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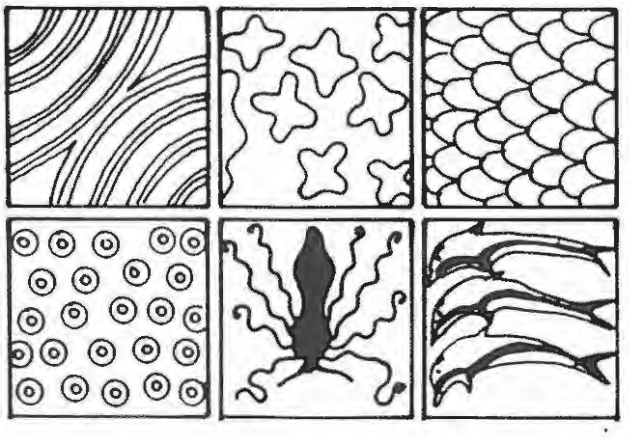

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MEASURING WEIGHT AND VALUE IN BRONZE AGE ECONOMIES IN THE AEGEAN AND THE NEAR EAST: A DISCUSSION ON METAL AXES OF NO PRACTICAL USE*

For Malcolm Wiener

Introductory note

This paper on measuring weight and value in Bronze Age economies is mainly a discussion centred on the subject of wealth and money. We are all aware that when studying Bronze Age societies in the Aegean and the Orient,[1] we are dealing with *pre-coinage* economies. Barter is considered to be the basis for the exchange of commodities, and measurement is therefore necessary at almost every step of such an economic process, the aim being to establish an equality in terms of value between the commodities exchanged. But how could equality be achieved? Aristotle (*Politics* I. iii. 14-15) defines: "...for the purpose of barter men made a mutual compact to give and accept some substance of such a sort as being itself a useful commodity, was easy to handle, in use for general life, iron for instance, silver and other metals, *at the first stage defined merely by size and weight* (my emphasis), but finally also by impressing on it a stamp in order that this might relieve them of having to measure it; for the stamp was put on as a token of the amount."[2]

Kemp has commented that the step on the road to money is to be found in the stone weights which, when used in the pans of scale balances, checked the weights and thus the values of metals, precious and otherwise.[3] Following this logic the inscribed balance weights (indeed a minority)[4] might be considered better candidates: one could suggest the idea of moving the authorizing sign from the weight on the one pan of the balance to the piece of metal on the other pan. On the other hand, Vargyas has drawn attention to cases where Mesopotamians used silver in small, pre-weighed and stamped linen bags; in this way the seal that guaranteed the weight and purity of the silver was not put on the silver itself (as in the case of coins) but on the bags containing the silver.[5] The same practice is very clearly attested in some hoards found in later times, as for instance the hoard at Tel Dor (11th to 10th century) where, inside a jar hidden in a pit close to the foundations of a building, silver subdivided on the basis of units of weight had been placed in linen bags, each of them with a clay bulla impressed in all cases with the same scarab seal; the importance of this particular hoard lies in the fact that it consisted mainly of small flat tokens cast in the shape of small coins and other

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* This paper is dedicated to Malcolm Wiener because he was the one to point out to me the potential economic significance of the gold and silver axes from Arkalochori, during a discussion at the closing reception of the Thera and the Aegean World Conference of 1989.

1 For studying in the library of the Orient Haus, of DAI in Berlin, I am very much obliged to Prof. H. Kyrieleis and Dr. M. Van Ess; I also express my thanks to INSTAP for providing me with the travel expenses to Crete and to libraries abroad.

2 "... *ο γαρ χαρακτήρ ετέθη του ποσού σημείον.*" The translation of the whole passage is by H. Rackham, edition of the Loeb Classical Library (1972) 43.

3 B.J. KEMP, *Ancient Egypt. Anatomy of Civilization* (1989) 248.

4 Cf. A. MICHAILIDOU, "Script and Metrology. Practical Processes and Cognitive Inventions," in A. MICHAILIDOU (ed.), *Manufacture and Measurement. Counting, Measuring and Recording Craft Items in Early Aegean Societies* (2001) 55.

5 P. VARGYAS, "Sennacherib's Alleged Half-Shekel Coins," *JNES* 61 (2002) 113 and n. 11 with reference to the hoard from Larsa, dated 1738 B.C.

pieces of cut silver, with only a small portion of broken jewellery, so it is rightly considered as a step in the development of coinage.[6] The idea of coinage is considered by Schaps (and others)[7] as 'an Asiatic notion, differing from *Hacksilber*[8] only in being pre-weighed and pre-divided, and marked as such.'

So, Aristotle clearly specified quantities of metal *measured* by size and weight as the acceptable medium of exchange before the invention of coins (*counted* by number of items). In recent times, we are faced with a long discussion on the subject of the invention of coinage[9] and on the possible pre-existence of a monetary system in the Near East. Powell, for instance, argues that 'Minas and shekels themselves were monetary terms in ancient Mesopotamia, as is evidenced not only by internal Mesopotamian usage but also by the fact that they turn up as words for monetary units in other languages' and he further insists that 'it is precisely the "monetary" economy that we do see in the documentary record. That is the reason we have it: it concerned "weighty" matters like minas and shekels.'[10]

Two kinds of data, one from the Orient and one from the Aegean

While reading Moorey's valuable book on Ancient Mesopotamian Materials, I came upon the following passage: 'Silver was certainly cast as standard ingots, or cut from ingots in pieces sufficiently regular, in terms of an established system of weights, to pass as currency... Such money took distinctive forms from an early date, most commonly rings...or *miniature axeheads*' (my emphasis).[11] I remembered a talk with Malcolm Wiener about the gold miniature axes from Arkalochori, where silver ones were also found. So, in this conference on *METRON* I thought of discussing two separate types of evidence: 1) Part of the material evidence regarding non-functional axes found in Crete and 2) the textual evidence from Mari that gave rise to the hypothesis of the use of axeheads made of precious metals as forms of currency.

1. Material evidence from Arkalochori and Juktas in Crete

The miniature double axes from Arkalochori are part of a deposit of a huge quantity of other metal items, bronze (or copper?) bun ingots, axes and weapons (most of the latter unfinished), found in this cave.[12] The gold and silver miniature axes, decorated with incision patterns (once also with an inscription), are known from photographs in various articles, books[13] and postcards; their weights, registered in the Museum inventory, are clustered as below:[14]

6 E. STERN, "The silver hoard from Tel Dor," in M.S. BALMUTH (ed.), *Hacksilber to Coinage. New Insights into the Monetary History of the Near East and Greece, Numismatic Studies* 24 (2001) 19, fig. 1.1-1.2, Pl. 1.3.

7 D.M. SCHAPS, "The Conceptual Prehistory of Money and its Impact on the Greek Economy," BALMUTH (*supra* n. 6) 95.

8 The term *Hacksilber* is used in numismatics to define items of silver in a pre-coinage function.

9 E.g. N. PARISE, *La nascita della moneta* (2001), G. LE RIDER, *La naissance de la monnaie: Pratiques monétaires de l'Orient ancien* (2001), BALMUTH (*supra* n. 6), S. VON REDEN, *Klio* 84 (2002) 141-174.

