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CHAPTER 2

FROM ‘VALUE ASCRIPTION’ TO COINAGE: A SKETCH OF MONETARY DEVELOPMENTS IN WESTERN EURASIA FROM THE STONE TO THE IRON AGE

Lorenz Rahmstorf

Abstract

Surely, ‘money is one of the most timeless, all-pervading, and arbitrary inventions in human history’ (Haselgrove and Krmnicek 2012, 235), yet it is possible to differentiate three different stages of monetary use and the estimation of value. Exchange is considered as the key to assessing the precise value of commodities. Hence it is of primary importance to understand how exchange was conducted. During the first stage, which began at an uncertain date within the Stone Age, various substances were considered as valuables and could have functioned as some form of currency, yet their range was limited by many factors, not least by social constraints. This was still very much the case during the Copper Age, even if metals now offered new and fantastic possibilities for defining value and creating money. On present evidence it cannot be established whether objects standardised by size (*aes formatum*) existed on a large scale at this period. A relationship between value and mass was apparently not yet established. Only in the Bronze Age did the invention of weights and scales enable such a nexus, marking the second stage. This step created a highly precise medium for exchange, as a method of payment and a standard of value. Metal was clearly now a currency. These innovations were more revolutionary than the appearance of coins in the Iron Age, the threshold of the third stage of fundamental monetary developments.

Introduction

If the title of the conference ‘The Archaeology of Money’ refers deliberately to Michel Foucault’s *The Archaeology of Knowledge* (1969) – like many other ‘The Archaeology of...’-publications across the humanities and social sciences – you could indeed find some concurrences, as Foucault’s ‘archaeological method’ is grounded in the premise that ‘systems of thought and knowledge... are governed by rules, beyond those of grammar and logic, that operate beneath the consciousness of individual subjects and define a system of conceptual possibilities that determines the boundaries of thought in a given domain and period’ (Gutting 2013). Some of the aspects mentioned apply well to the early history or the emergence of money, like the fact that money apparently operated (at least sometimes) beneath the consciousness of individual subjects. It is, however, equally possible that the conference title instead reflects the popular understanding of archaeology: an assumed old and long-lasting emergence, one that is mixed with many uncertainties and mysteries, but a history which is somehow retrievable through the application of the heuristic method. For non-specialists the title might refer to the period before coins, because coins (and later paper money) are sometimes considered to be the first money, however, ‘coinage is money; but money is not necessarily coinage’ (Haselgrove and Krmnicek 2012, 236; cf. Monroe 2005, 158).

This contribution will trace some major developments in the history of money. Coins are considered the endpoint of a development that started several millennia before. The geographical focus is on the broad regions of Europe, the Mediterranean and Western Asia – here understood as Western Eurasia – in the middle of which, in Western Anatolia, the first well dated coins were minted in the earlier or middle sixth century BCE (Howgego 2011, 2–3; von Kaenel 2012). It goes without saying that this essay is just an approximate outline of potential developments in these regions, illustrated with a few examples of archaeological data. We will proceed by following traditional period terminology. Key questions comprise:

- How was value defined and estimated in the different periods?
- To what degree can we speak of any kind of money at these periods?
- What were the fundamental changes and what brought them about?

In order to tackle these questions we must first consider some problematic issues: the nature of valuable objects in the archaeological record and the estimation of economic value and money.

Valuable objects

It is a rather common sense assumption that there were always objects desirable to humans, objects that were considered valuable. But how can we detect materials and objects perceived as valuables in ancient and especially prehistoric periods? There are different categories at our disposal that help to define valuables: rarity, expenditure, circulation and context. If the substance in question scores highly in most if not all of these categories it can be understood as a very desirable thing in a given ancient society.

1. *Scarcity* is certainly an important criterion. Rare substances, materials that are highly uncommon in the natural world, receive special appreciation and might become valuables only for this reason. Well known examples comprise for example jadeite, amber and lapis lazuli.
2. *Expenditure* defines the amount of investment needed to procure and process the materials and so can stand in correlation to their value. For example it is in most cases difficult to get access to metal ores and they need a complex process of refining and smelting, hence a large amount of investment. In this respect it is not so surprising that metals seem to have been highly appreciated in ancient societies. Scarcity and expenditure were emphasised long ago by Georg Simmel in his classic study *Philosophie des Geldes* (1900) as determining value.
3. *Circulation* is another sign. Objects that often changed place in their 'lifetime' indicate a special esteem. Such object biographies have been a popular research field in recent years (Gosden and Marshall 1999).
4. *Context* and contextual information are possibly the most indicative evidence available to pinpoint value in the archaeological record. Whether as a deliberate part of the goods in a grave or a hoard, or chance finds in settlements, objects can tell us a great deal just from the context in which they are found.

Estimating economic value

While it is therefore to a certain extent possible to detect in the archaeological record which objects were considered as valuable by the ancients, a fundamental problem relates to the question of how value was estimated in early times with regard to physical things. These can be called commodities, when they are defined as objects of economic value. We will briefly discuss three different approaches for estimating value.

One hypothesis was formulated by the cultural anthropologist Arjun Appadurai. Value is created through exchange. It is embodied in commodities that are exchanged (Appadurai 1986, 3), it is shaped by society. Hence

value cannot be inherent in things, but is a culturally constructed property. In consequence the thing may not be a commodity constantly, but may lose or regain this status in context-dependent situations ('a social life of things'). This stance has become a pillar of Anglo-American archaeological literature in recent decades as it opened the way to more fluent interpretative schemes and a biographical approach' to 'silent' artefacts (Skeates 2009).

