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THE
PREHISTORY
OF THE
NETHERLANDS

VOLUME 1

Edited by

J.P. Louwe Kooijmans



The Prehistory of the Netherlands

Volume I

Edited by

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Note on the dates used in this book

Dates before 50,000 are based on various physical dating techniques, other than radiocarbon, and expressed as 'years ago'.

Dates in the period 50,000-10,000 years ago are based on uncalibrated radiocarbon dates and expressed as 'years ago' or 'years BP' (= Before Present).

Dates in the last 10,000 years are based on calibrated radiocarbon dates and expressed as 'years BC'. Only these dates can be equated with calendar or solar years.

See chapter 1, section 'periods and dates' for the principles of radiocarbon dating.

17 From stone to bronze Technology and material culture

Jay Butler and Harry Fokkens

2900-1100 BC

The period of the transition from the Late Neolithic to the Early Bronze Age saw a number of fundamental innovations in material culture and technologies. The extensive use of the plough and the wagon with solid wooden disc wheels marked revolutionary developments in agriculture and transport around 2900 BC. Of no less importance was the emergence of metal production a few centuries later. Numerous changes took place in pottery manufacture, too, both in style and in technology. Characteristic of the pottery of the Late Neolithic are the lavishly decorated, thin-walled 'beakers', which were produced alongside less sophisticated types, known as 'beaker pots' and 'pot beakers'. At the end of the Early Bronze Age an entirely different type of pottery started to be produced, consisting of virtually undecorated, thick-walled pots tempered with fine to extremely coarse grit. Another category of finds that underwent stylistic changes in the Late Neolithic is that of the stone artefacts, such as hammer axes and arrowheads. Several of these developments will be discussed below.

POTTERY

The earthenware of the northern and central parts of the Netherlands underwent great changes in the period coinciding with the emergence of the Single Grave culture, while that of the coastal plain remained unchanged for some time.

The pottery of the Single Grave culture can be divided into two categories: thin-walled (protruding-foot) beakers that were decorated with corded impressions or grooves and were often tempered with sand, and coarser beaker pots that were decorated with finger-tip impressions and raised cordons and were tempered with grit. In the past, the thin-walled beakers received the most attention as they were found predominantly in graves, which were for many years the main subjects of archaeological research. The first comprehensive typological sequence for this kind of pottery in the Low Countries was set up in 1964 by J.D. van der Waals and W. Glasbergen.¹ Twenty years later a few minor points of their sequence were adjusted, when Lanting and Van der Waals demonstrated that the pottery of the Single Grave and Bell Beaker cultures in fact represented a continuous development (fig. 17.1).² This entirely novel view caused much surprise in Europe, as most archaeologists had always assumed that the different kinds of pottery had been produced by different groups of immigrants: first the Single Grave people and later the Bell Beaker people. Since then, this 'Dutch model' has been generally adopted in other countries, too. Recently the occupation period of the Single Grave culture has been divided into four phases of about 100 years each³ on the basis of typological characteristics of the hammer axes, which closely resemble Scandinavian examples for which sound dates have been obtained. This new chronological division indicates that the changes observable in the stylistic features of the decoration of the beakers are of only limited chronological value.

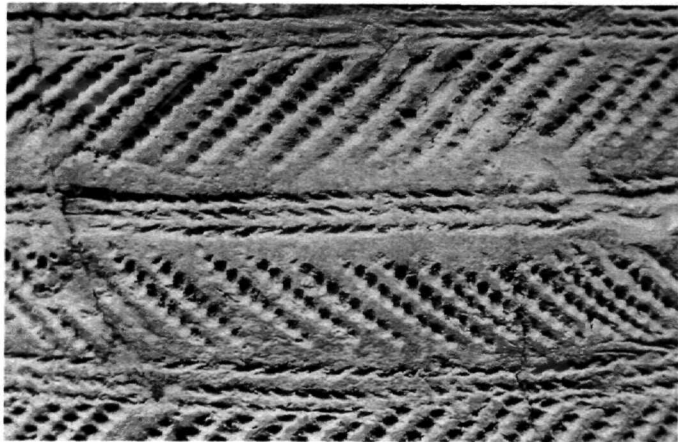


fig. 17.2

Detail of a bell beaker decorated with impressions made with a dentated spatula.

was wound, with which the distinctive impressions known as 'barbed wire impressions' or 'maggots' were produced (fig. 17.3).⁶ This method of ornamentation remained popular from c. 2000 until 1800 BC. The barbed wire beakers mark the end of the beaker tradition in terms of pottery typology. After 1800 BC a different style of pottery started to be produced, whose squat shapes and crude workmanship suggest that they were not (drinking) beakers. These vessels have more in common with the coarse beakers encountered in settlement contexts from the beginning of the Late Neolithic onwards.

Coarse beakers and 'settlement pottery'

It is only in the past few decades that settlements of the beaker cultures have been discovered and excavated. Among the remains found at the first of those settlements were fragments of a different category of pottery, which had hitherto never or only rarely been encountered in graves and which was therefore termed 'settlement pottery' (fig. 17.4).

This category of pottery comprises pots that bear some resemblance to beakers as far as their shapes are concerned, but are generally much larger and more



fig. 17.3

Pottery with barbed wire decoration.

- 1 complete beaker that was found near the Renkumse Beek
- 2 detail of a sherd with a barbed wire stamp impression

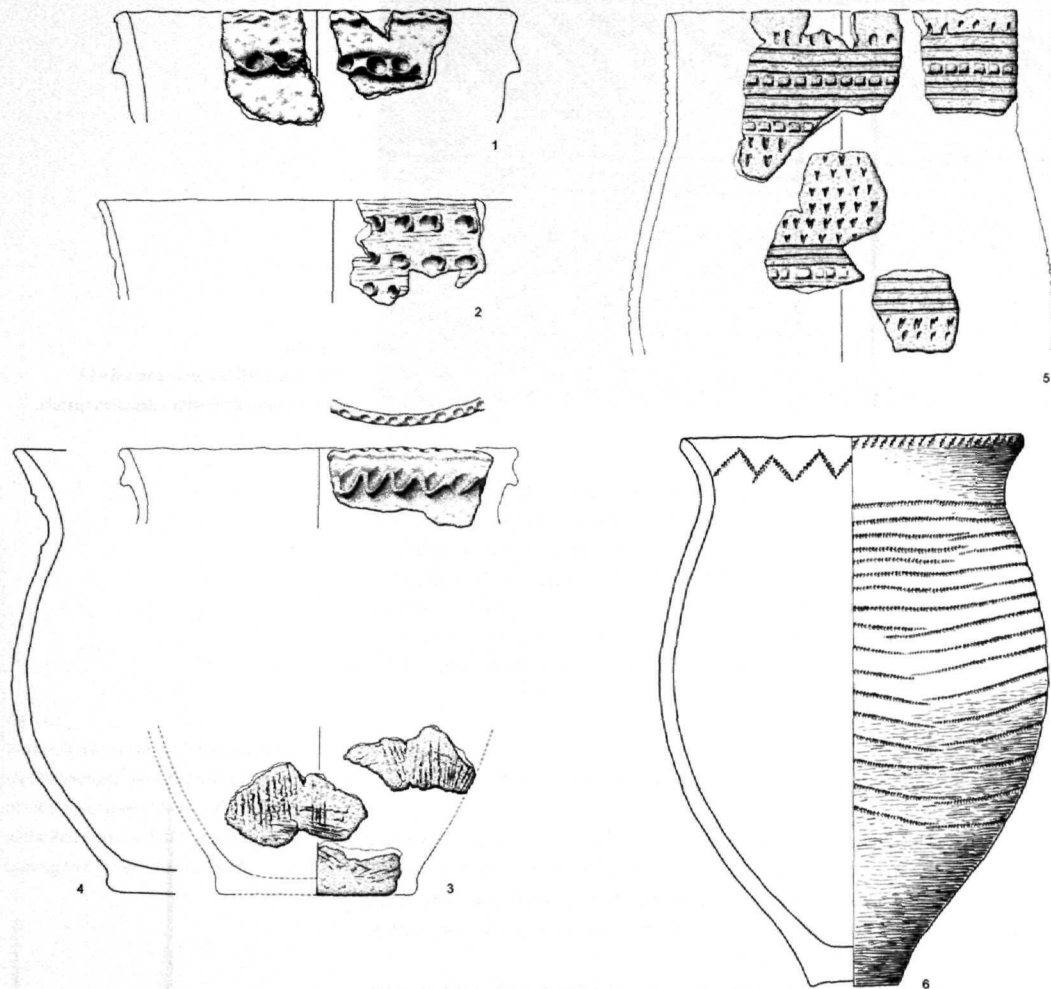


fig. 17.4

Settlement pottery of the Late Neolithic and Early Bronze Age. Scale 1:4.

- 1-3 beaker with 'short wave moulding'
(Wellenbandbecher) from the Single Grave culture settlement near Steenendam
4 complete profile of a Wellenbandbecher from a pit beneath a barrow near Putten
5 a 'pot beaker', Oldeboorn
6 a barbed wire beaker, Emmen

crudely decorated. Also these large types are widely distributed throughout Europe. The typical beaker pot of the Single Grave culture is referred to as a 'beaker with short wave moulding' as the rim and the zone bordering the rim are often adorned with a moulded decoration bearing finger-tip impressions. The bottom part of the pot is on the whole undecorated, like that of the thin-walled beakers, and often shows traces of scraping. Another characteristic that these pots share with the thin-walled beakers is the use of sand as temper. A type of vessels resembling the thin-walled pottery is encountered in bell beaker contexts. These vessels, which are known as 'pot beakers', are decorated with finger-tip and fingernail impressions, sometimes combined with grooves, arranged in zones over the entire surface of the pot (plate 26). A typological sequence has been set up for these pot beakers, too.⁷ They were tempered with grit, like their Early Bronze Age successors, the barbed wire pots.⁸ Only few of these are known, but then only one settlement has been investigated so far⁹; the lack of finds may therefore very well be due to insufficient research. The coarse beakers disappeared around the beginning of the Middle Bronze Age, but the production methods changed very little: the pot-

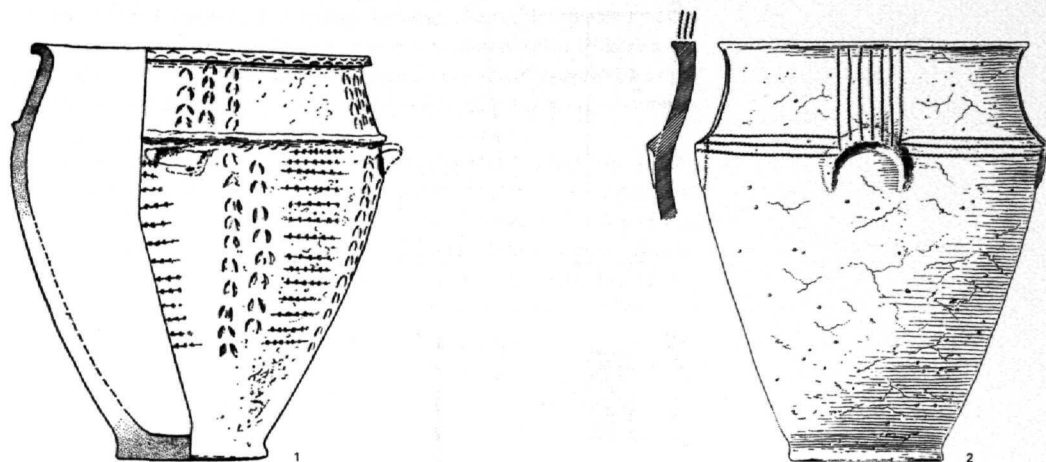


fig. 17.5

The urns from Vorstenbosch (1) and Budel (2). Scale 1:5.

tery produced after that time was all crudely finished and tempered with grit or fine gravel.

Regional traditions in material culture become traceable again from about 1800 BC onwards, the beginning of the Middle Bronze Age. Characteristic of the northern and eastern parts of the Netherlands in this period is the Elp pottery,¹⁰ the central and southern parts being characterized by the Hilversum-Drakenstein-Laren pottery. A different type of pottery was developed in Westfrisia: the Hoogkarspel pottery. The three traditions are closely related as far as manufacturing techniques are concerned: all three comprise barrel- or bucket-shaped pots with thick walls (sometimes up to 2 cm thick), tempered with grit and full of shrinkage cracks. In these respects the pottery of the Netherlands is no different from the bulk of the earthenware produced in Northern and Western Europe in this period.