10 M.A. POWELL, "Money in Mesopotamia," *JESHO* 39 (1996) 228.

11 P.R.S. MOOREY, *Ancient Mesopotamian Materials and Industries* (1994) 237.

12 See in J. HAZZIDAKIS, *BSA* 19 (1912-1913), S. MARINATOS, *AA* 49 (1934); 50 (1935); ID., *Prakt* 1935; ID., "Zur Frage der Grotte von Arkalochori," *Kadmos* 1 (1962); L. TYREE, *Cretan Sacred Caves: Archaeological Evidence* (1975), L.V. WATROUS, "The Cave Sanctuary of Zeus at Psychro," *Aegaeum* 15 (1996).

13 E.g. in R. HIGGINS, *The Archaeology of Minoan Crete* (1973) 100. For the larger of the group see in S. MARINATOS and M. HIRMER, *Crete and Mycenae* (1960) Pl. 110.

14 My sincere thanks to Nota Dimopoulou and Eleni Banou for the opportunity to consult the inventories of the Heraklion Museum in summer 2002. Loeta Tyree has generously given me helpful information on this subject, which I do not to publish.

Table 1. Miniature double axes of Arkalochori: weights in gr.
copied from the inventory book of Heraklion Museum

a) 29 axes of gold (almost complete)				b) 4 axes of silver (fragm.)
20?	19.2			
				14.2
				13.45
11.4	11.2			
				8.4
6.4	6.4			
5.8	5.5	5.5	5.2	
4	3.7			
				3.25
2.2	2.3			
1.9	1.7	1.4		
1.1	1.1	0.95	0.92	
0.6	0.54			
0.4	0.4			
0.2	0.2			
0.15	0.12			

The gold ones are more or less complete (with a shaft) with only some small details missing. The weight values are presented above in a simple comprehensive way; it is not my purpose here to establish a unit through a statistical approach, or to correlate with weight-units of the period at this early stage of study; we may note that at first sight 19.2:3 = 6.4, 11.2:2 = 5.6, 2.2: 2 = 1.1 etc. The item with the weight of 19.2 gr. is the largest with a length (of blade) of 0.085 m. The best preserved is the one with a length of 0.049 m. and a weight of 11.2 gr. Clusters by size sometimes coincide with clusters by weight (table 1a), but not always (depending on manufacture).[15] Therefore it is safer to suggest that in antiquity, selection by size was followed by weight verification. The silver ones are fragmentary (there are some more items), but are cited here for the sake of discussion of their possible value.

With what balance weights could the golden axes be evaluated? In Petruso's catalogue of the Aegean weights, the lighter (stone) balance weight has the value of 3.6 gr. (there follow values such as 5.15, 5.7, 6.4, 7.5, 8.4, 10.2, 11.4, 14.4, 20.2, etc.) and 3.36 gr. is the theoretical value of the smaller denomination Q in the Linear B tablets.[16] According to information given by Michel, the smaller weight value in a metrological tablet from Kültepe in Asia Minor is 7 ½ grains (also frequently mentioned in the documents of the Old-Assyrian traders); next comes the value of 15 grains for which an actual balance weight has been found in Kültepe.[17] Assuming that 1 grain (or barleycorn) is approximately 0.046 gr, that means 0.34 gr for the lighter balance weight recorded and 0.69 gr for the lighter balance weight found in Kültepe. For Mesopotamia, Powell notes a tiny duck with a mass of only 0.2923 gr. as the smallest weight stone to his knowledge, but recorded values go even lower.[18]

We need not mention the great importance of the copper/bronze axes of Arkalochori, ranging from small dimensions to impressive sizes, bearing incised decoration (and once an inscription)[19] but for which I have no information on their weight. I thought of turning to the

15 According to TYREE (*supra* n. 12) 306, few of them are solid, the others from a foil of gold.

16 K.M. PETRUSO, *Keos VIII, Ayia Irini: The Balance Weights* (1992) 78 and 63; this is only an indicative information on weighing small quantities (without an account of the exact date of the weights and records); it would be better, of course, if we were in a position to understand relevant information in the Linear A tablets.

17 C. MICHEL, "Les marchands et les nombres: l'exemple des Assyriens à Kaniš," in J. PROSECKÝ (ed.), *Intellectual life of the Ancient Near East, RAI* 43 1996 (1998) 254.

18 M.A. POWELL, "Ancient Mesopotamian Weight metrology: Methods, Problems and Perspectives," in M.A. POWELL & R.H. SACK (eds), *Studies in honour of Tom B. Jones, AOAT* 203 (1979) 107.

19 E.g. S. MARINATOS, *Prakt* (1935) 215-217.

copper/bronze double axes from the peak sanctuary on Mount Juktas where I had the help of the excavator, Alexandra Karetsou;[20] the methodological advantage of these axes[21] lies in the fact that they are again small, not solid and exist in great numbers, so that they are not far removed from the mentality that produced the axes of the precious metals, yet they are of copper, without a shaft, undecorated and appear more mass-produced as they are cut out of a plate of copper.

Table 2. Juktas: the Inv. no. 4173 copper/bronze complete axeheads displayed together in a frame in case 21A of the Heraklion Museum, but recorded here in order of length (of the blade)

Inv. No	Length max. (cm)	Width max. (cm)	Th. (mm)	Weight[22] (gr)	Complete	Manufact.
4173- 19	9.2	6	<1	14.41	Yes	Single plate
4173- 17	9.3	5.8	<1	9.93	Yes	Single plate
4173- 10	9.8	6.5		10.52	Yes	Single plate
4173- 22	9.9	6.5	<1	15.25	Almost	Single plate
4173- 15	10.3	5.6	1	13.54	Almost	Single plate
4173- 23	10.3	6.3	1	16.17	Almost	Single plate
4173- 24	10,6	7		18.7	Almost	Single plate
4173- 1	11.2	6.1	<1	10.66	Almost	Single plate
4173- 20	11.7	6.7		20.45	Almost	Single plate

The first two items are of almost the same size and thickness, yet have a difference in weight of 4.48 gr. The next two are almost identical (when put one upon the other), yet the difference in weight is 4.73 gr. This variation may have to do with the state of preservation of the metal but in any case points to a degree of tolerance in antiquity.