The popularity of this view has pushed a second hypothesis on early value assessment into the background: as argued by classical economic theorists like Adam Smith (1776), value relates to the amount of labour needed to produce or obtain it. With regard to the periods considered here one can therefore envisage rather stable value ratios because they were established over long periods of time through experiencing the application of similar technology to produce or obtain a commodity. Imagine two persons meeting to exchange domesticated animals. One has a cow, the other has sheep. Let's say they exchange one cow for four sheep because there has been a rather similar ratio of value between the two domesticated animals since forever (or at least since the Neolithic) reflecting factors like the amount of primary (meat) and secondary (wool, milk, etc.) products these animals can provide. Such ratios would therefore be conventional, being the result of processes of understanding all possible uses of things and their specific qualities, and therefore reflect accumulated cultural experience.

The written sources of ancient Mesopotamia document the preservation of very stable conventional value relations of commodities – prices – like silver, copper, wool or barley (e.g. Liverani 2006, 59; Monroe 2005, 161). Another example of a conventional reference of value is an ox in Early Iron Age Greece. John Kroll remarked that 'equivalency units like Homeric oxen were a routine feature of most early economies' (Kroll 2012, 34), referring to documentary evidence from Egypt and Mesopotamia (below). Such conventionally accepted standards of value may have been a common feature of many prehistoric/pre-literate societies (as in the hypothetical example above). In such societies – literate or not – things might only have changed when new materials or technologies appeared that overthrew such conventions and ultimately created new ones.

Finally, in neoclassical economic theory the value of a commodity is determined in relation to supply and demand, which set its price. Everything therefore theoretically has a price (value), which is regulated by the rather abstract market. These premises are of course hardly realistic for periods without swift information transfer from one region to another. Nevertheless, special demand for certain often rare materials is taken for granted and validated by archaeological contexts, as mentioned above for certain rare substances. However, we fail to reconstruct a clear-cut relationship between demand and supply, mainly because the infrastructure and political environment was not

favourable for achieving regular supply, at least in most periods and regions from the Stone Age to the Iron Age.

In sum, we are faced with rather contradictory hypotheses about value: it is context-dependent, it is based on labour and convention, or it is determined by demand and supply. All, however, consider exchange as the key to assessing the precise value of commodities. Hence it is of primary importance to understand how exchange was conducted. We will therefore consider some evidence from the Stone Age to the Iron Age.

Money

'The difficult question as to the best definition of money has been complicated by the effort of writers so to define the term as to give support to their particular theories' (Bastable 1911, 694, quoted by Powell 1996, 225). Whereas barter is limited by the required 'double coincidence of wants' (Jevons 1875, chapter I.5) and the indivisibility of certain goods (such as living animals), money offers a new flexibility for exchange. But what is money? Most specialists agree that any form of money should have the following three functions, with the first criterion considered the most important: a means of exchange and payment, but also a standard of value/a unit of account and a store of value (e.g. North 1994, 9). In this respect Carl Menger emphasised that the original and primary function of money was as a generally accepted means of exchange: '*Die ursprüngliche (die primäre) und allen Erscheinungsformen und Entwicklungsstufen des Geldes gemeinsame Funktion des letzteren ist die eines allgemein gebräuchlichen Tauschmittels*' (Menger 1909, quoted by Thomasberger and Voy 2000, n. 1). Because of this function it also becomes a standard of value. It has been described as a technology that communicates 'and because the information communicated is concerned primarily with prices of things, one might define a given monetary system as a language of value' (Monroe 2005, 158).

But how can we perceive money in prehistoric times when it is only identifiable through its use? Kurt Regling (1926; compare Mölders 2009, 299) named a few potential indicators: the appearance of identical pieces in great numbers, their contemporary appearance with other forms of money and their impracticality (once objects of utility, unfinished objects). Regling differentiated non-metallic monies like cattle (latin *pecus* > *pecunia*) or shells, and metallic money like '*Gerätegeld*', weighed raw metal or coins documented in ethnographic and written sources. Non-metallic money in particular is often called primitive, simple or special-purpose money because it 'performs some of the functions of our own money, but rarely all' (Dalton 1965, 44), or may have been restricted to specific purposes, being 'not media of commercial exchange, but... ranked into a hierarchy for the purposes of noncommercial exchange'

(Maurer 2006, 20). Others take the opposite view that there is no money without a general convertible means of measuring value (Firth 1965, 17). In the following section we will encounter some examples of potential monies.

The Stone Age

There are contextual indications that certain objects were considered as valuables as early as the Upper Palaeolithic. This is implicit for example in jewellery found in Upper Palaeolithic graves and shelter sites. According to Marian Vanhaeren (2010) jewellery was used as an object for exchange, as a marker of social role or ethnicity. In some cases, lithic material or Mediterranean shells ‘travelled’ over distances of hundreds of kilometres during the Upper Palaeolithic (Floss 1994, figs. 202, 210–12). It is possible that these hunter-gatherer communities brought these materials from the sources themselves, but potential exchange between mobile human groups should not be excluded (Floss 1994, 321). It is a reasonable assumption that specific rare materials were already highly appreciated in these societies. Nevertheless, the required mobility or exchange is more clearly ascertainable from the Neolithic onwards when people became sedentary.

From the mid- to later sixth millennium BCE, i.e. the Early Neolithic (Linear Pottery culture) in Central Europe, *spondylus* shells from the Mediterranean (e.g. Sévériadès 2010), most likely from the Aegean, were deposited in graves of the earliest farmers in Central Europe and in settlements in southeast Europe (Windler 2013, fig. 1). In Linear Pottery culture cemeteries in southern Bavaria, as at Aiterhausen-Ödmühle, *spondylus* artefacts like bangles, beads and shell valves with v-shaped notches are found in only some of the 159 graves with 176 interments (plus 69 cremations). Norbert Nieszery interprets these as the most richly equipped graves (Nieszery 1995, 205–7, fig. 103). It is calculated that only *c.* 1.5% of the population of the Linear Pottery culture received *spondylus* in their graves (Müller *et al.* 1996, 88). The special importance of *spondylus* is also implied by the fact that the bangles on the upper arm were worn already at a young age while the person was still growing. Later in life the bangles would have constricted the flesh on the upper arm. This underlines the role of the *spondylus* in marking out just a few members of the community from an early age. The value possibly stood in a direct relation to the status of the person. There is no correlation between the occurrence and number of tools and weapons on the one hand and jewellery like *spondyli* on the other. They followed different rules (Falkenstein 2008, 85, 88, fig. 5a). Hence, the ‘value ascription’ was probably defined mainly (or only?) by social criteria within that society. When not everybody is allowed to wear *spondylus* it is neither possible nor necessary to express value ratios with such a material.