However, the Dutch pottery does differ in terms of decoration, which is usually rare. Except for a few rare fingernail impressions, the Elp pottery shows no decoration whatsoever and for that reason no attempts have been made to set up

The Vorstenbosch urn combines the shape and decorative motifs of early Hilversum pottery with impressions made with a cord stamp. Other aspects in which this vessel differs from early Hilversum pottery are the decoration of the surface of the pot below the shoulder and the absence of cord impressions as a decorative motif. The urn from Budel is decorated with cord impressions and has horseshoe-shaped handles. As far as the vessel's shape and the decorative motif are concerned, this urn is highly reminiscent of British examples, but comparable pots are also known from northwestern France.

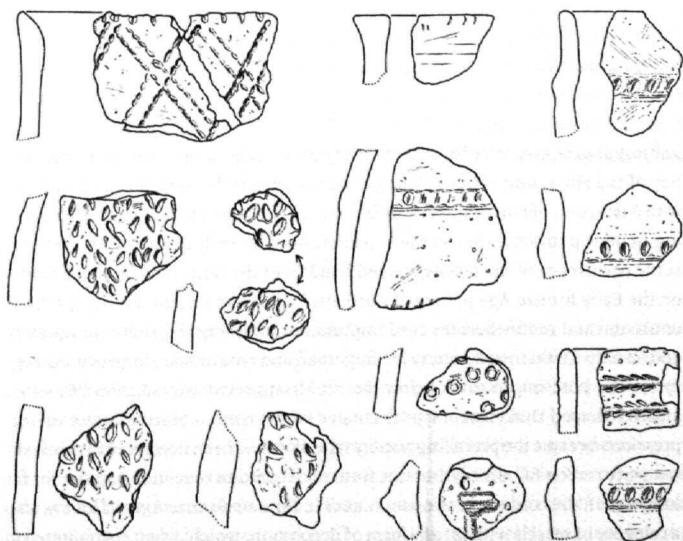


fig. 17.6

Early Hilversum pottery from Empel (North Brabant) decorated with cord impressions arranged crosswise on the shoulder, fingernail impressions, reed impressions and raised cordons with nail impressions. Some of the vessels have small lugs. Scale 1:3.

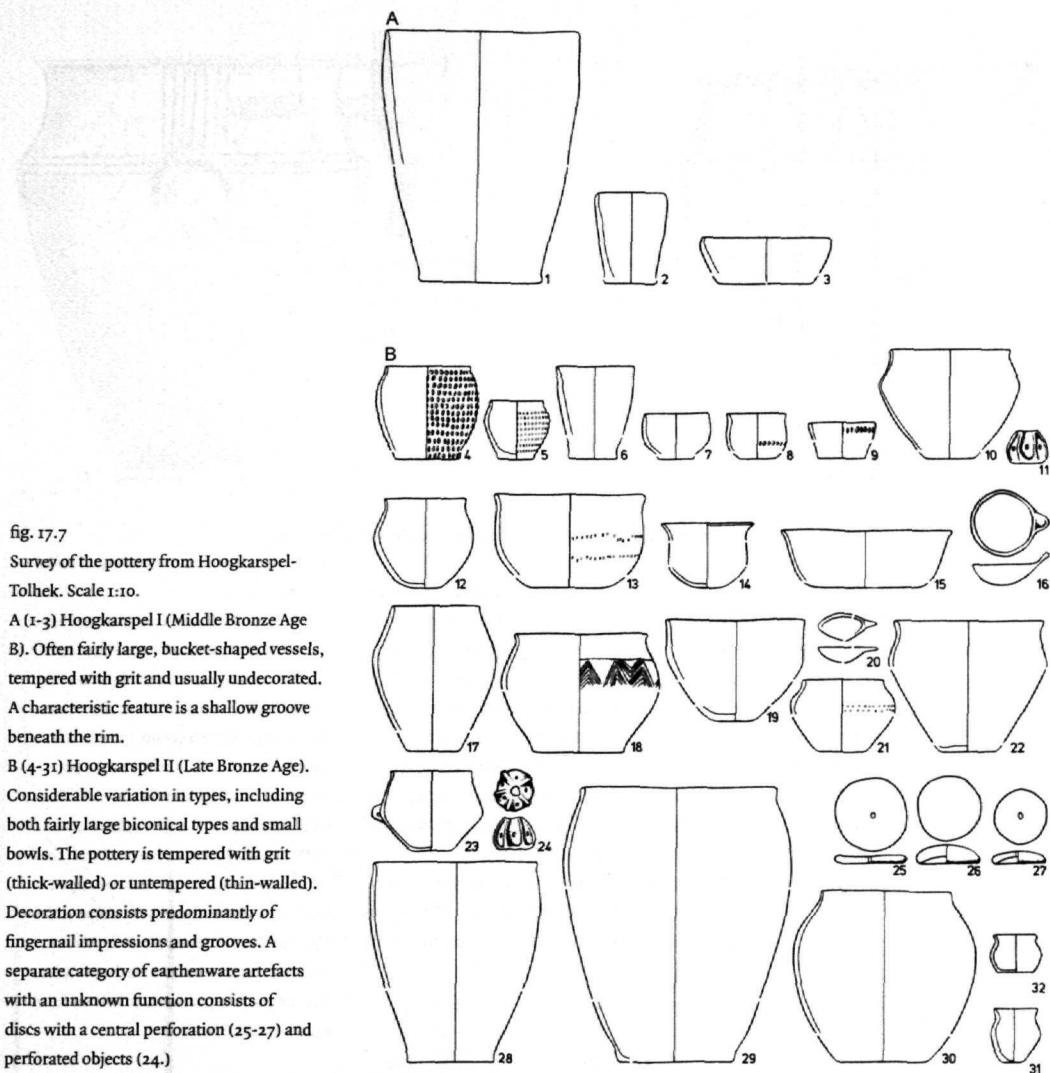


fig. 17.7

Survey of the pottery from Hoogkarspel-Tolhek. Scale 1:10.

A (1-3) Hoogkarspel I (Middle Bronze Age B). Often fairly large, bucket-shaped vessels, tempered with grit and usually undecorated. A characteristic feature is a shallow groove beneath the rim.

B (4-31) Hoogkarspel II (Late Bronze Age). Considerable variation in types, including both fairly large biconical types and small bowls. The pottery is tempered with grit (thick-walled) or untempered (thin-walled). Decoration consists predominantly of fingernail impressions and grooves. A separate category of earthenware artefacts with an unknown function consists of discs with a central perforation (25-27) and perforated objects (24.)

a chronological sequence for it. Such a sequence has been established for the pottery of the Hilversum culture.¹¹ The earliest pottery of this sequence is decorated with a few rows of cord impressions beneath the rim and often has a cordon bearing finger-tip impressions on the shoulder. Another early feature of this pottery is the occurrence of horseshoe-shaped handles of the same kind as encountered on the Early Bronze Age pottery of northern France and Britain (fig. 17.5).¹² Other ornamental motifs besides cord impressions adorning the Hilversum pottery and also the Drakenstein pottery are fingernail and reed or bone impressions (fig. 17.6). The cord impressions below the rim disappeared around 1600 BC, when a barrel-shaped Drakenstein type decorated with a cordon bearing finger-tip impressions became the prevailing pottery type. Pots had been decorated in this fashion since c. 1800 BC already, but this form of decoration remained popular for far longer than the cord impressions, i.e. until in the Late Bronze Age.¹³ There is also a category of vessels without any form of decoration, which, when encountered in

graves, tend to be more bucket-shaped. Glasbergen was of the opinion that this type of pottery, which he called 'Laren ware', marked the end of the Middle Bronze Age sequence,¹⁴ but evidence obtained in settlement research has proved this to be untrue. Laren ware, defined as undecorated Middle Bronze Age pottery, can consequently not be used as a basis for dating settlement remains.

After the colonisation phase, around the end of the Middle Bronze Age, a native style of pottery evolved in Westfrisia, which has been called 'Hoogkarspel ware' (fig. 17.7).¹⁵ The manufacturing techniques of this pottery were much the same as those used elsewhere in the Netherlands, but the range of types is much wider and the decoration differs. Characteristic of the Hoogkarspel ware of the Late Bronze Age in particular are the finger-tip impressions covering the entire surface of the pot. The settlements of Westfrisia also yielded large numbers of spindle whorls, which are fairly rare at contemporary settlements outside this area, and conical objects whose function is still a mystery.

Funerary pottery and settlement pottery

Brief reference has already been made to the contexts in which the different categories of pottery have been found. Beakers with short wave moulding, pot beakers and barbed wire beakers are conspicuously absent in graves. On the other hand, the thin-walled beakers cannot be classified as typical funerary pottery as they have been encountered both in graves and in settlements. Indeed, they represent a large proportion of the pottery found in settlements.¹⁶ The fact that thin-walled beakers are found in graves whereas beaker pots are not is in our opinion associated with a difference in function, the latter having been used mainly as kitchen ware and the former as tableware. If this interpretation is correct, the beakers that were placed in the graves may very well have contained foodstuffs or beverages, possibly intended to be consumed by the deceased on their journey to the other world. Indeed, some beakers found in graves still contained remains of food.¹⁷ Pot beakers are sometimes found outside the actual grave, on the old surface beneath the mound or at the edge of the mound. Many pot beakers had been buried upside down, probably according to a burial practice that differed in some respects from the common practice known to us.

The pottery from the Middle Bronze Age shows no such difference between funerary and settlement ware. In the northern Netherlands the deceased were only rarely accompanied by pottery in that period and in the central and southern parts the same type of pottery as used in the settlements was also used for the burial of cremated remains. This shows that views on the burial of the deceased had changed in the course of the Early Bronze Age.

METAL PRODUCTION

Metalworking was certainly not invented or even anywhere near the Low Countries.¹⁸ The cradle of metalworking lies somewhere on the other side of Europe or in western Asia: in the ore-bearing Balkans and on the other side of the Bosphorus in Anatolia. The oldest metal objects found in those areas – mainly beads and other ornaments – date from the 8th or 7th millennium BC. Metal tools and weapons made from hammered and cast copper were in common use in the Near East from the 4th millennium onwards. In the Low Countries, objects of metal (copper and gold) did not start to be produced until c. 2300 BC; they are associated with the

