Metal Standard during the Bronze Age

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Abstract

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At a time of increased mass production of metal tools, the embryo of a monetary structure or metal standard on the continent – broken bronze sickles – probably reached south and west Sweden too. Agricultural intensification and settlement expansion not only created a demand for new tools but also a chance for profit from an increasing number of clients, though not always on their own premises. The article discusses metal scrap hoards and standard moulds from this standpoint.

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The increasing economic interest in bronze and the early domestic mass production of metal artefacts may be seen in the light of the settlement expansion during the Bronze Age. Even if we cannot fully understand the mechanisms behind it, the clearance and occupation of new land also reflect the disappearance of old social barriers: territorial borders or taboos and attitudes to foreigners. Instead of being exotic objects for a few, metal artefacts were now manufactured in a combination of the new demand for tools and the chance for profit from an increasing number of clients.

As far as we know, all metal was imported, though there are easily accessible non-ferrous mineralizations and copper ore deposits in Sweden, Norway and Finland. There is a theory about copper sulphide ores in Central Sweden being of interest for prospectors with knowledge of mining and melting, though the proofs for this are still weak (Janzon 1988; *In search of* 1995, p. 31).

The idea of a control system ...

There are more distinct indications of a growing interest in the Scandinavian demand for metal from outside. Concerning the mass production of tools, some foreign raw material for moulds in Sweden has been recorded, e.g. bronze and sandstone, and at least one example of foreign technical criteria for fitting two mould halves together – holes for metal pins which was not the standard in Scandinavia (Weiler 1994, p. 122). The emergence of mass production of tools has raised the question about the existence of a control system for the distribution of metal. Archaeologists in the Mediterranean area have found standardized rods, pieces of sickles and weights from stone, lead and bronze, but the

weights were not used only for metals according to the written sources. Greece and Cyprus had a numerical standard value especially for gold, *talanton*, perhaps used in exceptional cases in Central Europe too (Eiwanger 1989), though there are no finds of balances or weights from the Bronze Age north of the Mediterranean.

In order to find some kind of control system, the interest has been focused on metal artefacts, mainly axes. Socketed axes, for example, still preserving their casting core intact, could have been some sort of currency (Thrane 1975, p. 257). The early shaft-hole axes of massive bronze, known as Fårdrup axes, as well as bronze figurines and gold arm rings have been suggested to represent a numeric weight standard, based on different unit weights between 26 and 500–525 g, and perhaps a weight system for products intended to be reworked later (Malmer 1989, 1992; Sperber 1996).

In non-European areas with metallurgical traditions, e.g. Central and South America, ethnohistorical sources suggest axe monies and sheet metal ornaments as a standard of value (Hosler 1988, p. 846). "Money axes" were made from thin copper sheets, the edges being hammered though not completely. Some of them could be broken into halves (Holm 1967).

Instead of manufactured products, weight standards have also been tested on the traces from the manufacturing process in Central Europe. Broken sickles in hoards have been suggested as a preliminary stage for means of payment, a kind of "premonetär Gerätegeld" or metal standard, which is an idea that has recently been taken up in West Europe as well (Primas 1986, pp. 36 ff.; Eogan 1995, p. 131).

... and of a European metal standard

There are 85 registered moulds for mass production in south Sweden, one made of bronze and the others of stone, mostly soapstone. Sixty per cent were made for the mass production of socketed axes and 12% for sickles. The production capacity for one mould is considered to be about 50 castings (Weiler 1994, p. 116; Rowlands 1976, p. 10). This means 7–10 kg bronze for a complete collection of locally manufactured socketed axes in south Sweden, 4–5 kg in west Sweden and 2 kg for a collection of socketed chisels.

A few moulds were made with casting cavity for more than one tool and one of these moulds differs from the others, the mould from Torbjörntorp in central Västergötland. It has four cavities for one knife, one socketed chisel and two rods, the tools undoubtedly for a bronze founder and the rods probably for some standards. But what kind of standard?

In order to find out that the scrap hoard from Järn close to Lake Vänern was examined and found to contain a small rod of one third the size of a Torbjörntorp rod, exactly fitting the cavity of that mould. The weight of the Järn rod

Table 1. The total weight, the weights of standardized or broken scrap and the existence of other artefact categories from five of the largest scrap hoards in south Sweden.

Place-name	*total weight grams*	*bars, ingots*	*axes*	*weapons*	*ornaments*	*sickles*	*craftsman's equipment*
1. Ystad	2000	194	196	512	x	x	x
2. Järn	800	500	27	213	x	x	x
3. Kareby I	1000?	57	103	30	x	x	–
4. Grava	1620	–	204	280	x	x	x
5. Håle-Täng	1485	–	1485	(x)	–	–	–

corresponded to the weight of a pair of locally manufactured tweezers (approx. 4.5 g) and two Järn rods to the weight of a razor. Each rod in the mould from Torbjörntorp could thus correspond to a set of ordinary toilet equipment for Late Bronze Age burials: a razor and a pair of tweezers. With reference to the assumed capacity of one stone mould, the maximum production from the Torbjörntorp mould could have been 100 standardized rods (=100 razors and 100 pairs of tweezers), 50 chisels and 50 knives.

