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Grégory Chambon & Adelheid Otto (eds.)

Weights and Measures as a Window on Ancient Near Eastern Societies

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Table of Contents

Metrology in action. Hacksilver and scale weights in Western Asia during the 3rd millennium BCE

Luca Peyronel

Introduction

The study of Early Bronze Age economies in ancient Western Asia is strongly dependent on data gathered from written sources. Regardless of the differences in regional trajectories of the socio-economic structures that emerged from archaeological evidence, Near Eastern economic history has usually been traced according to a long-term perspective. It followed the rise and development of the Mesopotamian city-states, regional kingdoms, and empires, epitomising the dependence on the textual reconstruction (van der Spek *et al.* 2018; Alivernini/Mynářová 2021), which for a long time had been influenced by the different models of the formalist and structuralist approach (Silver 1985; Powell 1999; Renger 2004). It is only during the past two decades that new research ventures off the beaten paths have allowed the reconstruction of a more nuanced picture, which also takes into account the archaeological analyses of specific periods and cultural contexts, aiming at highlighting local strategies and a more detailed description of the economic and exchange systems (Warburton 2016; Rahmstorf/Stratford 2019; Rahmstorf *et al.* 2021). At the same time, the long-standing debate on the concept of ancient globalisation has been resumed, enriched by a wealth of data gained from the scientific analyses of materials and organic remains (such as DNA and provenance studies), profiling the impact of interactions on a broader scale, and delineating the rise of an intertwined world in which technologies, economic tools and administrative devices were diffused over the whole Near East and also beyond during the 3rd millennium BC (Jablonka 2014; Wilkinson *et al.* 2011; Wilkinson 2014).

The circulation of metals gained crucial importance within the overall system, and the reconstruction of the procurement, production and consumption cycle shed light on local specificities, shared practices, and cultural behaviour. Operationally, it depended on the exchange systems and was regulated by shifting mobility patterns, agencies and political control in a progressive trend towards commodification. A separation between the base (copper, tin, lead) and precious metals (silver, gold/electrum) and their techno-system packages seems to be correlated with the rise of socio-economic complexity during the Late Chalcolithic period, when alloying techniques and technological improvements, such as cupellation, developed. Such a distinction and the practical and 'cultural' spheres of metals use are vividly represented throughout the cuneiform literature, especially in the Sumerian debate poem 'Copper and Silver', in which the rhetorical fiction of a dispute between them served to emphasise their complementarity in Mesopotamian society (Peyronel 2019a: 76-77). The development of metrological and commensuration systems was part of this general changing framework of socio-economic relations, on which the administrative and centralised structures had a strong impact. In this respect, the emergence of the specific economic role of silver is a phenomenon that should be investigated in relation to the development of a 'global' exchange network. The use of silver as currency can be recognised in the cuneiform records, but it was not exclusive to the Sumerian world. Archaeological evidence shows that silver bullions and sets of scale weights appeared in the same period in Western Asia, and they were correlated with standardised metrological values (Rahmstorf 2016).

However, the very beginning of this process still needs to be made clear because of the unsatisfactory publication of several important sites. The recent reappraisal of archaeological investigations into various urban areas

of Southern and Northern Mesopotamia as well as the explorations carried out in many 5th to 3rd millennium settlements in Turkey, together with a large amount of evidence from important centres of the Northern Levant (Ebla *in primis*), enable a substantial advance on the knowledge of early Near Eastern silver metallurgy and metrology.

The necessity of a multivariate analysis of silver use, which combines epigraphic and archaeological data, quantitative/statistical methods for metrological evaluation, and scientific analyses of silver pieces was the starting premise of the research project 'Silver Circulation in Ancient Near East' (SCANE), carried out by the University of Milan under the coordination of the Author (Peyronel 2018a; 2019a). The first phase of research was devoted to the analysis of the 2nd millennium BC evidence: a wealth of information on both scale weights and silver hoards is available for the Middle and Late Bronze Ages, allowing the testing of statistical methods and the refinement of the data collection criteria. Currently, the project focuses on the Early Bronze Age, and a first survey of the materials is here presented together with a preliminary evaluation of silver use as it emerged from available documentation.

Hacksilver in Syria and Mesopotamia during the 3rd millennium

Silver (Ag) occurs as native metal and in ores (Bachmann 1993; Hauptmann 2020, 74-85). The former is very rare in Western Asia, and since the very beginning polymetallic argentiferous ores were also exploited. The main silver ores are the sulphides and the chlorides, from which the precious metal can be easily smelted, and the silver-lead ores (especially galena, a lead sulphide, and cerussite, a lead carbonate) that usually contain the metal in a low percentage. The latter needs the process of cupellation to separate and extract silver, which allows the precious metal remaining apart, with the lead reacting and forming a waste slag (PbO) named litharge (Moorey 1994: 232-236; Hauptmann 2020, 286-293). The main sources of silver in South-Western Asia are located in the Taurus Mountains range of Anatolia: in the Keban mining district (Elaziğ Province, Turkey) on the upper Euphrates, lead-silver ores have been exploited since the 4th millennium BCE, as testified by the smelting site of Fatmalı-Kaleçik (Hess *et al.* 1998). In south Central Anatolia, the Bolkardağ valley also gave unequivocal evidence of polymetallic ores associated with 3rd millennium mining and smelting sites (Yener 1986; 2021); further west, the Aegean coastal region is characterised by various silver ores especially clustered around Çanakkale and Izmir (de Jesus 1980).

It is almost certain that most of the silver reached the Northern Levant and Mesopotamia from Anatolia, where 'the silver mountain' cited in the Mesopotamian cuneiform inscriptions must be placed. However, numerous silver-bearing deposits are also reported for the Iranian plateau. Some of them (e.g., Nakhlakh) are near the surface and might have been easily accessible for early metal extraction (Stöllner *et al.* 2004).

A precise identification of silver sources through chemical analyses is prevented by the complex process of refining and producing the metal, which alters the trace elements. Useful information can be gathered only from the isotopic composition of the lead content, if present, which remained constant from ore to artefact (Pernicka 2014). According to the lead's fingerprint, it is possible to indicate the compatibility of silver coming from archaeological contexts with one or more silver-lead ores without any certainty on their exclusive provenance. For instance, isotope analyses carried out on eleven objects from the ED III Royal Cemetery of Ur seem to indicate that silver originated from both Iranian and Anatolian multiple sources (Salzmann 2019, 89-107).