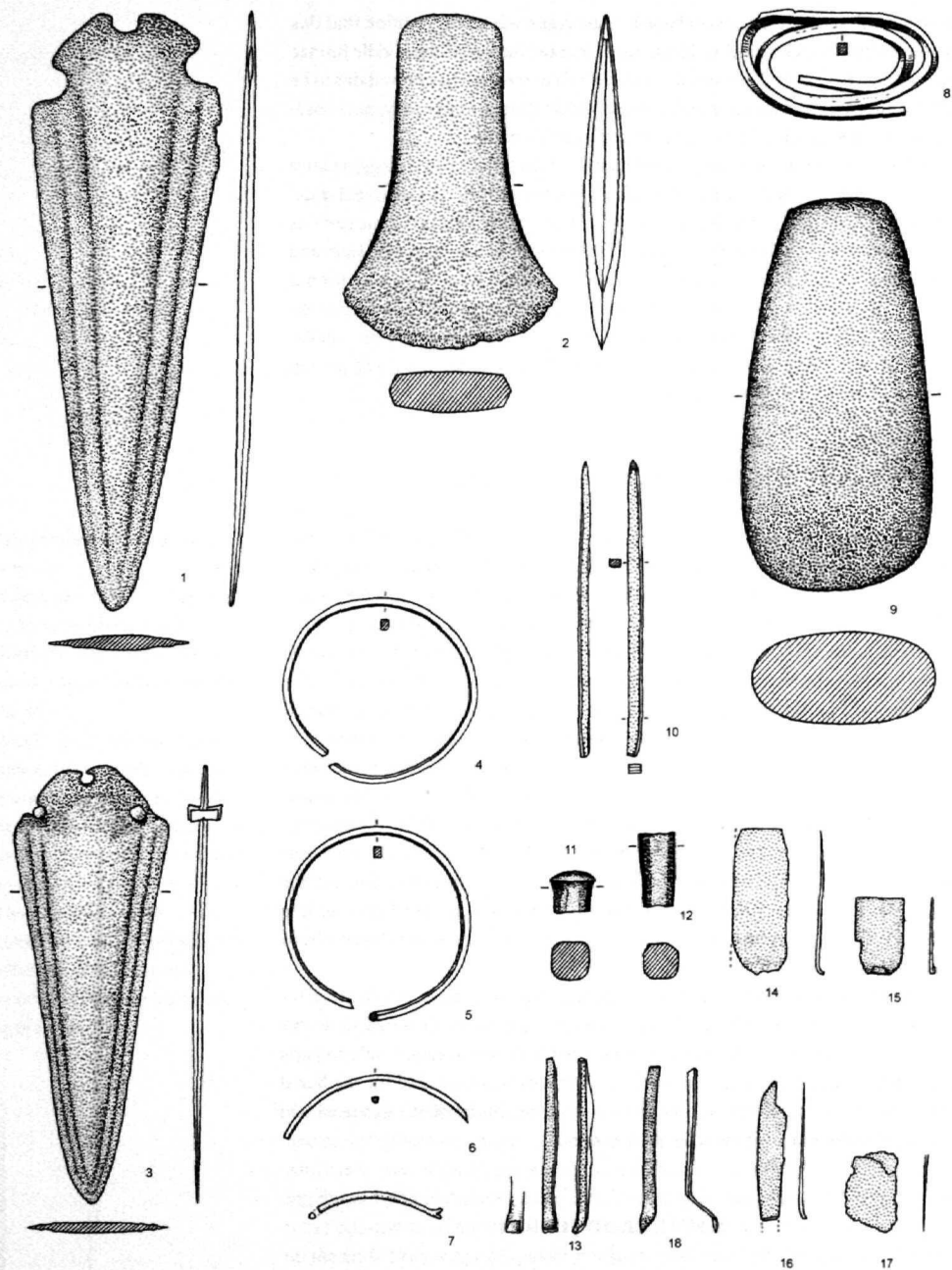


fig. 17.8

The Wageningen hoard, comprising objects made of copper and a stone axe, was deposited early in the Bronze Age in the Veluwe area, near the Rhine at Wageningen. The hoard was initially assumed to represent a travelling bronze smith's possessions. Although the concept of travelling smiths has

meanwhile been largely abandoned, we do not have a good alternative explanation for this unique deposit. Scale 1:2.

1 halberd
2 flat axe
3 dagger

4-5 bracelets
6-8 copper waste fragments
9 stone axe
10 awl
11-12 unfinished halberd rivets
13-17 copper waste fragments

Bell Beaker culture.¹⁹ The earliest metal hoard found in the Netherlands is that of Wageningen (c. 1900 BC). Besides unfinished rivets and bits of scrap, it contained various weapons and tools (flat axe, awl, dagger, halberd) and a few bracelets (fig. 17.8). They may have been produced locally from various types of copper imported from Central Europe.

Ore deposits and their exploitation

Copper

The earth's liquid core contains numerous metals. Via cracks in the earth's crust they flow to the surface, where they solidify, incorporated in for instance quartz and other igneous rocks. Prehistoric prospectors will probably have recognised outcrops of metallic veins by the white colour of the quartz and the bright colours of the oxidised metals. They indicated the places where the ore – the metal-bearing rock – could be exploited in open workings. When the parts of a vein close to the surface were exhausted, shafts had to be dug (shaft mining). At points where veins were intersected by running water the metals could be extracted by panning of gravels in the streambed. Sedimentary rocks, such as sandstone and limestone, sometimes also contain exploitable concentrations of copper ore, leached from the original veins. The first metal objects ever produced were manufactured from such readily accessible native (= pure) or oxidized ores obtained from outcrops.

Native copper ore and copper oxides found at the surface first had to be pounded with hammer stones to remove the adhering soil and rock. Then the metal-bearing components were ground with the aid of a grinding stone. The oxides were then mixed with charcoal and were reduced in a furnace by heating them to a temperature far above the melting point of copper (1083 °C). That necessitated the use of bellows, without which such a high temperature cannot be obtained.²⁰ Ores mined from deeper veins had to be subjected to additional processing because they usually contained sulphides. The sulphur had to be removed by roasting the ore in an open fire (artificial oxidation). Only after the release of this sulphur (in the form of volatile sulphur dioxide) could the ore be mixed with charcoal and reduced to pure or almost pure copper in a furnace.

A sulphide ore that was frequently used in the Bronze Age is the golden chalcopyrite. One of the main sources of this ore was the Mitterberg, to the south of Salzburg in Austria, where it was mined in deep shafts. So-called *Fahlerz* (brown or grey sulphuric copper ores) was also frequently used.

Other indications of prehistoric mining besides those in Austria (in particular on the Mitterberg) have been found in Spain (Rio Tinto), southern France, northern Italy, Ireland (in particular Mount Gabriel in County Cork), England, Scotland, Wales, Yugoslavia (Rudna Glava), Bulgaria (Aibunar), Anatolia, Cyprus and the Negev desert (Timna).²¹ All these sites have been at least summarily investigated.

Tin, lead, silver and gold

Tin is much rarer than copper. Pure tin is usually reduced from tin ore (mainly cassiterite, SnO₂). Tin ore was won by panning the sand and gravel of stream beds, which had eroded from quartz and granite veins.²² The tin that was – primarily or secondarily – used for the bronze objects that have come to light in the Low Countries is believed to have come from Cornwall and Devon. Objects of pure tin are rare. Well-known are the tin rivets that adorned the horn handle of an Early Bronze Age dagger found at Barger-Oosterveld (plate 28) and the tin beads which were found together with beads of faience and amber at Exloërmond (see below, plate

27B).²³ Both of these finds were recovered from the peat in Drenthe.

Lead and silver were used to manufacture objects in only a few areas in the Bronze Age (lead tableware is known to have been used in Anatolia, while silver objects have been found in Spain and other areas). No objects of these metals have so far been found in the Netherlands.

Gold does not oxidize and occurs exclusively in the native form. As it is also very easy to work, it was one of the first metals to be exploited by man. Being a very heavy metal, it could easily be separated from other types of stone in stream beds by panning. Gold does not become hard when hammered and does therefore not have to be annealed. It can be hammered endlessly and can easily be transformed into gold wire or gold sheet for the manufacture of ornaments, but it is far too soft for tools. The chief sources of gold in prehistoric times were in Transylvania and Ireland; gold was also found in some rivers, such as the Rhine.²⁴

The composition of copper and bronze artifacts

Pure copper can be easily forged, but becomes hard and brittle when it is hammered. It can be made softer again by heating it (what is known as 'annealing'). By subjecting copper to alternating hammering and annealing one can shape it into ornaments, but also tools and weapons, providing they are relatively small and of simple design. Larger and more complex objects can be made by melting copper and then casting it into moulds. However, cast pure copper is soft and absorbs a good deal of oxygen, which makes it porous. It then has to be hammered for a long time. In spite of these disadvantages, large quantities of objects were made from pure or almost pure copper in the heydays of early metallurgy. They included both hammered objects and heavy, cast objects such as axes, hammer axes, chisels and battle axes.

By mixing copper with certain other minerals or metals, such as arsenic,²⁵ tin or lead – small amounts of which are sometimes already present in the ore – a so-called alloy is obtained, which is not only harder, but also less porous after casting. The mixture moreover has a lower melting temperature.

In the third millennium in particular much use was made of arsenical copper. Experimental research has shown that this type of copper can without any great difficulties be smelted directly from arsenical oxidized copper ore. Arsenical copper was used for manufacturing all kinds of objects, including tools such as flat axes, daggers and halberds and ornaments such as beads and pendants, in a very wide area, extending at least from Anatolia and the Caucasus to northern Germany, Poland and Denmark.

In what has been called the 'experimental period', c. 2500-1700 BC, more complex metal compositions started to be used all over Europe. It has been suggested that these new types of metal were a consequence of the development of shaft mining in zones of unoxidized, sulphuric primary ore. Besides copper, the ores from these zones contained other metals, too, such as arsenic, antimony, silver, nickel or combinations of those metals. Sometimes they were present in such concentrations as to give the copper the properties of bronze. A well-known example is the copper of the so-called 'Singen type', which was also used widely in the Netherlands in the Early Bronze Age.

Around 1700 BC tin-bronze – which is almost always an artificial alloy, because tin and copper rarely occur together in a natural form – became the standard alloy in the whole of Eurasia; it was to remain the most important metal for tools, weapons and ornaments until the emergence of iron technology heralded the end of the

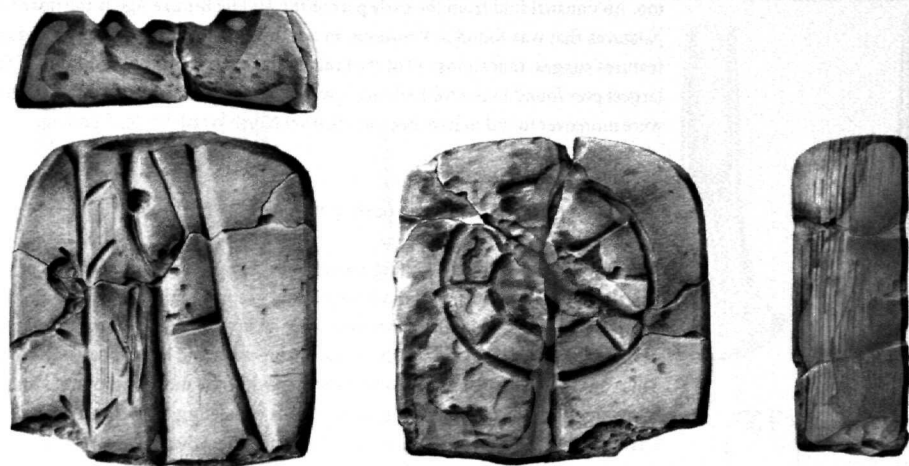


fig. 17.9

In 2001 part of a unique bipartite mould of a special fabric was found in a settlement pit near Oss (Horzak). One side contains the negative of a type of palstave with 'parallel sides', which Butler identified as native on typological grounds. That same side also contains the negatives of three tanged arrowheads which are sporadically found in rich graves. The other side contains the negative of a wheel-headed pin of a type of which two were found in a rich grave at Weerdinge and three more in the southern part of the Netherlands (see fig. 19.15). It was hitherto assumed that these objects were all imports. Scale 1:2.

Bronze Age, around 800 BC. The bulk of the tin that was used in prehistoric times is believed to have come from the southwest of Britain (Cornwall and Devon).²⁶ Between c. 1000 and 700 BC this tin was mixed with lead in some parts of Europe (e.g. southern Britain, Switzerland; in northern Wales from c. 1400 BC onwards). An alloy of bronze with tin and lead produces objects that are less hard than those of tin-bronze, but it flows better, which means that it fills the mould more easily.

It is interesting to observe the consequences of these developments in the Netherlands; as there are no natural ore deposits in the Netherlands, all the metal found here must have been imported.²⁷ The metal was probably imported in the form of finished objects or as scrap that could be melted down.

The early use of pure copper must have passed the Netherlands by completely; only one possible example of the use of pure copper has so far been attested. Arsenical copper has been found in the Netherlands mainly in the form of tanged daggers and other objects recovered from graves containing Late Neolithic bell beakers.