Among the metal scrap from Järn there was also one – undamaged – socketed chisel (cf. the Torbjörntorp mould) and pieces of broken sickles, perhaps implying some kind of control system common to standards in Central Europe. So was there a European "metal standard" also in areas where all metal had to be imported?
To obtain an answer to that, some more scrap hoards were examined, starting with a hoard from Ystad in south Scania where the import of metal was greatest.

The Ystad hoard

There are three metal scrap hoards from the Bronze Age in Scania. The largest one was found there are no details of any container made of metal, clay or any organic material now decayed. This find was published the year after in an article by Andreas Oldeberg (1927), the first one of his articles about early scrap hoards and metallurgy in Sweden (Oldeberg 1928, 1929, 1933, 1934, 1942).

The Ystad scrap hoard consists of 31 fragments of bronze with a total weight of almost 2 kg. One piece is a mass of almost pure copper of 455 g and three ingots with a total weight of 194 g. An awl, an edge of a chisel and an undamaged socked axe could belong to the craftsman's own equipment. Among the scrap are a heavy neck ring broken into two pieces (330 g), seven pieces of swords (431 g), one piece of a spearhead (81 g), two pieces of socketed axes (101 g) and the edge of a winged axe (95 g). Finally there are 12 fragments of sickles with hafting notches on the back,

Table 2. The weights of different categories of artefacts from the Ystad hoard in Scania and the Järn hoard close to Lake Vänern. The sickles in the Ystad hoard were too corroded to be weighed.

Place-name	*craftsman's equipment*	*bars, rods*	*ingots*	*hooks*	*axes*		*weapons*	*ornaments*	*sickles*
					winged	*socketed*			
1. Ystad	236	455	194	–	95	101	512	330	x
2. Järn	23	88	333	4	–	28	213	50	x

Table 3. The weight and numbers of sickles from five hoards in south Sweden.

Place-name	*fragments of sickles (numbers)*	*total weight (grams)*	*weight/fragment (grams)*
1. Ystad	10	?	? – 11.0
2. Järn	7	37	2.8 – 8.5
3. Kareby I	9	99	2.8 – 17.4
4. Grava	1	?	? – ?
–. Nya Åsle	> 40	80	1.0 –?