We still know much too little about the significance of valuables in Neolithic societies, but this example illustrates the sheer impossibility of expressing value within these societies beyond a context-dependent and highly socially imbedded situation. It seems that it was not possible to formulate an economic value, say in ratios to other cultural objects, yet value was surely ascribed to such objects.

The Copper Age

Valuables are even more visible in the archaeological record during the Copper Age. In western and central Europe jadeite axes were objects of high prestige and value during the fifth and fourth millennia BCE (Pétrequin *et al.* 2012). This is implied by all archaeological indications for value mentioned above. The material was rare and its procurement needed effort as it is only found in a few places in the Western Alps (Mont Viso, Mont Beigua) at heights between 1500–2400m. In addition, the evidence of its circulation and the context where jadeite axes were found underline the importance of the material during this period. But the new important material during the Copper Age is of course metal, more specifically copper and gold. Metal brought about considerable change, appearing as new material in some quantity in the fifth and fourth millennia BCE in Western Eurasia. Its low volume and high portability, storability, preservability (with no maintenance costs) and malleability made it an excellent candidate as a measure of value. However, metal needed new formats for its value to be assessed, because it cannot be counted easily since it is amorphous in its physical state. In addition, being a new material it had no traditionally worked out relations of value to the other goods used up to then.

In the Carpathian basin and the Balkans heavy metal tools, especially axes, are typical during the later fifth and earlier fourth millennia BCE. In the cemeteries of the Bodrogheresztúr culture of the Middle Copper Age in the eastern Carpathian basin during the earlier fourth millennium BCE there are always only one or two graves of adult or mature males within the graveyards of *c.* 25–100 individuals which contain an axe (Lichter 2001, 344), for example Tiszavalk-Kenderföld: Grave 29 (Patay 1984, pl. 66D; Lichter 2001, fig. 324), or Magyarhomorog-Kónyadomb: Grave 46 (Patay 1984, pl. 67C; Lichter 2001, fig. 148). These graves belong to the richest group within the cemeteries in terms of the numbers of objects placed in the graves. These rather rare objects were obviously of considerable value in this region during the earlier fourth millennium BCE. Their variability in shape and size and the common appearance only in single specimen make it unlikely that they had a monetary function. Like the *spondylus* shell ornaments their use was socially regulated, in this case possibly as an object used to distinguish the clan leader of a village

community (Patay 1974, 46). Therefore value ratios to other objects produced and used in that society could not and were not expressed by such artefacts.

But how would it have been possible to measure ratios of value? One possibility is offered by standardised ingots of metal, called *aes formatum* from the terminology used in later Roman archaeology (Haeblerlin 1910). *Aes formatum* acquires its value not from its weight but from its form and number. It seems unlikely, however, that the copper axes from the Middle Copper Age in the Carpathian basin represent standardised ingots. Their shape and size varies considerably and ratios in the mass of the objects are not detectable. Even in the richly furnished cemetery of Varna in Bulgaria (c. 4600–4400 BCE), it is not possible to detect any standardised objects from the published evidence, although *spondylus*, gold and copper artefacts all occur together in the richest burials (Krauß 2010, 294). Eight gold and electrum rings found at the Nahal Qanah Cave, Cisjordan (Figure 2.1), from a context of the second half of the fifth millennium BCE (Gopher *et al.* 1990; Gopher and Tsuk 1996; Rowan and Golden 2009, 46; Klimscha 2013, 35) might, however, be considered *aes formatum*. The metal was poured in open moulds and then hammered into their final shape. They consist of 64.4–98wt% gold and 1.47–35.22wt% silver and have a maximum outer diameter of 4.35–5.04cm. They look similar



Figure 2.1: Gold and electrum rings from the Nahal Qanah Cave, Cisjordan, late fifth millennium BCE. The largest ring is just over 5cm in diameter. (Courtesy of Avi Gopher and Tsvika Tsuk. Photo: N. Slapak.)

but are differentiable. Their weights are 88.06g, 106.97g, 108.59g, 136.09g, 137.38g and 165.03g (two have not been weighed). It is interesting to note that there are two pairs with rather similar mass of *c.* 107.8g and *c.* 136.7g. It is possible that their similar weight was intentional. This is not in itself, however, necessarily a sign of the use of scales. Similar weights of objects could also be achieved by using ingots of similar size. For example 16 small rod bars (Figure 2.2: 12–16) with notches on one side were found by Heinrich Schliemann in Treasure F at Troy, dated to the second half of the third millennium BCE or perhaps more precisely to the twenty-third century BCE, according to Göksel Sazcı (2007, 361). It has long been assumed that these rod bars were intended to produce objects of similar weight and that these notched objects conform to known weight standards of the third millennium BCE (Schliemann 1881, 553; Götze 1902, 342, 361–2, 370; Tolstikov and Treister 1996, 118–19, cat. nos. 128–32; Treister 1996, 215–16; Thompson 2003, 71, fig. 4; Bobokhyan 2006, 88–90).