A systematic study cataloguing silver artefacts from the pre- and protohistoric periods in Western Asia has not yet been carried out. However, a general survey of the metal chronological distribution shows that in the 6th–5th millennium BC, the earliest evidence are isolated small finds (beads) in native silver. A wider presence of artefacts is attested for the Late Chalcolithic 3-5 (4th millennium BC), and it would have been related to the diffusion of the cupellation technology, although silver obtained through cupellation cannot be unequivocally identified in the absence of processing by-products. Silver findings (ornaments, sheets, small vessels) are spread from Central and South-Eastern Anatolia (Fatmalı Höyük, Korucutepe, Arslantepe), Syria (Brak, Hamoukar, Habuba Kabira), the Levant (mostly from Byblos, but also isolated specimen from Tell esh-Shuna, Tell el-Farah N, Bab edh-Dhra'), Mesopotamia (Uruk), and Iran (Tepe Sialk, Arisman, Susa, Hissar Tepe), which shows the concentration of silver and litharge slags in the regions where silver-lead ores are located (Anatolia and Iran) (Prag 1978; Philip/Rehren 1996; Helwing 2014). Besides Uruk itself, the concentration of silver items has been pointed out and considered evidence supporting the commercial 'model' of the Uruk phenomenon (Algaze 2008). The Late Uruk enclave of Habuba Kabira on the Middle Euphrates constitutes another exception: here, the smelted metal was imported probably from the North (Pernicka *et al.* 1998). These 4th millennium silver items are mainly

small personal ornaments and jewellery pieces, while small containers, inlays and figurines are attested for the last part of the period (especially Late Chalcolithic 5), together with alloyed copper-silver objects (Helwing 2014; 2019).

The reasons why this metal began to be appreciated throughout entire Middle Asia and the Mediterranean should be related to a combination of factors: the presence of multiple sources of silver-bearing ores and their location near the copper-bearing ones makes silver procurement and exploitation relatively easy; the metal's physical properties—once smelted and refined, silver is a soft metal with a shiny white appearance; the pale grey/white colour of the metal, with the possibility of combination with gold (yellow) and copper (reddish-brown) permit the manufacture of polychromatic precious decorative items (Sherratt 2018).

During the 3rd millennium BC, a fundamental change in silver use is attested, undoubtedly tied to the socio-economic developments of the urban complex societies. The substantial increase of the metal in Syria and Mesopotamia during the Early Dynastic period were related to a new economic function assumed by the precious metal, which started to be used as a standard of equivalence and means of payment in the process of commodification related to the urban revolution (Rahmstorf 2016). Silver probably assumed this role precisely because it was relatively accessible from multiple sources and, at the same time, rare in comparison with other goods and materials, making the practice of exchanges through its use as a standard of value a very convenient choice. Thus, the circulation of silver by weight for commercial purposes was advantageous since a large number of trading activities could be performed with a small quantity of metal. Moreover, silver is an 'impracticable metal' since it cannot be employed in manufacturing implements, tools and weapons unlike copper and other metals. A similar process characterised gold in Egypt during the Old Kingdom, where it was used as a means of equivalence and as a metrological standard, since it was easier available than silver.

The condition of rarity was but of the reasons for the advent of the hacksilver economy in Mesopotamia, and the first appearance of silver bullions in the mid-3rd millennium BC is a clear manifestation of this structural change, also revealing that silver has become the primary raw material to store economic value. Silver processed into regular shapes (bun ingots, rings, and coils), roughcut pieces and scraps of metal (hacksilver) to be hoarded, recycled and/or exchanged are attested both for private and public contexts (Peyronel 2010; Ialongo *et al.* 2018). At the same time, the finding of early 3rd millennium balance pans and scale weights from the Aegean to the Indus Valley undoubtedly indicate the spread of the notion of weight and commensuration through direct contacts and the exchange of commodities (Ialongo *et al.* 2021). Within the Bronze Age 'global' network of interactions, weighing procedures might be considered as part of a wider 'institutionalised' package of technologies and administrative tools (such as seals and sealings), variously operating into the different economic structures (Rahmstorf 2011).

The epigraphic cuneiform sources confirmed the different stages of silver exploitation and the key role of the precious metal in ancient Western Asian economies (Bartash 2019). The Sumerian sign for silver (ku_3-babbar) means 'the white/bright metal', while its Akkadian counterpart, appearing in the Akkadian period, *kaspum*, derives from the verb *kasāpum*, which means 'to break into pieces' and it is derived from the economic use and circulation of silver.

Pictograms referring to metals and metalworking activities have been attested since the advent of writing in the mid-to-late 4th millennium Archaic tablets of Uruk (Eanna IVa and III). The presence of the sign KU_3 in these texts, which resembles half a coil, should indicate, amongst other, the substantive 'shining/precious metal', and a direct identification with silver has been suggested (Monaco/Pomponio 2009; Krispjin 2016). However, a generic meaning for metal seems more probable, and it would be related to copper or copper alloys (Bartash 2019: 178-180). During the ED I-II, silver did not appear in the Archaic texts of Ur (Lecompte 2013). It is only from the ED IIIa onwards that cuneiform documents (Fara texts, ancient *kudurrus*) unequivocally attest the Sumerian sign for silver in relation to the metal's use as a measure of value and account's unit (Milano 2004). During this early period, however, the metal most used in economic transactions was copper (counted in minas), while silver first appeared on specific (ceremonial?) occasions and as an addition to the main exchange's operation, and then replaced copper to become the only metal that fulfilled the functions of a medium of exchange and payment, a reserve of wealth and standard of equivalence in the late 3rd millennium BC. Looking at the epigraphic documentation of the Early Bronze Age, the development of silver use appears quite clear: the Fara texts (ED IIIa) include several sales of land tenures and houses in which a quantity of copper usually indicates the 'price' (and also the 'addition'), and silver is only rarely used in relation with a 'gift' added to the economic transaction (Martin 1988). In the so-called ancient *kudurrus*, a script-bearing stone with inscriptions regarding land tenure administration and the exchange

of properties, dating from the end of the 4th millennium BC down to the Akkadian period, we can note a striking difference between the early (JN-ED I-II) and late documents (ED III-Akkadian). The latter ones are characterised by the presence of silver and its use in connection with numerals that suggest an indication of purchase payment (Gelb *et al.* 1991; Milano 2008). The corpus of Old Akkadian administrative and legal texts also allows to recognise an increase in the economic use of silver (e.g., in the so-called Manishtusu obelisk, and in various sales documents from Nippur, Isin, and Adab) (Monaco/Pomponio 2009). Outside Mesopotamia, a wealth of information on the exchange and use of silver come from the Ebla texts, dating back to the 24th century BC, where the cuneiform texts of the royal archives clearly show the intersection of the gift system with the circulation of silver as a means of payment in a redistributive pattern (Archi 1985; 2003; 2011; Peyronel 2014a). Silver and gold objects of standard weights (plates or disks, daggers, bracelets, and pendants, from 10 to 60 shekels) circulated according to redistributive procedures and were the traditional method of wealth accumulation. Instead, silver vessels—rarely present among precious goods exchanged within the kingdom—mostly correlated with the foreign ceremonial and gift exchange system. Notwithstanding the different circuits, all these precious items were recorded indicating their weights (or 'value') in silver.

