis (mussel). Sample No. 293: M, or M, and distal end of metapodium of sheep/goat; 51 mammalian bone fragments; atlas and humerus of mouse species; bird bone fragment.
r. Undatable, AD 450-750. The disturbed cremation burial must be older, AD 400-550.
360.

a. Inhumation.
Disturbed cremation burial.
b. J 6, level 8.
c. xx, lower part of the body was cut away by grave 393.

361.

p. Unburnt faunal remains: second phalanx of pig; mammalian bone fragment.
q. Under this grave lay grave 422. Either this grave dates from an older period of the cemetery or the urn grave was disturbed by grave 422. On the basis of the pot: AD 500–700.

362.

a. Urned burial, perhaps disturbed by grave 422.
b. L 6, level 8.
c. xx, only the base of an urn.
d. d. 20 cm.
g. 39 g of cremation, perhaps sample 315 of an apparently un-urned cremation is from the same feature.
h. 365.1 Base of an urn, hand-made ware, undecorated. h, >3; c, >11.5 cm.
o. Burnt faunal remains: 16 bone fragments of large mammal; 167 mammalian bone fragments.
The early medieval cemetery of Oosterbeintum (Friesland) 393

d. 1. >0.88, w. 0.56 m; depth of skull 0.20, pelvis 0.27 m -NAP.
e. SW-NE.
g. Upper half of skeleton (find No. 360 and probably find No. 216).
h. Ost. female; arch. female.
i. 40-50 years.
j. Green staining on thumb phalanx, probably from the buckle.
k. Supine, arms crossed over the chest.
l. Inhumation.
m. 360.1 Cruciform brooch of Midium type, bronze with iron pin, l. 8.5 cm. All over the brooch, textile is preserved in the corrosion (find No. 243).
m. 360.2 Small long brooch, bronze with iron pin, l. 5.4 cm. On the back of the headplate textile is preserved in the corrosion (find No. 294).
m. 360.3 Small long brooch, decorated with dot-in-circle motifs, bronze with iron pin, l. 5.3 cm (find No. 336).
m. 360.4 Needle, bronze, broken at the eye, remaining l. 8.0 cm. On the upper half the thread was wound on the needle (find Nos 337 and 358).
m. 360.6 Annular buckle, bronze, d. app. 2.7 cm (find No. 359).
m. 360.1 Under the chin, near the mandible.
m. 360.2 Under the chin.
m. 360.3 On the right of the chest.
m. 360.4 Top part at the right shoulder, bottom part at the left shoulder.
m. 360.5 At the neck.
m. 360.6 On the lumbar vertebra under the right hand.
o. The grave fill contained a little (0.5 g) cremation (find Nos 243 and 243).
p. Fragment of right humerus of cattle.
r. On the basis of the cruciform brooch: AD 475-525. The disturbed cremation burials must be older, AD 400-475.

361.
a. Ash stain (samples 278 and 361).
b. M 6, level 8.
c. 110x30 cm.
d. <1 ml of charcoal.
e. Sample 278: 1 g of cremation, sample 361: 1 g of cremation.
p. Sample 361: 15 unburnt mammalian bone fragments. Sample 278: 3 unburnt mammalian bone fragments.
r. Undatable, AD 400-750.

362.
a. Inhumation.
b. H 7, level 8.
c. x. skeleton flattened.
d. 0.72x0.44 m; depth of pelvis 0.48, feet 0.53 m -NAP.
e. SW-NE.
g. Skeleton (find No. 362).
h. Ost. --; arch. possibly girl.
i. 4-5 years.
j. Supine, right arm along the body with the forearm up, left arm along the body with the forearm across the abdomen, legs extended.
n. 362.1 At the neck.
r. Undatable, AD 450-750.

363.
a. Stray find.
b. L 8, level 8.
m. 361.1 Rivet, bronze, l. 1.2, head 1.2 cm.
r. Undatable, AD 400-750.

365.
a. Stray find.
b. H 8, level 8.
m. 365.1 Head and part of bow of a cruciform brooch, unknown type, bronze, traces of burning, remaining l. 4.3 cm.
r. AD 400-625.

372.
a. Umed burial.
b. M 7, levels 7 and 8.
c. xxx, only the base of the urn.
d. 35 cm.
f. 100 ml of charcoal: 40 ml of Fraxinus, 0.5 ml of Alnus, 1 ml of Pinus and 58.5 ml residue.
g. 557 g of cremation.
h. Ost. female; arch. female.
i. Adult.
m. 372.1 Base of a hand-made urn, h. >2.5, d. >9.5 cm.
m. 372.2 Small pot, hand-made ware, decorated with lines and dots, h. 6.5, d. 7 cm, with traces of burning.
m. 372.3 Fragment of spindle whorl, undecorated pottery, d. 5.5, th. >1.5 cm, with traces of burning.
m. 372.4 Small tube, iron, l. 0.9, d. 0.2 cm.
m. 372.5 Oval buckle, iron, l. 2.4, w. 1.4 cm.
m. 372.6 13 calcined wing bone fragments of Calidris minuta temminckii (little/Temmink’s stint): 3 fragments of right humeri, left humerus, left radius, 2 left or right radii, left ulna, 2 right ulnae, left or right ulna, left and right carpometacarpus (minimum number of individuals: 2) (fig. 61).
r. A radiocarbon date from the charcoal (GrN-19446 1380±25 years, calibration in table 1) dates the grave to the second half of the 7th century. The pottery can be dated to the same period, AD 650-700.

374A.
a. Inhumation.
b. L 6, levels 8 and 9.
c. 1.60x0.80 m; depth of skull 0.17, pelvis 0.17, feet 0.14 m -NAP.
d. WNW-SEE.
e. Skeleton (find No. 343).
f. (9-10 years.
g. On the left side, arms folded before the chest, legs crouched.
h. Left rib and fragment of right scapula of cattle (find No. 350).
i. Grave 374A did not disturb the deeper grave 374B, from AD 450-700. It is not impossible that the child of 374A and the female of grave 374B were put in a single grave. In that case both burials date from AD 450-700. If they are two graves, then 374A is younger and probably AD 500-750.

374B.
a. Inhumation.
b. L 6, level 9.
c. x, head was cut away by ditch 261.
d. 1. >1.60, w. 0.76 cm; depth of skull 0.20, pelvis 0.25, feet 0.22 m -NAP.
e. SW-NE.g. Skeleton without skull (find Nos 239, 374 and 411).
h. Ost. female; arch. female.
i. 30-45 years.
j. 1.50 m.
k. Two vertebrae grown together: ankylosis.
l. Supine, arms and legs stretched.
m. 374B.1 Annular brooch, plano-convex in section, underside flat and plain, upper surface ridged and grooved, bronze, d. 3.7 cm (find No. 239).
m. 374B.2 Annular brooch, plano-convex in section, underside flat, plain, upper surface ridged and grooved, bronze with iron pin, d. 3.8 cm. In the corrosion, fragments of textile survive (find No. 239A).
m. 374B.3 Two beads, glass: 1. Biconic, white with red spots and a
green trail around the middle, 2. White with brown trails (find No. 346).
374B.4 Knife, type A, iron, l. 11.5 cm.
374B.5 Mass of rusted iron, with ring (d. 4.5 cm), chain and attached to it an app. 5.5 cm long upper canine of a wolf (find No. 345). Near by lay a second canine of a wolf (374B.6). The canines were not of the same animal. This was probably a chatelaine. In the corrosion was an impression of wood. It is quite certainly no oak; maybe it is softwood.
374B.6 Right upper canine of a wolf, l. 6.0 cm (find No. 344).

n. 374B.1 At the neck.
374B.2 At the neck below 374B.1.
374B.3 On the chest.
374B.4 Above the left hip, along the arm.
374B.5/6 Along the left hip, near the hand.

r. On the basis of the annular brooches: AD 450-700. The find of the chatelaine is in accordance with this date.

376.

a. Urned burial.
c. xxx.
d. d. 30 cm.
e. 108 g of cremation.
   i. Adult.
m. 376.1 Fragments of the base of an urn, hand-made ware, no measurements (n.ill.).
p. Unburnt faunal remains: fragment of rib of cattle; 2 fragments of thoracic vertebrae of sheep/goat; fragment of thoracic vertebra of pig; 9 bone fragments of small mammal.

r. Undatable, AD 400-750.

388.
a. Ash stain.
b. H/18, level 8.
c. 40x35 cm.
f. 70 ml of charcoal: 2 ml of Quercus, 23 ml of Alnus, 3 ml of Corylus, 2 ml sintered remains, 1 ml other than wood and 39 ml residue.
g. 3 g of cremation.
i. Possibly a child, 0-3 years.
r. Undatable, AD 400-750.