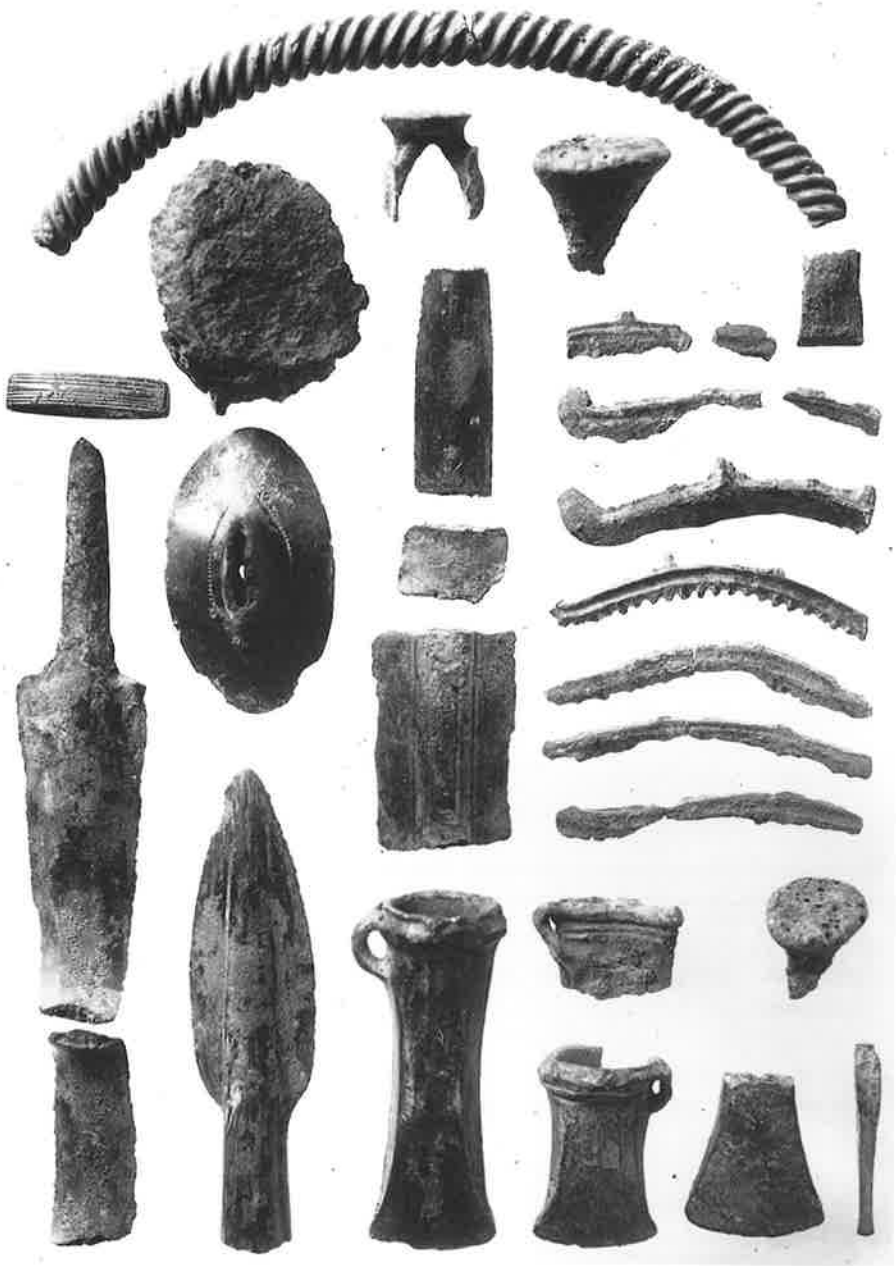

Fig. 1. A sample of the Ystad hoard finds. Photo: ATA, Stockholm.

unfortunately so corroded that exact weighing would be misleading, but their total weight could have been approximately 60–70 g.

Summing up, the total weight of metal mass and ingots is 649 g, the craftsman's tools 236 g and the metal scrap from broken implements about 1100 g. The material was meant for mass production of tools or massive ornaments, and

the craftsman had also some extra copper to make the metal harder.

Some of the artefacts in the Ystad hoard were consumed before scrapping, others were wrongly cast or never came into use. On the sickles the superfluous metal from the casting was not filed away and the edges were not hammered out. A socketed axe has an incomplete ear and part of the body is also missing.

The weapons seem to have been furnished with wooden handles or metal-shod sheaths, fixed with resin, because there are traces of resin inside the socket of the spearhead, on the tang of a sword and inside the bronze ring enclosing the upper part of a sheath. Apart from the bronze ring there is just one more loose piece of a sword, a broken pommel of the so-called Möriger type. These pieces are still intact, whereas the blades are broken into pieces, the fractures being old and not the result of the digging when the hoard was found.

One cannot break a bronze sword blade into pieces by oneself, just after having heated the metal. When bronze is heated to about 600 °C it becomes more pliable and fragile, and that must be the method practised by the scrap collectors or the craftsmen. It can explain why part of the blade of the largest sword in the Ystad hoard is bent and also the broken end of the largest sickle. A socketed axe was so strongly heated and then beaten out so that the metal started cracking. To heat bronze to a temperature of 600–700 °C no special arrangements are needed, just a hearth.

There also seems to have been some system behind the breaking of the metal, which can be illustrated by the sword blades. There are five pieces of them, three of the same length or "cut" into pieces 6.1 centimetres long, and the fourth into a 2 centimetre long piece. Their weights are 16, 31, 38 and 74 g. When putting the pieces on top of each other it was found that the biggest one is about twice the size of the two 31–38 g pieces and four times the size of the smallest piece.

So besides the fact that there are old fractures on the artefacts, they were intentionally and systematically broken into pieces. This supplements the idea of some sort of control system – but still far from being a fact that there really existed a numeric metal standard even in Late Bronze Age Scandinavia.

The character of the Swedish scrap hoards

Almost forty years ago there were about 125 registered metal hoards from the Late Bronze Age (Periods IV–V) in South Sweden (Oldeberg 1933, 1942; Baudou 1960). The number is still about the same today. Literature studies show that 8% of the hoards contain traces of mass production and/or some kind of control system similar to the Ystad hoard: raw stuff, ingots and broken sickles, sword blades or socketed axes. With the addition of the existence of other metals (tin, lead) or unfinished metal rods where the superfluous metal from the casting has not been filed away, the percentage increases to 13%. The largest hoards including raw stuff and ingots have been found in Scania, SW Sweden (Bohuslän, Västergötland, Dalsland, Värmland) and Uppland.

A survey of the material reveals that the Swedish scrap hoarding can be divided into three categories: (a) raw stuff hoards, (b) metal scrap for tool-making and (c) metal scrap for ornament making, following the technical premises for bronze casting with different alloys for tools and ornaments. But apart from one axe hoard, the scrap hoards are more or less mixed. As we have already seen, the metal scrap for tool making dominates the Ystad hoard and there is some raw stuff too, whereas traces of ornament-making are almost missing, although there is one half of a heavy neck ring, broken into two pieces.

Apart from the scrap hoard in Uppland, which is the northernmost of them, the hoards are generally located in areas where there are also concentrations of stone moulds for mass