At the time of the Ur III empire, the strong bureaucratic and administrative organisation of the kingdom resulted in the standardisation of weights and measures and in the emergence of a fixed system in which silver and barley eventually became the only standards of reference to express the value and price of other goods (Garfinkle 2008; Mander/Notizia 2009) and to indicate the rates of interest in the loan contracts (Garfinkle 2004). At the end of the 3rd millennium BC, a series of texts from Ur, Lagash, Puzrish-Dagan, recorded the manufacture and distribution of precious metal standardised objects named in Sumerian ḪAR (Akkadian *šewirum*), which literally means 'ring' (Michalowski 1978; Paoletti 2008: 150-152 with references). The Drehem Treasure Archive presents lists with silver ḪAR that high-ranking individuals and members of the crown 'received as gift' by the crown on specific occasions (e.g., marriages or births, celebrations of military victories) or during social events, such as religious festivals. The weights of the rings are specified, ranging from one to ten shekels, and the Ur metal texts—which contained notations on metalworking—recorded the overwhelming prevalence of rings corresponding to five shekels. The rings were in fact always weighted rather than counted, thus giving the possibility to check with precision the silver quantity. As attested in the earlier documentation from Ebla, the Neo-Sumerian evidence suggests that silver circulation, now in the recurrent ring-shape, allowed internal wealth redistribution, in a system strongly embedded in social and ideological spheres. It has been rightly noticed that the term ḪAR might not only denote rings, but also coils and spirals frequently found in the silver hoards (Powell 1978) together with a variety of other silver pieces, including length of rods and wires, ingots, sheets, and scrap metal fragments (Peyronel 2010).

The archaeological evidence testifies to the large amount of silver that reached Mesopotamian centres after the mid-3rd millennium BC. The precious metal was used to manufacture prestige items, such as vessels, composite sculptures, pieces of jewellery and decorative parts of composite artefacts, including animal and anthropomorphic miniature figurines, as the ones found in the funerary assemblage of the Royal Cemetery of Ur (Zettler/Horne 1998). One of the biggest single silver artefacts is the extraordinary Enmetena vase, retrieved at Tello/Girsu and now in the Louvre (Heuzey 1895; Chevalier 1996): it is 35 cm high and has a copper-footed support in the shape of four lion's paws. Its ovoid body is engraved with four large lion-headed eagles grasping alternatively couples of lions and ibexes surmounted by a row of crouched cows, and a cylindrical neck bearing at the rim the votive dedicatory inscription to the god Ningirsu by the Ensi of Lagash (**Fig. 2**). A similar range of manufactured items is documented for Tell Mardikh/Ebla in Northern Syria, at Tell Brak/Nagar on the upper Khabur, and at Tell Hariri/Mari on the middle Euphrates, showing the same silver use in the wealth economies of the northern regional powers. The emergence of political entities in Anatolia in the very same period is characterised by the presence of citadels and by the evidence of strong interactions with both the Aegean and Syria-Mesopotamia (Bachhuber 2015). With regard to metallurgy, a distinctive occurrence of prestige metal objects including often items obtained by alloying silver, copper, and gold, is attested for the EB I-III. The phenomenon is epitomised by the rich burial offerings of the so-called 'royal tombs' of Alaca Höyük and by the 'treasures' of Troy II-III, where also several silver objects and ingots were found.

Contemporary with the spread of prestige silver items in entire South-Western Asia is the appearance of silver bullions. The hoarding of silver pieces was intended to conceal the precious metal that had assumed an exchange value in the ancient economies. From this time onwards, silver by weight was used in the Near East and Eastern Mediterranean until the introduction of coinage, and even when the first silver coins appeared they

Fig. 1: Map of Western Asia with indication of the main sites mentioned in the text (by V. Oselini, Base map: ESRI World Physical Map, March 2019. WGS84).

Fig. 2: Silver vase of Enmetena from Tello/Girsu. Département des Antiquités orientales, Louvre (courtesy of Musée du Louvre).

were exchanged according to the weighing practice in the same manner as the other pieces of silver (Peyronel 2010; 2014a; 2019; Thompson 2003).

A hoard's classification based on the content led to a distinction between hoards containing only silver pieces, hoards with silver plus other various precious items, and hoards with silver, precious items, handicrafts and administrative/economic tools. This sub-division has proved useful in recognising regional differences and trends from the long-term diachronic perspective (Peyronel 2010). Context and type of containers add further information for understanding the hoarding practice, and allow the investigation into the relation between the owners and the silver bullion, thus revealing the depositional dynamics (Bjorkman 1994). To examine the economic function of silver, these 'utilitarian' hoards are our primary archaeological source. They may clearly be distinguished from foundation deposits in which precious objects, including those made of silver, had a completely different meaning (Ellis 1968).

Early Bronze silver bullions have been reported only for two Syro-Mesopotamian sites: Khafaja/Tutub in the Diyala valley and Tell Chuera in the Syrian Jazirah. By contrast, hoards containing hacksilver and silver items, together with other materials and objects, are more widely distributed, with evidence from Mesopotamia to Anatolia (Tell Taya, Khafaja/Tutub, Tell Asmar/Eshnun-

na, Tell Agrab, Tell Brak/Nagar, Tell Hariri/Mari, Troy, Mahmatlar, Eskiyapar) (Peyronel 2010; Bachhuber 2018) (**Fig. 1**). All the silver hoards come from household contexts, namely private buildings where the silver used to be hidden below a floor, and the silver pieces were contained in a small jar. Mixed hoards are usually associated with domestic architecture but come also from public buildings (temples and palaces). Most hoards from Mesopotamia were retrieved in urban centres in the Diyala valley, with a paucity of data for the southernmost alluvium, although the lack of published information could bias our reconstruction.

Among the hoards found at Tell Asmar/Eshnunna, inside small jars hidden below the floors of houses (XX, XXXIII, XXXIV, XXXVIII) dating to the Akkadian period (Levels V-IVa), several contained silver pieces (Delougaz 1952; Bjorkman 1994). Their inventory is briefly described in the reports, without any details or photographs of the pieces, preventing a detailed analysis. However, the available information allows us to point out the association between hacksilver and cylinder seals, semi-precious stone beads and, in one context also, balance weights.

House XX is associated with a silver hoard found below the floor of room L.19:1, which is only briefly described in the excavation report, mentioning silver ornaments and a large filigree disc (Delougaz 1952, pl. 187; Delougaz et al. 1967, 169; Bjorkman 1994, 619, Asmar #02).

Two hoards were retrieved below the main room (H18:4) of House XXXIII (Delougaz *et al.* 1967: 177, 226-227, pl. 28; Bjorkman 1994, 621, Asmar #04): one contained c. 110 pieces, mostly hacksilver (2 coils, 2 rings, 42 beads, 1 frog-shaped amulet, fragments of wires and sheets) and semi-precious stone beads (lapis lazuli, carnelian, agate), and the other one cylinder seals, balance weights, beads, and small copper tools, apparently without silver pieces.