In these cases, however, we are discussing evidence from the Early Bronze Age. Similar artefacts from the Copper Age have not, to my knowledge, yet been identified. In addition, the evidence for other potential *aes formatum* from the Copper Age, like the rings from the Nahal Qanah Cave, is tenuous. Hence, it is so far difficult to demonstrate that Copper Age ratios of value were based on ingots of metal, which were standardised in size and therefore also roughly in mass. It seems more likely that 'value ascription' was practised during this period. A differentiated relationship between value and size (and therefore weight) was apparently not yet really consciously understood or did not yet matter. But, as in earlier periods, high value was clearly ascribed to certain objects and substances. During the subsequent Bronze Age, however, things changed quite dramatically.

The Bronze Age

The beginning of the Bronze Age marks a turning point in human history. While the Old World was not unconnected before then, the need and desire for certain commodities like metals (copper, tin, silver, gold), precious stones (e.g. lapis lazuli, carnelian), textiles and other goods reached a new level during this period, especially in the large geographical area between the Eastern Mediterranean in the west, the Caucasus and Central Asia in the north, the Greater Indus in the east and the Gulf and Egypt in the south (Aruz and Wallenfels 2003). Only at this period a new category enters the sphere of exchange. While *aes formatum* might have functioned to give an approximation of value ratios, any intended precision required a notion that had apparently not been worked out before: the notion of weight.

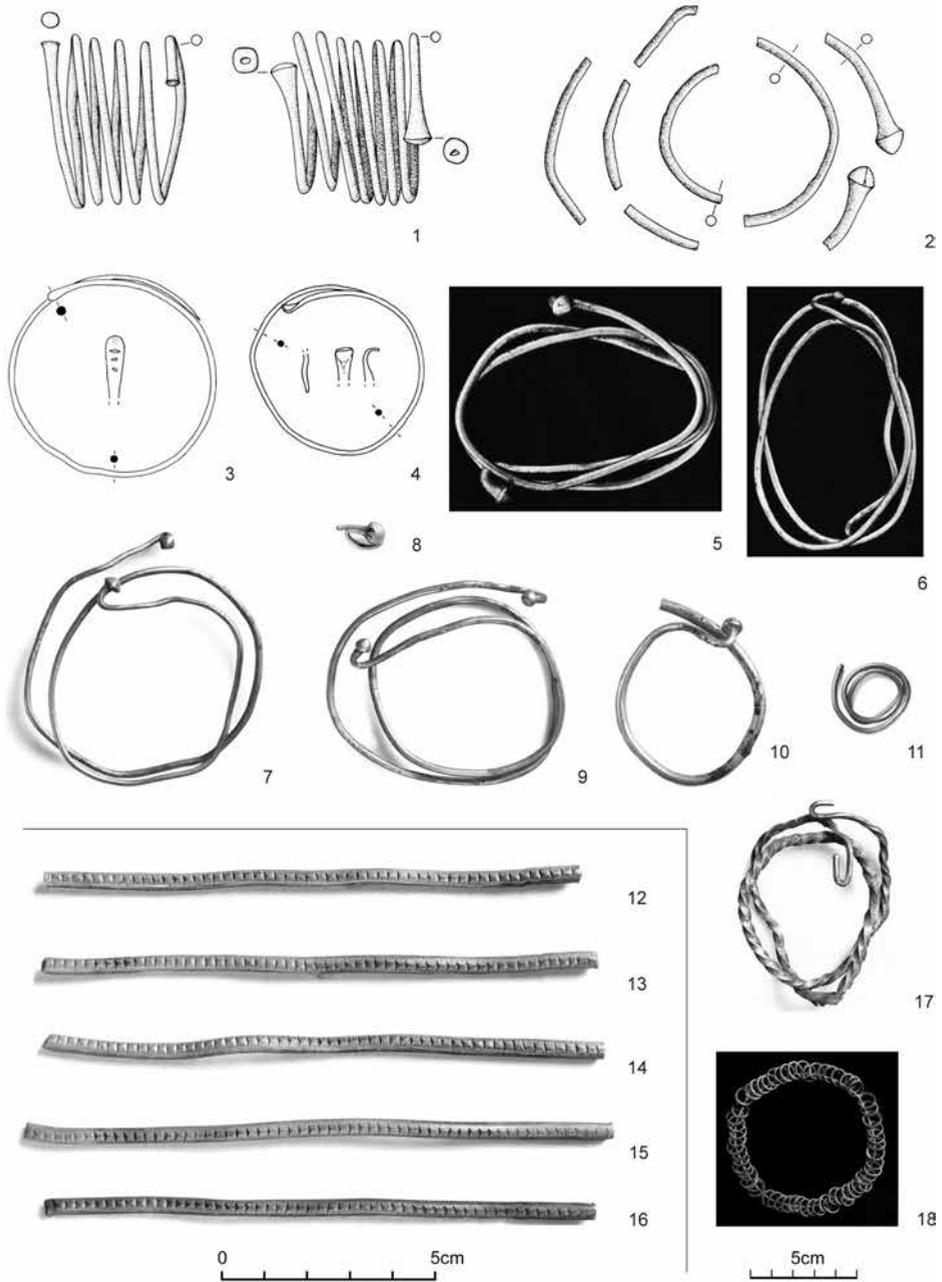
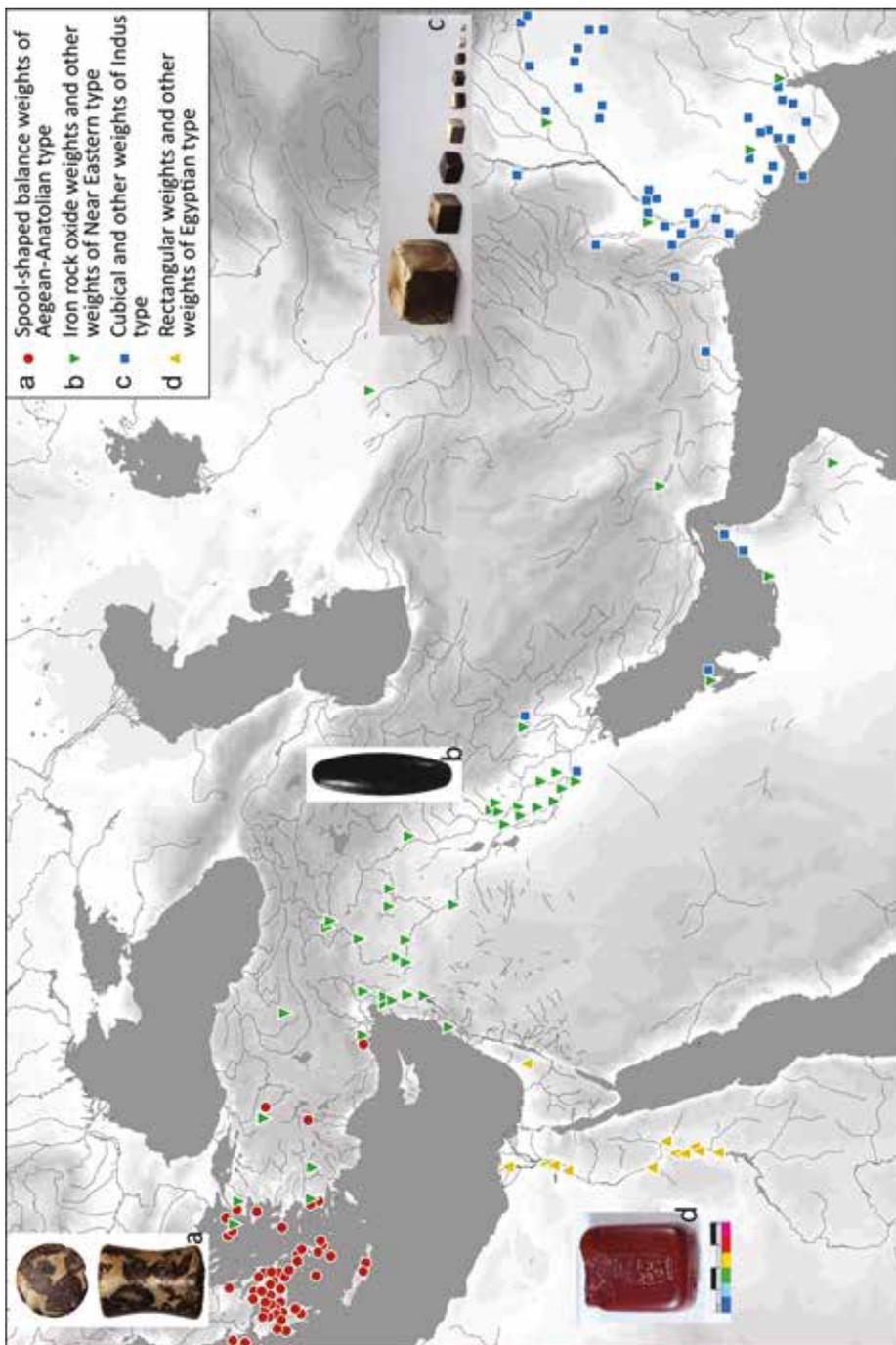