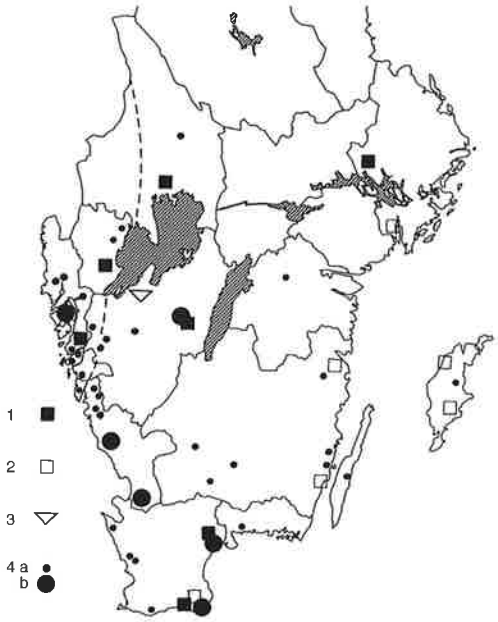

Fig. 2. Map showing the traces of mass production of bronze tools and ornaments during the Late Bronze Age in south Sweden: moulds and metal scrap hoards.Distribution of scrap hoards and stone moulds mostly of soapstone for mass production of bronze tools in south Sweden. Soapstone is found in the terrain west of the broken line.Legend: 1: scrap hoard with ingots, broken sickles and other raw material, 2: scrap hoard (?) with cast rods or rings, the superfluous metal not taken away, 3: axe hoard, 4: stone mould from the Late Bronze Age, a: 1–2 specimen and b: 3–5 specimen.

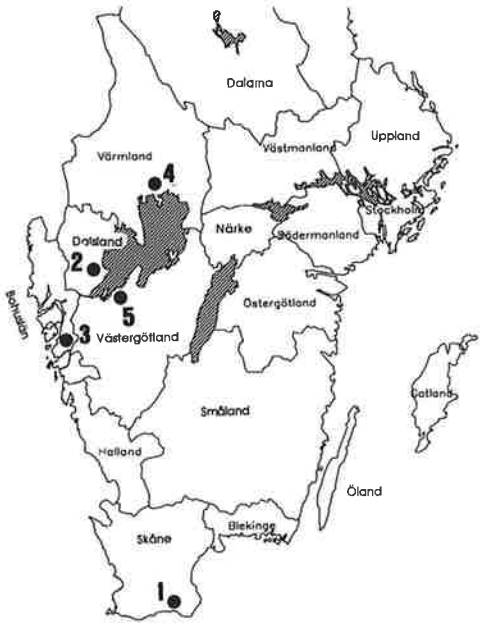

Fig. 3. Map of south Sweden with the current hoards and counties marked:
1 = Ystad, Skåne (Scania). 2 = Järn, Dalsland. 3 = Kareby, Bohuslän. 4 = Grava, Värmland. 5 = Håle-Täng, Västergötland.

production or natural deposits of soapstone, extremely resistant to high temperatures and the most common raw material for the Scandinavian Bronze Age moulds. This pattern is most striking in the south-east and north-east parts of Scania, in the central part of Västergötland and in south Bohuslän close to the Vänern area, that is, an area with a good supply of metal compared to more peripherally located areas. By land the distance between Ystad and the south coast of Lake Vänern is 330 km, while by sea and then along the Göta River it is 400 km.

As regards the assumed supply of metal there are no remarkable differences between the Ystad (1) and the Vänern areas (2–5). However, the metal scrap from Kareby (two hoards Kareby I–II) and Grava in the Vänern area in western Sweden was probably put into belt-boxes or hanging bronze vessels, in contrast to the scrap from Järn which was found in a clay vessel, covered by a flat stone. The weight of a belt-box is about 500 g, so if it was a package, not a part of the scrap, the total weights in the table are misleading.

The Håle-Täng hoard

Let us now look at the axe hoard from Håle-Täng (5), south of Lake Vänern, according to the idea of a general standard or control system for early bronze. It consists of 17 socketed axes and a

socket of a spearhead. There are no bars or ingots in the hoard, no equipment for the craftsmen and no systematically broken artefacts. The metal quantity of the axes is 1485 g, with an average weight of 102 g per axe. They were never used, because part of the clay casting core for the socket is still inside some of them and they incurred errors during the casting, such as incomplete ears, rough edges and even holes in the metal.

More than half the collection could be from the same workshop, because they have the same design with two curved parallel lines along the sides and a round knob in the middle. As far as we know, this type of axe was not manufactured in SW Sweden, but in Scania and Denmark (Baudou 1960, p. 18 and Karte 9).

The weight of such a foreign axe is 20–30% higher than the weight of the contemporary west Swedish socketed axes. Most of them contain bronze enough to cover the quantity for a locally produced axe including the ingot, so they might have been brought further north as raw material for new axes. As the metal scrap already came from axes, this must have been a guarantee of correct alloy for making new ones. The founders in the Vänern area could use waste bronzes whose alloy they were not aware of and concentrated their technical skill on the mould and correct temperatures. In this situation a weight system was hardly necessary, because the volume/weight of metal was limited by the mould cavity.

The Ystad and Järn hoards

The scrap in the Ystad and the Järn hoards is of identical character, though there is a difference between the quantity of metal. The regional character of the hoards is also striking, in the Ystad hoard with the edge of a winged axe and the pommel of a Möriger sword. The Järn hoard has no such traces of continental contacts but has a bronze hook among the scrap.

Most of the scrap consists of pieces of weapons, axes and sickles and the ornaments of just a few pieces from neck or arm rings and – in the Järn hoard – a fragment of a disc from a fibula and a couple of studs. The ends of the Järn sickles and some of the sword pieces have also been bent by heating. Both hoards contain masses of almost pure copper (Oldeberg 1942, pp. 35 f.), the weight differing between 455 g in Ystad and 25.5 g in Järn.