A small jar filled with silver and other precious small finds (Delougaz *et al.* 1967: 223, pl. 28; Bjorkman 1994, 632, Asmar #16) was hidden below the floor in the entrance room of House XXXIV. The silver inventory included 12 silver coils, 2 'lumps' (probably ingots), 1 ring, 4 ornaments and 1 frog-shaped amulet, associated with 6 carnelian beads, a gold bead, and a lapis lazuli cylinder seal with silver caps (Frankfort 1955: n. 644).

M.A. Powell published a photograph with three groups of silver pieces, specifying that they came from domestic contexts of Tell Asmar (Powell 1978: 230, pl. II-IA-B), although we cannot precisely identify them. They include several fragmented rings and coils, cut pieces of wires, small bars, folded sheets, lumps, and some small ingots.

A spectacular hoard comes from the Northern Palace (Level Va), wrapped in a textile, and hidden below the floor of a peripheral room of the building (E16:16) (Delougaz *et al.* 1967: pl. 37; Bjorkman 1994, 624, Asmar #07). It consists of more than three hundred precious ornaments, mostly silver and semi-precious stone beads, lapis lazuli and silver amulets (lion-headed eagles, bulls, frogs, and lion) (Frankfort 1934: 35-36, figs. 28-29; Delougaz *et al.* 1967: 190, 245). The silver inventory also includes some scrap silver (sheets and fragments of rings) and a large filigree disc of 11 cm in diameter.

A hoard exclusively consisting of hacksilver was found at Khafaja/Tutub, buried beneath the floor of the main room (Room 1) of a house (S 41:1) dating back to the Akkadian period and located immediately east of the Temple of Sin X (Delougaz *et al.* 1967: 17, 45. pl. 16; Bjorkman 1994: 534, Khafaja #19; Peyronel 2010, 929, fig. 1: A1). The precious material was found inside a small pot (Delougaz 1952: Pl. 107a, 183) sealed with bitumen, and included 4 coils, 15 biconical beads, 2 small 'cones', 15 rings/coils, 13 sheets, 1 thick folded bar, 9 sheet's pieces and c. 30 scraps. No data are available on the specimen' total weight and individual masses, although the materials are currently under study by W. B. Hafford (see vimeo.com/436797333) (**Fig. 3**).

More than one hundred spirals/coils of silver allegedly from Khafaja and now kept in the Museum of the

Fig. 3: Silver items from a hoard found below room 1 of house S 41:1 at Khafaja/Tutub (38-10-82). University of Pennsylvania Museum of Archaeology and Anthropology (after vimeo.com/436797333).

Oriental Institute of the University of Chicago were acquired by H. Frankfort in Baghdad from A. D. Messayeh in 1930 (Powell 1978). If their provenance is correct, it cannot be excluded that they come from a unique silver hoard/cache from a public building (due to the quantity, a domestic context seems to be excluded) and, considering the settlement history of the site, they might date from between the second half of the 3rd and the beginning of the 2nd millennium BC. However, silver bullions discovered in controlled excavations are always made of a mixture of silver pieces and never only by rings/coils. The metrological data and the description of the specimen published by M. A. Powell show that most of the coils display masses between 0.5 g and 34.5 g, thus ranging between 1 shekels' fraction and 4 Mesopotamian shekels maximum (Peyronel 2010, 933-934, fig. 12; 2019a, 77). The only heavier coils are A9546 (61.65 g = 8 shekels?), A9547 (a complete spiral of 75.4 g = 9 shekels), A 9544 (a whole spiral of 241 g = 30 shekels or half a mina), A 9547 (a spiral cut at one end of 470 g = 60 shekels or 1 mina), and A 9543 (a complete coil of 492.5 g = 60 shekels or 1 mina). It is interesting to note that the specimen' weights do not match those reported in the cuneiform records dating to the Ur III period that attested the manufacture and distribution of 'rings', which mainly were standardised according to the weight/value of 5 shekels (8.4 g x 5 = c. 42 g).

Evidence of hacksilver associated with sacred buildings in the 3rd millennium BC is scarce and comes from Tell Agrab in the Diyala valley, where a 'visible' hoard with rings/coils and hacksilver was retrieved in a long room/corridor of the Shara Temple dating back to the ED II (L 13:3; Delougaz/Lloyd 1942: 250, 272-273). The items listed in the report include silver wires, rings/coils, ornaments, beads and an enigmatic 'gold weight' (Bjorkman 1994, 606, Agrab #19).

Two silver hoards from the Akkadian period were discovered at Tell Taya during the excavations carried out by the British School of Archaeology between 1967 and 1973. One hoard (Reade 1973: 165, Pl. 67a; Peyronel 2010, 929, fig. 1: A3), whose total weight is not registered, includes 5–6 irregular flat and bun-shaped ingots, c. 10 coils/rings, some biconical beads of silver together with gold beads and sheets, and some small stone beads. It comes from a filling layer without relation to architectural structures in the Gatehouse area, and according to the excavators, the vessel in which the silver used to be kept was probably thrown away when the area was levelled during phase VII. It might date from the previous period of occupation (Level VIII).

A second hoard from Level VIII was found in a pot sealed with a clay stopper and buried under the floor of a private house located west of the temple (Reade 1968: 248; Bjorkman 1994, 673, Taya #01; Peyronel 2010, Tab. 1: B6). It includes 38 complete rings/coils and several fractioned spirals/rings, 5 biconical beads, 8 flat ingots, 20 irregular lumps and numerous scraps of silver, together with two gold beads and several semi-precious stone beads.

Moving to the west, 3rd millennium silver hoards are attested for the Jazirah at Tell Brak/Nagar and Tell Chuera.

The evidence from Tell Brak is particularly rich, with four hoards retrieved hidden below the floors of private dwellings dating back to the late Akkadian period. A small hoard of hacksilver came from a house in Area ER (beneath Room 6) and was kept in a goblet of Metallic Ware, sealed by a clay stopper. It included 1 thick twisted rod, 1 disc, 9 rings, 43 beads, fragments of twisted wire, some pendants of silver, together with some gold ornaments and 1 lapis lazuli bull amulet (Mallowan 1947: 74, 176-177, pls. 15:2, 33-34; Bjorkman 1994, 645, Brak #03). A small jar—buried below the floor of the last refurbishment of a dwelling in Area CH (Room 12)—contained silver pieces (1 ring, 1 twisted rod, several folded/distorted strips and beads), together with 4 interlaced copper (or copper-silver alloy) rings, gold and semiprecious stone (agate, carnelian, lapis lazuli) beads, gold coil pendants, and 2 ellipsoidal hematite scale weights (masses not indicated) (Mallowan 1947: 74, 177-178, pls. 15:2, 35; Bjorkman 1994, 643, Brak #01). Probably related to very poorly preserved remains of a private building located east of Area CH was a small jar filled with gold ornaments (earrings, rings, beads) and two thick silver rings (4.5 cm in diameter).