Figure 2.2: Neckpieces, torcs, needles and ingots from the third millennium BCE Aegean, made of silver (1–2) and gold (3–18). 1–2 Steno, Lefkas (after Kilian-Dirlmeier 2005); 3–4 Kolonna, Aegina (after Reinholdt 2008); 5–6 Poliochni, Lemnos (after Bernabò-Brea 1976); 7–18 Troy (after Tolstikow and Trejster 1996). Scales approximate.

Weight as a category had to be comprehended through physical experience. Whilst this seems obvious to us, attempting to assess the weight ratios of things in relation to one another was a revolutionary step in human development. Scales and weights were the new devices. They enabled people to express the principle of equilibrium through the equal-arm balance and multiples or fractions of a mass-unit through balance weights. Definite weights made of stone are first observed around 3000 BCE and occur in some number in the early third millennium BCE. There are some methodological problems in identifying scales and especially weights, for example weights are much more easily recognisable when shaped in a standard form. This happened from the early third millennium onwards. Specific shapes (and materials) imply canonical types of weights for certain regions (Figure 2.3): in the Aegean these are spool-shaped (Rahmstorf 2003), in Egypt rectangular (e.g. Cour-Marty 1990), in Syro-Mesopotamia and beyond iron oxide stone weights (e.g. Ascalone and Peyronel 2006), for example in the shape of a sling bullet (*sphendonoid*), and in the Indus valley mainly cubical (e.g. Miller 2013).

It is interesting to compare the earliest dated weights, either by context or inscription, in the relevant regions. In Egypt an apparent weight (Mollat 2007, 2046, fig. 1) – unfortunately without a context like most examples from Egypt – bears the name of King Narmer of Dynasty '0' (Neqada III c1), dating it to 3000 or even 3100 BCE. Potential weights have also been found in royal graves of the First Dynasty at Abydos (Weigall 1901, 385, pl. IV, 7043, 7046). Definite weights have come to light in settlements layers of the Second and Third Dynasty at Buto (von der Way 1997, 153, 162–3, 204, pl. 70, 9; XXII, 8) and Elephantine (Kopp in Raue *et al.* 2004, 12–13, Tab. 1, 24334a). In Syro-Mesopotamia, too, well-documented weights from around 3000 BCE are scarce, but are known in contexts of Early Dynastic II onwards – for example in northern Mesopotamia or the Diyala-Region (Rahmstorf 2014). In Anatolia and the Aegean, weights are documented from at least 2700 BCE, if not before (Rahmstorf in press), for example at the newly excavated site of Çukuriçi Höyük (Horejs 2009, 365–6, fig. 8).