Table 3. Juktas: The rest of the Inv. no. 4173 axeheads, kept in the Scientific Collection at the Heraklion Museum, in order of length (of the blade)

Inv. no	Length max. (cm)	Weight[23] (gr)	Preserved condition	Manufacture
4173- 3	8	7.78	Almost complete	Single plate
4173- 12	8.2	10.65	Almost complete	Single plate
4173- 11	8.6	12.97	Slightly underweight	Single plate
4173- 18	9.1	12.13	Complete	Single plate
4173- 14	9.2	11.21	Complete	Single plate
4173- 13	9.4	11.37 (-)	Not complete	Single plate
4173- 21	9.5	10.6	Almost complete	Single plate
4173- 4	9.9	9.90 (-)	Not complete	Single plate
4173- 7	10	9.73	Slightly underweight	Single plate
4173- 8	10	12.26 (-)	Not complete	Single plate
4173- 5	10.6	15.38 (-)	Not complete	Single plate
4173- 16	10.8	11.66	Almost complete	Single plate
4173- 9	11	17.53	Slightly underweight	Single plate
4173- 26	11	13.39 (-)	Not complete	Single plate
4173- 25	11.2	15.55	Slightly underweight	Single plate
4173- 6	11.2	9.37 (-)	Not complete	Single plate
4173- 2	11.5	14.55 (-)	Not complete	Single plate

20 I wish to express my thanks to Alexandra for our discussion in Athens (especially for her role as *advocatus diaboli*) and for permission to weigh the items involved.

21 A. KARETSOU, "The Peak Sanctuary of Mt. Juktas;" in R. HÄGG and N. MARINATOS (eds), *Sanctuaries and Cults in the Aegean Bronze Age* (1981) 146, fig. 14 (the group of small axeheads is on the right half of the picture). Also Reports by KARETSOU in *Prakt* 1974-1985.

22 Weighed by a museum's conservator in summer 2002 thanks to the facilities provided by Nota Dimopoulou.

23 Weighed by myself in summer 2000.

In this table the complete samples with lengths of 9.1 and 9.2 (4173-18 and 4173-14) have a difference in weight of only 0.92 gr. At present I will leave aside the statistical approach,[24] and note only that at least four axes in this table, those with the additional numbers 2, 9, 25 and 26, are nearly identical when placed one upon the other; their weight values are respectively: 14.55 (-), 17.53, 15.55, 13.39 (-). We get the impression that they were sorted empirically by size, since their weight could vary between 17.50 to 15.50 (the complete ones), giving a tolerance of 2 gr in this case! The tables reveal that objects were produced in gradually increasing size, while each item's weight could be checked in balance on any occasion. Perhaps even the greater difference (4.73 gr.) attested in Table 2 between items of the same size, might not be so important: for instance, the quantity of a half-shekel (4.2 gr.) of bronze or copper is considered by Vargyas to be too low to be used as a standard, for it is not attested in the texts of the Orient,[25] being obviously a very modest sum.[26]

Table 4. Juktas: Copper/bronze axeheads displayed standing in case 21A, Heraklion Museum

Inv.no.4171	21.8 cm	15 cm	1 mm 90.94 gr	Complete
Inv.no.4172	21.7 cm	14.9 cm	1 mm 89.93 gr	Slightly restored

In contrast to the axeheads of tables 2-3, these two[27] have a shaft hole, therefore these were once placed in an upright position; they have almost the same size and weight – equivalent to one Egyptian *deben* (around 1 ½ Minoan unit). In Egypt, copper blades that weigh one *deben* have been considered by some scholars as serving at least as a standard of value and a way to store wealth.[28]

Since the reason for dealing with unpublished – therefore dangerous – material was the textual evidence for the economic use of miniature axeheads (cf. page 2) we must proceed to the second type of evidence

2. Textual documentation from Mari in Northern Mesopotamia

The text referred to by Moorey is published by Bottéro[29] who, in his discussion on "paiement en argent," after making it clear that 'il ne s'agissait évidement pas de monnaie au sens modern du mot,' notes that 'pour autant que nos texts nous permettent d'y voir clair, l'argent devait être cependant découper en morceaux suffisamment réguliers, que l'on pouvait peser, comme nous l'avons vu, en sicles et même en grains,' and classifies the following items among forms of currency: 'anneaux, barres, *hachettes* (my emphasis) ou vases.'[30]

In this paper we will intentionally leave aside the other forms,[31] concentrating only on axeheads. Among the texts from Mari published by Bottero, the *hazzinnu* items (written in *CAD* VI, p. 133 as *ḫaṣṣinnu*) appear in the text *ARM* VII **249**: there are ten axes made of bronze, the rest being made of silver (of a weight of 320 gr or 240 gr, or 160 gr.) plated with gold (of 16 gr. or 12 gr, or 8 gr). It is perhaps useful to cite the French translation[32] of *ARMT* VII **249**:

24 It is better to apply it at a second stage, after having explored the subject more thoroughly; statistics by themselves might prove misleading. I will also – temporarily - leave aside any correlation with weight- units of the period.

25 VARGYAS (*supra* n. 5) 113.

26 K. RADNER, "Money in the Neo-Assyrian Empire," in J.G. DERCKSEN (ed.), *Trade and Finance in Ancient Mesopotamia*, *MOS* 1 1997 (1999) 127, n. 2.

27 Cf. KARETSOU (*supra* n. 21) 146, fig. 14 (left).

28 Cited from D.C. SNELL, "Methods of Exchange and Coinage in Ancient Western Asia," in J. SASSON (ed.), *Civilizations of the Ancient Near East* III (1995) 1489. Of course our sample is very small; It would be so useful if we could have the weight of similar axes from other places in Crete!

29 J. BOTTÉRO, *Textes économiques et administratifs*, *ARM* VII (1957) 133-134.

30 BOTTÉRO (*supra* n. 29) 332-333.

31 To be discussed elsewhere, as part of the project in progress on Weight and Value in the Aegean.

32 BOTTÉRO (*supra* n. 29) 133-134.

.....(at least one line missing in the beginning)
1 vêtement-utuplû, ordinaire: [M]û[t]u-Dagan.
1 hachette en argent, de ⅔ de mine, (avec) 2 sicles d'or de placage;
1 vêtement-utuplû, ordinaire : Ian1ibum.
1 hachette en argent, d'½ mine, (avec) 1 sicle ½ d'or de plac[age];
1 vêtement-utuplû, ordin[aire] : Sinrêmêni.
1 hachette en argent de ⅓ de mine (avec) 2 sicles d'or de plac[age];
1 vêtement-utuplû, ordinaire : Maš[u]m.
1 hachette en argent de ⅓ de mine (avec) 1 sicle d'or de placa[ge];
1 [vêtemen]t-utuplû : Šamaš-nà1 ir.
1 [hach]ette en a[rgen]t de ⅓ de mine (avec) 1 sicle d'or de [placage];
[1] vêtement-u[tuplû ordinaire] : Ili-šarr[i].
1 boucl[e de x] sicle(s), 1 anneau de 6 sicles en [ ]
1 hachette en b[ronze]
2 vêtements-utupl[û]
[ ] 6 sicles d'argent [ ]
Rev..... (lines not fully preserved where again 1 axehead and 1 ring (?) of 2 shekels of silver are mentioned)
Towards the end:
[T]otal : 10 sicles d'or tréfilé (?);
13 sicles d'or;
4 mines, 3 sicles d'[a]rgent;
10 hachettes de br[o]nze;
[x] vêtement(s) de- tissu-fin;
[x vêtements- ut]uplû.
(Two or three lines are missing at the end of the Reverse side of this tablet)

We may note that one silver axehead (plated with gold) plus one garment, are mentioned for each of the first persons recorded, but the weight of the axeheads gradually diminishes from 1 mina (?) of silver (or another quantity in gold?) for the first person (Mûtu –Dagan) to ⅔ of mina and ½ of mina for the following two respectively, and ⅓ of mina for each one of the following three persons; the recorded weight of gold for plating the axes varies from 2 shekels to at least 1 shekel; a seventh person received (?) not a silver but a bronze axehead plus 1 coil (?) and 1 ring (of unpreserved record of metal) and perhaps also two garments instead of one. In the total there is mention of 10 axeheads of bronze (of unspecified weight) and garments of fine tissue that obviously were also given (?)[33] parallel to the utuplû ones.