The Early Bronze Age hoard of Wageningen also included objects of arsenical copper (a dagger and a halberd) and of 'experimental' types of copper, but no tin-bronze. The earliest tin-bronze proper that has so far been found in the Netherlands is that of the low-flanged axes of British-Irish type and workmanship which came to light in the central part of the country. They were apparently imports. The native low-flanged axes of the Emmen type, which are encountered mainly in the northern parts of the country, consist largely of 'experimental' metal from Central Europe, in particular Singen metal.²⁸

Around 1600-1500 BC tin-bronze became the standard alloy in the Netherlands

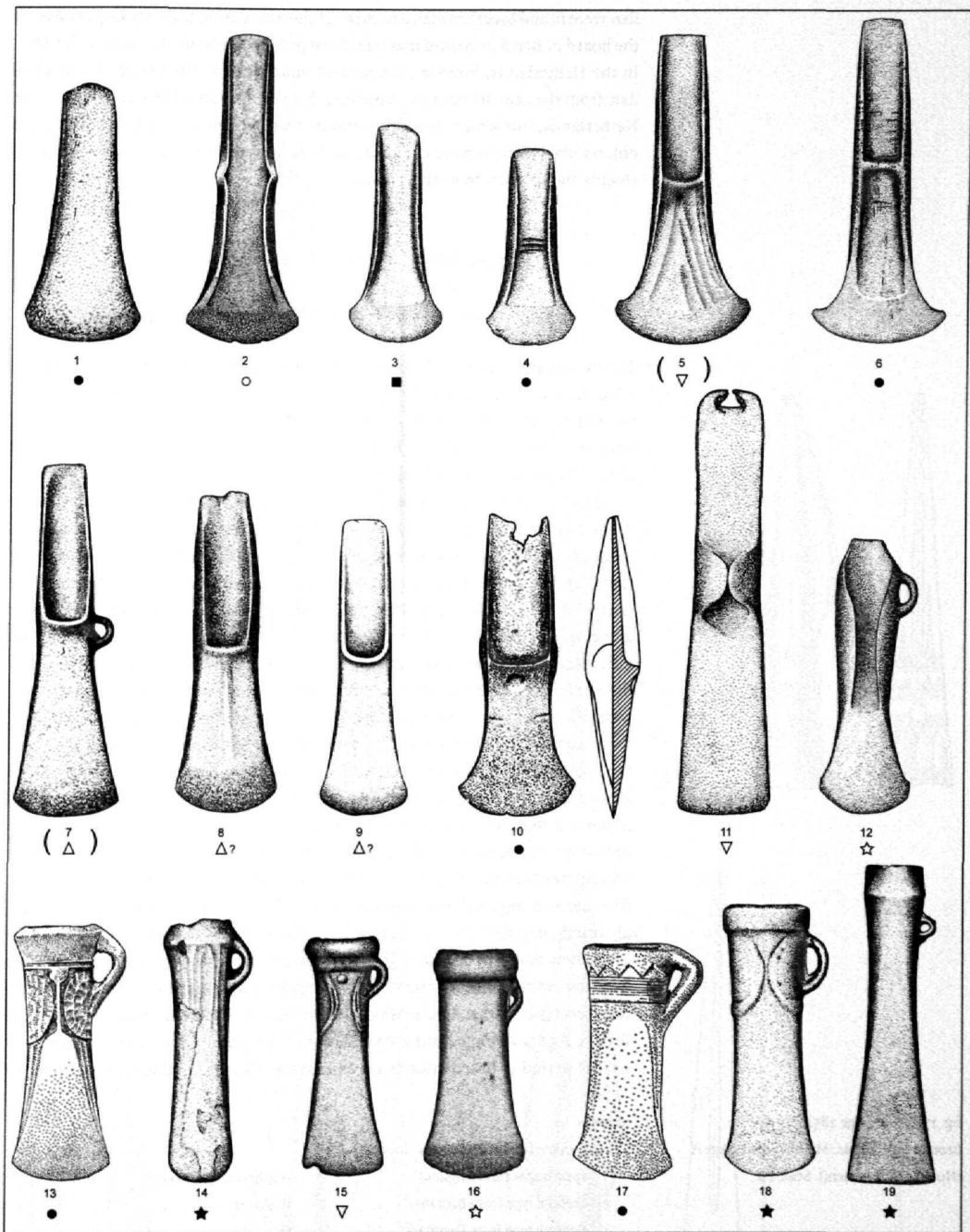
too. An unusual find from the early part of the Middle Bronze Age is the hoard of palstaves that was found at Voorhout, in South Holland (plate 27A). Typological features suggest that almost all of the nineteen palstaves of this hoard – one of the largest ever found in the Netherlands – were imported from northern Wales; they were moreover found to have been made from North Welsh tin-lead bronze.

Casting methods

A great variety of different casting methods were developed in the course of the Bronze Age. The simplest method, which was used at a fairly early date already, entailed pouring metal into a cavity hollowed out in a stone. A major disadvantage of this method was that the cooling metal absorbed air and hence became porous. This could be prevented by covering the mould while the metal was poured into it. More complex objects could be cast in moulds consisting of two parts, in which shallow grooves were cut for the release of air and gases where necessary (fig. 17.9). Such moulds were made from heat-resistant types of stone, clay or even bronze. Any cavities required in the finished object, for example sockets, were created by placing moulded clay cores in the mould. Highly complex objects, finally, such as certain ornaments, figurines and ritual objects, were made by first modelling the desired object in wax. Wax can be easily modelled when warm and becomes hard when left to cool. The wax model was covered with clay and baked, during which process the wax melted and flowed from the mould. The cavity thus obtained was filled with molten metal, which was left to cool, after which the clay mould was broken away from the metal casting. This method, which is known as the lost wax, or *cire perdue*, technique, was being used for the manufacture of complex ritual and prestige objects in Israel around 3000 BC already.²⁹ The two small *cire perdue* bulls

fig. 17.10
Survey of various types of bronze axes that were common in the Netherlands in the Early and Middle Bronze Age. Scale 1:2.5.

Early Bronze Age 2000-1800 BC	flanged axe	1	low-flanged axe, Emmen type
Middle Bronze Age A 1800-1500 BC	flanged axes	2	<i>geknicktes Randbeil</i> , Sögel type
		3	high-flanged axe, Oldendorf type
		4	high-flanged axe, Oldendorf type Ekehaar variant
		5	Plaisir type
Middle Bronze Age B 1500-1100 BC	stopridge axes	6	Vlagtwedde type
		7	wide blade, West European type
		8	regional type, with narrow midrib
Middle Bronze Age B (2nd half) 1300-1100 BC	palstaves	9	'plain' palstave
		10	arches on the side
Middle Bronze Age B (2nd half) 1300-1100 BC	winged axes	11	mid-winged axe (Grigny type)
		12	high-winged axe
Late Bronze Age 1100-800	winged axe	13	with imitation wings in relief
		14	Helmeroth type
		15	Plainseau type
		16	Wesseling type
Late Bronze Age (1st half) 1100-900 BC	socketed axes	17	with sawtooth decoration
		18	Nedermaas type
Late Bronze Age / Early Iron Age 900-600 BC	socketed axe	19	Geistingen type



■ common type
 ● local type of the northern Netherlands
 ○ import, predominantly in the northern Netherlands

★ local type of the southern Netherlands
 ☆ import, predominantly in the southern Netherlands, from western Germany

▽ import, predominantly in the southern Netherlands, from northern France
 △ import, predominantly in the southern Netherlands, from western Europe

that were found together with a number of flat axes dating from the Copper Age in the hoard of Bytyń in Poland may have been produced around that same early date. In the Netherlands, however, the earliest indications of the use of this method date from the Late Bronze Age. A method that seems to have been used little in the Netherlands, but which was quite common elsewhere, involved manufacturing objects like bowls, copper cauldrons and buckets and weapons such as armour, shields and helmets from sheet metal.

METAL OBJECTS IN THE LOW COUNTRIES

Weapons, tools and ornaments of copper and bronze (plate 28)

The two copper coiled beads that were recovered from the hunebed of Buinen and a few stray finds of copper flat axes are believed to be the oldest metal objects so far found in the Netherlands. As the results of the analyses of the metal of these objects are rather ambiguous, it is however not clear whether they were produced in the TRB period or in the Early Bronze Age.

In total, about 2400 prehistoric copper and bronze artefacts have been found in the Netherlands. Only a relatively small number of these finds were recovered from graves. Rich graves are rare in the Low Countries; the few that have been found are moreover relatively poor when compared with the rich Bronze Age graves of Wessex (GB) and Brittany (Fr) or with the lavish Middle Bronze Age graves of Central and Northern Europe with their wealth of luxury objects. This difference may be due to a shortage of bronze in the Low Countries. However, the cause may also be of a more ideological nature: in some periods metal objects were *not buried along with the deceased, but were removed from circulation in a different manner*. The fact that a large proportion of the metal artefacts known in the Low Countries was recovered from rivers and swamps suggests that in these areas depositing objects in such watery contexts may have been considered more important than burying them in graves in the Bronze Age.³⁰ Bronze objects are only very rarely encountered in settlements in the Low Countries and no evidence whatsoever of bronze production (smiths' workshops) has been found, although a few Late Neolithic bell beaker graves have yielded hammers, anvils and other metalworking implements of stone (Lunteren, Soesterberg, Beers-Gassel, plate 25A). They show that copper and/or gold were already being worked in the Netherlands and that smiths were respected in those early days of metalworking. One of the few direct proofs that bronze was being worked in the Netherlands in the Middle Bronze Age is a single bronze mould; our assumption of a local bronze industry in that period is based entirely on typological evidence obtained in attempts to

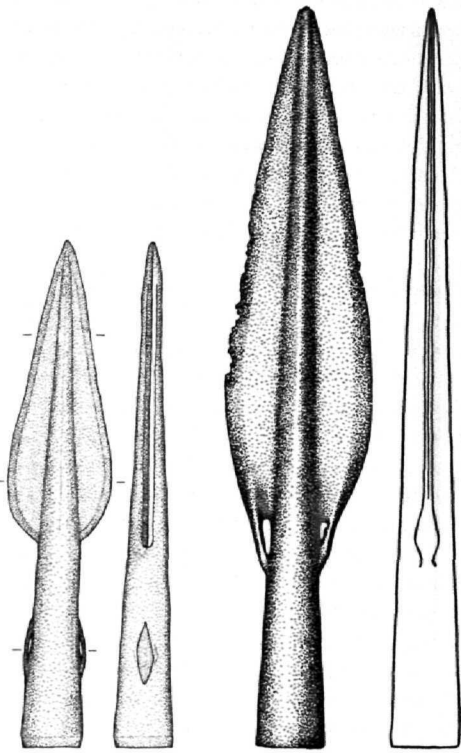
fig. 17.11 (see page 385)
Bronze spearheads. Middle Bronze Age A
(No. 4) and B (others). Scale 1:2.

imports

- | | |
|---|----------------------|
| 1-2 socketed-looped and basal-looped
spearheads from England | Veldhoven, Onstwedde |
| 3 Tréboul type from Brittany | Witharen |
| 4 Bagterp type from Denmark | Overloon |
| 5 British socketed-looped, secondarily
'continentalized' by filing off the loops
and drilling peg-holes | 's-Hertogenbosch |

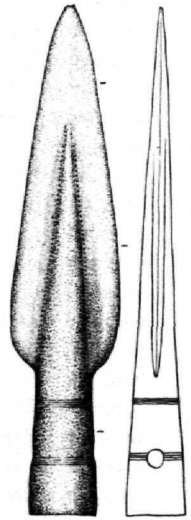
regional types

- | | |
|--------------------------|----------------------------------|
| 6 flame-shaped spearhead | southern part of the Netherlands |
| 7 'common' spearhead | all over the Netherlands |



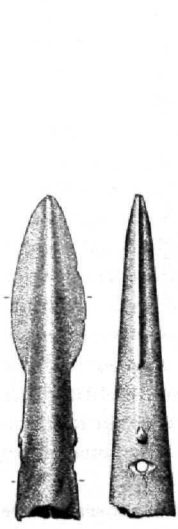
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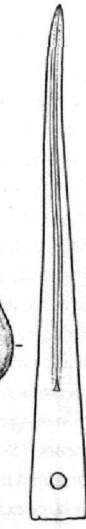


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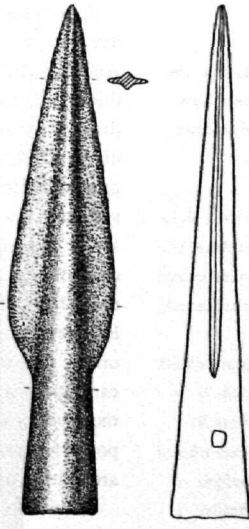
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5