In the Greater Indus the earliest weights have been excavated at Harappa (Kenoyer 2010, 115), at Kalibangan (Lal *et al.* 2003, 237, pl. LIII – not identified as such in the publication) and Kunal (Possehl 1999, 718) in layers of the late Early Harappan period or the so-called transitional phase to the Mature Harappa period. This transitional phase is dated to 2800–2600 BCE. Given the similar dating of the earliest weights in all these regions it seems likely that we are dealing with a single origin and that the idea of weight and weighing spread swiftly as far west as the Ionian Sea and as far east as Gujarat in north-west India. There are overlaps in the distributions of weights associated with different cultural spheres in the third millennium BCE: haematite *sphendonoids* of 'Near Eastern type' are found in the northeast Aegean (Poliochni, Troy)



and the Greater Indus (Harappa, Mohenjo-daro, Dholavira, Lothal), whilst Aegean type weights occur as far east as Cilicia at Tarsus, and Indus weights as far west as southern Mesopotamia at Ur (Figure 2.3). These observations are also synchronised by some overlaps in the mass-units used in the various regions. Furthermore, weights were used in regions without an apparent state organisation. 'Trade before the flag is a universal human experience' (Postgate 1992, 220), also in this case trade preceded government intervention (Monroe 2005, 164).

What evidence do we have then for money at this period? For Mesopotamia the Assyriologist Marvin Powell, one of the most eminent scholars who has worked on this subject, pointed out that 'the history of money in Mesopotamia is intimately bound up with weighing and measuring' (Powell 1996, 226). For example, the weight unit 'shekel' (gin_2 – the Sumerian word gin also means axe!) in texts from Fara/Šuruppak (c. twenty-sixth century BCE) is always related to silver (Krebernik 1998, 305, n. 703). Payments were made and prices were expressed in shekels or minas (60 times a shekel), as for example in an inscription from the obelisk of the Akkadian king Maništušu from the twenty-third century BCE (Postgate 1992, 95, text 5:4). During the Ur III period in the very late third millennium and during the Old Babylonian period of the earlier second millennium BCE, silver is the constant reference for determining the value of other goods. The Codex Ešnunna lists the amount of staples like oil, bitumen, wool or salt you can buy for one shekel of silver (Postgate 1992, 192–3, text 10:2). Powell (1996) argues that there were various monies, with grain (barley) and silver probably the most widely accepted ones. But lead, copper/bronze, tin and gold also functioned as money because they were also common denominators of value.

Occasionally other substances or living objects could also function as money but they lacked this crucial factor (*ibid.*, 227–8). Today, it is a commonly shared view among Assyriologists that 'silver (together with barley) covered all basic functions of a currency' (Paoletti 2008, 128, with n. 3 for further references): it was an equivalent of value, a medium for exchange and payment and a store of value as documented by hoards in temples and palaces. A few scholars, most prominently the Assyriologist Johannes Renger, have denied money any substantial role, on the grounds that it was unnecessary in an economy based (allegedly exclusively) on the temple, the palace and subsistence (Renger 1995; reply by Powell 1999). It is true that a 'private sector' or

(*opposite*) Figure 2.3: Distribution of balance weights in the third millennium BCE. (a) spool-shaped weight from Tiryns, Greece (Photo: L. Rahmstorf); (b) sphenonoid weight from Ebla, Syria (Archi 1987, n. 18); (c) cubical weights from Chanhudaro (Aruz and Wallenfels 2003, cat. no. 292a); (d) rectangular weight from Egypt <http://www.digitalegypt.ucl.ac.uk/chronology/khety.html> (accessed 21 August 2014).

freelance merchants are not very well represented in the epigraphic evidence, but the textual archives derive largely from palaces and temples. But when we look beyond cuneiform, we find weights as primary evidence for trade, production and taxation not only in palaces and temples but also in domestic areas of settlements, for example at Tell Sweyhat (Holland 2006, 231) and Tell Selenkahiye (van Soldt 2001, pl. 9.2, c, f, e). This shows without doubt the pervasive nature of weighing and consequently money use from the third millennium BCE in Mesopotamia.

There is also written documentation for metal objects of standardised weight, especially from Royal Palace G at Ebla (e.g. Archi 1985). In addition, coils and rings of silver are known from several hoards of the third and second millennia BCE in Mesopotamia. Some are finished objects, others apparently scrap. Marvin Powell assumed that they might have been used as a pre-coinage currency (Powell 1978; also Le Rider 2001, 1–24) building mainly on possible textual references and very limited data from the objects. In addition, the etymology of the word ‘silver’ in Akkadian (*kapsu*) is related to the word ‘broken’. More recently Luca Peyronel (2010) assembled some data and stated that scrap silver, fragments of ingots or lumps are generally only briefly mentioned in published reports. Such artefacts are therefore in most cases insufficiently reported to permit an assessment of their potential use in a monetary function. On present evidence it seems unreasonable to assume that the existence of produced or cut weight-regulated metal objects was already hinting at coinage, since ‘the correspondence (in some cases attested) between the number of rings and the total weights was not important for the administration, since the rings were always weighed rather than counted’ (Peyronel 2010, 934), or as Raz Kletter (2004, 209) put it, each transaction involving silver/gold required weighing.

Nevertheless this field should be accorded much more attention in the future, both in and beyond Mesopotamia. Metal objects apparently produced or cut to the amount of a certain mass-standard also occur for example in the Aegean Early Bronze Age. A few Early Bronze Age hoards at Troy, Poliochni, Steno and Kolonna contain so-called neckpieces, torques or needles. At Troy (Tolstikow and Trejster 1996, 78, 117, 140, cat. no. 75–6, 127, 163) two were excavated in Treasure A (Figure 2.2: 7, 9) and single specimens in Treasure F (Figure 2.2: 8) and Treasure J (Figure 2.2: 10). Their mass (4.55g; 36.26g; 55.15g) fits well ($1/2 \times 9.1g$; $4 \times 9.07g$; $6 \times 9.19g$) with the unit of *c.* 9.1–9.4g well known in the Early Bronze Age Aegean and Syria. The piece from Treasure J is a bit too heavy ($48.2g = 5 \times 9.64g$) but solid baked particles of silver chloride adhere to its surface (Tolstikow and Trejster 1996, 140). Similar silver objects have also been excavated in a hoard from the settlement of Poliochni on Lemnos in the Aegean Sea opposite Troy (Figure 2.2: 5–6; Bernabò-Brea 1976, 199, 288, pl. CCCXLVI, 25–6), and in two graves in

the R-cemetery at Steno on Ithaca in the Ionian Sea (Figure 2.2: 1–2; Kilian-Dirlmeier 2005, 13, 26, 117–18, pl. 5, 1; 6, 6; 19, 5). Unfortunately they have not yet been weighed.