Bottéro accepts that gold, recorded only as the material of precious objects, should anyway give them a sort of monetary value, and he adds that on rare occasions (as in text *ARM* VII **217**) gold might also function as a direct means of payment;[34] as for the ratio between the two metals, in text *ARM* VII **98**, ⅓ of a mina in silver is needed to buy 10 shekels of gold.

After Bottéro, Kupper uses the above textual evidence in his article on the use of silver at Mari; while referring to presents given by the king of Mari, he mentions among silver vases, weapons and garments 'des hachettes en argent avec placage d'or' (citing the same text *ARM* VII **249**).[35] Of special interest to us (for the find of both gold and silver axes in Arkalochori) is the fact that though he defines silver as the monetary metal and the principal means to finance external trade, he refers also to the text *ARM* VII **217** where the contributions registered, in

33 S. DALLEY, *Mari and Karana* (1984) 66, and F. Van KOPPEN, "The Organisation of Institutional Agriculture in Mari," *JESHO* 44 (2001) 489, consider it more probable that the items recorded represent gifts given from the palace, though this is not firmly stated.
34 BOTTÉRO (*supra* n. 29) 297.
35 J.-R KUPPER, "L'usage de l'argent à Mari," in G. VAN DRIEL, TH.J.H. KRISPIJN, M. STOL, K.R.VEENHOF (eds), *Zikir Šumim, Assyriological Studies presented to F.R. Kraus* (1982) 167.

fact representing monetary penalties collected for the king's treasury, are expressed in both metals: for example 11 shekels of gold plus 11 ½ minas and 4 shekels of silver from one person, or 5 shekels of gold plus 1 ½ mina and 8 shekels of silver from another, etc.[36] Kupper further refers to the text *ARM* XIII **110** for the fabrication of a divine throne with the silver collected from the persons condemned to pay fines.[37] Thus the collection of the "argent du jugement"[38] was one of the ways that silver given could return to the palace and from there be sent to the temple.

Dalley, also refers to the text *ARM* VII, **249**; I quote: 'Payment seems also to have taken the form of silver-and-gold axes or axe-heads. One text allots a garment and a *ḫaṣṣinnum*-axe, which is made with a stated weight of silver and plated with gold, to each of six different, named officials. Such an axe could never have been used as a tool. The weight of each man's axe presumably reflects the payment which was due. Only a single tablet so far published attests this practice, but it is particularly enticing as a parallel for the currency- or ingot-axes of Armorica (Brittany in France) in the early first millennium.'[39]

Regarding the status of the officials named in text *ARM* VII **249**, it is van Koppen who, in a recent article on agriculture in Mari, gives the prosopography of them;[40] he places the recipients (?) of the axes (and the garments) in the category of the *ikkarum*, a title representing various tasks in different areas but according to van Koppen 'all *ikkarum*-farmers attested in Mari during the reign of Zimri-Lim seem to fit the role of agricultural managers.'[41]

Returning to the miniature (Moorey's word) axeheads, Powell in his article on money in Mesopotamia concludes with what he calls a remarkable oddity: 'the Sumerian sign for "shekel" actually seems to be the stylized picture of an axe; moreover, the Sumerian word "gin" not only means shekel but also axe. This can hardly have been accidental. Axe hoards are ubiquitous, and it is virtually certain that these were used as money, and indeed axes are on rare occasions attested in cuneiform documents as a money form. Mesopotamians may have begun – at least in part- where we have ended, in *representational money*'(my emphasis).[42] According to Keynes, representative (or token) money is something, the intrinsic value of the material substance of which is divorced from its monetary face value, in contrast to the so-called commodity money.[43]

The context for the discussion is now complete, and we need only add its chronological setting: the Mariote text with the reference to axeheads given as gifts to the '*ikkarum*-farmers,' in this particular case considered as agricultural managers,[44] belongs to the archives from the time of the king Zimri-Lim, that is 1678-1664 B.C.[45] The Juktas axeheads come from an open air Old Palace peak sanctuary[46] while the Arkalochori material is not securely dated but LM I seems to be the *terminus ante quem*.[47]

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36 KUPPER (*supra* n. 35) 164, M. BIROT (*ARM* IX, 1960) 311, BOTTÉRO (*supra* n. 29) 108.
37 KUPPER (*supra* n. 35) 164.
38 KUPPER (*supra* n. 35) 170 and note 48.
39 DALLEY (*supra* n. 33) 66–67 where she also quotes (in English) the *ARMT* VII **117** with gifts received by messengers abroad but contributed to the palace treasury on their return; 'Total 14 mines ⅓, 5 sicles ⅓ d'argent, versement (fait) à la caisse du roi' (BOTTÉRO [*supra* n. 29] 45).
40 VAN KOPPEN (*supra* n. 33) 489-492.
41 VAN KOPPEN (*supra* n. 33) 482.
42 POWELL (*supra* n. 10) 238 with references to the CAD Dictionary and other bibliography.
43 J.M. KEYNES, *A Treatise on Money*, vol I (1930) 7.
44 VAN KOPPEN (*supra* n. 33) 481.
45 VVAN KOPPEN (*supra* n. 33) 451 and 489 (category c).
46 The context is described as follows: 'Very close to the altar, also in a context of secondary use, was found a poros kernos..., and beside it a treasure of bronze double axes, two large ones with shaft holes, and thirty-two small ones; these finds belong to the Old Palace stratum designated by Evans as the "ash altar" (KARETSOU [*supra* n. 21] 145-146, fig. 14).
47 S. MARINATOS, *Prakt* (1935) 214.