393.
a. Inhumation.
c. x, skull and brittle skeleton crushed.
d. l. 2.0, w. head 0.88, w. foot 0.60 m; depth of skull 0.40, pelvis 0.40, feet 0.37 m -NAP.
e. W-E.
g. Skeleton (find No. 393 and probably No. 439).
h. Ost. probably female; arch. female (?).
i. >45 years.
j. 1.75 m.
k. Abscess on the left-hand upper jaw (fig. 43); in the upper jaw two teeth broken and rotten to the root; a lot of tartar. Green staining from the bronze jewellery on some ribs, vertebrae, ulna and mandible. Black charcoal stains on several bones. l. Supine, right arm across the chest, left arm folded before the chest, legs crouched.
m. 393.1 Bowl, hand-made ware, h. app. 8, d. 18.0 cm (find No. 390).
393.2 Cruciform brooch, Midlum type, on the headplate two dot-in-circles, bronze with iron pin, l. 5.8 cm. Above and under the brooch are fragments of preserved textile.
393.3 Small long brooch, bronze with iron pin, l. 5.8 cm. Above and under the brooch are fragments of preserved textile.
398.5 Bangle, bronze. Completely corroded and not preserved. The drawing is after a bracelet of the same type from grave 295.

n. 398.1 At the left shoulder.  
398.2 On the right of the chest.  
398.3 Under the chin.  
398.4 On the chest; the beads were as much as possible preserved in their original order. Since probably the largest amber beads were originally in the middle, the preserved order is perhaps not the original one.  
398.5 Left forearm, clear traces of green staining on the bones.  

o. Four traces of cremation ritual were cut in the grave (Nos 194, 269, 396 and 655).  
p. Fragment of right metatarsus of sheep.

r. The younger, undatable grave 270 cuts grave 398. On the basis of the cruciform brooch grave 398 is dated to AD 475-525.

399.  
a. Ash stain.  
b. H 8, level 9.  
d. Scattered finds d. 35 cm. Only half of the stain is observed, the other half remaining in the section.  
<1 ml of charcoal.  
g. 1 g of cremation.  
m. 399.1 One or two beads, molten glass, l. 2 cm.  
r. Undatable, AD 400-750.

3x.  
a. Ash stain.  
b. Feature not recorded on levels 7, 8 or 9.  
f. 58 ml of charcoal: 8 ml of Quercus, 7 ml of Alnus, 3 ml of Betula, 4 ml sintered remains, 3 ml no wood and 33 ml residue.  
g. 4 g of cremation.  
i. Possibly a 1-5 years old child.  
r. Undatable, AD 400-750.

402.  
a. Inhumation.  
b. H 5, level 9.  
c. x, skeleton crushed.  
d. 0.92x0.48 m; depth of skull 0.61, pelvis 0.58 m -NAP.  
e. ESE-WNW.  
g. Skeleton (find Nos 395 and 402).  
h. Ost. ––; arch. possibly girl.  
i. 6 years.  
l. Supine, left arm stretched, right arm across chest, legs extended.  
m. 402.1 Round planiconvex pendant, one side with a hole, (red deer) antler, d. 1.6 cm. The hole is encircled. Near the hole: green staining.  
402.2 Two beads, amber.  
n. 402.1 Near the neck.  
r. Grave 402 lay beneath grave 273 which probably dates from AD 500-750, and may date to AD 450-600.

404.  
a. Dog burial.  
Disturbed cremation burials.  
c. 1.10x0.52 m; depth of skull 0.30, pelvis 0.22 m -NAP.  
e. NE-SW.  
g. Skeleton (find Nos 233, 369, 387 and 404).  
h. Ost. male dog.  
i. 3-4 years.  
j. Height at the withers 0.60-0.69 m.  
k. Small degree of osteophytes on some thoracic vertebrae.  
l. The dog was on its left side, with legs drawn up.  
o. The grave fill contained at least 8 g of cremation (find No. 369).  
p. Fragment of femur of cattle; fragment of tibia of pig with cut-marks; 2 bone fragments of large mammal.  
Sample of the fill of the grave (find No. 369) contained: 27 mammalian bone fragments; 2 fish bone fragments; 2 shell fragments of Mytilus edulis (mussel) (all unburnt).  
r. Undatable, AD 450-750.

405.  
a. Inhumation.  
b. M 6, level 9.  
c. Skull is missing.  
d. 1.092, w. 0.44 m; depth of cervical vertebrae 0.34, pelvis 0.36 m -NAP.  
e. ESE-WNW.  
g. Skeleton (find No. 405).  
h. Ost. male dog.  
i. 17-19 years.  
j. If male 1.82 m, if female 1.79 m.  
k. M's erupting in the mandible the M, have not yet erupted.  
l. Supine, left hand in the lap, right hand across the chest, legs crossed.  
r. Undatable, AD 450-750.

409.  
a. Umned burial.  
b. M 6, level 9.  
c. Skull is missing.  
d. 1.092, w. 0.44 m; depth of cervical vertebrae 0.34, pelvis 0.36 m -NAP.  
e. ESE-WNW.  
g. Skeleton (find No. 408).  
h. Ost. male dog.  
i. Over 7 years old.  
j. Height at the withers 0.65-0.69 m.  
k. Osteophytes on several thoracic and lumbar vertebrae (fig. 48); abscesses in right radius and left tibia (fig. 49).  
l. The dog was on its left side, with legs drawn up.  
p. A first wing phalanx of Anas platyrhynchos (mallard); 4 bone fragments of large mammal.  
r. Undatable, AD 450-750.

410.  
a. Inhumation.  
Disturbed cremation burials.  
b. M 6, level 9.  
c. Skull is missing.  
d. 1.80x0.60 m; depth of skull 0.24, pelvis 0.40, feet 0.42 m -NAP.  
e. NNW-SSE.  
g. Skeleton (find Nos 375 and 410).  
h. Ost. on the base of the skull female, on the base of the long bones male, conclusion male; arch. ––.
j. 40-50 years.
j. 1.79 m.
k. M, left and both M1 have caries.
l. Supine, arms crossed over the chest, legs extended.
o. Black staining on the foot bones indicates the presence of a cremation. In and above this grave two nails have been found: 410.1 Nail with bent end, iron, l. app. 2 cm, d. head 1.4 cm.
410.2 Head of a nail, iron, l. >2.4, d. 2.4 cm (find No. 244).
p. Find Nos 410, 321 and 348. 410: Right centrotarsale of sheep/goat. 321: Cattle bones: fragment of lumbar vertebra, fragment of indefinite vertebra, distal end of left humerus and first phalanx with dog gnawing marks. 348: Bones of sheep/goat: fragment of lumbar vertebra and shaft of right radius with dog gnawing marks.
r. Graves 374 and 335 cut this grave, therefore it is of the earlier phase of the cemetery, probably AD 450-550. The disturbed cremation burial must be older, AD 400-475.

420.  
a. Inhumation.  
Disturbed cremation burial.
c. 1.88, w. head 0.84, w. foot 0.92 m; depth of skull 0.38, pelvis 0.52, feet 0.49 m -NAP.
d. SSE-NNW.
e. Skeleton (find Nos 400 and 420).
f. Ost. definitive male; arch. -.
i. 35-45 years.
j. 1.76 m.
k. Some vertebrae, the right hand and the right foot have osteophytes. On the right fibula is an outgrowth, perhaps resulting from ossification of the tendon.
l. Supine, hands in the lap, legs extended.
m. 420.1 Hand-made ware, undecorated, h. 12.5, d. 12.5 cm (find No. 401).
n. 420.1 Right-hand side near the head.
p. Left radius of sheep/goat; M, of pig; bone fragment of large mammal.
q. The grave-fill contains at least 7 g of cremation of an adult individual, some charcoal and burnt clay and:
   420.2 Buckle, iron, l. 3.4, w. 1.6 cm (find No. 400).
   420.3 Nail, iron, l. 6.3, w. head 1.4 cm.
   420.4 Fragment, iron, l. 1.8 cm.
r. On the basis of the pot: AD 550-725. The disturbed cremation burial must be older, AD 400-600.

421.  
a. Inhumation.  
b. L 6, level 9.
c. 35-45 years.
d. 0.75, remaining w. 0.29 m. Width in situ was 0.38 m. The fragment had survived but was not conserved.
e. Skeleton, legs are broken due to the excavation (find Nos 424 and 497).
f. Ost. female; arch. female.
i. >45 years.
j. Two lumbar vertebrae have grown together (ankylosis), other lumbar vertebrae have lipping. The posture of the body points to a stooped back. A phalanx has osteophytes.
k. On the left side, right arm across the abdomen, left arm along the body, legs crossed.
m. 421.1 Spindle whorl, bone (caput femur cattle), h. 2.1, d. 4.2 cm (find No. 425).
421.2 Small sherd of red wheel-thrown pottery, gr. l. 1.8 cm (n.ill.).
n. 421.1 At the left hand.
421.2 From the grave fill.
.p. Fragment of right tibia of cattle (find No. 420), left pelvis of juvenile sheep with dog gnawing marks (find No. 425).
r. The outside of the coffin was radiocarbon-dated: 1390±25 years BP (GrN-16539, calibration in table I). The outer yearrings are lacking and the date concerns a group of the younger rings, so the real date is a small number of years (perhaps 20) younger than the calibrated "C date. On the basis of this latter date the grave is dated AD 575-700.