6



7

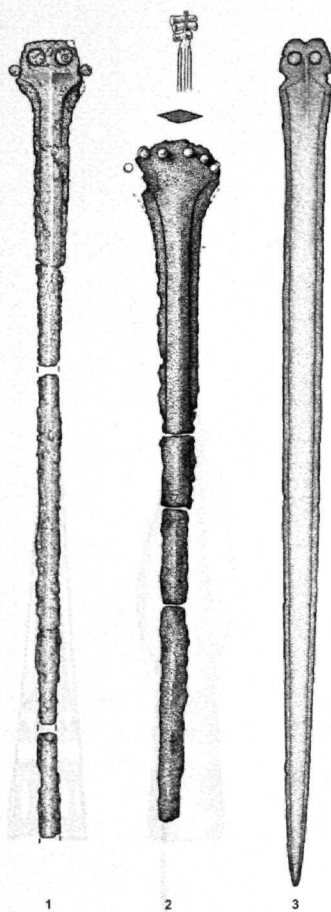


fig. 17.12
Middle Bronze Age rapiers from burials. The Meteren rapier was associated with at least two bronze arrowheads (fig. 17.16) and two bronze needles or awls. Scale 1:4.
1 Velserbroek (see fig. 19.6)
2 Zwaagdijk
3 Meteren

identify types that are absent or rare in other areas. In actual fact, the range of types that may have been produced in the Netherlands is only small. The majority of the approximately 900 axes that have so far been found here were produced locally (fig. 17.10). Regional differentiation is observable from the Early Bronze Age onwards. The British type of low-flanged axes are encountered mainly in the central part of the Netherlands, on both sides of the major rivers. The largest distribution area of the Emmen axes, which bear the closest resemblance to low-flanged axes from Westphalia, is in the northern part of the Netherlands. On the whole, there is a great difference between the flanged axes and palstaves of Middle Bronze Age date that have been found to the north of the major rivers and those that have been found further south: whereas the northern axes resemble types encountered in northwest Germany, those from the south are more like types found in England, Belgium and northern France.³¹

A second important category of bronze artefacts (7% of the total amount) is that of spearheads (fig. 17.11). They vary tremendously in size, from very small to extremely large specimens. The latter were almost certainly prestige objects. The spearheads found in the Low Countries are almost all socketed and have two holes through which pegs could be inserted to secure the spearhead to the shaft. The British basal-looped type of spearhead has been found only rarely. The 42-cm long basal-looped spearhead that was recovered from the peat at Exloërmond in Drenthe (plate 28) was almost certainly used for ceremonial purposes.³² The socket loops of a smaller specimen from 's-Hertogenbosch had been removed and replaced by holes for pegs.³³ A few spearheads were imported from Scandinavia, for example the decorated spearhead from the hoard of Overloon.³⁴ Most spearheads are however so standardised that little can be said about their origins.

Few other types of bronze weapons have been found in the Netherlands. A few small copper daggers are known from the bell beaker period, but they are too small to be classed as weapons. An unusual find is the Early Bronze Age dagger with a horn handle decorated with copper and tin rivets that was found in the Barger-Oosterveld peat near Emmen.³⁵ Early Bronze Age daggers of flint (some of which were imported from Denmark or Schleswig-Holstein) are more common in the Netherlands than copper daggers (fig. 17.20).³⁶

Rapiers were not to become popular until around the end of the Early Bronze Age (fig. 17.12). The earliest examples are associated with graves of the Sögel-Wohlde tradition, which are predominantly rich male graves. The richest grave of this tradition, which was centred around Lower Saxony and Schleswig-Holstein, is that which was found at Drouwen in Drenthe (fig. 19.11). In the course of the Middle Bronze Age the rapiers became longer, evolving into swords proper, and were produced in greater numbers. Most swords from this period were found in rivers or swamps; a few exceptional finds come from a hoard (Overloon) or from graves (fig. 17.13). Of special importance are two recent grave finds, brought to light in rescue excavations, containing long rapiers imported from southern Germany. One of these, from a plank-lined inhumation burial in a dune at Velserbroek, North Holland, had, in addition to the long rapier, a decorated palstave-axe of North German origin, probably a prestige axe rather than a chopping tool, and three gold wire earrings or hair-rings. These finds support the impression that in the Netherlands there were in the Middle Bronze Age warriors who were able to acquire scarce imported weapons and ornaments.³⁷ Some of the rapiers (those of the Rosnoën type) are believed to have been imported from western France (fig. 17.14).

From a few exceptionally large examples we know that swords also served some ceremonial function; they were too large to have been used for the usual purposes. A noteworthy example is the excessively large sword that was deposited in a

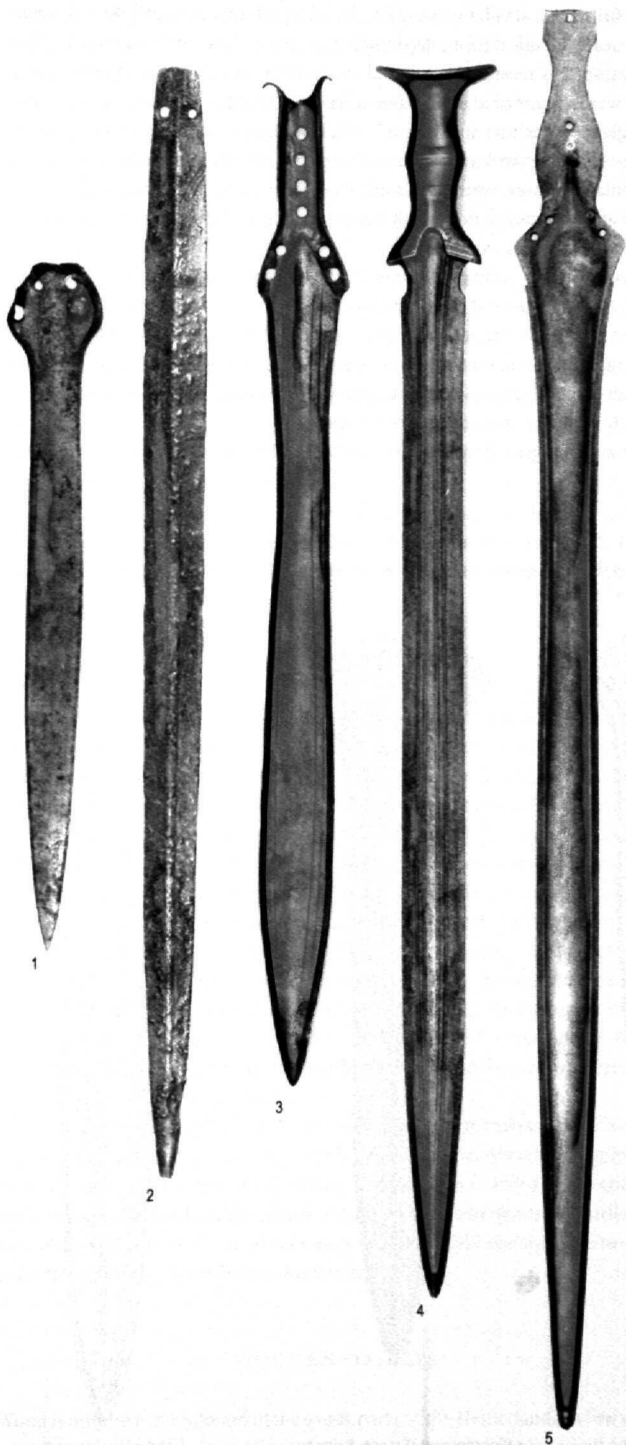


fig. 17.13

Rapiers and swords dating from the Middle and Late Bronze Age from the (southern) Netherlands, all dredged up from the river Meuse. Scale 1:3.

Middle Bronze Age

- | | | |
|---|----------------|--------------|
| 1 | Wohlde rapier | Venlo |
| 2 | Rixheim rapier | Stevensweert |

Late Bronze Age

- | | | |
|---|-------------------|---------|
| 3 | Griffzungen sword | Venlo |
| 4 | Vollgriff sword | Tegelen |

Early Iron Age

- | | | |
|---|------------------|-------|
| 5 | Gündlingen sword | Venlo |
|---|------------------|-------|

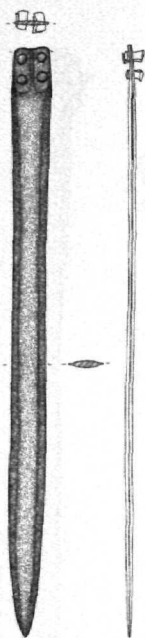


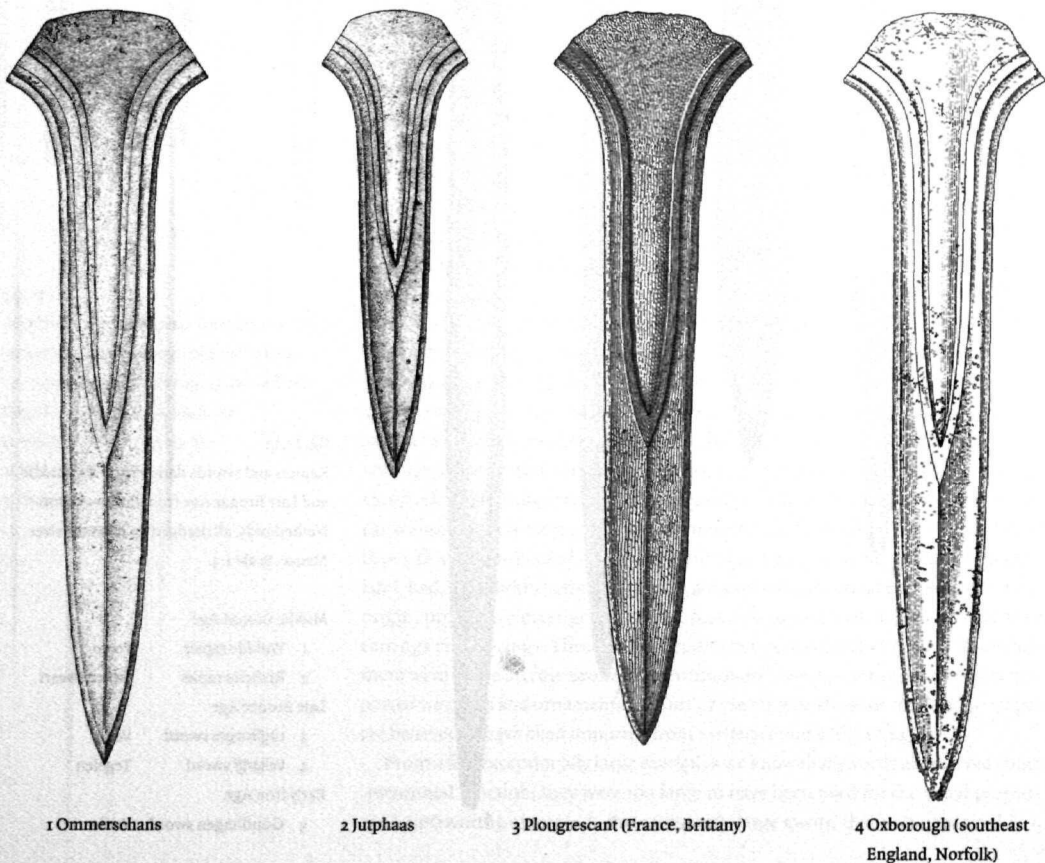
fig. 17.14
Sword of the
Rosnoën type, found
in the valley of the
brook the Aa near
Den Dungen (N.Br.).
Scale 1:5.

swamp near Ommerschans along with other bronze objects, including a razor of Sicilian or Aegean origin.³⁸ An exact parallel of this sword is known from Plougrescant in Brittany; a smaller version was found near Jutphaas (plate 28).³⁹ A sword of very nearly identical form, decoration and size as those of Ommerschans and Plougrescant has recently been found in southeast England (fig. 17.15).⁴⁰ These objects were all produced in the same workshop (whether in Brittany or in southern England is unclear) and were all unfit for normal use. Apparently there was some exchange network via which such prestige objects, intended exclusively for ceremonial purposes, were circulated. The results of the metal analyses suggest that the aforementioned excessively large spearhead of Exloërmond (plate 28) was produced in the same workshop.

In several graves in Drenthe (Sleenerzand, Hijken-Hooghalen, Vries) and in the Betuwe (Meteren) as well as settlement sites in the Betuwe (Meteren, Eigenblok) bronze arrowheads (tanged or barbed-and-tanged) have been found (fig. 17.16). These finds show that for the Bronze Age society the bow and arrow continued to be an important weapon, whether for warfare or hunting, or both, throughout the Middle Bronze Age (see note 52 and feature L).

Bronze ornaments from the Early and Middle Bronze Age are rare in the Neth-

fig. 17.15
Ceremonial swords, apparently all by the same maker. Scale 1:4.