Discussion

First we should look for Near Eastern material supporting the textual analysis offered above. Non-functional axes along with cast ones are found in the rich graves of Ur, made of bronze/copper (or precious metal); the hammered ones are considered to be imitations of the weapons and some miniature ones as toys or models, e.g. a silver one (length of blade 0.105 m).[48] If, for the sake of our study here, we look for the form of the double axe in the Orient,[49] then the most recent publication[50] is of a solid double axe brought to the Museum of Bolu from Korucuk (19.2 cm. x 5.2 cm) and compared to another cast example (18.3 cm x 2 cm) found in a cist grave under the floor of a room at Kültepe;[51] from the latter site also comes a steatite mould demonstrating that at the time of Karum level II, this type of axe was produced in situ (another double-headed axe from Tarsus is mentioned as a 'foundation deposit'). Mellink mentions the MBA double axes from Kültepe Karum II and from the mound at Tarsus as functional weapons of useful size distinguished in form from the Cretan type, with an MBA *labrys* from Megiddo, closer to the Cretan fashion.[52] Perhaps closer (as a model and a prestige item) to the Arkalochori miniature axes is a miniature silver double-headed axe (7.3 cm long), found at Semayük/Karataş: it is considered a model of votive function, is decorated with incisions in the front side (the back is plain), and bears a shaft hole in the centre; dating in the EBA (II-III) it is described as of Anatolian type, 'perhaps the earliest known precious metal *labrys* from the Eastern Mediterranean, about contemporary with the Early Minoan II copper and lead models from Mochlos.'[53]

Turning to the Cretan material, one has only to look at the Heraklion Museum exhibition and study the inventory book, to remember how important and broad the subject of the double axe is,[54] which in its real form is a functional tool and weapon, found in settlements, tombs and sanctuaries. What interests us here is whether the models of this object, though correctly defined as votive offerings and symbols with a special meaning - depending on their particular context - also point to an acceptable monetary form (along with their value as metal) especially the imitations in foil (therefore of no practical use)[55] of copper[56] or precious metal,[57] sometimes found in great numbers.

We must emphasise that the axes from Arkalochori and Juktas, taken here as case studies, belong to a wider deposit of metals;[58] for example, the unfinished or simplistic[59] models of daggers and swords, found at Arkalochori might be of interest for our purposes - some at

48 C.L. WOOLLEY, *Ur Excavations, The Royal Cemetery* (1934) 305, 307, 436, 533, 543 and pl. 223.

49 See in H.-G. BUCHHOLZ, *Zur Herkunft der kretischen Doppelaxt* (1959) 28-30.

50 T. YILDIRIM, "A Group of Hittite Bronze Objects from the Seben District of Bolu," *Anatolica* 27 (2001) 131, fig. 8.

51 T. ÖZGÜÇ, *Belleten* 73 (1955) 70, fig. 41a-b.

52 M.J. MELLINK, *AJA* 71 (1967) 265.

53 MELLINK (*supra* n. 52) 265-6, Pl. 84 fig. 50a.

54 For a general survey on the subject of the double axe with a catalogue of finds see BUCHHOLZ (*supra* n. 49). The most recent bibliography is assembled again by Buchholz in the chapter "Die Doppelaxt zwischen West und Ost," in H.-G. BUCHHOLZ, *Ugarit, Zypern und Ägäis. Kulturbeziehungen im zweiten Jahrtausend v. Chr., AOAT* 261 (1999) 603-605.

55 Of course in this way larger items could be manufactured of less quantity of metal.

56 E.g. the axes from the Psychro Cave that are called by Hogarth simulacra; two are reported as made of almost pure copper and, among those made of a single plate, there is one with the socket formed by rolling the single plate back on itself, while many others would appear not to have been furnished with shafts. (D.G. HOGARTH, "The Dictaean Cave," *BSA* 6 (1899-1900) 108-109, fig. 40. Also J. BOARDMAN, *The Cretan Collection in Oxford* (1961) 42-45.

57 Gold ones are not confined to Arkalochori: e.g. one miniature comes from Apodoulou and another from the cave of Phaneromeni (where two miniature bronze ones were also found : cf. the catalogue of double axes in caves in TYREE (*supra* n. 12). Two miniature double axes made of a thin foil of gold were found by Schliemann in tomb IV and he comments on them mentioning the Zeus Labrandian of Caria and the information given by Plutarch that the axe, *πέλεκυς*, was called in the Lydian language *λάβρυς*: H. SCHLIEMANN, *Mycenae. A Narrative of Researches and Discoveries* (1880) 1967, 252-253.

58 So, conclusions, if any, have to be tested when the material is properly studied: I have applied to the Heraklion Museum for permission to measure the relevant material.

59 J. HAZZIDAKIS, "An Early Minoan Sacred Cave at Arkalochori in Crete," *BSA* 19 (1912-1913) 44.

least of them containing no tin (two instances of a very low quantity of 3.28 % and 2.8 % are recorded) according to an old analysis,[60] in this case[61] representing deposits of copper or recycled bronze in a special form, each to be evaluated by weight when required (of the two published unfinished swords, the longer blade weighs 600 gr. and the shorter three times more, that is 1800 gr.; 8 kg. is the recorded weight for one of the bun ingots)[62] Another interesting find in Crete consists of tiny foils of copper/bronze or gold in elongated triangular shape, sometimes referred to as votive models of tools;[63] at Arkalochori, for instance, 20 such pieces of gold are registered with a total weight of 9.95 gr.

Axes and weapons, real or non-functional, are defined by their context. But, as S. Sherratt comments, bronze weapons are put 'to practical as well as symbolic use in the pursuit of power and influence.'[64] Einzig, in his book on primitive money, refers to axes[65] and unfinished swords[66] used also as currency.

Powell, makes it clear that almost everything under the sun occasionally had a money function, while stating that in Mesopotamia barley and copper were the cheap money and silver the most expensive, their role as "normal" monies being defined by their repeated use as denominators of value.[67] Unfortunately, we have no price lists for the Aegean era in the deciphered Linear B.[68] But we have prestige items in metal, and information about exporting them to the Orient; considering the possibility of silver or gold or even copper double axes being sent[69] as gifts to rulers of Mari, we can refer to the 'Captorian' objects recorded among other items in the texts of the palace of Zimri-Lim at Mari, especially weapons but also vases with engraved decoration.[70] So, we are interested in the value embodied in them.

Postgate points out that the metal pieces had both the practical value that the raw material of finished artifacts gave them as well as any value assigned to them *by society* as currency; that we need not look for a single kind of currency, for instance knives in early China and axes of precious metal in the north of Mesopotamia were functioning in this way.[71]

If we accept a similar role for metals in Minoan Crete, who would be the owners/ dedicators of such items (axes and weapons, whether real or models) in such quantities to certain sanctuaries? The contents of Cretan tombs and settlements may give an answer;

60 HAZZIDAKIS (*supra* n. 59) 44-47. The low tin content could mean that recycled material was used only for the required non- functional (?) form (the usual percentage of tin in Akrotiri daggers is 12-13 %).

61 We would be hoping for more recent results.

62 MARINATOS (*supra* n. 12, *Kadmos* 1) 91, fig. 1.

63 E.g. of copper in Juktas: A. KARETSOU, *Prakt* (1985) 291-2.

64 S. SHERRATT, "Circulation of metals and the end of the Bronze Age in the Eastern Mediterranean," in C.F.E. PARE (ed.), *Metals Make The World Go Round. The Supply and Circulation of Metals in Bronze Age Europe* (2000) 83.