The metal was broken into more and smaller pieces in the Järn hoard. Some of the ingots still have traces of the rods produced here by the local founder. There are two almost identical rods among the scrap with a weight of 7.4 and 7.8 g, where the superfluous metal from the casting has not been taken away. That quantity of metal is enough for a small knife, an awl, a pin or just for repairing, an adequate amount of raw stuff for household use. Clay mould debris for casting that kind of small implements has been found on the settlement sites from the Late Bronze Age (Weiler 1984, p. 67).

The Kareby and Grava hoards

The Kareby I and the Grava hoards are of almost identical character and in some details identical also to the Ystad and Järn hoards. Again we meet the pieces of sword blades (though not so many of them), socketed axes, sickles and a few neck or arm rings, all broken after heating. Moreover, the Grava hoard contains seven bronze lure fragments with a total weight of 40 g and one sword ring from a shod sheath which is almost identical to the ring in the Ystad hoard.

Common to the Kareby I and the Grava hoards are fibulae of "spectacles type" (Swedish *glasögonfibula*) with two round or oval discs of framed metal sheets, the surface covered with cast decorations. There are two almost complete fibulae in the Grava hoard with the remarkable weights of 195 and 100.6 g. The situation is quite the opposite in the Kareby hoard, with part of two discs of extremely thin metal, the weight being just 14 g for the most complete one. This type of fibula was real craftsmanship, because it

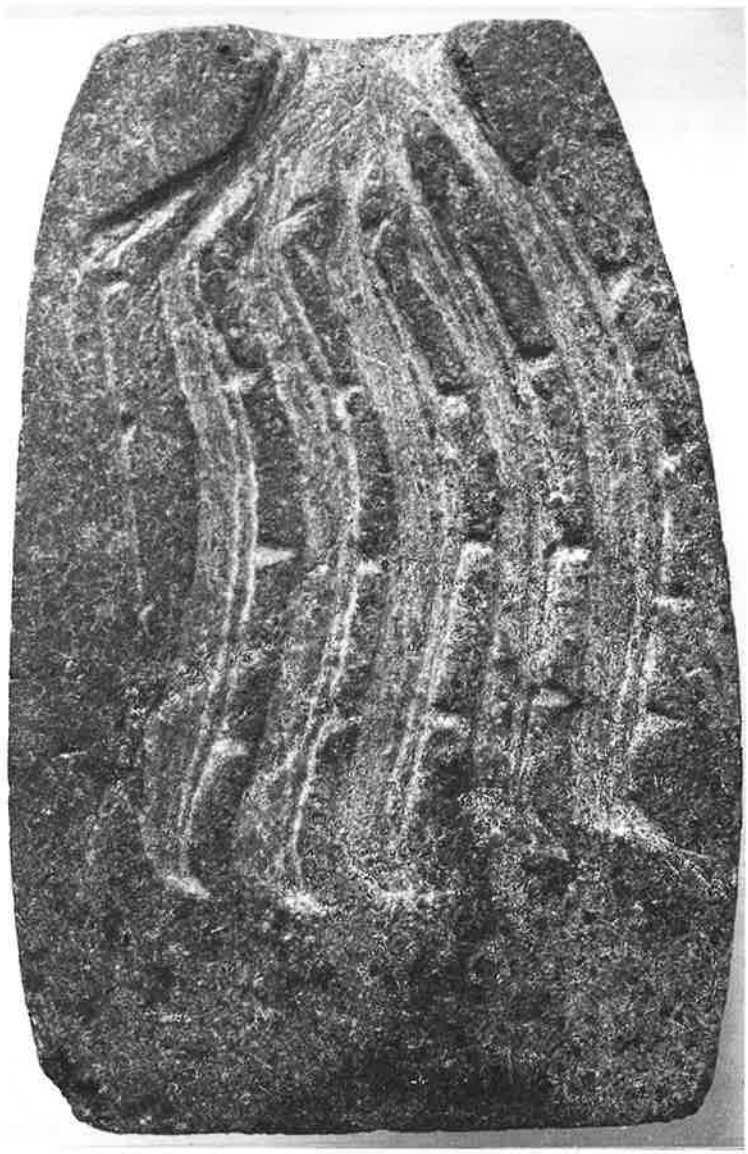

Fig. 4. A stone mould for mass production of sickles from Borrby in Scania (inv. no. LUHM 29081). There are casting cavities for five sickles and the carver even tried to make room for a sixth (to the left). Photo: E. Weiler. Inset map: finds of sickle moulds in Sweden.

was cast in individually made clay moulds with the decorations engraved inside the mould. But the result were rather fragile ornaments, and one can often see signs of repair (Oldeberg 1933).