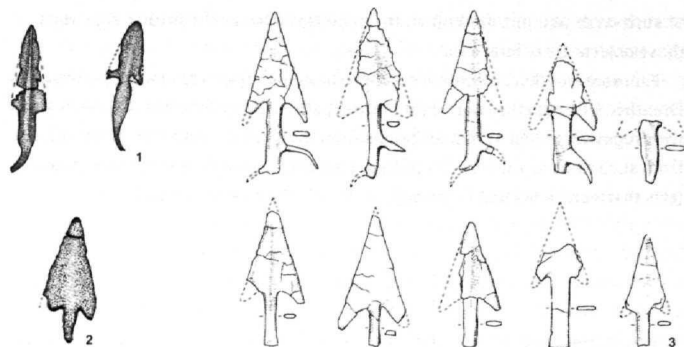


fig. 17.16
Bronze arrowheads from Middle Bronze Age
burials. Scale 1:2.

- 1 Meteren-De Bogen
- 2 Geldermalsen-Eigenblok
- 3 Hijken

erlands. They are found mainly in graves, which are for that reason interpreted as female graves. One of the few examples of such rich female graves found in the Netherlands is that of the 'Weerdinge Lady', which yielded a string of amber beads, a bronze bracelet and four pins, including two with wheel-shaped heads. What makes this grave so unusual is that it contained a combination of objects that would cause no surprise in northern Hessen or Thüringen, but is in fact highly exceptional in the Netherlands. This led Butler to conclude that the 'Weerdinge Lady' was actually a 'Lady from Hessen', who had married a native chieftain.⁴²

Gold ornaments

Among the bell beaker grave goods found in the central part of the Netherlands are a few ornaments made from lengths of gold wire whose ends had been flattened and then decorated with impressions. They include a pair of earrings (or lock rings?) from Beers-Gassel and a diadem from Bennekom. These ornaments may have been produced locally with the aid of stone tools of the kind known from Lunteren, Soesterberg and Beers-Gassel. Similar gold objects are also known from the British isles, Central Europe and Poland. A few Middle Bronze Age graves, for example at Drouwen and Hijken (Drenthe) and Velsbroek, yielded coils of single or double gold wire which were used as hair or ear ornaments. A necklace of four such double wire coils was found at Susteren. However, not one of the early gold finds recovered in the Netherlands is as rich as the exceptional treasure that was found in the peat near Lorup, in Emsland, just across the German border. Besides an amber bead, this deposit included no fewer than 34 gold coiled wire beads and pendants and two gold bracelets.⁴³

All of the aforementioned gold objects that have been analysed were found to contain different amounts of silver, varying from 7% (Bennekom) to approx. 20-25% (Drouwen). This silver was probably not deliberately added to the gold, but accidentally mixed with it during the panning. In the Netherlands, the earliest objects of cast gold that also contain amounts of copper, deliberately added to obtain a harder metal, date from the Late Bronze Age.

WOODEN OBJECTS

Wood is only very rarely found in the sandy parts of the Netherlands. A few wooden objects have been recovered from deep wells or pits, but as only a small number

of such wells and pits are known from the Neolithic or the Bronze Age, most of those objects are of later date.

Far more wooden objects have come to light in the peat regions, in particular in Drenthe. Although they were unfit for occupation, the raised bogs of these regions were regularly visited by human beings from the Neolithic onwards. This we know from such finds as the remains of bog trackways, a temple and the numerous objects that were deposited in the bogs, some of which were of wood.

Disc wheels

A remarkable category of bog finds is that of the solid wooden disc wheels, which date from a late phase of the Single Grave culture, c. 2500 BC. In total, fifteen specimens have been found in the peat of Drenthe (see fig. 16.1).⁴³ Almost all of these wheels had been made from a single piece of oak, which is why they are called 'disc wheels'. They were split vertically from the tree-trunk and were then shaped with the aid of adzes and hollowed out so as to create a raised hub at the centre.⁴⁴ At Midlaren an unfinished specimen was found, in which the hole for the axle had not yet been made.

Exactly how these wheels were used is not entirely clear. For example, we do not know whether they were mounted under two- or four-wheeled wagons, how the wagons were drawn or whether the wheels rotated with the axle or around it. The well-finished round hubs and the absence of a hole for a locking pin led Van der Waals to conclude that the wheels rotated around the axle.⁴⁵ Both two- and four-wheeled wagons were used in this period, so the wheels may have belonged to either.⁴⁶ It is generally assumed that the wagons were drawn by a pair of oxen, as illustrated by the copper statuette from Bytyń. Horses were not yet used as draught animals in those days.

Another interesting question is why the wheels were deposited in the bog within a relatively narrow time span. An obvious answer would be that they were dumped there, having become unfit for further use. However, only one of the wheels was found near a bog trackway (Nieuw-Dordrecht); several, including the unfinished specimen, had been deposited at quite a distance into the bog. That suggests that the wheels were votive deposits. Objects had been deposited in the bogs for many centuries already and this practice continued unchanged in the Bronze Age and Iron Age. Although only few votive deposits of the Single Grave culture are known, it is likely that the disc wheels recovered from the peat are to be classified in this category.

Bows, axe shafts and a 'hockey stick'

Various other wooden objects besides wheels have been recovered from the peat. Some of these are of help in completing the picture based on the stone objects recovered from other contexts: male graves of the Single Grave or Bell Beaker cultures sometimes yield stone shaft hole axes, arrowheads and hammer axes, but hardly ever the wooden shafts or bows with which they were buried. Those missing wooden parts have sometimes survived in peat. Two wooden bows are at present known, one from an unknown context near Noordwijk (De Zilk), the other from the peat near Onstwedde.⁴⁷ Only the latter bow is still intact; it is 1.70 m long and dates from c. 2500 BC. The bow from Noordwijkerhout, whose ends are missing, is believed to date from the Early Bronze Age.⁴⁸



fig. 17.17
Stone hammer axe with
a 70-cm-long handle
of rowan wood that
was found in a bog at
Emmercompascuum.
Scale 1:6.

Two other interesting wooden objects came to light during the excavation of the Late Neolithic bog trackway of Nieuw-Dordrecht: an adze shaft and a piece of wood that had been shaped into a kind of blade at one end, rather like a hockey stick.⁴⁹ It is difficult to determine the function of the latter artefact. Bottema, referring to ethnographic parallels, suggested that it may have been used to swat spawning fish, which often swim in shallow water.

Another rare find is the shafted hammer axe from Barger-Compascuum (fig. 17.17).⁵⁰ The 70-cm-long shaft was made of rowan wood. It projected through the perforated end of the hammer axe, which was not secured to the shaft. This find shows that hammer axes were used in very much the same way as stone axes, i.e. for slashing or cleaving. Whether they were indeed also used as weapons, as the frequently used term 'battle axe' suggests, is difficult to say. In view of their particular shapes and the fact that they were buried as grave goods, it is assumed that the hammer axes of the single-grave and Bell Beaker cultures were indeed also used as weapons.

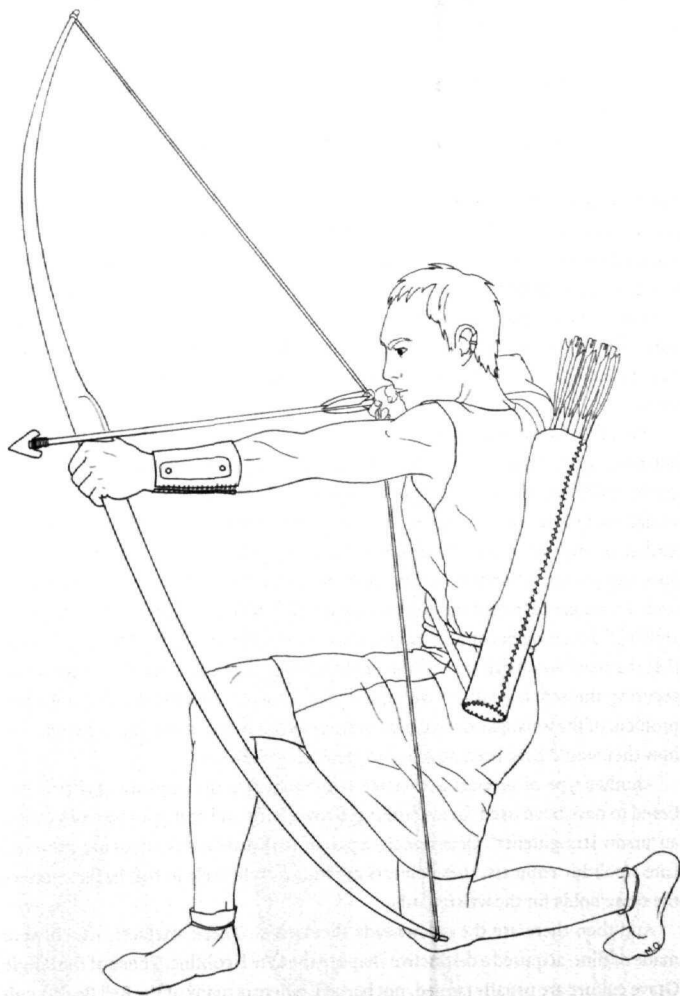


fig. 17.18

An archer of the Bell Beaker culture with a 'wristguard'. Contrary to the traditional interpretation, the stone 'guard' was probably a form of decoration worn on the outside of a leather wristband, which was the actual wrist guard. It was fastened to the leather guard with a thong or bronze rivets.

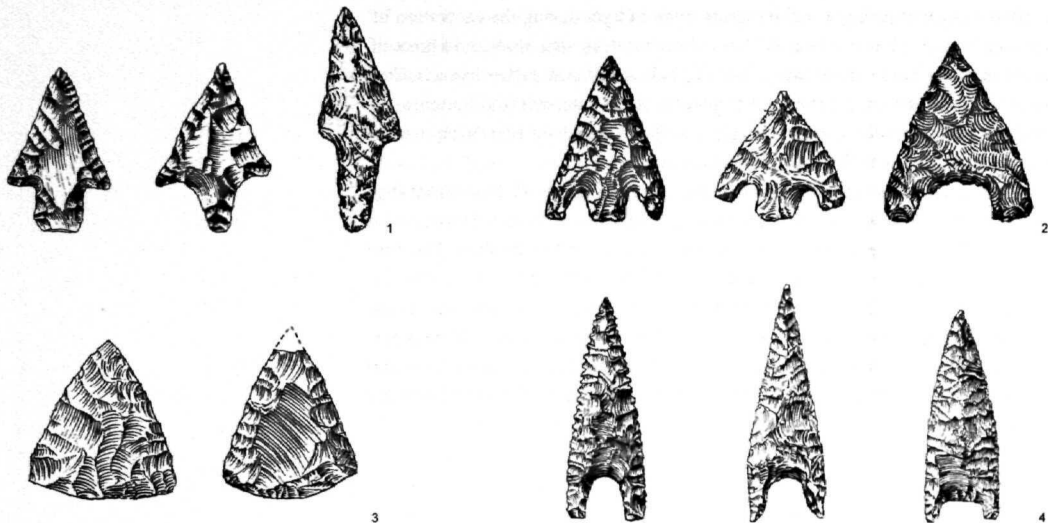


fig. 17.19

flint arrowheads from the Late Neolithic and the Early and Middle Bronze Age. Actual size.

- | | | |
|---------|----------------------|------------------------|
| 1 | Vlaardingen group | Hekelingen III |
| 1 right | Single Grave culture | Wijnjeterp |
| 2, 3 | Bell Beaker culture | Ede,
Ginkelse Heide |
| 4 | Middle Bronze Age | Drouwen |

WEAPONS, TOOLS AND ORNAMENTS OF STONE

Arrowheads and wristguards: the archer's equipment

The grave goods of the tribal communities of the Late Neolithic and the (Early) Bronze Age include a high proportion of objects of a distinctly warlike nature. Many of the deceased of the Bell Beaker culture in particular were accompanied by archer's equipment, comprising a bow and arrows, a wristguard and an implement for polishing arrow shafts (see fig. 19.10). Others were buried with 'battle axes', flint or copper daggers and, from the end of the Early Bronze Age onwards, swords, though all these weapons are found less frequently than archer's equipment.

One of the most curious objects associated with archery is the wristguard or bracer – a stone plate of a varying shape with two, three or four perforations. Most are of slate, which does not occur naturally in the Netherlands. It is usually assumed that these wristguards were tied to the inside of the wrist with the aid of leather thongs to protect the archer's wrist from injury due to the recoil of the bowstring when he shot an arrow. A trained archer would probably object that such a wristguard would in fact increase the risk of injury, due to the high probability of the string becoming caught behind the plate. It is indeed far more likely that the plate was worn on the outside of the wrist, as a kind of decorative clasp securing the actual (leather) wristguard (fig. 17.18).⁵¹ That would also solve the problem of the wristguards with two or three perforations: it is difficult to imagine how they would have been attached to the wrist otherwise.