65 Special–shaped axes (named celts) found in hoards are considered to have served as currency in the interior of Gaul; of special interest to us are the arguments used by Einzig to this direction regarding a hoard of about 4,000 very small bronze celts found tied together by a wire at Maur-de-Bretagne: their great number and small size (plus the peculiar shape), the fact that both used and unused items were found mixed together, many of them were hidden in earthenware jars and some hatchets are made of lead (therefore not of practical use); in the same deposit, about twenty celts had ornamental designs which would be worn off by practical use (P. EINZIG, *Primitive Money* [1966]^2 231).

66 In ancient Britain of the Ist century, the iron bars (if this translation instead of rings is accepted for the relevant text of *De Bello Gallico*) referred to by Julius Caesar as serving for currency, took the forms of unfinished swords and one of the arguments for the *unfinished swords* found in hoards is that there is too much metal in them, also that they represented approximate fractions and multiples of a certain unit (EINZIG [*supra* n. 65] 192 and 235).

67 POWELL (*supra* n. 10) 227-228.

68 Apart from the debated case of the Linear B tablet KN L 693 (M. VENTRIS and J.CHADWICK, *Documents in Mycenaean Greek* [1973] 320).

69 For long-distance transportation of the bronze double-axe see the Ulu Burun wreck (E.H. CLINE, *Sailing the Wine-Dark Sea. International Trade in the LBA Aegean* [1994] 224).

70 E.g. in CLINE (*supra* n. 69) 126-127 and in M. WIENER, "The Nature and Control of Minoan Foreign Trade," in N. GALE (ed.), *Bronze Age Trade in the Mediterranean* (1991) 328-329.

71 J.N. POSTGATE, *Early Mesopotamia. Society and Economy at the Dawn of History* (1992) 204 and note 345.

unfortunately we do not have the rich textual evidence on the accumulation of property *in private hands* that exists for Ugarit.[72] With regard to the treasure at Arkalochori, Rethymiotakis is of the opinion that it may represent a palatial hoard of *ka-ko na-wi-jo*,[73] that is 'sacred property' of sanctuaries that was in the way to the palace of Galatas for recycling in the palatial workshops; he based his argument on similar finds such as "swords, daggers, double axes and pieces of ingots" from large sanctuaries considered to be connected to the palaces (he explicitly refers to double axes of Kophinas similar to those from Juktas); he further correlates the early destruction of the palace at Galatas with the concealment of the treasure in the cave.[74] Whatever the case (a votive deposit *in situ*[75] or a secondary concealment of the treasure), the hoard represents a large property in metal, originally offered in shape of weapons and double axes. The circulation of metal between palaces and temples is textually confirmed in Mari texts[76] and mentioned at in Linear B texts.[77] Of special interest to us are texts from Mari recording gold stored in temples, yet as a royal property.[78] Perhaps we could reconstruct a mechanism of circulation for metal items of a prestige value related to the palatial propaganda of power and the divine order – like the decorated bronze axes or the miniature ones of precious metals – in a chain in which the palace gives them as gifts (= compensation for services)[79] to persons of a certain position, who can use them (as prestige items and personal belongings)[80] or store them (as reserve capital) or give them (as 'valore circolante')[81] in

72 M. HELTZER, "Private property in Ugarit," in A. ARCHI (ed), *Circulation of Goods in non-palatial Context in the Ancient Near East* (1984) 161-191; of special interest to us is the text RS.21.15, where copper artifacts (defined by the translator as statuettes) are cast in purpose to be exchanged for donkeys in a transaction that seems to be *on a personal level* (*ibid*, 189-190).

73 The term is from the Linear B tablet PY Jn 829 , possibly translated as 'copper from the temple' (e.g in. J. CHADWICK, *The Mycenaean World* [1976] 141-142).

74 G. RETHYMIOTAKIS, "Το νέο Μινωϊκό ανάκτορο στον Γαλατά Πεδιάδος και το ιερό Σπήλαιο Αρκαλοχωρίου', A. KARETSOU (ed.), *Κρήτες θαλασσοδρόμοι* (1999) 106-107.

75 It should not be forgotten that in the Psychro cave, double axes are mentioned inserted into the stalagmites and the largest and finest double axe was placed in a niche within the adjacent side chamber (cf. E.L. TYREE, "Diachronic Changes in Minoan Cave Cult," in R. LAFFINEUR & R. HÄGG (eds), *POTNIA. Deities and Religion in the Aegean Bronze Age, Aegaeum* 22 (2001) 41; so these simulacra are not precisely non-functional because there – or at Nirou Chani, for example - they were meant to function as *insignia* of divine or cosmic authority, that is why the definition as 'axes of no practical use' is preferred in the title of this paper.

76 E.g. Zimri-Lim received from the god Addu the weapons (with no description unfortunately) with which he had defeated the god of the sea, as a gift for his ascension to the throne of Mari; the weapons were afterwards sent by the king to the city of Terqa, to the North of Mari, and deposited there in the temple of the god Dagan, cf. A. MALAMAT, "Weapons deposited in a Sanctuary by Zimri-Lim of Mari and David and Saul of Israel," in *Ex Mesopotamia et Syria Lux, Festrischft M. Dietrich* (2002) 325 (he also mentions the instances of warriors depositing the weapons of the defeated enemy to sanctuaries, p. 326-7). KUPPER (*supra* n. 35, 1982), 167 and n. 29 provides further information on the circulation of precious metals between the palace and the temple; on the definition of the "sacred property " of some gods (the term is literally "forbidden"); also on the expenditure by the palace of quantities of gold for the sake of the goddess

77 E.g. in the Linear B tablet PY Tn 316 (CHADWICK [*supra* n. 73] 89 ff).

78 "Il se pourrait aussi, dans certain cas, que les métaux précieux aient été seulement déposés dans les temples; un document inédit fait état de la remise à l'orfèvre Yašub-Nūr, travaillant pour le Palais, d'une quantité de 5 mines et 16 sicles d'argent qui était entreposée dans le temple de Nergal'" (KUPPER [*supra* n. 35] 167).

79 They could be given to military officials, to agricultural or commercial managers etc. They could be something like the *qīštum* "present, gift," the term used to denote the pay or remuneration received by the housebuilder and the boatwright for their services according to the "Laws of Hammurabi," in contrast to *idū* = "wages" (information on these terms by J. RENGER, "Patterns of Non-Institutional Trade and Non-Commercial Exchange in Ancient Mesopotamia at the Beginning of the Second Millennium B.C.," in ARCHI (*supra* n. 72) 91.

80 The wire loop preserved at the end of one of the shafts of the miniature gold axes, points to a hanging position. It reminds me of the pendant of the "fly of the valour" given as a reward by the Pharaoh to military officials, and the so called 'order of the golden fly,' cf. I. SHAW & P. NICHOLSON, *British Museum Dictionary of Ancient Egypt* (1995) 101.