422.  
a. Inhumation.  
b. L 7, level 9.
c. xx, trunk, arms and head were destroyed by ditch 261. The fragments of a comb in ditch 261 were probably from this grave, though perhaps they belonged with um 409.
d. >1x0.60 m; depth of pelvis 0.36, feet 0.36 m -NAP.
e. WSW-ENE.
f. Legs of skeleton (find No. 422), the human bones in ditch 261 belong to the same individual (find Nos 315, 385 and 455).
i. 35-45 years.
j. Legs extended.
k. Some vertebrae, the right hand and the right foot have osteophytes. On the right fibula is an outgrowth, perhaps resulting from ossification of the tendon.
l. Supine, arms crossed over the chest, legs extended.
m. 422.1 Two-sided comb, decorated with lines, straight sides, (red deer) antler, l. at least 7.4 cm, h. app. 6 cm (find Nos 409, 412 and 422).
n. Found in ditch 261.
op. Fragment of right tibia of sheep.
q. Above the grave was um 356 dating from the 6th or 7th century, hence grave 422 may date from AD 450-550.

424.  
a. Inhumation.  
c. x, foot end is lacking.
d. l. 1.64, w. head 0.72, w. foot 0.80 m; depth of skull 0.47, pelvis 0.58 m -NAP.
e. S-N.
f. Fragment of the head of a tree-trunk coffin of Quercus, remaining l. 0.75, remaining w. 0.29 m. Width in situ was 0.38 m. The fragment had survived but was not conserved.
g. Skeleton, legs are broken due to the excavation (find Nos 424 and 497).
h. Ost. female; arch. female.
i. >45 years.
j. Two lumbar vertebrae have grown together (ankylosis), other lumbar vertebrae have lipping. The posture of the body points to a stooped back. A phalanx has osteophytes.
k. On the left side, right arm across the abdomen, left arm along the body, legs crossed.
m. 424.1 Spindle whorl, bone (caput femur cattle), h. 2.1, d. 4.2 cm (find No. 425).
424.2 Small sherd of red wheel-thrown pottery, gr. l. 1.8 cm (n.ill.).
n. 424.1 At the left hand.
424.2 From the grave fill.
p. Fragment of right tibia of cattle (find No. 424), left pelvis of juvenile sheep with dog gnawing marks (find No. 425).
r. The outside of the coffin was radiocarbon-dated: 1390±25 years BP (GrN-16539, calibration in table I). The outer yearrings are lacking and the date concerns a group of the younger rings, so the real date is a small number of years (perhaps 20) younger than the calibrated "C date. On the basis of this latter date the grave is dated to the second half of the 7th century: AD 650-694.

426.  
a. Stray find.  
b. M 7, level 9.
m. Knucklebone marked with two dots, left astragalus of sheep.
r. Undatable, AD 450-750.

428.  
a. Inhumation.  
Disturbed cremation burial.
b. I 8, level 9.
c. x, not that part of the body lay within the south section. During or short after the period of use of the cemetery this grave was
The early medieval cemetery of Oosterbeintum (Friesland)
g. 2 g of cremation.
i. 3±1 years.
m. 317.1 Rim fragment, Anglo-Saxon ware, l. 2.6 cm, traces of burning.
317.2 Two small fragments of hand-made pottery (n.ill.).
p. Unburnt human bones of head of a radius, fragment of a rib and a carpus; male. Unburnt faunal remains: mammalian bone fragment; upper/lower premolar/molar of Microtus sp. (vole).
r. On the basis of the pottery: 400-550 AD.

335.
a. Inhumation.
b. M 5, level 7.
c. x, left leg was lacking from the knee down, skull broken.
d. l. 1.64, w. head 0.80, w. foot 0.48 m; depth of skull 0.20, pelvis 0.25, feet 0.20 m -NAP.
e. NE-SW.
f. In some of the corroded iron grave goods an impression of wood can be seen.
g. Skeleton without left lower leg (find No. 335).
h. Ost. male; arch. male.
i. 30-40 years.
l. Supine, left hand in the lap, right arm across the chest, legs extended.
m. 335.1 Spearhead with split socket and narrow oval blade, iron, l. 1.54, blade w. 3.6 cm (find No. 333). The blade has traces of Langstreijendamast. The wooden handle had decayed.
335.2 Schmalsax, iron with hilt of wood, l. 3.55, blade w. 2.9 cm. The end of the hilt was mounted with a small plate of iron (find No. 334).
335.3 Buckle, oval, iron, l. 4.5, w. 3.5 cm (find No. 334).
335.4 Mass of rusted iron, with knife type B, l. app. 6 cm and two knobs, bronze; one 2.7x1.5 cm and one 1.4x1.2 cm (find No. 334A).
335.5 Iron mass with buckle and fragment of knife, app. 4x4 cm (find No. 334A).
335.6 Flint, l. 3.5, w. 3.0, th. 1.3 cm (find No. 334B).
335.7 Iron mass with tweezers?, l. 3.5 cm (together with 335.8 and 335.9, find No. 334C).
335.8 Small nail, iron, l. 1.1 cm.
335.9 Two fragments of iron.
335.4-335.9 Appear to be the remains of a small pouch, with knobs attaching it to a belt.
335.10 Clincher, iron, l. 7 cm (find No. 221).
335.11 Clincher, iron, l. 5 cm (find No. 221).
n. 335.1 Near left upper arm.
335.2 On the left hip.
335.3 On the spine.
335.4/5 Lumbar region, right.
335.6 Lumbar region, middle.
335.7/8/9 Lumbar region, left.
335.10/11 At the foot of the grave.
p. First phalanx of cattle.
r. The spearhead and Schmalsax date the grave to AD 525-600.

342.
a. Inhumation.
b. K 5, level 8.
c. x, the thighbones were dislocated.
d. l. 1.68 m.
i. 5-6 years.
l. On the right side, with the arms stretched before the chest and the legs crouched.

347.
a. Stray find.
b. K 5, level 8.
g. Human bones; distal part of right femur and proximal part of right tibia.
h. Ost. probable female; arch. —.
i. Adult.
j. Undatable, AD 450-750.

348.
a. Stray find.
b. O/P 4/8, level 8, no exact location recorded.
c. Fragment of charcoal Quercus (18 ml, n.ill.).
r. Undatable, AD 400-750.

353.
a. Inhumation.
b. Disturbed cremation burials.
c. x, the thighbones were dislocated.
1. 1x0.8 m; depth of skull 0.32, feet 0.35 m -NAP.
e. E-W.
f. Skeleton (find Nos 293 and 353).
i. 5-6 years.
j. Three black-stained tooth caps.
k. On the right side, with the arms stretched before the chest and the legs crouched.

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The early medieval cemetery of Oosterbeintum (Friesland)
356.
a. Urned burial, perhaps disturbed by grave 422.
b. L 6, level 8.
c. xx, only the base of an urn.
d. d. 20 cm.
g. 39 g of cremation, perhaps sample 315 of an apparently un-urned cremation is from the same feature.
m. 356.1 Base of an urn, hand-made ware, undecorated, h. >3, c. >11.5 cm.
o. Burnt faunal remains: 16 bone fragments of large mammal, 167 mammalian bone fragments.
p. Unburnt faunal remains: second phalanx of pig, mammalian bone fragment.
r. Under this grave lay grave 422. Either this grave dates from an older period of the cemetery or the urn grave was disturbed by grave 422. On the basis of the pot: AD 500-700.