A fourth hoard was found in a two-room building—perhaps part of a larger compound—located in Area HS3, below the floor in baked bricks of Room 2, interpreted as a bathroom. In this case, the silver and other precious items were kept in a perishable bag sealed by a cretula with a seal impression, and placed within a jar, which was also sealed by clay and covered by a bowl (Matthews 2003: 203-208, figs. 6.14-19,58,62-65). The rich assemblage of the hoard included several pieces of hacksilver: 3 ingots (2 disc-shaped and 1 elongated one), 2 fragmentary pendants and 12 folded sheets (scrap metal), a thin rod, a large torque with one hooked end, 8 rings/coils, 11 small rings, 4 folded rods (**Fig. 4**). It also contained 4 copper/bronze small rings and some precious ornaments: an Imdugud pendant/amulet made of lapis lazuli and gold foil, a sheet gold pendant/amulet with two rampant crossing lions, a silver equid figurine, a jasper pendant, 2 gold beads, several carnelian beads, 2 small lapis lazuli pendants/amulets.

Fig. 4: Silver items from a hoard found below room 2 of a two-room building in Area HS at Tell Brak/Nagar (after Matthews 2003: figs. 6.18-19).

Ritual closure deposits containing silver pieces together with jewellery and copper/bronze objects are attested for the courtyards (FS 48 and SS 8) of the monumental cultic compounds in Area FS and SS (Oates *et al.* 2001: 44, 233-235, 243-246, figs. 50-51, 265). The precious items from Area FS were grouped into various perishable containers (in leather and cloth bags and baskets) in the filling over the floor, surrounded by copper/bronze tools placed upright. One of these metal collections comprised 137 silver beads, 9 silver rods/ingots, a length of silver chain, a silver disc, and some gold pieces of jewellery and semi-precious beads. Several silver rings/coils were found in the deliberately deposited mass of metal objects (c. 5.5 kg) in the temple courtyard 8 in Area SS.

A silver bullion from Tell Chuera was found in a small jar beneath the floor of Room 5 in House A, which dates back to the ED III-Akkadian Period (Moortgat 1960: 7-8, Pls 11-12; Bjorkman 1994, 666, Chuera #12; Peyronel 2010, 929, fig. 1: A2). It contained 10 larger irregular lumps/ingots, 20 coils/rings and c. 50 scrap items and lumps. The hoard was composed only of hacksilver with the usual array of silver objects used as currency. Unfortunately, the short description in the report neither mentions the total amount of silver nor the masses of individual items.

Along the Middle Euphrates, more than one hundred silver scrap items and small pieces of rings/coils were contained in a bottle found in the filling layer of a dwelling at Tell Munbaqat (MBQ 29/29-137), possibly dating to the late 3rd millennium BC (Machule *et al.* 1989, 76-77, Pls. 5.1 e 11, 12; Bjorkman 1994, 570 Mumbaqat #4). The hoard comprised many small fragments of rings or lengths of rod/wire, resulting from multiple splitting operations, together with cut pieces of ingots and small lumps. Three silver ingots (a bar of 78 g, a flat disc of 62 g, and a lump) originate from another hoard found in the so-called 'Steinbau 1', also dating to the late Akkadian/Ur III period (Czichon and Werner 1998, 179, 182 pls. 128-129).

The lack of silver hoards at Tell Hariri-Mari 'Ville II' is strange, considering the large extension of the excavations of the 3rd millennium settlement. In the well-known 'Trésor d'Ur' from the Pre-Sargonic Palace of Mari, only two silver rings/coils are present out of the unique collection of precious objects (more than one hundred separate objects, including a lapis lazuli Anzu pendant, several cylinder seals, copper and ivory statuettes, pins, semi-precious beads among which the one inscribed with the name of Mesanepada, ruler of Ur) (Parrot 1968; Bjorkman 1994, 550, Mari #01). It was contained in a jar covered by two bowls buried in a pit at the foot of the eastern pillar of Courtyard XXVII, which belongs to the palatial temple sector. The 'treasure' has been widely discussed, and it was considered either as a 'true' hoard hidden to be recovered or as a votive or foundation deposit (see Bjorkman 1994, 77-88 for a review of the different hypotheses). According to Margueron (2004, 212-215), it might have been buried only after the end of the ED palace, thus in association with the Pre-Sargonic Palace 'o' dating to the Akkadian period. However, most of the scholars agree with a dating before the destruction of the Pre-Sargonic Palace 1.

In Anatolia, silver had been exploited from various ores since the early periods of metalworking. Sophisticated silver objects and vessels appeared in rich deposits and funerary assemblages during the 3rd millennium BC (e.g. at Troy and Alacahöyük). At the same time, the presence of hacksilver and ingots is documented for a few sites (Bachhuber 2015). The precious metal was circulated by means of items different from those attested for Mesopotamia and Syria.

At Troy, six so-called tongue-shaped silver ingots ('Zungenbarren')—i.e. rods or bars with one rounded and one concave end—come from 'Treasure A' (Schliemann 1881: 470-472 no. 787-792; Bobokhyan 2006, 87-88, fig. 1.7, tab. 5a). Their standardised shapes and masses (ranging between 170.8 g and 189.2 g) suggest a manufacture roughly following metrological values related to the 20-multiple of the Mesopotamian (8.5-8.7 g) or the Levantine (9.1-9.4 g) shekel-units. A series of 16 elongated gold/electrum rods weighing c. 10-11 g (c. 10 cm in length), with regularly spaced multiple notches, discovered in 'Treasure F' have also been considered as a kind of 'ingot', either assuming the notches were metrological signs or splitting marks to obtain small metal pieces of the same size (Götze 1902, 342, 361-362; Rahmstorf 2022, 197-201). L. Breglia (1958) pointed out that both the silver bar ingots and the gold/electrum rods can be related to a weight unit ranging between 5 and 5.9 g, while more recently, a unit of 5-5.5 g has been proposed as the only standard for the gold/electrum bars (Bobokhyan 2006, 88-90, tab. 5b).

18 silver ingots have been retrieved by the villagers, probably in a unique hoard at Mahmatlar near Alaca Höyük (Kosay/Akok 1950). 17 of them are bun shaped, with masses clustering around the value of a mina (from 416 to 494 g), and one is an exceptional ingot of 4 kg and 630 g, corresponding to c. 10 'western' mina of c. 470 g.

Two hoards from Eskiyapar (Özgüç/Temizer 1993) were found buried in pits beneath the floor of a domestic structure dating to the late Early Bronze III period. They contained silver and gold vessels and pieces of jewellery but no hacksilver or ingots.

The practice of hoarding silver in the shape of ingots, rings/coils and scrap metal items was widespread in Mesopotamia and Syria and appeared sporadically also in Anatolia, while it seemed to be absent in the Southern Levant and on the Iranian plateau during the second half of the mid-3rd millennium BC. However, the picture is based on data gathered from publications and a complete survey of the museum collections is needed to analyse the silver circulation comprehensively. A specifically morpho-functional and metrological analysis of the silver found in 3rd millennium hoards is also made difficult by the almost complete lack of information regarding masses and technical characteristics (such as manufacture signs, cutting marks). Furthermore, metallurgical analyses have been carried out only on a few hacksilver samples, privileging another kind of finished objects. To fill this serious documentary gap, a systematic survey in the museum's collections is currently in progress as a part of the SCANE project by the University of Milan, and a programme of compositional analyses on a large sample of silver materials is also scheduled (Peyronel 2018).