There is no molten bronze mass in the Grava hoard but special equipment for the craftsman: three complete bronze awls of different sizes and a loop of lead, broken into two pieces. The craftsmen involved must have been real specialists, because they had the resources for sheet bronze casting, easy formable, thin metal sheets for ornaments, by adding just small quantities of

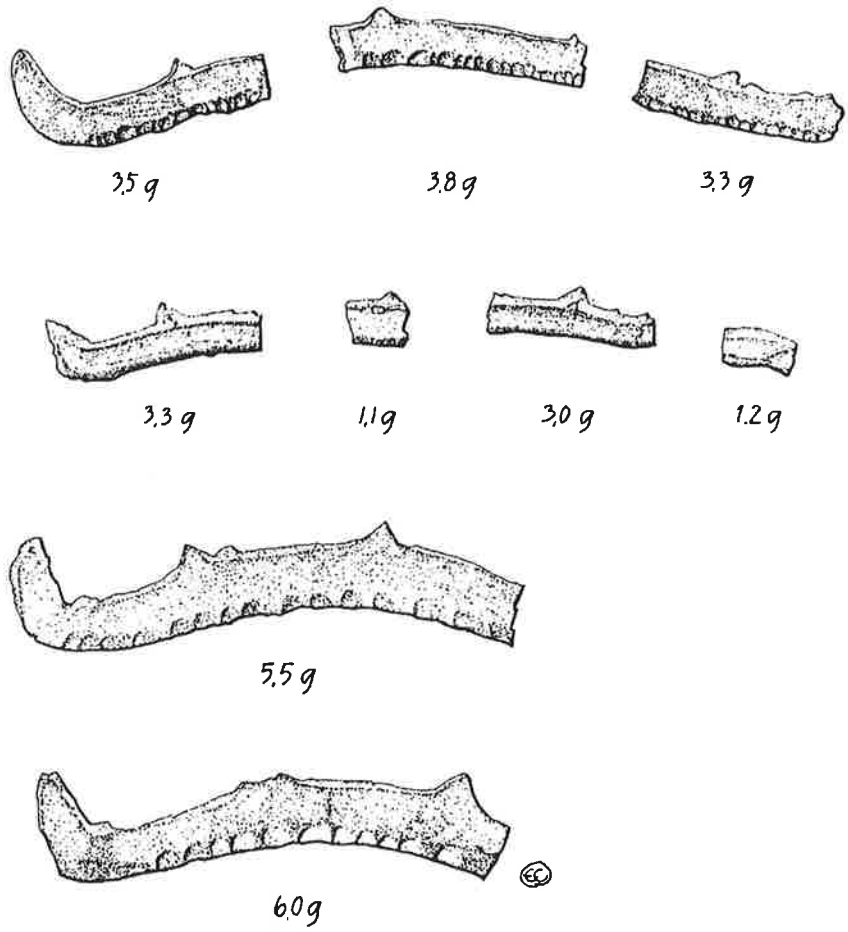

Fig. 5. Some principles for breaking a bronze sickle in south Sweden. From hoards. Drawings: E. Crafoord. Scale 3:4. (From Weiler 1994, fig. 143 and 145.)

lead to the bronze. They probably had some knowledge of punching techniques for simple decorations, as a awl may have been used as a punching implement too (Herner 1987, p. 141).

There are two small pieces of molten bronze and one ingot in the Kareby I hoard. Of special interest, however, are two bundles of double bronze wire, wound three times round and the open ends then twirled tight together. One of them is intact, but the other bundle has been opened in the Kareby II hoard. On old drawings the unopened bundle is described as an arm ring similar to the arm rings and necklets of wound metal wires in Central Europe (see e.g. Moszolics 1973, Tafel 103–107). But I suggest that the bundles were sold as raw material of a special volume or weight. The weights of 14 and 16 g respectively are practically identical to the weight of one thin disc of a Kareby fibula.

Why so many broken sickles?

One category of artefacts common to all of the mixed hoards are the broken bronze sickles. They are of "Nordic" form, curved and narrow-leafed with hafting notches on the back and