360.
a. Inhumation.
b. Disturbed cremation burial.
c. J 6, level 8.
d. K 153, level 153, perhaps disturbed by grave 422.
The early medieval cemetery of Oosterbeintum (Friesland)
green trail around the middle; 2. White with brown trails (find No. 346).
374.4 Knife, type A, iron, l. 11.5 cm.
374.3 Mass of rusted iron, with ring (d. 4.5 cm), chain and attached to it an app. 5.5 cm long upper canine of a wolf (find No. 345). Near by lay a second canine of a wolf (374B.6). The canines were not of the same animal. This was probably a chatelaine. In the corrosion was an impression of wood. It is quite certainly no oak; maybe it is softwood.
374B.6 Right upper canine of a wolf, l. 6.0 cm (find No. 344).
374B.1 At the neck.
374B.2 At the neck below 374B.1.
374B.3 On the chest.
374B.4 Above the left hip, along the arm.
374B.5/6 Along the left hip, near the hand.
374.5b. J/K 5, level 9.
374.5a. Undatable, AD 400-750.
374b. 3 ml of charcoal; 0.7 ml of sintered remains.
374a. 8 ml of charcoal; 1.75 m.
376. a. Urned burial.
c. xxx.
d. d. 30 cm.
g. 108 g of cremation.
i. Adult.
j. 376.1 Fragments of the base of an urn, hand-made ware, no measurements (n.ill.).
k. Unburnt faunal remains: fragment of rib of cattle; 2 fragments of thoracic vertebrae of sheep/goat; fragment of thoracic vertebra of pig; 9 bone fragments of small mammal.
l. On the basis of the annular brooches: AD 450-700. The find of the chatelaine is in accordance with this date.
376.
393a. Inhumation.
c. xxx.
d. d. 20 cm.
f. 110 ml of charcoal: 0.7 ml of Quercus, 23 ml of Alnus, 3 ml of Corylus, 2 ml sintered remains, 1 ml other than wood and 39 ml residue.
g. 1 g of cremation.
i. Possibly a child, 0-3 years.
j. Undatable, AD 400-750.
398.
398a. Ash stain.
d. d. 20 cm.
f. 4 ml sintered remains and 74 ml residue.
g. In the SW comer of the grave were some human bones at a depth of 0.42 m. -NAP (see detail B) and:
398.6 Fragment of a knife, type unknown, iron, l. >5 cm (find No. 439).
r. On the basis of the brooch AD 625-750. The grave cuts grave 360 (AD 450-525) and itself was cut by grave 342 which also contained an equal-armed brooch, van Bellingen type 5.3. Therefore grave 393 probably dates from the early period of use of the cemetery: AD 650-700.
396.
396a. Ash stain.
c. xxx.
d. d. 30 cm.
f. 1 g of cremation.
i. Possibly a child, 0-3 years.
j. Undatable, AD 400-750.
399.
399a. Inhumation.
c. xxx.
d. d. 30 cm.
f. 1 g of cremation.
i. Possibly a child, 0-3 years.
j. Undatable, AD 400-750.
393.
393a. Inhumation.
c. xxx.
d. d. 30 cm.
f. 1 g of cremation.
i. Possibly a child, 0-3 years.
j. Undatable, AD 400-750.
398.
398a. Ash stain.
c. xxx.
d. d. 30 cm.
f. 1 g of cremation.
i. Possibly a child, 0-3 years.
j. Undatable, AD 400-750.
399.
399a. Inhumation.
c. xxx.
d. d. 30 cm.
f. 1 g of cremation.
i. Possibly a child, 0-3 years.
j. Undatable, AD 400-750.
393.
393a. Inhumation.
c. xxx.
d. d. 30 cm.
f. 1 g of cremation.
i. Possibly a child, 0-3 years.
j. Undatable, AD 400-750.
398.
398a. Ash stain.
c. xxx.
d. d. 30 cm.
f. 1 g of cremation.
i. Possibly a child, 0-3 years.
j. Undatable, AD 400-750.
399.
399a. Inhumation.
c. xxx.
d. d. 30 cm.
f. 1 g of cremation.
i. Possibly a child, 0-3 years.
j. Undatable, AD 400-750.
393.
393a. Inhumation.
c. xxx.
d. d. 30 cm.
f. 1 g of cremation.
i. Possibly a child, 0-3 years.
j. Undatable, AD 400-750.
398.
398a. Ash stain.
c. xxx.
d. d. 30 cm.
f. 1 g of cremation.
i. Possibly a child, 0-3 years.
j. Undatable, AD 400-750.
399.
399a. Inhumation.
c. xxx.
d. d. 30 cm.
f. 1 g of cremation.
i. Possibly a child, 0-3 years.
j. Undatable, AD 400-750.
398.5 Bangle, bronze. Completely corroded and not preserved. The drawing is after a bracelet of the same type from grave 295.

n. 398.1 At the left shoulder.
398.2 On the right of the chest. 398.3 Under the chin.
398.4 On the chest; the beads were as much as possible preserved in their original order. Since probably the largest amber beads were originally in the middle, the preserved order is perhaps not the original one.
398.5 Left forearm, clear traces of green staining on the bones.
o. Four traces of cremation ritual were cut in the grave (Nos 194, 269, 396 and 655).
p. Fragment of right metatarsus of sheep.
q. Fragment of femur of cattle; fragment of tibia of pig with eut.
r. Fragment of right metatarsus of sheep.
s. Ost. male dog.
t. Ost. female; arch. -.
u. Ost. -; arch. possibly girl.
w. Feature not recorded on levels 7, 8 or 9.
x. Skeleton (find Nos 402).
y. Feature not recorded on levels 7, 8 or 9.
z. Skeleton (find Nos 408).
a. Ash stain.
b. H 8, level 9.
c. Scattered finds d. 35 cm. Only half of the stain is observed, the other half remaining in the section.
d. <1 ml of charcoal.
e. 1 g of cremation.
f. 58 ml of charcoal: 8 ml of Quercus, 7 ml of Alnus, 3 ml of Betula, 4 ml sintered remains, 3 ml no wood and 33 ml residue.
g. 4 g of cremation.
h. Possibly a 1-5 years old child.
i. Undatable, AD 400-750.
j. Undatable, AD 400-750.

399.
a. Ash stain.
b. Feature not recorded on levels 7, 8 or 9.
c. 58 ml of charcoal: 8 ml of Quercus, 7 ml of Alnus, 3 ml of Betula, 4 ml sintered remains, 3 ml no wood and 33 ml residue.
d. 4 g of cremation.
e. Possibly a 1-5 years old child.
f. Undatable, AD 400-750.

402.
a. Inhumation.
b. H 5, level 9.
c. X, skeleton crushed.
d. 0.92 x 0.48 m; depth of skull 0.61, pelvis 0.58 m -NAP.
e. ESE-WNW.
f. Skeleton (find Nos 395 and 402).
g. Ost. -; arch. possibly girl.
h. 6 years.
i. Supine, left arm stretched, right arm across the chest, legs extended.
j. Supine, left arm stretched, right arm across the chest, legs extended.
k. Round planiconvex pendant, one side with a hole, (red deer) antler, d. 1.6 cm. The hole is encircled. Near the hole: green staining.
l. 402.2 Two beads, amber.
m. 402.1 Near the neck.
n. 402.2 Near the neck.
o. Grave 402 lay beneath grave 273 which probably dates from AD 500-750, and may date to AD 450-600.
p. Undatable, AD 450-750.
q. Undatable, AD 450-750.
r. Undatable, AD 450-750.
s. Undatable, AD 450-750.
t. Undatable, AD 450-750.

409.
a. Urned burial.
b. M 6, level 9.
c. Skull is missing.
d. 1.092, w. 0.44 m; depth of cervical vertebrae 0.34, pelvis 0.36 m -NAP.
e. ESE-WNW.
f. Skeleton (find Nos 395 and 402).
g. Skeleton (find Nos 408).
h. Ost. male dog.
i. Over 7 years old.
j. Height at the withers 0.65-0.69 m.
k. Osteophytes on several thoracic and lumbar vertebrae (fig. 48); abscesses in right radius and left tibia (fig. 49).
l. The dog was on its left side, with legs drawn up.
m. A first wing phalanx of Anas platyrhynchos (mallard); 4 bone fragments of large mammal.

409.1 Urn, rough-walled pot with handle, Böhner type D6a, wheel-thrown-pottery, orange, h. 27.5, d. 22.5 cm (find Nos 71, 92, 214, 223, 237, 245, 249, 254, 364, 371, 378, 379, 380, 381, 382, 283, 384, 409).
m. Clincher, iron, l. 7.0 cm.
m. Clincher, iron, l. 5.0 cm.
m. 409.4 Fragment of molten glass, translucent, l. 1.7 cm.

409.2 Sample 409: Unburnt faunal remains: M1 or M2 of juvenile cattle; 11 bone fragments of large mammal; 5 fragments of vertebrae of small mammal. Sample 379: Unburnt faunal remains: fragment of right pelvis of sheep/goat.

q. The fragments of an unburnt comb (find Nos 409 and 412) are more likely to belong to grave 422 than to the urn grave 409.
r. On the basis of the pot: AD 500-600.