Another type of artefact associated with archery is the implement that is believed to have been used for smoothing arrow shafts and that is sometimes called an 'arrow straightener'. Occasionally a pair of such artefacts is found in a grave. In Late Neolithic contexts, these objects are found exclusively in bell beaker graves; the same holds for the wristguards.

And then there are the arrowheads themselves. These artefacts, which were made of flint, acquired a distinctive shape in the Late Neolithic. Those of the Single Grave culture are usually tanged, not barbed, whereas many of the Bell Beaker cul-

ture are barbed and tanged. The tanged type of arrowhead disappeared altogether in the Bronze Age (fig. 17.19). There was also a triangular type with a convex or concave base which started to be produced around 2200 BC. The characteristic type of the Middle Bronze Age is slender and barbed. This type is encountered in graves of the Sögel group, but has also been found in the southern part of the Netherlands.

The arrowheads of the Late Neolithic and the Bronze Age were carefully finished with pressure-flaked surface retouch. The greater attention that was apparently paid to the shape of the arrowheads in this period suggests that the weapons were not only used for hunting, but also – and above all – for tribal warfare.⁵² Of interest in this context is the fact that they further support the impression that arrows were important weapons in Bronze Age society.⁵³

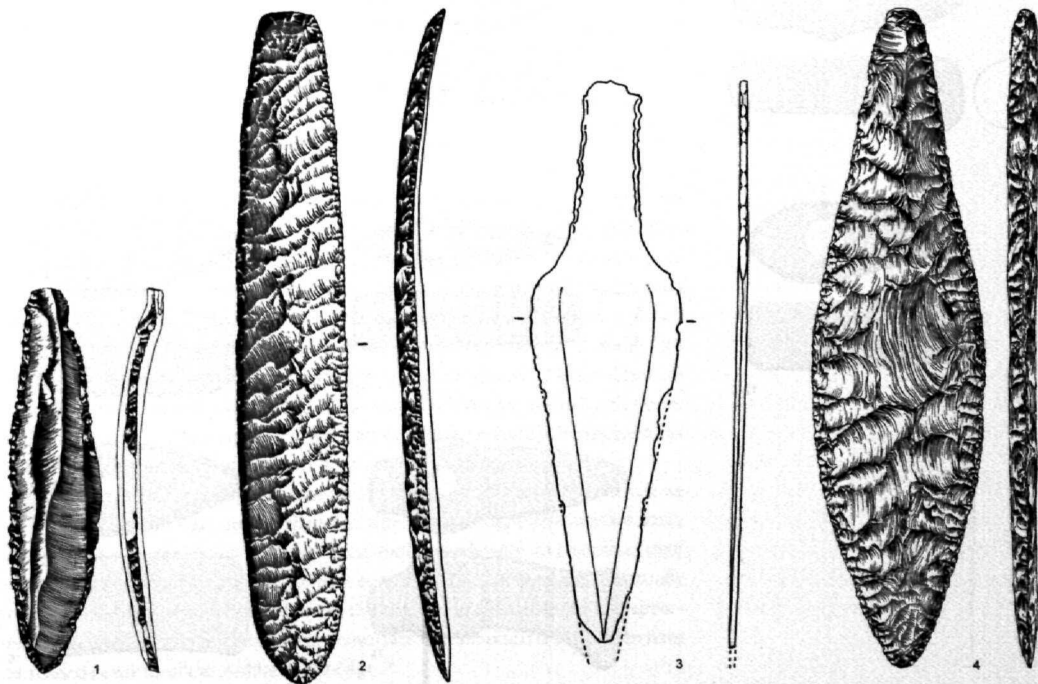
Daggers and knives of flint

Some graves of the Single Grave culture were found to contain large flint blades that are interpreted as daggers or knives. The most remarkable are the daggers of (French) Grand Pressigny flint. Nine of these daggers have so far been found in the Netherlands (fig. 17.20, plate 29).⁵⁴ The blades of local flint are on the whole

fig. 17.20

Dolken uit het laat-neolithicum en de vroege bronstijd, grafgiften (1-3) en losse vondst (4).
Schaal 1:2.

- | | | |
|--------------------------|---------------------------|------------------|
| 1 blade knife | Single Grave culture | Sleen |
| 2 Grand-Pressigny dagger | late Single Grave culture | Eext |
| 3 copper tanged dagger | Bell Beaker culture | Ede |
| 4 Scandinavian type | Early Bronze Age | Wollingboermarke |



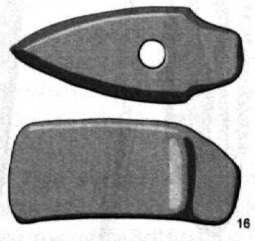
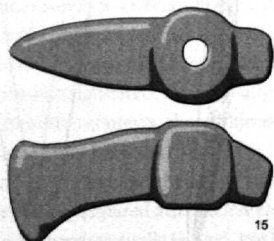
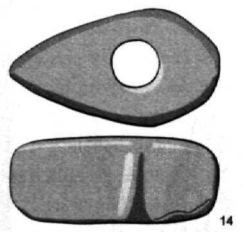
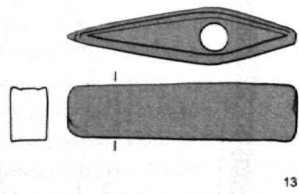
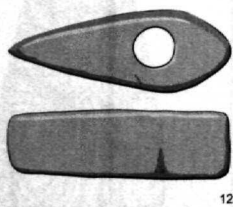
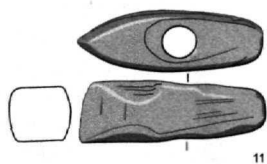
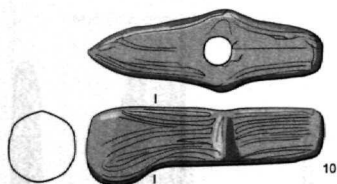
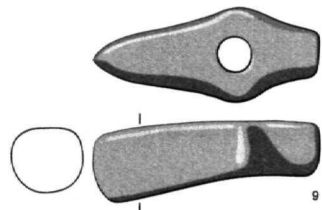
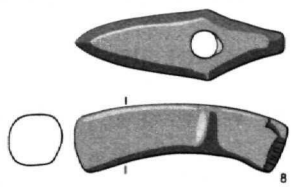
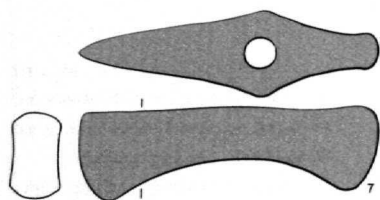
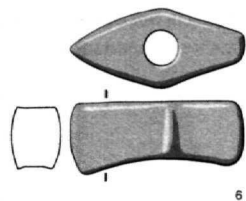
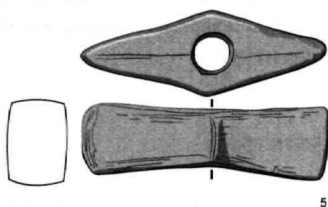
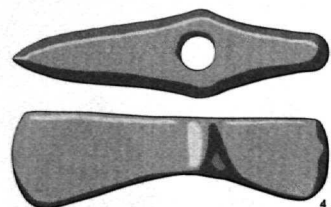
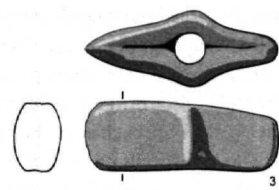
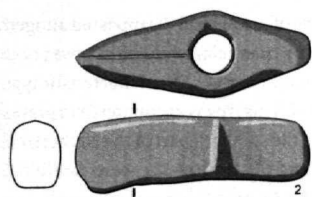
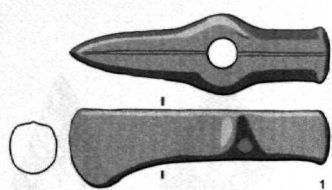
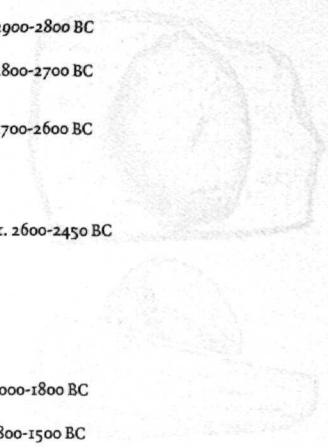


fig. 17.21 (page 394)

Survey of stone hammer axes from the Late Neolithic, the Early and Middle Bronze Age and the Early Iron Age. Scale approx. 1:4.

laat-neolithicum		
1 A-hammer	}	c. 2900-2800 BC
2 B-hammer		c. 2800-2700 BC
3 C-hammer		
4 D-hammer	}	c. 2700-2600 BC
5 E-hammer		
6 F-hammer	}	all c. 2600-2450 BC
7 G-hammer		
8 H-hammer		
9 P-hammer		
10 facettede hamer		
11 R/S-hamer		
Early and Middle Bronze Age		
12 Emmen type	}	c. 2000-1800 BC
13 Zuidvelde type		
14 Arbeitsaxt		c. 1800-1500 BC
Late Bronze Age and Iron Age		
15 Baexem type	}	c. 900-500 BC
16 Muntendam type		



much smaller and less carefully finished; they are therefore sometimes referred to as 'pseudo-Grand Pressigny daggers'. This type is not encountered in the later bell beaker graves; it was replaced by small flint knives or copper tanged daggers.

In southern Sweden, Denmark and Schleswig-Holstein, where high-quality flint was mined on a large scale from the many flint veins that were to be found in the local chalk, large numbers of bifacial flint daggers were produced in the Late Neolithic and the Early Bronze Age. About fifty daggers of this southern Scandinavian flint – probably all imports – have been found in the northern and central parts of the Netherlands⁵⁵ – that is several times the number of early metal daggers found in the whole of the Netherlands.

Hammer axes or 'battle axes'

Although the Single Grave culture is in other countries also known as the 'battle axe culture', 'battle axes', or hammer axes, are in fact relatively rare; only about a quarter of the graves contained hammer axes and none whatsoever have been found in settlements. Perforated hammer axes have a long tradition which goes back to the Early Neolithic. However, that does not mean that they were always used for the same purpose or in the same context. During the period of the TRB culture hammer axes started to acquire a less practical shape. This development culminated in the frequently varying exotic shapes of the axes of the Single Grave culture (fig. 17.21). The latter artefacts can definitely no longer be regarded as tools; they were probably used as weapons in tribal warfare.

The practice of depositing hammer axes in graves came to an end in the course of the Early Bronze Age, around the same time that a comparable artefact made its appearance in settlement contexts. These tools, which were much coarser than the hammer axes and are assumed to have served a utilitarian function, are usually referred to by the German term *Arbeitsaxt*. By this time, bronze weapons had apparently replaced the former hammer axes in warfare. The *Arbeitsaxt* is believed to have remained in use until the Middle Bronze Age.⁵⁶

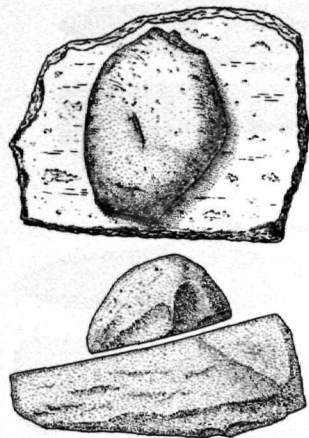


fig. 17.22
A granite quern from the Middle Bronze Age
that was found at Hoogkarspel. Scale 1:8.

It is difficult to say what types of stone axes were still being used in the Late Neolithic. Flint and stone axes gradually decreased in size towards the end of the Neolithic. All of the axes from the bell beaker period that have so far been found in graves and settlements are relatively short (at most 14 cm long). This decrease in size may very well be associated with a change in the way in which the axes were shafted or in the purposes for which they were used. The large Middle Neolithic axes were simply mounted in a hole in the shaft, whereas the smaller ones were probably mounted in an antler sleeve of the kind found in large numbers in Late Neolithic contexts in Switzerland and northern France. These later axes have oval or rectangular cross-sections and are on the whole less carefully polished than their Middle Neolithic predecessors.