Even with this incomplete information, it is possible to point out the following observations: (1) In Syria-Mesopotamia, few hoards contained scrap silver items only. However, hacksilver was a recurrent component of the material assemblage, often together with limited amounts of gold. The practice changed in the later periods when a higher number of silver bullions was documented for the whole Near East. (2) Silver circulated as a currency in the same shapes as attested for the 2nd millennium BC in Mesopotamia and the Levant: pieces of rods, bars, lengths of wires, irregular ingots/lumps, rings, sheets, and fragments of jewellery to be recycled. (3) Rings/coils make their appearance in mid-3rd millennium BC in Syro-Mesopotamian hoards before the earliest epigraphic documentation of ḪAR/*sewirum*, which dates to the Akkadian period. (4) Bun and bar ingots occurred in Anatolian hoards and deposits, which also contained precious silver and gold objects, such as vessels and jewellery, but no hacksilver and rings/coils. (5) Silver was associated with scale weights only in one hoard from Tell Brak (two specimen). (6) Clay stoppers and sealings are attested for Mesopotamian hoards, showing the same practice as in the following periods.

Silver by weight: The 3rd millennium scale weights in Western Asia

The presence of 3rd millennium silver hoards indicates the circulation of precious metals in the various regions of Western Asia, with the first attestations coeval to the earliest occurrence of the scale sets of weights. The archaeological and epigraphic evidence thus points to a direct relation between the introduction of silver as a means of payment and standard of equivalence and the sudden diffusion of balances and weights according to codified and shared metrological systems during the Early Dynastic III period (c. 2600-2300 BC).

The evidence on proper balance weights in the 4th and early 3rd millennium BC is in fact still to be determined. A handful of potential weights from uncertain stratigraphic contexts have been associated with Late Chal-

colithic phases only at Tepe Gawra and Uruk (Hafford 2019; Rahmstorf 2014; 2022, 344-345).

Among the thousands of weights discovered in Southern Mesopotamian sites before the introduction of stratigraphic methods of excavation, only a limited number can be definitely dated before the end of the 3rd millennium BC, while only a few weights associated with 3rd millennium levels have been published from recent archaeological investigations (Powell 1979; Karwiese 1990; Rahmstorf 2022, 328-346). It is therefore quite difficult to trace the development of weight systems and weighing practices in the Early Bronze Age before the Ur III period. It is only in the latter period that the documentation includes several marked and inscribed royal weights showing the process of standardisation of measures and the widespread bureaucratic use of metrological instruments (Hafford 2012; Peyronel 2012).

In the recent comprehensive study of EBA weights of Europe, Western and South Asia by L. Rahmstorf (2022), less than two hundred allegedly weights coming from Southern Mesopotamian sites date back to the epoch spanning the ED II and the late Akkadian period. The most important groups come from the Diyala region: 57 specimen from Tell Asmar/Eshnunna, and 49 from Khafaja/Tutub (Meyer 1981; Rahmstorf 2022: 328-333), with the earliest ones dating to the ED II period (c. 2700-2600 BC), according to the associated building levels. Among the large corpus of Nippur (324 weights: Unger 2018; Hafford 2005), only 45 come from reliable 3rd millennium contexts. The most interesting group has been retrieved in Area WF, where a transitional ED III/Akkadian phase has been singled out (McMahon 2006: pl. 165). 26 weights belonging to one or more scale sets, come from a foundation deposit (a broken jar base atop a baked brick) together with some large shell beads. It is one of the few well-dated assemblages of weights from a 3rd millennium context in lower Mesopotamia: notwithstanding masses are indicated only at the nearest gram, it seems probable that most of the specimen belong to sub-multiples and multiples of the Mesopotamian shekel of c. 8.4 g (with ratios of ½, 1, 2, 4, 5, 10).

Only 20 potential weights from the old excavations at the large ED II-III urban site of Fara/Shuruppak have been published (not illustrated: Unger 2018, Tab. V; see now Rahmstorf 2022: 339-342 and this volume). Fara is undoubtedly a key site for the study of the development of weight systems (and early administrative practices) in Mesopotamia, and the renewed archaeological research by the German expedition headed by A. Otto would allow gathering new important metrological evidence.

No balance weights unequivocally dated to the ED/Akkad period from Tell Muqayyar/Ur can be identified among the hundreds of specimen recently studied by Hafford (2012), and the few 3rd millennium weights published from Tello/Girsu and al-Hiba/Lagash date back to the post-Akkadian periods. The earliest 'royal' weight is a limestone sphendonoid weighing 119.3 g with the inscription '15 shekels, for Ningirsu, Uruinimgina king of Girsu', thus indicating the metrological value, the dedication to the deity and the name of the ruler of the 1st dynasty of Lagash (c. 2400 BC). It was bought on the antiquities market at the beginning of the 20th century, and the place of discovery is unknown, although a provenance from Tello is probable (Scheil 1912; Peyronel 2012: 11-12, fig. 1). The 15 units of 7.95 g can be considered to be either Mesopotamian shekels (-0.4 g of a shekel value of c. 8.3–8.4 g) or 'Syrian' shekels (+0.15 g of c. 7.8 g).

Archaeological evidence indicates the presence of multiple metrological systems since the first appearance of scale weights in Mesopotamia. Most of the specimen can be related to the Mesopotamian sexagesimal system (shekel of c. 8.4 g and mina of c. 504 g), showing that it was adopted in the main urban centres by the public institutions. However, a certain degree of variation in the values is indicated by the masses, probably because of the political fragmentation in the ED period, suggesting that metrological standards were not fixed and regulated at regional level. The 'Western' system (mina of c. 470 g reckoned at 60 'Syrian' units of c. 7.8 g, 50 'Levantine' units of c. 9.4 g and 40 'Anatolian' units of 11.7 g) was also widely used during the Early Dynastic period (especially the 'Levantine' units related with the shekel of 9.4 g). The early presence of metrological interaction spheres might be considered as the practical result of the affirmation of silver circulation and globalised network of exchanges in Western Asia. During the Akkadian period, archaeological evidence shows a trend towards standardisation and the almost exclusive adoption of the Mesopotamian system, as indicated by marked weights, although some exemplars belonging to the 'Western' system are also attested.

In Northern Mesopotamia, the Jezirah and the Northern Levant, various balance sets were found in stratified contexts facilitating a more detailed evaluation of the weight systems during the Early Bronze III-IV period (c. 2700-2000 BC, corresponding to the different regional periodisation of ENL, EME/EUE, EJZ, ETG of the ARCANE chronology, https://www.arcane.uni-tuebingen.de).