410.
a. Inhumation.
b. L 5, level 10.
c. Small degree of osteophytes on some thoracic vertebrae.
d. The dog was on its left side, with legs drawn up.
e. The grave fill contained at least 8 g of cremation (find No. 369).
f. Fragment of femur of cattle; fragment of tibia of pig with cutmarks; 2 bone fragments of large mammal.
Sample of the fill of the grave (find No. 369) contained: 27 mammalian bone fragments; 2 fish bone fragments; 2 shell fragments of Mytilus edulis (mussel) (all unburnt).
r. Undatable, AD 450-750.
The early medieval cemetery of Oosterbeintum (Friesland)

420. a. Inhumation.
   b. Disturbed cremation burial.
   c. L 4, level 9.
   d. l. 1.88, w. head 0.84, w. foot 0.92 m; depth of skull 0.38, pelvis
      0.52, feet 0.49 m -NAP.
   e. SSE-NNW.
   f. Skeleton (find Nos 400 and 420).
   g. Ost. definitive male; arch. female.
   h. i. 35-45 years.
   j. 1.76 m.
   k. Some vertebrae, the right hand and the right foot have osteophytes.
      On the right fibula is an outgrowth, perhaps resulting from
      ossification of the tendon.
   l. Supine, hands in the lap, legs extended.
   m. 420.1 Hand-made ware, undecorated, h. 12.5, d. 12.5 cm (find No.
      401).
   n. 420.1 Right-hand side near the head.
   p. Left radius of sheep/goat; M, of pig; bone fragment of large
      mammal.
   q. The grave-fill contains at least 7 g of cremation of an adult
      individual, some charcoal and burnt clay and:
   r. On the basis of the pot: AD 550-725. The disturbed cremation
      burial must be older, AD 400-600.

421. a. Umed burial.
   b. L 6, level 9.
   c. xxx, urn in sherds, sample 367 contains pyre remains from a level
      overlying grave 421.
   d. 50x40 cm.
   f. 492 ml of charcoal: 15 ml of Ulmus, 0.7 ml of Fraxinus, 135 ml
      of Alnus, 1.5 ml of Corylus, 3 ml of Salix, 2 ml of Pinus and 335
      ml residue.
   g. 662 g of cremation.
   h. Ost. female; arch. female.
   i. Adult.
   m. 421.1 Urn, hand-made pottery, undecorated, h. >11.0, d. 13.0 cm.
   n. 421.2 Fragment of a nail, iron (find No. 367), remaining l. 3.8 cm.
   o. 421.3 Unknown object, charred willow (find No. 367; n. ill.).
   p. Unburnt faunal remains in sample 421: fragment of cervical
      vertebra of cattle; fragment of cervical vertebra of sheep/goat;
      fragment ofibia of foetal sheep/goat; left scapula of Anas
      platyrhynchos (mallard).
   q. On the basis of the pot: AD 500-700. The radiocarbon date of
      sample 421 (charcoal from the urn, GrN-19447 1590±70) has a
      long range from the second half of the 3rd until the 7th century.
      The radiocarbon date of sample 367 (charcoal above the urn,
      GrN-19445 1473±35) has a range from the end of the 6th until the
      beginning of the 8th century (for the calibration of both see table
      1). On the basis of this latter date the grave is dated AD 575-700.

422. a. Inhumation.
   b. L 7, level 9.
   c. xx, trunk, arms and head were destroyed by ditch 261. The
      fragments of a comb in ditch 261 were probably from this grave,
      though perhaps they belonged with urn 409.
   d. >1x0.60 m; depth of pelvis 0.36, feet 0.36 m -NAP.
   e. WSW-ENE.
   f. Legs of skeleton (find No. 422), the human bones in ditch 261
      belong to the same individual (find Nos 315, 385 and 453).
   g. Legs extended.
   h. Ost. female; arch. female.
   i. 35-45 years.
   l. Supine, arms crossed over the chest, legs extended.
   m. 422.1 Two-sided comb, decorated with lines, straight sides, (red
      deer) antler, l. at least 7.4 cm, h. app. 6 cm (find Nos 409, 412 and
      422).
   n. Found in ditch 261.
   o. Fragment of right tibia of sheep.
   p. Above the grave was urn 356 dating from the 6th or 7th century,
      hence grave 422 may date from AD 450-550.

424. a. Inhumation.
   c. x, foot end is lacking.
   d. l. 1.64, w. head 0.72, w. foot 0.80 m; depth of skull 0.47, pelvis
      0.58 m -NAP.
   e. S-N.
   f. Fragment of the head of a tree-trunk coffin of Quercus, remaining
      l. 0.75, remaining w. 0.29 m. Width in situ was 0.38 m. The
      fragment had survived but was not conserved.
   g. Skeleton, legs are broken due to the excavation (find Nos 424
      and 497).
   h. Ost. female; arch. female.
   i. >45 years.
   k. Two lumbar vertebrae have grown together (ankylosis), other
      lumbar vertebrae have lipping. The posture of the body points to
      a stooped back. A phalanx has osteophytes.
   l. On the left side, right arm across the abdomen, left arm along the
      body, legs crossed.
   m. 424.1 Spindle whorl, bone (caput femur cattle), h. 2.1, d. 4.2 cm
      (find No. 425).
   n. 424.2 Small sherd of red wheel-thrown pottery, gr. 1. 1.8 cm
      (n. ill.).
   o. 424.1 At the left hand.
   p. Fragment of right tibia of cattle (find No. 424), left pelvis of
      juvenile sheep with dog gnawing marks (find No. 425).
   r. The outside of the coffin was radiocarbon-dated: 1390±25 years
      BP (GrN-16539, calibration in table 1). The outer yearrings are
      lacking and the date concerns a group of the younger rings, so the
      real date is a small number of years (perhaps 20) younger than the
      calibrated 14C date. On the basis of this outcome the grave is dated
      to the second half of the 7th century: AD 650-694.

426. a. Stray find.
   b. M 7, level 9.
   m. Knucklebone marked with two dots, left astragalus of sheep.
   n. Undatable, AD 450-700.

428. a. Inhumation.
   b. Disturbed cremation burial.
   c. 1 8, level 9.
   d. x, note that part of the body lay within the south section. During
      or shortly after the period of use of the cemetery this grave was
affected by erosion following a storm flood.

d. 1. h. 92, w. head 0.60, w. foot 0.52 m; depth of spinal column 0.34, feet 0.36 m -NAP.
e. WSW-ENE.
f. Remains of bark were observed.
g. Skeleton (find Nos 428, 502 and probably 423).
h. Ost. female; arch. female.
i. 25-35 years.
j. One tooth with caries, all teeth with extreme amounts of tartar.
Green staining on right clavicle and inner side of mandible from the brooch. Several bones with black charcoal stains.
k. It is not known whether the body lay on its back or on its side. Arms remained in the section and hence must have been folded, legs extended.
l. 428.1 Annular brooch, underside flat and plain, upper surface grooved, bronze with bronze pin, d. app. 4 cm (find No. 502). In the corrosion fragments of textile are preserved.
428.2 Annular brooch, underside flat, undecorated, bronze, d. app. 4 cm (find No. 502). In the corrosion fragments of textile are preserved.
428.3 Small long brooch of Domburg type, bronze, l. 5.4 cm (find No. 502).
428.5 Cylinder-shaped fragment of amber, one side smooth, the other sides rough.
428.6 Small cindel.
428.7 Knucklebone, (right astragalus of) sheep, l. 2.9, w. 1.9 cm. Two dots are vaguely visible. The knucklebone is heavily worn through use (find No. 428).
428.8 Small sherd of grey wheel-turned pottery, gr. l. 2.8 cm.
428.9 Small sherd of grey wheel-turned pottery, gr. l. 2.1 cm.
428.10 Small sherd of grey wheel-turned pottery, gr. l. 2.6 cm.
428.11 Fragment of stone, l. 3.5 cm.

n. 428.1-2 On the right clavícula.
428.3 Under the chin.
428.4-428.6 On the abdomen.
428.7 During the sorting of the bones.
428.8-11 In the grave fill.

o. Some traces of charcoal and 1 g of cremation of a child (0-1 year; find No. 502). Perhaps the small cindel belonged to this cremation. Black staining on the bones too indicates the presence of a disturbed cremation burial.

r. On the basis of the Domburg brooch of an early type, the probable date is AD 500-600. The disturbed cremation burial must be older, AD 400-525.