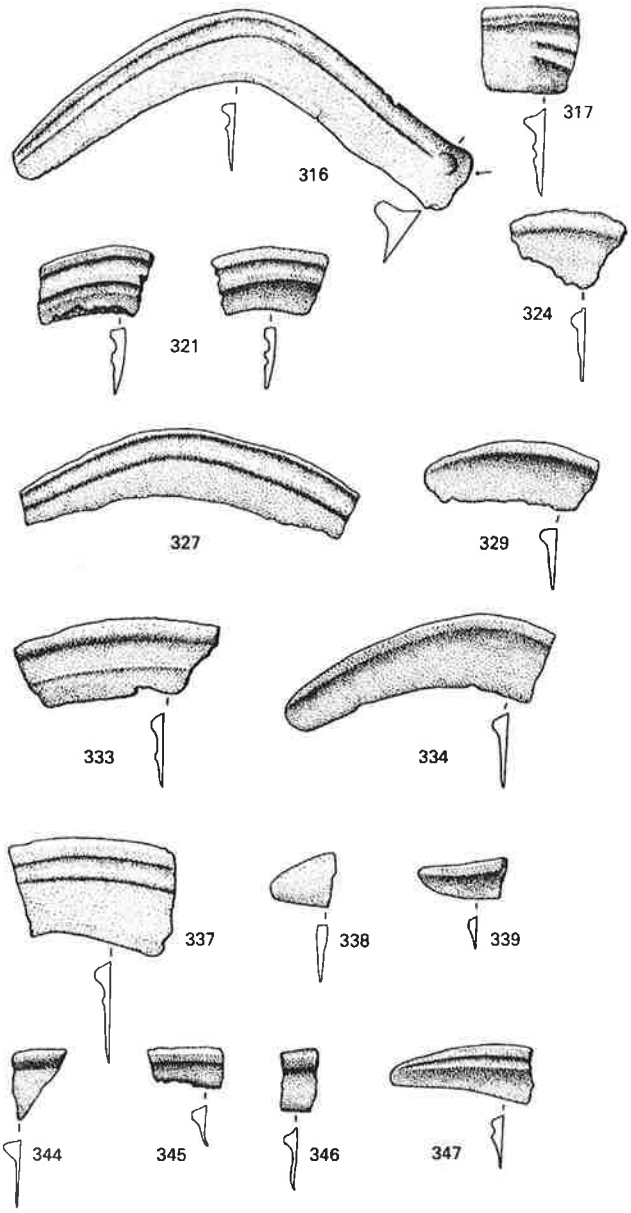

Fig. 6. Examples of broken bronze sickles from Central Europe: 321 is from a burial, 333–347 from hoards and the rest from settlement sites. Scale 2:5. (From Primas 1986, Tafel 20.)

more or less saw-toothed edges. None of them is complete, and one can see that they have also been systematically broken into pieces after heating. But how can we explain the existence of systematically broken harvest implements in the scrap hoards – a principle similar to the situation in Central Europe?

First of all, can we be sure that the scrap

hoards are from the Bronze Age? Or were they raw material for the bronze founders during the Iron Age, when bronze sickles were already out of use and had been replaced by iron sickles?

The scrap hoards most probably accumulated during the Late Bronze Age. The bronze scrap is never mixed with bronze from the Iron Age, and, as I have already pointed out, it strictly follows the technical principles for metal working during the Bronze Age. As regards the sickles, which are usually dated to periods IV–V, they have been found in Late Bronze Age cremation burials in south Scandinavia together with razors, tweezers, studs and other items characteristic of the time – with two exceptions. The first one is from Vestfold in Norway where a fragment of a bronze sickle was found in an urn burial from the terminal Bronze Age into the Iron Age (Johansen 1981, p. 48). The second one is a broken sickle in a secondary burial from Ljungby in Halland, dated to the Roman Iron Age by ^{14}C analysis of charcoal – although the grave monument, a cairn, and the other burials had a general Bronze Age character (Hernek 1994, p. 16).

Broken sickles are always found among metal scrap in circulation, not in the axe hoard. Most of them were never used as tools and seem to have been taken directly out of the mould, because the edges are seldom hammered and superfluous metal not taken away.

The total weight of the sickles in the Swedish hoards is hard to estimate, because the material is badly corroded in the Ystad and the Grava hoards. Supplemented with one of the largest Swedish scrap hoards (Nya Åsle in Västergötland) the number of fragments varies from one to more than 40 fragments in one hoard and the weight is 100 g at most. But did the finders really gather all bronze fragments when there were so many other fine artefacts to take care of? I am not sure about that, except in one case. The scrap in the Järn hoard had been put in a clay vessel and the finder picked up both small potsherds and even smaller bronze fragments.

However, there is no conformity between the weight and the number of the fragments. The fragments of sickles in the Kareby hoard are from rather heavy implements compared to the sickles in the Nya Åsle and the Järn hoards, for example. Like the fragments of socketed axes some of the sickle fragments are so small that they could just have been used for repairing, while the weight of others correspond to our small knives, razors, and so on, and the largest fragment from Kareby, weighing 17.4 g, could, for example, be the raw stuff for an awl. But there seem to be some general principles for breaking up the metal (Fig. 9).

The fragments were broken off so that at least one notch for hafting was left, even on the smallest ones. Could our sickle fragments then be used as universal sharp-edged tools of different sizes? The sickles in the two examples from burials above consisted of just one fragment. In burials in Denmark, south Halland and central Västergötland there are also fragments of sickles, mostly in male graves or common to both sexes (Sahlström 1932; Lundborg 1972; Draiby 1989). That could verify the idea of a universal tool, perhaps combined with a growing need to save metal. On the other hand, there are broken sickles even in those parts of Europe where the supply of metal was good.

The crucial point might be that there is not one single explanation for broken sickles. The agricultural intensification and the settlement expansion during the Bronze Age might have been the starting-point for planned mass production of metal saws, harvesting implements, and so on. A normal stone mould for sickles could produce between 300 (Scania) and 150 tools (west Sweden). But were bronze sickles as functional as flint sickles? Were people interested in buying them or did the distributors fail to sell them? For some reason they were not a success, at least not in their original function. Once designed for practical purposes, the sickle underwent a change to non-utilitarian functions as currency or fractional metal values in Late Bronze Age society.

Professionals and conservative mechanisms

What we have seen in this investigation are the professionals, not the beginners. There were general principles for the distribution of metal as well as technical know-how independent of the local supply of metal or the geographical position of the hoards. A mixed hoard is not just an example of ritual and non-ritual objects mixed together, it is an accumulation of raw material for specialized alloys.