The most significant number of specimen from a single building occurs at Tell Mardikh/Ebla (Ascalone/Peyronel 2006, 80–121, 179–207; Peyronel 2019a, 68–70; 2019b; Rahmstorf 2022, 276–293) (**Fig. 5**), where the administrative documents from the royal archives also offer the paramount opportunity to combine archaeological

and textual information (Archi 1987, 67–83; Chambon 2011, 58–61). 50 out of 79 Early Bronze balance weights retrieved up to the 2005 excavation season come from the destruction level marking the end of the EB IVA town (c. 2400–2300 BC). 47 specimen were found scattered in different sectors of the Royal Palace G, with a significant concentration in the so-called Administrative Quarter and the Southern Unit of the Central Complex. They are mainly iron oxides, sphendonoids and sub-spherical weights with masses between 1 g and 150 g. Heavier exemplars have also been retrieved, including a scale set of marked exemplars kept in the small archive at the corner of the Audience Courtyard. A specific class of limestone conical weights horizontally pierced atop with masses corresponding to a double mina (local and in one inscribed exemplar foreign) is unequivocally associated with raw lapis lazuli in the palace (Peyronel 2011; 2019b). The remains of a wooden beam near one specimen in the 'treasury' at the back of the throne room, where also c. 23 kg of lapis lazuli was retrieved scattered on the floor, testify to the presence of a scale for weighing the semi-precious stone (**Fig. 6**).

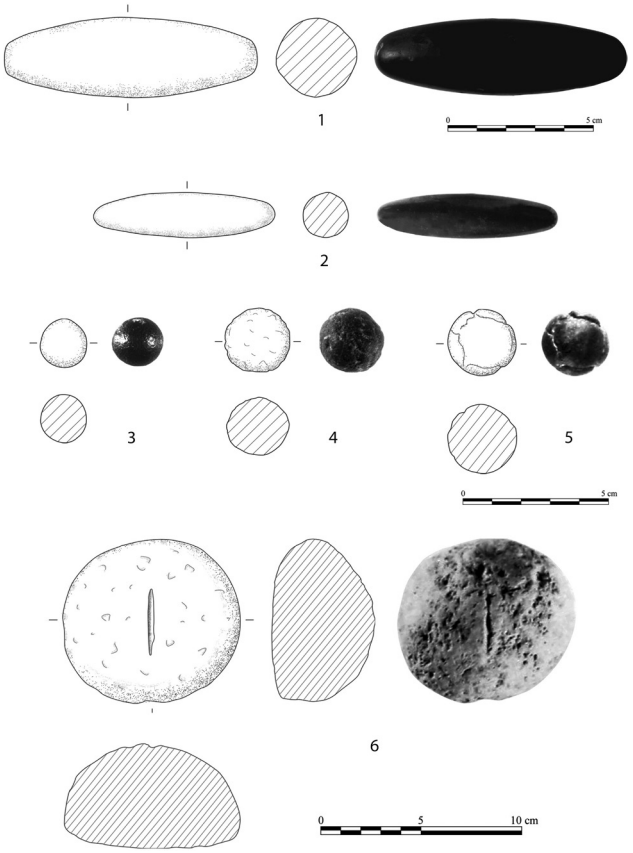

Fig. 5: Scale weights from the Royal Palace G at Tell Mardikh/Ebla (after Ascalone/Peyronel 2006: cat. nos. 15-16 (1-2), 29-31 (3-5), 48 (6).

Fig. 6: Limestone conical weight from room L.2982 of the Royal Palace G at Tell Mardikh/Ebla (after Peyronel 2019b).

The metrological analysis of the Eblaite weights and the information gathered from the cuneiform documents have shown that the palace administration used the 'Western' system with a mina of c. 470 g reckoned at 60 units of c. 7.8 g. However, the sub-regional standards of c. 9.4 and c. 11.7 g were also attested for the palace. Moreover, a group of weights seems to be related to a c. 6.6 g unit and its 10-multiple of c. 66 g, possibly a weighing system for wool/textiles characterised by a mina of c. 660–670 g (Peyronel 2014b). The lack of weights related to the 'Mesopotamian' system is striking at Ebla, especially considering that the 'Western' system was documented by numerous exemplars in Northern and Southern Mesopotamian sites dating to the ED III period. The co-existence of Mesopotamian and Levantine standards in the Syrian Euphrates valley is instead testified by the weights from Tell Sweyhat—with an inscribed (1 ma-na) limestone weight of 472.2 g dating to the 23rd century BC (Holland 1975; 2006: 231 fig. 163:2, pl. 123b–c.) (**Fig. 7**). In this respect, the lack of information on Early

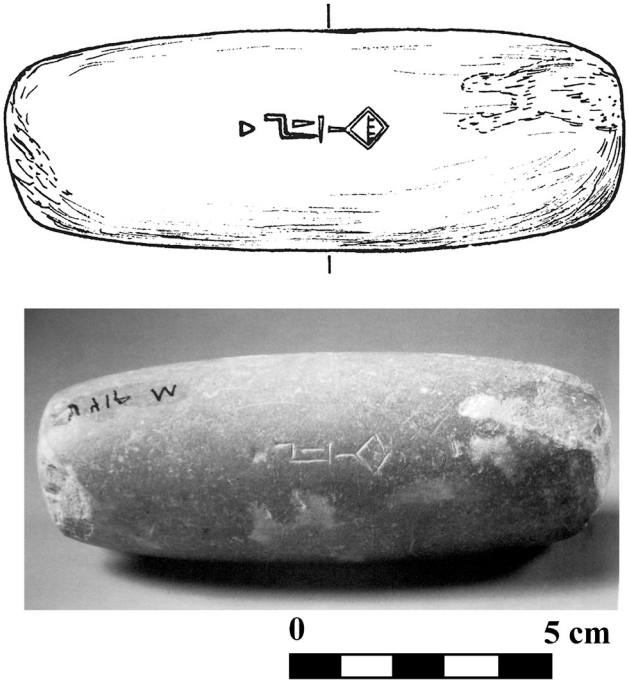

Fig. 7: Limestone inscribed weight from Tell Sweyhat (after Holland 2006: fig. 163:2, pl. 123).

Bronze/Early Dynastic balance weights from Tell Hariri/Mari poses a serious obstacle to the overall reconstruction, preventing to verify the situation in a crucial area at the intersection between the Mesopotamian and Levantine metrological spheres (Ascalone/Peyronel 2006, 354–355; Rahmstorf 2022, 314–315).

The Eblaite weights can be usefully compared with those from Tell Brak/Nagar and Tell Beydar/Nabada in the Upper Khabur, a region under the control of the regional kingdom of Nagar, which had strong political and economic relations with Ebla (Milano 2004; Ascalone/Peyronel 2006: 292–295; Rahmstorf 2022: 305–311). The occurrence of weights with metrological marks at Beydar testifies to the adoption of the 'Western' system before the Akkadian conquest. In contrast, a hematite weight of 25.3 g with three parallel incisions (3 'Mesopotamian' shekels of 8.34 g) from the late 3rd millennium BC at Tell Brak (Phase M) may indicate that the Mesopotamian system was introduced during the Akkadian control.