430.

a. Horse burial.
Disturbed cremation burial.
c. x, the skull was found to be broken.
d. l. 2.00, w. 1.40 m; depth: skull 0.48, back 0.26 and 0.25, pelvis 0.20, forelegs and hind legs 0.21 m -NAP.
e. WSW-ENE.
g. Skeleton (find Nos 373 and 430).
h. Ost. stallion.
i. Circa 6 years old.
j. Height at the withers 1.35-1.39 m.
k. Osteophytes on several thoracic vertebrae.
l. The stallion was buried on his right side, with his legs drawn up.
m. 430.1 Ring, iron, d. 3.3 cm (find No. 120).
n. 430.1 Was found at a higher level than the stallion, i.e. in level 5. It may have belonged to the fill of the grave, or be a later intrusion.

o. The stray find of a molten glass bead found in level 7 (find No. 250) may derive from a cremation destroyed by the digging of grave 430. Charcoal and calcined bone may belong to the same cremation. Two calcined bone fragments of large mammal.

p. Fragment of scapula, fragment of ulna, fragment of left femur and third phalanx of adult cattle; calcaneus of foetal cattle; fragment of cervical vertebra, fragment of lumbar vertebra and centrotarsal-le of sheep/goat; fragment of mandible of pig; incisor of mouse species; 65 bone fragments of large mammal (find No. 373).
r. Below the grave lay grave 460, which contained a disturbed cremation burial; therefore the horse burial belongs to the younger period of the cemetery: app. AD 600-750. The disturbed cremation burial must be older, AD 400-650.

431.

a. Ash stain.
b. L. 7, level 9.
c. 30x30 cm.
d. l. 0.84, w. 0.72 m; depth of skull 0.27, pelvis 0.27 m -NAP.
e. W-E.
g. Skeleton (find Nos 387 and 432).
h. Ost. male dog.
i. Over 7 years old.

432.

a. Dog burial.
b. K 6, level 9.
c. l. 0.84, w. 0.72 m; depth of skull 0.27, pelvis 0.27 m -NAP.
e. W-E.
g. Skeleton (find Nos 387 and 432).
h. Ost. male dog.
i. Over 7 years old.

433.

a. Inhumation.
c. Skull broken.
d. l. 1.36, w. head 0.52, w. foot 0.40 m; depth of skull 0.42, pelvis 0.47, feet 0.43 m -NAP.
e. SSE-NNW.
g. Skeleton (find No. 433).
i. Undatable, AD 500-700, if not, then AD 433 is undatable, AD 450-750.

435.

a. Inhumation.
b. J 8, level 9.
c. Skull broken.
d. l. 1.88x0.52 m; depth of skull 0.22, pelvis 0.25, feet 0.28 m -NAP.
e. WSW-ENE.
g. Skeleton (find No. 435).
h. Ost. male; arch. probably male.
i. 19 years.
j. 1.72 m.
k. One molar with caries.
l. Supine, left hand in the lap, right arm stretched, left leg slightly flexed, right leg stretched.

m. 435.1 Sheath of leather, with a large knife, iron, l. 21.0 cm and an awl-shaped item, iron, l. 11.2 cm. In the sheath a nail, probably bronze (find No. 442).
435.2 D-shaped buckle, iron, l. 1.7, w. 1.3 cm (find No. 441).
435.3 Needle or pin, bronze, broken in two halves, l. 1.8 and 1.1 cm (find No. 443).
435.4 Rivet, bronze, h. 0.7, d. 0.7 cm (find No. 444).

n. 435.1 Above the left hip.
m. 435.2 On the left of the pelvis.
m. 435.3 Along the left arm.
m. 435.4 Under the head.
p. Distal end of metapodium of adult horse.
r. The grave was cut by horse grave 430 and itself cuts grave 428. Therefore it probably dates from AD 550-700.

437.

a. Ash stain, no sample.
b. I 8, level 10.
c. d. 30 cm.
d. Undatable, AD 400-750.
438.

a. Inhumation.

b. L. 6, level 10.

c. d. 1.56x0.56 m; depth of skull 0.53, pelvis 0.54, feet 0.51 m -NAP.

d. SSE-NNW.

e. Skeleton (find No. 458).

f. Ost. male; arch. –.

i. 35-45 years.

k. Some vertebrae have osteophytes, tartar on teeth.

l. On the left side, arms folded along the body, crouched with the knees to the left.

m. Undatable, AD 450-750.

445.

a. Inhumation.

b. Disturbed cremation burial. The cremation is of an adult and a child, therefore perhaps two cremation burials have been disturbed by the grave.

c. j/K 7, level 10.

d. 1.56x0.60 m; depth of skull 0.43, pelvis 0.46, feet 0.52 m -NAP.

e. W-E.

f. Skeleton (find Nos 450 and 460).

h. Ost. male; arch. –.

i. 20-30 years.

j. 1.75 m.

k. A bent as metatarsale.

l. On the left side, arms stretched in front of the body, legs crouched.

m. 461.1 Pin, red deer antler, l. 1.47 cm (find No. 463).

460.2 Knife, type A, iron, l. >9.5 cm (find No. 464).

460.3 Nail, iron, l. 2.3 cm (find No. 463). 460.4 Piece of lead, l. 4.0, w. 1.6 cm (find No. 462).

n. Undatable, AD 400-750.

451.

a. Inhumation.

b. Disturbed cremation burial.

c. J/K 6, level IO.

d. 70x50 cm.

f. 65 ml of charcoal: 15 ml of Corylus and 50 ml residue.

g. 1 g of cremation.

p. Unburnt faunal remains: fragment of thoracic vertebra of cattle; 2 mammalian bone fragments; shell fragment of Mytilus edulis (mussel).

r. Undatable, AD 400-750.

461.

a. Inhumation.

b. K/L 8, level 10.

c. x, the head of the grave was cut by ditch 261.

d. 1.168, w. head 0.64, w. foot 0.68 m; depth upperchest 0.58, pelvis 0.57, feet 0.42 m -NAP.

e. E-W.

f. Some impressions of bark were observed.

g. Skeleton without skull (find No. 461 and perhaps No. 468 in ditch 261).

h. Ost. female; arch. –.

i. Adult.

j. 1.55 m.

l. Supine, arms stretched, legs slightly flexed.

p. Find Nos 453, 457 and 461. 461: Distal end of metapodium of
sheep/goat. 453: Fragment of right tibia of sheep/goat. 457: Fragment of third phalanx of cattle; fragment of right humerus of sheep with cutmark.

r. Undatable, AD 450-750.

473.

a. Inhumation.
b. O 4/P 3, levels 7 and 10.
d. >1.69x0.56 m; depth of skull 0.40, pelvis 0.36, feet 0.35 m -NAP.
e. SSW-NNW.
g. Skeleton (find No. 473).
h. Ost. probably female; arch. --.
i. 40-50 years.
j. 1.58 m.
k. Several vertebrae have osteophytes.
l. Supine, arms and left leg stretched, right leg bent with the right foot under the left.
r. Undatable, AD 450-750.

474.

a. Inhumation.
b. N 5, level 10.
c. xxx, only an upright skull.
d. Depth top of skull 0.60 m -NAP.
e. Skull was facing to the north.
g. Skull (find No. 474).
h. Ost. probably female; arch. --.
i. 30-40 years.
j. The skull lay beneath grave 433 which is dated AD 675-750. Therefore grave 474 is from the earlier period of the cemetery, AD 450-675.

477.

a. Dog burial.
b. G 6/7, level 10.
c. L 1.24, w. 0.72 m; depth of skull 0.73, pelvis 0.79 m -NAP.
d. WSW-ENE.
e. Skeleton (find No. 477).
f. Ost. male dog.
i. 1.5 years old.
j. Height at the withers 0.62-0.64 m.
l. The dog was buried on its right side, with the legs slightly drawn up.

p. Second phalanx of sheep/goat; tooth of mouse species; 42 bone fragments of large mammal; 2 mammalian bone fragments; right radius and right ulna of Anas platyrhynchos (mallard); precordial vertebra of Liza ramada (thin-lipped grey mullet) (identification by Dr. D.C. Brinkhuizen).

r. Undatable, AD 450-750.

480.

a. Dog burial.
b. G 8, level 12.
c. L 1.08, w. 0.64 m; depth of skull 0.73, pelvis 0.73 m -NAP.
d. NNE-SSE.
e. Skeleton (find No. 480).
f. Ost. male dog.
i. More than 8 years old.
j. Height at the withers 0.67-0.69 m.
k. Abscess on the sternum. A total of 85 remains of a foetal pig (92 days after conception) were found at the place of the abdomen: left and right os petrosum, left occipitale, 18 otherskull fragments, left and right mandible, 6 deciduous premolars, 30 fragments of vertebrae, fragment of rib, left and right humerus, left and right ulna, fragment of pelvis, 4 metapodia, 2 first phalanges, second phalanx, third phalanx, hoof (horn) and 11 indefinite parts of the skeleton of the foetal pig (fig. 58).
l. The dog was buried on its right side, with the legs extended.
p. 7 mammalian bone fragments.
r. Undatable, AD 450-750.