81 The term from PARISE (*supra* n. 9) 87.

exchange for other commodities or services and above all dedicate them to gain the favour of the deity, thus fulfilling the ultimate destination for which these items were meant: to become 'sacred' property and ultimately to contribute to the 'royal' property.[82]

To give an idea of the value of just one of the votive axeheads: the payments in silver recorded in the Mariote text *ARM* VII **139** are from 16 grains (0.65 gr.) to 1 mina (c. 500 gr.) with all the intermediary sums (1 gr., 2 gr., 2-3 gr., 4 gr., 6 gr., 8 gr., 12 gr., 16 gr. etc.), the most frequently recorded being 8 gr. (one shekel), which in Mesopotamia usually represents a month's payment for many trades.[83] The approximate weights of the (fragmented) silver axes of Arkalochori, vary from at least 2 shekels to half a shekel (one published by Hazzidakis looks in better condition and its reported weight is 3.5 gr).[84]

Concluding Remarks

'The value of goods, and hence wealth, is indeed largely a matter of convention whereby a society covets one commodity rather than another....Wealth, the ownership of desirable transferable goods, is as much a social phenomenon as an economic one.'[85] I see no reason to consider Minoan society so very different from the societies in the Near East. It is widely accepted that 'In the second millennium, precious and base metals- primarily gold, silver, copper and tin- represent what may be regarded as prime or convertible value within the exchange systems of the eastern half of the Mediterranean.'[86] Even in Egypt, where the barter system was one in which goods were traded against goods, "value" came in time to mean "metal value," which is an almost monetary conception.[87] Very indicative in this direction are the 'metal debens' in the letter of Hekanakhte (Middle Kingdom) in whatever *form* they came.[88]

So, back again to the form of axeheads (*ḫaṣṣinnu*) in the *ARMT* VII **149**; Bottéro is explicit: 'Il s'agit de la "hachette," bien connue et qui était peut-être, comme *pâšu*, et *niggallu* en "Cappadoce," sinon une unité de poids, au moins une sorte de bien d'échange ayant valeur de "monnaie."'[89] The first term (*pâšu*) is axe, the second term (*niggallu*) means sickle. So sickle is another tool proposed also for a monetary function.[90] We must keep in mind that 'in a primitive economy there is no necessity for all the functions of money to be performed by a single item.'[91] Copper axes were already recorded as payment in the Obelisk of Maništušu, along with quantities of barley and silver (in the massive land sales of Old Akkadian period).[92]

82 Compare with various ways of contributing to the 'king's treasury,' recorded in Mari texts, *supra* notes 36, 38, 39.

83 See in BOTTÉRO (*supra* n. 29) 330-331. The equivalences in the laws of Eshnuna, 1 gin (shekel) of silver = 1 gur barley or 20 sila oil or 12 sila sesame or 1 gur dates or 6 minas wool (RENGER [*supra* n. 79] 115) are also indicative, though they might not reflect the reality, at least not everywhere; a definition of the value of silver in the Minoan/Mycenaean era is more difficult, since even the word for this metal is not securely read in the tablets of the Linear script (A and B).

84 HATZIDAKIS (*supra* n. 59) 45-46 and Fig. 9h.

85 *Emergence of Civilisation*, 370.

86 SHERRATT (supra n. 64) 83.

87 T.G.H. JAMES, *Pharaoh's People. Scenes from Life in Imperial Egypt* (1984) 257.

88 The letter says clearly '24 copper debens,' not '24 deben of copper' which ought to signify 24 pieces of copper each weighing one deben. They had been sent for the payment of the land rent, not, apparently, because they were a kind of coin, but because they were a convertible commodity and easily portable: JAMES (*supra* n. 87) 245 and 259.

89 BOTTERO (*supra* n. 29) 304-305. There are more recent publications of other texts, e.g. *ARMT* IX, **20** and **80**, where we have 'haches en bronze, avec plaquage (?) d'argent,' and *ARMT* IX, **272** where 'hachettes en argent' are mentioned, and M. BIROT (*ARM* IX, 1960, 322) comments: 'celles du no **272** qui ne pèse que 250 et 170 grammes, sont des "hachettes" et sur leur usage monétaire, voir BOTTERO *ARM* VII , p. 305.'

90 *CAD* Dictionnary, vol. 11 (1980) part II, 213-214: s.v. *nigallu*, paragraph a) a tool, paragraph b) used for payments (as currency, OA only) ; cf. one of the texts cited: " I gave them two minas of tin, [x] minas in sickles, their expenses."

91 SCHAPS (*supra* n. 7) 96-97. He cites Homer where the heroes hoard bronze tripods, estimate an item's value in cattle, and trade by barter; he believes that the transition from what he calls utensil money to coinage was direct. The question is what does he mean by the definition of an economy as a primitive one?

92 Cf. POSTGATE (*supra* n. 71) 321, note 345.

Particularly for the term *ḫaṣṣinnu* in the Nuzi texts, I cite Oppenheim's remarks: 'Notons bien qu'il ne s'agit pas d'une véritable hache, mais d'une monnaie *de bronze* en forme de hache'[93] (my emphasis); also: 'The *gín* was originally a small piece of metal in the shape of the *pâšu*-axe (actually attested in Cappadocian texts...) or of the axe called in Akk. *ḫaṣṣinnu* (actually attested in the texts from Nuzi).'[94] In such a case, could we not think of the possibility of the small Cretan models of silver, copper or gold,[95] being used as means of payment?

It is time to refer to two miniature – solid - models of a double axe, found in the palace of Knossos. They are made of copper/bronze with some relics of gold plating preserved,[96] like the silver axeheads in the Mariote text; the latter are perhaps not miniatures but simply small, with even the smallest weight recorded - 160 gr.- not a negligible quantity of silver! Now, regarding their difference in weight values as compared to the metal Cretan axes in tables 1-4 above, there are references to lighter samples in other texts: there are two passages in the *CAD* dictionary, referring to the use of *ḫaṣṣinnu* as currency,[97] in the first of which the axe weighs only five shekels (c. 40 gr.) and in the second one is stated that among seven minas of bronze, ⅓ of mina is in axes (if again of 5 shekels each, this would lead to 4 axes).

But, if not of a standard weight, then the axes could be given as means of payment, without functioning as a standard – countable - index of value:[98] the golden axes from Arkalochori present many - yet not so distinct - intervals among the preliminary groupings in table 1 and unfortunately the silver ones are not well preserved. Most probably they were regulated by form and size, but had to be weighed for their evaluation when given. The copper cut-outs from Juktas, with no provision for the shaft, seem to be more mass-produced (yet each one with individual outlines); their lengths are from 8 to 11.7 cm, so perhaps they were meant to be negotiable in units first and afterwards evaluated in the balance (unless precision in smaller quantities of copper was not so important and these differences in size were sufficient, but this needs further study in comparison with the finds from other sites). Once obtained, they could easily become a store of value with others or be given as copper[99] in easily calculated multiples of low quantities and in a widely acceptable form for payment of services and goods. They were simple single plates of metal, but of a shape respected and easily transformed into a votive object, by one of the ways Boardman states for similar items from Psychro and many other sites (settlements included).[100]

There is not enough room here for the discussion of the name *pelekys*, whether it, like the gin (=shekel), also represents a monetary term; at present I will only cite Parise[101] (for the discussion on "segni premonetari," like the axe and the sickle, in later periods) and Vandenabeele and Olivier[102] (for *PE* in the Linear B script) and of course Svoronos who also

93 A.L. OPPENHEIM, *JA* 230 (1938) 659.

94 A.L. OPPENHEIM, *Catalogue of the Cuneiform Tablets of the Wilberforce Eames Babylonian Collection in the New York Public Library* (1948) 138. It is also the name of a functional item, and Oppenheim refers to a "gin-adge" on a belt, made of silver and dedicated by the king to the goddess.