Metalworking implements

Four graves of the late Bell Beaker culture on the Veluwe and the hills of the Utrecht ridge yielded a small, but remarkable category of stone artefacts: small 'cushion-shaped' stones, which were used as anvils and hammers (plate 25A).⁵⁷ Only few parallels for these finds are known outside the Netherlands: a small number have been found in Germany (in rich graves), in Ireland⁵⁸ and in southern Russia. In the latter area such an object was found in a grave that also contained a few earthenware nozzles of bellows, which were probably used in a metalworkshop.⁵⁹

The other objects found in the graves on the Veluwe clearly indicated that the implements had not belonged to full-time specialists or itinerant smiths: the deceased had been buried by their own relatives, according to local burial rites. The grave of Lunteren, for example, also contained a Veluwe bell beaker, a wristguard, arrowheads and a flint axe.

Querns and grinding stones

Querns and grinding stones constitute a poorly known find category. They are not often encountered in graves and are also quite rare in settlements of this period, of which only few have as yet been excavated.⁶⁰

There are many different kinds of grinding stones, of many different sizes, varying from portable stones to large rocks in the ground. Most differ clearly from querns in that they are made of fine-grained sandstone, whereas querns are made of granite.⁶¹ The portable grinding stones that were used for grinding or polishing stone axes are usually of a characteristic rectangular shape with rounded sides. Often, two of the sides were used for grinding or polishing the butt of an axe and the other two for polishing the cutting edge. It is assumed that these grinding or polishing stones were used until in the Late Neolithic, but none have been found in a datable context (fig. 13.8).

Smaller grinding stones have been found in Bell Beaker graves and in a few graves of the Early and Middle Bronze Age.⁶² Among the objects in the aforementioned Ommerschans hoard were a few small stones which were probably used for polishing metal castings.⁶³

Querns – or usually fragments of querns – are occasionally found in settlements. From intact specimens, some of which have been recovered from Vlaardingen contexts, we know that the querns that were used in the Late Neolithic and the

Bronze Age were hollow; the grain or other organic matter was ground in the cavity with the aid of a wide, flat stone (fig. 17.22).⁶⁴

AMBER ORNAMENTS

From the Mesolithic onwards amber was in great demand for the manufacture of beads to be worn around the head or neck. One of the main sources of this fossil resin, which, on account of its static properties and its beautiful golden brown colour, was probably believed to possess magic powers, was the Baltic coast. From time to time, however, large lumps of amber are also washed up on the Dutch beaches.⁶⁵ The beads, conical buttons and crescent-shaped pendants of amber that have been found in a number of AOO and Bell Beaker graves may very well have been made from amber found in ice-pushed moraines or on the Dutch beaches (plate 25B). The beads from the Early and Middle Bronze Age, however, resemble types that have been found elsewhere, too, which suggests that they are imports. Objects of amber from the Baltic shores were also imported in other areas in Europe in the Middle Bronze Age. The fact that these objects were deposited in graves (or other contexts) indicates that amber was regarded as a prestigious material in that period.

Almost all the Early and Middle Bronze Age amber beads known in the Netherlands were found in the south of Drenthe, in particular in the surroundings of Emmen,⁶⁶ where they had been deposited in bogs or in women's graves. The best-known bog find is the Early Bronze Age necklace of Exloërmond (plate 27B). Besides beads and pendants of amber, this find also included beads of tin and faience, both of which are extremely rare in the Netherlands; they may have been imported via southern England. The beads of Roswinkelerveen and Emmer-Compascuum were also recovered from the peat. Amber beads have furthermore been found in relatively rich Middle Bronze Age graves such as that of Weerdinge (two separate interments), Emmerdennen and Hijken. Some were accompanied by bronze pins and bracelets or, in a few exceptional cases, a bead of glass or rock-crystal.

NOTES

- 1 Van der Waals/Glasbergen 1955.
- 2 Lanting/Van der Waals 1976a.
- 3 Drenth/Lanting 1991.
- 4 Drenth/Lanting 1991.
- 5 Lanting 1973.
- 6 Modderman 1955, Lanting 1969b.
- 7 Lehmann 1965; Lehmann inferred a development from necked pot beakers to pot beakers with an S-shaped profile. The beaker pot was probably a later development of the latter type (Lanting 1969b).
- 8 Lanting (1973, 252) uses the term 'beaker pot' for large to very large types from the Late Neolithic and Early Bronze Age. This term could also be used for the large beakers with short wave moulding.
- 9 Molenaarsgraaf (Louwe Kooijmans 1974).
- 10 This kind of earthenware was in the past described as Kümmerkeramik ('poor ware') because it appeared to have been poorly fired and was tempered with grit. In this book the less derogatory term 'Elp ware' will be used for this kind of pottery, which is associated

with the Elp Culture, by analogy with the contemporary Hilversum ware, which is associated with the Hilversum Culture (Fokkens 1998a).

- 11 Glasbergen 1969, Ten Anscher 1990. Ten Anscher's classification into Hilversum 1, 2 and 3 ware is not used here because it essentially corresponds to Glasbergen's classification into Hilversum, Drakenstein and Laren ware. This is however not to say that we do not acknowledge the value of Ten Anscher's observations on the dating and typology of the Hilversum ware in particular, which are certainly relevant (see also Fokkens 2001).
- 12 This and several other similarities (see chapter 4) led Glasbergen to the hypothesis that the Hilversum Culture originated in Britain (De Laet/Glasbergen 1959, Glasbergen 1969). Nowadays the whipped cord ware and the pottery of the Hilversum and Elp Cultures are assumed to represent a continuous tradition.
- 13 Fokkens/Smits 1987.
- 14 Glasbergen 1969.

- 15 R.W. Brandt 1988a.
- 16 Kohlhorn (Van der Waals 1989), Oldeboorn (Fokkens 1998a).
- 17 Champion et al. 1984.
- 18 For a general introduction (in Dutch) to the early use of metal, see Butler 1980 and the literature referred to in that work. The most important recent work (in English) on prehistoric metallurgy is that by Tylecote, 1992. Another interesting recent publication is the up-to-date, non-specialist, but scientifically sound German work by Steuer and Zimmermann (1993). See J.D. Clark (1991) for comparative ethnographic evidence. The Proceedings of the Freiburg Conference (Bartelheim et al. 2002) could not be taken into account here.
- 19 'Chalcolithic' literally means 'copper-stone age'. In the Low Countries this period is classed as part of the Late Neolithic, but in many other European countries a separate 'Copper Age' or 'Chalcolithic' is distinguished.
- 20 The copper is reduced (i.e. oxygen is extracted from it) because the oxygen in the copper reacts with the burning charcoal to form carbon dioxide ($\text{CuO}_2 + \text{C} = \text{Cu} + \text{CO}_2$).
- 21 For results of the recent explosive research into mining see e.g. Eibner 1982, Jovanović 1982; Crew/Crew 1990, which contain many references.
- 22 Butler 1980, 113-130.
- 23 Butler 1990, 54-56, fig. 4.
- 24 See e.g. Hartmann 1970, 1979, 1982; Taylor 1980; Eluère 1982.
- 25 More recent works discussing the production and importance of arsenical copper are e.g. Bilgi 1990; Pollard, Thomas/Williams 1990; Frangipane 1985.
- 26 Whether any use was made of tin from Central Europe, Brittany or Ireland is still not clear. A Bronze Age tin mine has recently been discovered in Anatolia (Wilford 1994).
- 27 Butler/Van der Waals 1966, which contains illustrations and details of almost all the Neolithic and Early Bronze Age metal objects found in the Netherlands and provides the results of metal analyses and metallurgical data for some of those finds.
- 28 'Singen metal', or perhaps 'Singen-Nitra metal', which would be a more accurate term, is a type of copper that contains relatively large amounts of antimony and nickel and smaller amounts of arsenic and silver. It is believed to have come from the Alps and was frequently used in Central Europe in the Early Bronze Age, in particular by the representatives of the Singen, Nitra and Adlerberg 'Cultures'. It was also imported into the central and northern parts of Germany, southern Scandinavia and the Netherlands. For a detailed discussion see Krause 1988, 181 f.; and see Liversage/Liversage 1989, 1990; Liversage 2000. Some 40,000 spectral analyses have been published of metal objects of the European Copper Age and Early Bronze Age. Valuable detailed discussions, based on recent (and on-going) revaluations of this enormous material, can be approached with the help of (for example) the publications cited in Junk et al. 2001, 361-362, and Liversage 2001, 392-393.
- 29 Shalev/Northover 1993.
- 30 See chapter 20 for a further interpretation of hoards.
- 31 Butler 1963c. Butler 1995-'96 and Butler/Steegstra 1998-'99 provide complete catalogues of the Early and Middle Bronze Age axes found in the Netherlands. Comparison of the axe finds in the Netherlands with those of neighbouring areas has been made easier by publications such as Wegner 1996 and Laux 2000 for Niedersachsen, Kibbert 1980 for Middle West Germany, Vandkilde 1996 for Denmark.
- 32 Butler 1963a, 99 f., fig. 28.
- 33 Butler 1961a.
- 34 Butler 1990, 74-76, fig. 5.
- 35 Glasbergen 1956; 1960; Butler/Van der Waals 1966.
- 36 Bloemers 1978; it must however be borne in mind that objects of copper and bronze are less durable than objects of flint.
- 37 Butler 1969; 1986, 149-150, fig. 161-c; 1987b; 1990, 71-73 (Drouwen), 74-76 (Overloon), 94-95 (Velsbroek); Meijlink 2001, 2002 (Meteren, tumulus 'De Bogen').
- 38 Butler 1969; 1987b; 1990, 86-91, figs. 17 and 22; Butler/Bakker 1961.
- 39 Butler/Sarfati 1970-'71.
- 40 Needham 1990; Briard 2001, 153-154; Fontijn 2001, 263-280.
- 41 Butler 1969, 114-116, fig. 51 (and photograph 12); 1979, 122-124, fig. 31 and 83; Butler 1990 (1992), 59-61, fig. 7. See Lohof 1991 for a more detailed version of this interpretation.
- 42 Tackenberg 1978; Wegner 1996, no. 203 (with colour photo).
- 43 Van der Waals 1964; Lanting/Mook 1978, 96. Six of the wheels were dated by means of ^{14}C analysis. It is difficult to calibrate the results because of their relatively large standard deviations; the average result yields a date of c. 2500 BC.
- 44 Van der Waals 1964a, 40.
- 45 Van der Waals 1964a, 45.
- 46 The fact that the wheels were found in pairs in three cases could imply that they belonged to two-wheeled wagons, but in one case (Gaselterboerveen) the wheels differed in size (Van der Waals 1964a, 48).
- 47 Clarke 1963; Brongers/Woltering 1978.
- 48 The narrowest range obtained after calibration of 3500 ± 100 BP is 2050-1610 BC (2 s). A probability of 68% (1 s) yields a range of 1960-1730 or 1720-1690 BC, i.e. in the Early Bronze Age.
- 49 Casparie 1984.
- 50 Glasbergen 1957.
- 51 This was suggested by J.N. Lanting, who was led to this hypothesis by the American Indian wristguards, which he saw while touring the US. They consisted of leather bands that were held in place on top of the wrist by a similar decorative (silver) plate.
- 52 Direct evidence for tribal warfare involving the use of arrows was found in the communal grave of Wassenaar (see feature L).
- 53 Butler 1990, 66, fig. 11a; 85, fig. 20; Meijlink 2001, 407-409 with fig. 4, 424-425 (Meteren warrior grave); Hielkema 2001, 337-338, fig. 3 (Eigenblok).
- 54 Lanting/Van der Waals 1976a, Drenth 1991. Drenth is of the opinion that the true Grand-Pressigny daggers found in graves are insignia of the deceased's rank (see chapter 19).
- 55 Bloemers 1978, 47-110.
- 56 Lanting 1973.

- 57 Butler/Van der Waals 1966.
58 The Newgrange settlement from the Bell Beaker period: O'Kelly, M.J./C.A. Shell 1979, 127-144.
59 Butler/Van der Waals 1966, 74.
60 See e.g. Louwe Kooijmans 1974 (Molenaarsgraaf, Ottoland).
61 Fokkens/Schinkel 1990.
62 Butler 1990, 72, fig. 14:16 (Drouwen); 77, fig. 16:A3 (Monnikenbraak).
63 Butler 1990, 86-91, numbers 17-18.
64 Harsema 1979a.
65 Waterbolk/Waterbolk 1991.
66 Butler 1990, 48-69.