482.

a. Inhumation.
b. B 8, level 12.
c. xxx, scattered, weathered fragments only.
d. Depth 0.58 m -NAP.
e. Fragments of right humerus, ulna, radius, femur and patella (find No. 482).
f. Adult.
g. Severely weathered bones.
r. Undatable, AD 450-750.

483.

a. Inhumation.
c. xx, skeleton crushed, skull, pelvis and upper legs were lacking.
d. 2.44x0.40 m; depth of skull 0.70, pelvis 0.66, feet 0.61 m -NAP.
e. WSW-ENE.
f. Tree-trunk coffin, clear impression of the bark and some fragments of wood. The coffin was covered by cross boards. All wood samples were Quercus.
g. Skeleton without skull, pelvis and femora (find No. 483).
h. Ost. female; arch. probably female.
i. 30-40 years.
j. Distinct tartar.
k. On the right side, arms and legs stretched.

m. 483.1 Narrow-mouthed, hand-made pot, undecorated, h. 13.5, d. 14.0 cm.

n. 483.2 Fragments of a brooch, type unknown, bronze, impossible to preserve (n. ill.).

483.1 At the left of the head.

483.2 Near left clavicula.
p. Fragment of rib and fragment of left femur of cattle; 2 loose distal epiphyses of metapodium of sheep/goat.

r. The wood fragments of the coffin were radiocarbon-dated: 1545 ± 35 years BP (GrN-16341, calibration in table 1). It is not known what part of the coffin was dated, but the real date is a little (perhaps 20 years) younger than the calibrated 14C date. On the basis of this date the grave is dated in the second half of the 5th, the 6th or the 7th century: app. AD 450-625. The pot is dated to the 6th or 7th century. Grave 605 lay below grave 483 and is dated by radiocarbon to the middle of the 5th century; therefore grave 483 is dated probably AD 525-625.

485A.

a. Inhumation: skeleton 486, and north of it skeleton 487 (grave 485B) in the same grave. The right arm of skeleton 486 lay beneath the left arm of skeleton 487. Skeleton 487 was buried after skeleton 486. The two skeletons were facing each other.

Disturbed cremation burial.
b. E 8, level 12.
c. xx, the lower part of the body is cut by ditch 128.
d. >1.0x0.96 m; depth of skull 0.64, pelvis 0.74 m -NAP.
e. E-W.
f. Skeleton lay on plant material.
g. Skeleton without legs and right arm (find No. 486).
h. Ost. probably male; arch. --.
i. >45 years.
j. Between the upper left P2 and M1 was a small extra tooth. The teeth were worn down to the roots. In the right upper jaw was an abscess. Several vertebrae had osteophytes, also osteophytes on the right hand. One vertebra had corrosion staining.
l. On the right side, with the left arm in the lap, the right arm stretched. The skeletons of burials 485A and 485B were facing each other.

m. 485.1 Kidney-shaped buckle, bronze, l. 3.7, w. 2.3 cm (find No. 486). In the corrosion fragments of textile are preserved.

485.2 Neck sherd, Anglo-Saxon ware, decorated with grooves.

n. 485.1 Near the right of the chest.

485.2 In the fill of the grave.

o. The grave fill (find No. 485) contained at least 3 g of cremation.
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405

511.  
a. Stray find.  
b. G 6, level 5.  
m. 511.1 Knife, type C, iron, l. 11.5, w. 2.3 cm.  
r. Undatable, AD 400-750.

515.  
a. Umed burial.  
b. J 3, level 5.  
c. xxx, this grave, like the nearby inhumation grave 501, is heavily disturbed by the ring-ditch. The brooch found with the cremation in grave 515 is assumed to belong to grave 501 and the cremation and burnt finds in grave 501 are assumed to belong to grave 515, the disturbance by the ring-ditch having caused the mixing.  
d. d. 60 cm.  
g. 34 g of cremation. There is no sample from the fill of grave 501.  
i. Adult.  
m. 515.1 Urn, biconic pot, Anglo-Saxon pottery, decorated with grooves, h. >13, d. 15.5 cm.  
515.2 Mass of corroded iron with cremation, charcoal, an iron knife (l. 10.1 cm), and a piece of iron, function unknown, l. 8 cm (find No. 501A).  
p. Unburnt faunal remains in sample 515: third phalanx of sheep/goat; 2 bone fragments of small mammal; fragment of right carpo-metacarpus of Anser anser (grey-lag goose).

r. On the basis of the pot: AD 400-525.

518.  
a. Small ash stain, no sample.  
b. L 3, level 5.  
d. No measurements recorded.  
m. 518.1 Sherd of wheel-thrown pottery, biconical pot (find No. 518), remaining h. 9, w. 13 cm.  
r. Undatable, AD 400-750.

519.  
a. Brandgrube.  
b. L 6, level 5.  
d. 60x40 cm.  
f. 50 ml of charcoal: 3 ml of Quercus, 0.2 ml of Acer sp., 5 ml of Fraxinus, 5 ml of Alnus and 8 ml residue.  
g. 320 g of cremation.  
i. 35 years.  
m. 519.1 Calcined fragment of a comb, decorated with lines, (red deer) antler, remaining l. 2.5 cm.  
519.2 Bent plate of iron, l. 2.8, h. 1.6 cm. Perhaps part of a handle?  
519.3 Fragment of knife, iron, l. 5.8 cm.  
p. Unburnt faunal remains: fragment of left metacarpus V of dog; 13 mammalian bone fragments; caudal vertebra of Pleuronectidae.

r. Undatable, AD 400-750.

521.  
a. Umed burial.  
b. M 3, level 5.  
c. xxx.  
d. d. 35 cm.  
f. <1 ml of charcoal.

m. 521.1 Urn with foot, Anglo-Saxon pottery, decorated with lines and stamps, alternated with six shallow, applied vertical bosses, h. >16.5, d. 14.3 cm.  
r. On the basis of the urn: AD 550-700.

522.  
a. Ash stain.  
b. M 4, level 5.  
d. d. 20 cm.  
f. <1 ml of charcoal.
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523.

a. Ash stain.

b. M 4, level 5.

d. d. 25 cm.

f. <1 ml of charcoal.

g. <1 g of cremation.

p. Unburnt faunal remains: 3 mammalian bone fragments.

r. Undatable, AD 400-750.

524.

a. Ash stain.

b. M 3/4, level 5.

d. 20x15 cm.

f. <1 ml of charcoal.

g. <1 g of cremation.

p. Unburnt faunal remains: mammalian bone fragment.

r. Undatable, AD 400-750.

525.

a. Ash stain.

b. N 4, level 5.

d. 30x20 cm.

f. <1 ml of charcoal.

p. Unburnt faunal remains: 3 mammalian bone fragments; shell fragment of *Mytilus edulis* (mussel).

r. Undatable, AD 400-750.

526.

a. Ash stain (samples 526 and 580).

b. N 4, levels 5 and 6.

d. 30x20 cm.

f. 55 ml of charcoal: 15 ml of *Quercus* and 40 ml residue.

p. Sample 526 contains 120 ml of charcoal: 25 ml of *Quercus* and 95 ml residue. Sample 580 contains 35 ml of charcoal: 8 ml of *Quercus* and 27 ml residue.

i. Probably child, 0-3 years.

p. Sample 526: unburnt faunal remains: 7 mammalian bone fragments; precaudal vertebra of *Anguilla anguilla* (eel); spina pinnae abdominalis of *Gasterosteus aculeatus* (stickleback); 5 shell fragments of *Mytilus edulis* (mussel). Sample 580 contains 18 unburnt mammalian bone fragments; 2 shell fragments of *Mytilus edulis* (mussel).

r. Undatable, AD 400-750.

527.

a. *Brandgrube*.

b. O 3, level 5.

c. xx, three pots in sherds.

d. 25x20 cm.

f. 55 ml of charcoal: 15 ml of *Quercus*, 0.2 ml of *Pimus* and 40 ml residue.

g. 86 g of cremation.

h. Ost. —; arch. female.

i. 2-5 years.

m. 527.1 Rough-walled pot, wheel-thrown pottery, h. >12.5, d. 11 cm.

527.2 Small wide-mouthed pot, soft hand-made ware, tempered with organic material, with at least two, perhaps three, small pierced lugs, h. 8, d. 9.5 cm.

527.3 Fragment of the base of a pot, hand-made ware, l. sherd 10 cm.

527.4 Biconic spindle whorl, pottery, h. 1.9, d. 3 cm, with traces of burning.

r. On the basis of the pottery: AD 500-700. A radiocarbon date of the *Quercus* charcoal, GRN-19449 is 10:50 BP has a range from the end of the 9th to the second half of the 7th century. The grave dates from AD 500-700.