95 Depending also on the extent to which gold might or might not be used as an index of value in certain periods, but this is another subject, not to be discussed here.

96 See *PM* III, 414 (East Treasury) fig. 277: '...the occurrence, each in a different part of the present deposit, of two bronze double axes of miniature dimensions, with remains of gold plating still attached to their surface' (Also BOARDMAN [*supra* n. 56] 42). One of them is on display in the Heraklion Museum.

97 *CAD* Dictionnary, 134, s.v. *ḫaṣṣinnu*, paragraph d.

98 Standard of accounting is one of the functions of currency, along with medium of exchange and means of payment, cf. POSTGATE (*supra* n. 71) 203.

99 Especially if they prove to be of pure copper, than they could be a distinctive form of 'cheap money' (as Powell classifies this metal), though of course in Crete there might be a different situation, but again this is not a subject for this paper.

100 See BOARDMAN (*supra* n. 56) 42-45 and fig. 19 (199-209). The double folding in the middle of the length of fig. 19A is suggestive for the Juktas material. As for finds in settlements, see for instance, for Tylisos in J. HAZZIDAKIS, *ArchEph* (1912) 222.

101 N. PARISE, "Circuiti di 'segni premonetari' nell'etá dell' Orientalizzante. Il *pelekys*: da 'valore circolante' ad unitá ponderale," in PARISE (*supra* n. 9) 87-89.

102 F. VANDENABEELE and J.-P. OLIVIER, *Les idéogrammes archéologiques du Linéaire B* (1979) 153.

mentions Aristotle's view that the Homeric *Τάλαντον* was specified only by shape and not by the quantity of metal.[103] With regard to the variations in weight (among miniature axes of the same size), perhaps I should quote the most recent words on the practice of *weighing money* in the ancient Near East, even in the period when coins were elsewhere counted: 'it is well known that money, whether coins or scrap silver, was weighed until the end of cuneiform documentation...Coins were considered bullion and were weighed on a balance. If a weight smaller than the coins was needed, the coins were cut into pieces without hesitation.'[104] After all, the term *šaqālum* (to weigh) is used for the action of paying.[105]

Were the miniature axes of gold exchangeable[106] and convertible? For instance we know from a letter from the ruler of Assur to the colony of Kanish, that there existed a law (*inscribed on a stela*) which prohibited the sale of gold to non-Assyrians on penalty of death.[107] One could also argue that they had the disadvantage of not being convertible physically, without losing their labour value, so this is perhaps why they were meant to end their circulation as votive offerings to sanctuaries (and palaces); Decorated axes and axes of precious metals have something in common with elaborate cups, perhaps following the same way of circulating that Zaccagnini describes for cups of precious metals: 'In sintesi, si puó osservare che le coppe, spesso insieme ad altri beni di lusso, sono registrate in entrata come oggetto di tributo (nei testi hittiti il termine é *mandattu*) , in entrata e in uscita come doni (il termine accadico, usato nei testi hittiti é *šulmānu*) fra sovrani, nobili e personaggi di rango dell'entourage palatino, e – sempre in uscita - come offerte votive a divinità.'[108]

If we decide that Powell's belief that 'Money, of course, did exist in ancient Mesopotamia' is also tentatively acceptable for Bronze Age Crete, that a monetary system functioned along with simpler barter exchanges, then we are faced with the hypothesis that the small models of axes, besides being portable objects of symbolic significance, could be used as forms of currency (on certain occasions intentionally manufactured as such), as "special purpose money,"[109] "concrete or treasure money"[110] "sacred money"[111] even 'symbolic or representational monies,'[112] the decorated ones perhaps more at home in an elite level of exchange, the cut-outs of copper in a wider - yet semiotic - way of circulation. To the objection that the sacral element in double axes is still too strong to ignore, the better respond is by Einzig (for other periods): 'There is, of course, the possibility that the axes served purely sacrificial requirements. But then, *regular demand* (my emphasis) created by such requirements does often qualify various objects in primitive communities to assume the role of money.'[113]

103 I.N. SVORONOS, *Journal International d'Archéologie numismatique* 11 (1906) 183.
104 VARGYAS, (*supra* n. 5) 113.
105 RENGER (*supra* n. 79) 102.
106 According to A. APPADURAI, *The Social Life of things* (1986) 3-4: "exchange is not a by-product of the mutual valuation of objects but its source" and "it is the economic exchange that creates value, value is embodied in commodities that are exchanged and what creates the link between exchange and value is politics" (a helpful remark for the placement of the double axe).
107 K.R. VEENHOF, "Silver and Credit in Old Assyrian Trade," in DERCKSEN (*supra* n. 26) 55-56.
108 C. ZACCAGNINI, "Ancora sulle coppe d'oro e d'argento nel Vicino Oriente del Tardo Bronzo," *Scienza dell' Antiquitá* 5 (1991) 374; but he poses some objections to the role of cups as currency.
109 In contrast to the 'all-purpose money,' perhaps meant to be used on certain occasions, like the one recorded in the Mariote text discussed (VAN KOPPEN *supra* n. 33).
110 This term applied by K.R. VEENHOF to the goblets, cf. "Some social effects of Old Assyrian trade," *Iraq* (1977) 116.
111 Cf. B. LAUM, *Heiliges Geld* (1924). Also G. RETHEMIOTAKIS, "Evidence on Social and Economic Changes at Galatas and Pediada in the New-Palace Period," in J. DRIESSEN, I. SCHOEP and R. LAFFINEUR (eds), *Monuments of Minos: Rethinking the Minoan Palaces, Proceedings of the International Workshop "Crete of the hundred Palaces?" Louvain-la-Neuve, 14-15 December 2001, Aegaeum* 23 (2002) 64-65.
112 POWELL (*supra* n. 10) 238; though for the second adjectif, a nominal value different from their substance (metal) value, should be proved.
113 EINZIG (*supra* n. 65) 231. See also *ibid*, 82 for ceremonial axes used as currency, especially in loan transactions, in the Melanesians.

To conclude: The idea that elaborate metal axes could function as gifts in return for services, therefore as means of payment, is very probable; the idea that axeheads cut out of copper plate could pass as cheaper forms of currency is not improbable. Models of double axes are perhaps more likely candidates for the function of currency than other metal artefacts (also exchangeable): they have lower use value but higher nominal value assigned to them by their society and *en plus* a distinctive form. Of course, we would need textual documentation for them as denominators of value to apply fully the term of money.

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