The coil rings from Steno were worn on the lower arm, but the ones from Poliochni and Troy are irregularly twisted, which makes their current interpretation as adornment rather unrealistic. Their mass and their deposition in 'treasures'/hoards suggests that they were jewellery ingots, a store of value that at the same time had a precisely defined mass (= value). They were indeed ring money. It is also possible that eleven gold and silver 'pins' (Figure 2.2: 3–4) from the newly found hoard at Kolonna on the island of Aegina can be interpreted in a similar way (Reinholdt 2008, 15, 45–50, 106–7, pl. 3, 005–013, pl. 8, 2–3, pl. 9–11, 2). Again, these 'pins', which have a length up to 33.4cm, are twisted in circle; again their weights are not available. Claus Reinholdt remarked on the uniqueness of these objects not only within the Aegean, but also in Anatolia and Syro-Mesopotamia (Reinholdt 2008, 45), but in view of the somewhat similar examples from Troy, Poliochni and Steno this no longer holds. In addition to these objects some bent gold wire from Treasure R weighs 9.45g (Figure 2.2: 11; Tolstikow and Trejster 1996, 186 cat. no. 242), a symmetrically twisted gold wire with hoe endings from Treasure A weighs 63.92g or 7 x 9.13g (Figure 2.2: 17, Tolstikow and Trejster 1996, 78–9, cat. no. 77) and 61 small rings from Treasure J together have a mass of 9.4g (Figure 2.2: 18, Tolstikow and Trejster 1996, 140–1, cat. no. 162). Hence, preliminary data on their mass is only available from Troy; this indicates a correspondence to multiples of the mass-unit of just above 9g, but more data is needed. This potentially indicates deeply entrenched conceptions of value and weight that have not yet been retrieved from archaeological data.

Several important points may be noted in considering the evidence for the third millennium BCE:

1. Within only *c.* two to three centuries of its first appearance around 3000 BCE, the innovation of weighing had been disseminated across a vast geographical area, from the Aegean in the west to the Indus valley in the east.
2. The use of similar mass-units at places so far apart demonstrates that they must have been disseminated through cultural contacts. In fact, the complexity of weighing systems with various units, multiples and fractions required some apprenticeship for the untrained. It is a reasonable assumption that the skills could not have been acquired without teaching; mere observation would not suffice to understand it. We must consequently take into account face-to-face communication of the mathematical principles that eventually resulted in the wide distribution of weight metrology. One plausible hypothesis is therefore that a highly mobile class of merchants was responsible for the dissemination of similar weights or weight-units.

3. In the Indus valley, the Aegean and western Anatolia weight metrology appears in the earlier third millennium BCE at about the same time as the first unambiguous signs of the use of seals for administrative purposes is documented (Rahmstorf 2011, 109, fig. 9.2), and in the Indus also of writing. This apparent nexus implies not only contemporaneous dissemination of both innovations by a mobile class of people, but also their potentially connected function: commodities were being weighed, secured, marked and stored, strongly emphasizing concepts of property. The key innovations, seals and weights, formed an *administrative and commercial tool kit*, which drove the economy of the day.
4. In Mesopotamia mainly silver but also other substances clearly functioned as money. It was a fundamental equivalent and store of value and was used as a means of payment and exchange. The textual documentation substantiates this. Potentially standardised metal objects, especially of silver, are a deeply neglected field of study. Such items from Syro-Mesopotamia are often not published with their weight, even in recent publications. Preliminary data from other contemporary areas such as the Aegean also hint that silver or gold objects sometimes had standardised and mass-related shapes, possibly functioning in a manner similar to silver objects in Mesopotamia. More empirical data is clearly needed.

A few words should be added concerning Bronze Age developments in Europe outside the Aegean. In the late third and the early second millennia standardised metal ingots also appear to be present in central Europe in the form of copper ring ingots of the Early Bronze Age (Lenerz-de Wilde 1995). They appear in large numbers in hoards, sometimes in bundles of five or ten rings. They are also unfinished (in regard to their unpolished surface) and they often cluster statistically in weight. A monetary function is therefore likely, although it is not always possible to prove this. Some hoards cannot be interpreted this way, for example the rib ingots from Purharec in the Czech Republic, which weigh between *c.* 100g to *c.* 200g without showing any clustering (Chvojka and Havlice 2009, graph 2).

Only in the second half of the second millennium BCE is there secure evidence for the use of weights in Europe outside the Aegean. The increasing presence of weights as signs of complex economic procedures in Europe has been noted in recent decades by several archaeologists, particularly Christopher Pare (1999; 2013) for central Europe, Andrea Cardarelli *et al.* (1997) for Italy and Raquel Vilaça (2011) for Portugal. Interestingly, the metal weights from Portugal were apparently based on the 9.4g unit that was commonly used throughout the Bronze Age in the east Mediterranean (Syria, Anatolia, the Aegean). In sum, the state of research is still generally very sketchy for Bronze Age Europe.