528.

a. Ash stain.

b. O 3, level 5.

d. d. 20 cm.

g. 13 g of cremation.

i. Adult?

m. 528.1 Fragment of the base of a pot, hand-made ware, l. 5.5 cm.

p. Unburnt faunal remains: mammalian bone fragment.

r. Undatable, AD 400-750.

529.

a. Stray find.

b. P 3, level 5.

m. 529.1 Head of a nail, iron, remaining l. 0.8, d. 2.1 cm.

r. Undatable, AD 400-750.

531.

a. Ash stain.

b. M 3, level 5.

d. d. 25 cm.

f. <1 ml of charcoal.

g. 1 g of cremation.

p. Unburnt faunal remains: 14 mammalian bone fragments; femur of mouse species; 4 shell fragments of *Mytilus edulis* (mussel).

r. Undatable, AD 400-750.

532.

a. Ash stain. In the field the two ash stains observed in levels 5 and 6 were considered a single feature and the samples were put together. However, their recorded positions on levels 5 and 6 do not overlap each other.

b. O 3, levels 5 and 6.

d. d. 20 and 15 cm.

f. 260 ml of charcoal: 60 ml of *Quercus* and 200 ml residue.

g. 2 g of cremation.

p. Unburnt faunal remains: 2 first phalanges of sheep/goat; 17 mammalian bone fragments; humerus of mouse species; 4 shell fragments of *Mytilus edulis* (mussel).

r. Undatable, AD 400-750.

533.

a. Ash stain.

b. H 4, level 5.

d. d. 15 cm.

g. 7 g of cremation.

p. Unburnt faunal remains: lower incisor of sheep/goat; mammalian bone fragment; vertebra of mouse species; shell fragment of *Mytilus edulis* (mussel).

r. Undatable, AD 400-750.

534.

a. Ash stain.

b. I 4, level 5.

d. d. 20 cm.

f. <1 ml of charcoal.

g. 1 g of cremation.

r. Undatable, AD 400-750.

535.

a. Ash stain. In the field the two ash stains observed in levels 5 and 6 were considered a single feature and the samples were put together. However, their recorded positions on levels 5 and 6 do not overlap each other.

b. O 3, level 5.

d. d. 20 and 15 cm.

f. 120 ml of charcoal: 38 ml of *Quercus* and 82 ml residue.

g. 1 g of cremation.
p. Unburnt faunal remains: 10 mammalian bone fragments; 2 bird bone fragments; 3 shell fragments of *Mytilus edulis* (mussel).

r. Undatable, AD 400-750.

536.

a. Ash stain, fragment 536.1 probably belongs to this feature.

b. A 5, level 6.

c. 20 cm.

f. 190 ml of charcoal; 2 ml of *Quercus*, 0.5 ml of *Fraxinus*, 15 ml of *Alnus*, 1 ml of *Corylus*, 1.5 ml of *Betula*, 15 ml of sintered and 155 ml residue.

g. 1 g of cremation.

i. Possibly a child.

m. 536.1 Fragment bronze (find No. 437, n.ill.).

p. Unburnt faunal remains: fragment of epistropheus of sheep/goat; 2 mammalian bone fragments; 3 shell fragments of *Mytilus edulis* (mussel).

r. Undatable, AD 400-750.

568.

a. Ash stain.


c. 20 cm.

f. <1 ml of charcoal.

g. 6 g of cremation.

m. 568.1 Buckle, bronze, L 2.7, w. 1.7 cm.

p. Unburnt faunal remains: atlas of sheep/goat; 11 mammalian bone fragments; upper/lower premolar/molar of *Microtus* sp. (vole); humerus and femur of mouse species; 2 fish bone fragments; 3 shell fragments of *Mytilus edulis* (mussel).

r. Undatable, AD 400-750.

570.

a. Inhumation.

   Disturbed cremation burial.

b. G/H 4, level 6.

c. x, skull broken.

d. 2.0x0.6 m; depth of skull 0.21, pelvis 0.29, feet 0.31 m -NAP.

e. W-E.

f. Skeleton (find Nos 561 and 570).

g. Ost. probably female; arch. –.

i. >45 years.

j. 1.62 m.

k. Teeth severely worn, some down to the roots. Ankylosis of a row of four vertebrae and of two others; in these places the spine was rigid.

l. Supine, arms and legs extended.

o. The grave fill contains some charcoal (no sample).

p. Fragment of left humerus of cattle with dog gnawing marks (find No. 562).

Sample of the fill of the grave contained mammalian bone fragment and caudal vertebra of Pleuronectidae (all unburnt).

r. Grave 570 cut grave 606 and itself was cut by grave 100. Therefore it dates probably from the middle of the period of use of the cemetery, AD 525-625.

The disturbed cremation burial must be older, AD 400-550.

571.

a. Ash stain.


c. 25x20 cm.

f. <1 ml of charcoal.

g. 12 g of cremation.

i. Adult?

p. Unburnt faunal remains: 6 mammalian bone fragments; tibia of mouse species; 2 fish bone fragments; 2 shell fragments of *Mytilus edulis* (mussel).

r. Undatable, AD 400-750.

581.

a. Ash stain.


c. 25x20 cm.

f. 44 ml of charcoal; 0.5 ml of *Fraxinus*, 20 ml of *Alnus* and 23.5 ml residue.

g. 16 g of cremation.

p. Unburnt faunal remains: 10 mammalian bone fragments; ulna of mouse species; 2 shell fragments of *Mytilus edulis* (mussel); shell fragment of *Cerastoderma edule* (cockle).

r. Undatable, AD 400-750.
582.  
(a) Ash stain.  
(b) F/G 4, level 6.  
(c) 50x5 cm.  
(d) <1 ml of charcoal.  
(e) 2 g of cremation.  
(f) 2 years ±8 month.  
(p) Unburnt faunal remains: 2 mammalian bone fragments; upper/lower premolar/molar of Microtus sp. (vole); shell of Succineaede; 3 shell fragments of Mytilus edulis (mussel).  
(r) Undatable, AD 400-750.

583.  
(a) Umed burial.  
(b) P 3, level 6.  
(c) d. 20 cm.  
(d) <1 ml of charcoal.  
(e) 38 g of cremation.  
(f) i. 17 years.  
(m) 583.1 Small urn, hand-made pottery, undecorated, h. 7.2, d. 8.8 cm.  
(m) 583.2 At least three and at the most five burnt knucklebones, astragalus sheep/goat, one almost complete right and four fragments of one or two right and one or two left ones.  
(r) On the basis of the pot: AD 450-700.

605.  
(a) Inhumation.  
(b) P 6, level 12.  
(c) Skull broken.  
(d) 1.56x0.76 cm; depth of skull 0.80, pelvis 0.93 m -NAP.  
(e) W-E.  
(f) The skeleton lay on bark; along the edge was a piece of Quercus wood from the coffin. There was also a fragment of Corylus. The bark was indeterminable.  
(g) Skeleton (find No. 605).  
(h) Ost. probably male; arch. male.  
(i) >45 years.  
(j) 1.72 m.  
(k) Two teeth had caries, one had tartar, three teeth were worn down to the roots. The skeleton was porous (osteoporosis). Vertebrae and some carpal bones had osteophytes. One fibula was bent. The left clavicula had been broken and had healed.  
(l) Supine, the hands lay in the lap, the legs were slightly flexed.  
(m) 1.62 m.  
(n) M, right has caries.  
(o) On the right side, with the arms crossed before the chest and the legs crouched.  
(p) 38 g of cremation.  
(q) Disturbed cremation burial.  
(r) Undatable, AD 400-750.

624.  
(a) Inhumation.  
(b) N 3, level 8.  
(c) skull broken, recent reed canes were growing through the skeleton.  
(d) 1.88, w. head 0.68, w. foot 0.48 m; depth of skull 0.41, pelvis 0.54, feet 0.60 m -NAP.  
(e) W-E.  
(f) An impression of bark of a tree trunk coffin was observed.  
(g) Skeleton (find No. 624).  
(h) Ost. male; arch. female.  
(i) 16-18 years.  
(j) M right and M, right not yet fully grown.  
(k) Supine, left arm stretched, right arm slightly bent, legs slightly flexed with the knees to the right’s.  
(l) The fill of the grave contained cremation and charcoal.  
(m) Disturbed cremation burial.  
(n) 1.72, w. head 0.60, w. foot 0.60 m; depth of skull 0.34, pelvis 0.29, feet 0.32 m -NAP.  
(o) W-E.  
(p) Skeleton (find Nos 495 and 606) with damaged knee.  
(q) Ost. female; arch. female.  
(r) Undatable, AD 400-750.

645.  
(a) Ash stain, no sample.  
(b) F 6, level 7.  
(c) 50x40 cm.  
(r) Undatable, AD 400-750.

646.  
(a) Ash stain, no sample.  
(b) G 7, level 5.
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