But was there a metal standard or just traces of standardization in the mass production of tools and ornaments in south and west Sweden? The indications are as follows:

1. Sword blades, socketed axes and sickles are intentionally and systematically broken into pieces after heating. There is a difference between sickles and other tools, because normally the sickles were never used after casting. The broken bronze sickles are a common trait over wide areas of Europe and may be considered as some kind of monetary structure also in south Scandinavia.
2. There are some standards for tools as regards weight and alloy:

a. Imported raw material for socketed axes including the ingot in the form of defective axes.
b. Imported raw material for ornaments in the form of bundles of bronze wire. Such bundles are also found in Central Europe though there they are said to have been arm rings.

3. Stone moulds for approximately 50 castings of tools and the craftsman's own equipment. The standard could be adjusted to the available quantity of metal; one can see how the cavity for axes was shortened though the mould was still fit for use.
4. Locally cast rods, due to the local demand for metal (cf. the Torbjörntorp rods and the Järn rod).

Even if the sellers used numerical standard weights for metal, I am not convinced that the south Scandinavian consumers or the craftsmen did. They had standard stone moulds for tool production. If Malmer and Sperber are right in their opinion about numerical weight systems in south Scandinavia during the Bronze Age, the traces of reworked metal or standard weights are not possible to identify today. There are no pieces of bronze figurines or gold rings in the scrap hoards, just fragments of swords, axes, lures and bronze ornaments. The fact that no other weights have been found is not an acceptable argument, however – were all distaffs, for example, used just for spinning? There is also a confusing detail in this statement: the weight of the wire bundles from Kareby which coincides with the standardized rods from Torbjörntorp. Is it just a coincidence that the standardized raw material for a fibula disc and a common item of toilet equipment have almost the same weight (15–18 g)?

At a time of increased mass production of metal tools, the embryo of a monetary structure from the Continent – broken sickles – probably reached south and west Sweden too. For the rest of the material we can talk about local standards, practical elements which from a continental or west European point of view indicate strong conservation mechanisms, characteristic of Scandinavia (Stig Sørensen 1989).

What is obvious is also the fact that the most varied scrap hoards have been found in the marginal areas in west Sweden. Why scrap from bronze lures, heavy fibulae and metal for ornament alloying in a hoard at Grava? Judging from the provenance of the metal this was no local scrap; it was exported from the south even though there may have been middlemen. Despite some differences in the amount of metal, there are, for example, the same type of locally manufactured socketed axes from south Scandinavia in the hoards from Håle-Täng and Grava and the same sword ring for shod sheaths in both the Ystad and the Grava hoards.

As to the mass production of metal tools, there is one standard stone mould from the woodlands north of lake Vänern with casting cavities for two sickles and a 20 cm long dagger or rather a blade for a spear. This is the only mould for a dagger/spearhead from the Bronze Age found in Sweden. With the large slate Stone Age spears from this area in mind, the mould reflects the seller's idea about how to get in touch with people rather than their own demand. Correspondingly, the heavy fibula was perhaps meant as a matrix for ornament production in clay moulds.

I believe that the scrap is still here because the interest in metal was less than expected. This hoard is not primarily a mirror of the demand for metal, it is the producer's anxious endeavour in buying products from this area, perhaps through middlemen with interests in metal objects. As can be seen on the map (Fig. 2), the accumulation of metal scrap hoards is close to the west Scandinavian soapstone deposits, i.e. the best raw material for standard moulds. But the landscape is also a border area where the fully cultivated land of south Scandinavia gives way to the woodlands, which must have been an interesting potential for the exchange of other commodities too. The closest equivalent to the Grava hoard in the south is probably the collection of semi-manufactured soapstone moulds found in north-west Scania in 1881 (Weiler 1994, p. 128).

Some final remarks

From the archaeological source material we can find out and analyse the contacts between different areas and still see some kind of general control of the supply of metal during the Late Bronze Age. But we know very little about the distribution mechanisms and the people involved. There must, for example, have been a great deal of luck and common sense in the contacts between the prospectors and the locals in areas with little interest in or knowledge of metals.

Usually bronze fragments are not a very popular find category from archaeological excavations. They are hard to explain and expensive or maybe unnecessary to preserve. In reality, however, they may represent parts of the distribution systems searched for as well as the people involved. As far as I know, there is at least one example of a piece of a broken sickle and a rod of about the same size as the Järn rod found in a workshop in central Bohuslän (Weiler 1996, p. 100). The material from scrap hoards was distributed to specialists not only as raw stuff but also as some kind of "metal standard".

The finds mentioned in the text have the following inventory numbers:
Hoards: Ystad Museum 1388–1415 (Ystad), SHM 1995 (Järn), SHM 4127 (Nya Åsle), SHM 5295 (Kareby), SHM 17093, 17143 (Grava), Vänersborg Museum 44–45 (Håle-Täng).
Moulds: SHM 23823 (copy, Torbjörntorp, craftsman's equipment), Helsingborg Museum 443–26 and 444–26 (Brunnby, semi-manufactured moulds), Värmland Museum 14044a (Ransäter, dagger/spearhead).

Note

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