The Iron Age

A major advance – for some, *the* major advance – in the history of money was the invention of coinage: ‘a stamped piece of metal of standard weight, certified by an authority with marks of identification’ (Haselgrove and Krmnicek 2012, 240). This innovation was to ‘save men the trouble of determining the value on each occasion’, as long ago described by Aristotle (*Politics* 1257a; Kroll 2008, 13). But was it really such a fundamental change? We have seen that money in different forms was present from much earlier periods, even if there is as yet no evidence that metal was then produced in standardised and guaranteed amounts like coins. In addition, coins were still commonly checked and weighed to control their alleged value. The procedure did not change very much. In recent scholarship the appraisal of the invention of coinage has been revised, and coinage is often situated ‘within the continuum of development of monetary instruments’ because it was ‘a development from an existing Near Eastern tradition rather than a fundamentally new technology’ (Meadows 2008).

One aspect which has received special attention (e.g. Thompson 2003; Kletter 2003; Gitin and Golani 2004; Kletter 2004) is whether the precious metal found in ‘Hacksilber’ hoards of the southern Levantine Early Iron Age (c. 1200–600 BCE), which were already guaranteed by weight and composition – aspects defining early coinages – not only foreshadow the invention of coins around 600 BCE but in fact blur any clear differentiation between these sealed chocolate-bar ingots and coinage (Thompson 2003). The problem is again that there is no conclusive evidence that they were proportioned precisely according to weight (Kletter 2004, 207). Coins, however, do guarantee that, at least theoretically. Hence full comprehension of the idea of coins should still be considered something fundamentally new. Nevertheless the strong Near Eastern influence in the Aegean and western Anatolia during the seventh century BCE (Orientalizing period) is obvious. Eastern ideas were absorbed and interpreted anew. The emergence of silver bullion as a currency in Archaic Greece belongs to these impulses (Kroll 2008; 2012), which ultimately led to the invention of coins. Coinage subsequently spread through the Mediterranean and the Near East even if other forms of money remained in use for some time, like for example bronze arrowheads in the northwestern Black Sea (Stingl 2005).

It should not be forgotten that coinage was a brilliant idea for several reasons, not just economic ones. It enabled differentiation between the face value and the intrinsic value of this specific piece of metal, a fact that was already an incentive for the issuers of early electrum coins (Le Rider 2001, 71–3, 94–5; Kroll 2012). It also allowed the dissemination of power, influence and propaganda through the circulation of the coins and the images they

presented. The importance of coins for politics is efficiently demonstrated by their use in propaganda, for example in the war between Octavian and Marc Antony in late Republican Rome (Zanker 1987, 61–73) or in state formation processes during the Viking Age (Randsborg 1980, 151).

Conclusions

Potential monies have existed since the Stone Age but only in the Bronze Age can the concept of standard of value be demonstrated. A major new development in the Iron Age is the appearance of coinage. A tripartite scheme of monetary development can therefore be proposed (Table 2.1). At one level, the sketch of monetary developments prior to the emergence of coins presented here is not really new. It is similar to the tripartite scheme with a ‘*Nutzgeldphase*’ where there is no real difference between commodity and means of exchange, a ‘*Gewichtsgeldphase*’, where the actual material becomes of prime importance

Table 2.1: The three stages of major monetary developments from the Stone Age to the Iron Age.

<i>Stage 1: simple monies</i>	<i>Stage 2: weight metrology</i>	<i>Stage 3: coin money</i>
Since the Stone Age (maybe since the Upper Palaeolithic, clearly since the Neolithic): various materials (e.g. shells, stone tools) possibly functioned as <i>means of exchange</i>	Since the Early Bronze Age (c. 3100/3000–2700 BCE) in Egypt, Mesopotamia, Syria, Aegean, Anatolia, Greater Indus, & since the Middle/Late Bronze Age (c. 1500/1300 BCE) in many parts of Europe (outside the Aegean): <i>first (identifiable) weights and scales</i>	Since the later Early Iron Age (earlier 6th century BCE) in Western Anatolia, soon after in other parts of the Mediterranean and Western Asia: <i>first coins</i>
Since the Copper Age (c. 5th mill. BCE) in Southeast Europe, Eastern Mediterranean, Near East: special appreciation of metals due to their physical properties. They were maybe used as <i>aes formatum</i>	In Mesopotamia (and possibly other regions): physical objects/substances (primarily metals) were used as <i>common denominators of value</i>	While certified by an authority, weighing remained common Nevertheless, coins as stamped pieces of metal enabled the <i>differentiation between face and intrinsic value for the first time</i>

and the value of precious metals is measured through weighing, and finally a 'Münzgeldphase' (Wiechmann 2007, 418).

It is now, however, possible to define the nature and the chronology of these changes more precisely. In a historical perspective the transition from 'value ascription' in the Stone Age and Copper Age to weight use at the beginning of the Bronze Age was a much more fundamental change than the transition from weights to coins in the Iron Age. Only with the idea of weighing did it become possible to measure value and equivalences in a precise way. Subsequently currencies mainly based on silver developed. The appearance of new formats for assessing value is connected to the Metal Ages, but it is not until the Bronze Age with its more advanced metallurgy (e.g. controlled alloys and extensive use of precious metals), large-scale textile industries and long distance trade in semi-precious stones that scales and weighing are found. This leaves us with some hypotheses that should receive more attention in future research:

1. The appearance of highly differentiated crafts and the systematic use of secondary products, like wool, and especially the extensive trade in raw materials were the primary factors that fuelled the introduction and use of weights.
2. The introduction of weights was always connected to the introduction of a stable measure of value based on metal (e.g. silver) and therefore defines a pivotal moment in the history of money.
3. Weight use drove the monetisation of the economy. Subsequent to the introduction of weights, the minds of the people started to structure value according to weighed-out ratios of a commodity to precious substances, mainly precious metals.
4. Following the dissemination of the idea of weights and scales, commercial trade became possible on an unprecedented scale.
5. Weights were a key component of the world's earliest trade economies and thus had a very significant impact on early civilisations.

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