The only available data on balance weights in Northern Mesopotamia comes from Tepe Gawra (Ascalone/Peyronel 2006: 297–306; Rahmstorf 2022: 305–311). 25 specimen have been assigned to Levels VII-IV, roughly dating to the period spanning the period from the 26th century to the end of the 3rd millennium. The predominance of weights (17) related to the Mesopotamian standard ensured that this was the metrological system used at the site in the mid-3rd millennium. At the same time, some exemplars related to the 'Western' units suggest the existence of metrological interactions with the Jezirah and Northern Levant.

Unfortunately, out of 54 weights from Qala't Sherqat/Ashur kept in Istanbul Museum, only the few inscribed ones can be dated (to the 2nd and 1st millennium BC), preventing the study of the metrology in a diachronic perspective in the Assyrian capital (Ascalone/Peyronel 2006: 423–430).

In Anatolia, groups of specimen dating to the Early Bronze II–III have been retrieved at several sites, including Hisarlik/Troy, Çukuriçi Höyük, Demircihüyük, Bozöyük, Aphrodisias, Alişar Höyük, Gözlü Kule/Tarsus (Rahmstorf 2022: 214-257). The metrological evidence has been scrutinised during the past years, and it has been pointed to the presence of metrological solid interactions in the wide region stretching from the coast to the central and south-eastern plateau. The revision of materials from former excavations, such as the weights from Troy, Tarsus and Alişar (Bobokhyan 2006; 2009), as well as recent discoveries of assemblages in specialised metallurgical sites, such as Çukuriçi Höyük, definitely dating to the first half of the 3rd millennium BC (Horejs 2009; 2016), indicate the early development of weighing procedures in Anatolia, interrelated with Syro-Mesopotamia on the one hand and with the Aegean on the other, as the co-occurrence of spool-shaped weights testifies by barrel-shaped specimen. Although it is still unclear when the 'local' unit based on a shekel of c. 11.7 g and linked with the 'Western' system (mina of c. 470 g) was introduced, evidence shows the crucial role of the region at the intersection of different metrological spheres in the affirmation of an interregional network of exchanges already in the first half of the 3rd millennium BC (Peyronel 2018b).

Conclusions

The 3rd millennium in Western Asia witnessed the development of long-distance exchanges, the diffusion of technologies and administrative devices, and the advent of commodification reflected by the widespread distribution of raw materials (metals *in primis*), imported items, sealings, and scale weights. It was at the apogee of this 'archaic globalisation', around the middle of the 3rd millennium BC, that the economic function of silver—used as a standard of equivalence, means of exchange and storing of wealth—made its first appearance and became within a short time firmly established in the Levant, Anatolia and Mesopotamia. During the same period, weight units and metrological systems were elaborated from the Indus Valley to the Aegean, together with commensuration and equivalence systems. The distribution of weights and silver hoards highlights this process and indicates the strong interactions that led to overlapping metrological systems.

The research conducted within the European project coordinated by L. Rahmstorf on 3rd millennium balance weights from Western Asia, the Aegean, and the Indus Valley (Rahmstorf 2022; Ascalone 2022) has clearly demonstrated the importance of a methodological approach that combines the scrutiny of the archaeological contexts and the quantitative/statistical analysis of the groups of scale weights.

The objective of the project 'Silver Circulation in the Ancient Near East' (SCANE) of the University of Milan is to investigate/ examine the silver function in the ancient economies of Western Asia, carrying on a multivariate analysis of silver bullions during the Bronze Age. A systematic study of silver during the 3rd millennium BC is currently hampered by the incomplete documentation of the published material. The analysis of 2nd millennium hoards, and in particular a Middle Bronze silver bullion from Ebla, have in fact demonstrated the importance of a morphometric and metrological analysis of the silver

pieces to shed light on the practice of weighing the metal. The Ebla silver hoard was found in a jar buried beneath a floor of a poorly preserved house, and it contained 172 silver objects weighing 5043.5 g (c. 10 Mesopotamian minas), including complete or fragmented ingots of different sorts (bars/rods, disc- and bun-shaped, with masses ranging from 1.3 g to 285 g), coils/rings, thick lengths of wire and rod, several small rings, thin sheets, several irregular lumps of different sizes and a biconical bead (Peyronel 2019a: 78–81). The chemical composition of 13 pieces (2 rods, 4 elongated bar ingots, 6 discoid ingots and the bead) has been determined using a portable XRF spectrometer, showing that all the samples are made from silver alloyed with copper, and trace amounts of gold and lead are always very low (Au max 0.5 % and Pb max 1.3 %). The silver dataset has been compared with contemporary groups of weights (Ebla: 94, Kültepe: 162, Larsa: 67, Nippur: 132, and Ur: 327 specimen), testing the statistical properties of fragmented silver as a form of bullion currency: Cosine Quantogram Analysis (CQA) and Frequency Distribution Analysis (FDA) were performed on the different datasets, giving interesting results (Ialongo et al. 2018). The statistical-quantitative tests applied to silver and scale weights have shown that the masses of silver pieces and scale weights behave statistically in the same way and, therefore, that the practice of metal fragmentation was (aimed at obtaining) intended to obtain predetermined quantities (and values). Silver by weight, as an economic and financial instrument accepted in the whole Near East, easily transportable, and with a convenient value-to-weight ratio, is therefore also predestined as a means of circulation in the form of recurring quantities, which would have been easily (re)-convertible into the weight units adopted by the various economic/administrative systems. This convergence of values would also have facilitated interregional and long-distance exchanges in an effective compromise between the commercial practices and the administrative needs of the public organisations. The actual validity of this reconstruction, also in the 3rd millennium BC, will have to be carefully verified by enlarging the sample of silver datasets. Undoubtedly, this first application has shown the necessity of a rigorous method of silver analysis. Furthermore, a holistic approach to interpret the complex economic world of the pre-monetary Near Eastern cultures makes the careful use of archaeological data alongside epigraphic information indispensable.

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MAAO 9

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Weights and Measures as a Window on Ancient Near Eastern Societies

The study of weights and measures (metrology) of the Ancient Near East has long been understood as a valuable method for understanding ancient economic interactions and ways of quantification. However, the social value of metrology and the ubiquity of metrological actions and tools has not yet been fully recognized. Weighing and measuring are human processes that involve different people (experts and accountants, dealers and customers) and are based on culturally constructed representations such as the notions of justice, standardization and accuracy.

In this respect, epigraphic and archaeological sources complement each other. The epigraphic sources facilitate an approach towards weighing and measuring practices mainly through the point of view of the administrators of economic and political organisations, while archaeological material remains and depictions in images grant insight into the daily activities of private people involved in trade and exchange, measurement experts and palace or temple staff. The cross-referencing and interlacing of these sources, presented in this book by international experts and young scholars, aims to demonstrate how interdisciplinary studies of weights and measures provide a window on Ancient Near Eastern societies.

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