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HITTITE METAL "INVENTORIES" (CTH 242) AND THEIR ECONOMIC IMPLICATIONS

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The present paper is a first step in a systematic study of all Hittite references to metals and metal products.[1]

Anatolia as a centre of Near Eastern metal working and the origin of the iron industry and trade during the Bronze Age has become a commonly accepted myth. This is mainly based on the famous Kizzuwatna letter *KBo* 1:14 rs 20–24: "As for the good iron which you wrote me about, good iron in Kizzuwatna in my seal-house is not available. That it is bad time for producing iron I have written. (But) they will produce good iron; so far they will not have finished. When they will have finished, I shall send (it) to you. Today now I have an iron dagger blade brought on its way to you." (Goetze 1940:27–28). In spite of Goetze's warnings against exaggerating these references to iron, this letter has time and again been used as "evidence" for the enormous impact of the Hittite iron trade of the Late Bronze Age (Janssen 1975:157).

As a matter of fact, it is impossible to make any conclusions without thoroughly investigating the whole body of complex material rather than taking one or two passages out of context. While some of the archaeological material has been adequately dealt with (Przeworski 1939; Boehmer 1972), no comparable attempt has been made to assess textual evidence on a similar scale. Some basic works, like Laroche's article on metal names (1966a:171 ff.) or works by Brandenstein (1943) and Rost (1961–1963:161 ff., 175 ff.) on Hittite descriptions of divine statues deal with the subject only marginally; regrettably, they are the only works on Hittite metallurgy existing at the present time. Muhly's monograph (1973) on copper and tin devotes only ten pages out of 300 to Anatolia and does not deal with texts from the Hittite period at all.

Obviously, it cannot be expected that the archaeologist can find all the artefacts used in antiquity, as the passages from *KUB* 26:69 VI 7 ff. illustrates quite clearly: URU-an-na *IŠ-TU Ú-NU-TE* ša-ak-la-ja-za *Ú-NU-UT* ZABAR LÚ^{mes} URU a-ra-ú-un-na ša-ru-wa-ir "The *Araunna*-people have looted the bronze implements of the town, as customary."[2] Therefore, it is essential that textual evidence should supplement archaeological evidence; only such a combination can give an overall picture of the

1 The project was initiated by Dr. B. Rothenberg, who has proposed concentrating all relevant archaeological and textual evidence on ancient metallurgy in the Mediterranean basin in a central information pool. The team working on Anatolian data (R. Maxwell-Hyslop, A. Kempinski and S. Košak) will collaborate with Prof. G. Bachmann (Bochum University), who will provide scientific analysis of the metal objects. The paper was read at the XXIII Rencontre Assyriologique Internationale at Birmingham 1976.

2 Werner 1967:44 f. Our translation differs slightly from Werner's.

culture. It is the aim of our project to compile this evidence, clarify the terminology regarding metal objects, as well as those applying to metallurgical techniques, and only then, with the help of archaeologists and a metallurgist, to compare our results with the actual finds.

Metals are mentioned in Hittite texts in a wide range of documents: historical narratives, rituals, administration texts, etc. As an example, a group listed in Laroche's Catalogue as "Inventories" (CTH 242) was chosen. Under this heading, 14 texts are listed, none of them fully preserved. It soon became obvious that the subject matter belongs to different categories, and a regrouping is called for. This would include such overlapping groups as *mandattu*-texts, inventories of chest contents, memoranda and various related subjects. Nevertheless, the contents are fairly similar and therefore the entire group listed under CTH 242 has been considered and checked for metal products, their weights and provenance; special attention was paid to texts CTH 242:4, 5, 8, 10.

The common feature of the latter group is a certain activity involving people bringing or receiving goods. The comprehension of the texts depends on the interpretation of the crucial word *idi* and whether it refers to objects that were carried *into* or *out of* the treasury. The structure of sentences is as follows: in the first clause individuals or representatives of certain communities are mentioned in connection with metal products, while in the second clause one or two people, sometimes high-ranking officials, perform an action referred to by the Akkadian verbal form *idi*. The most obvious interpretation would be that these officials inspected or checked the objects brought by the former groups of people. Indeed, *idû* is used in a similar context in Akkadian documents but always in D-stem;[3] the G-stem *idi*, however, is used in Hittite (as in Akkadian) with the meaning "he knew"; furthermore, it occurs in Hittite texts, mainly in legal proceedings, as "he knew, he witnessed." There are too many options open for a definitive translation, but we suggest we might be dealing here with a list of people acting as accountants and confirming that they "knew" about the objects named, i.e. they had checked and registered them. A few examples should illustrate this point.

KUB 40 95 II 1–18

1 URUDU GUN 3 *BI-I[B-RU]* ^{na4}NUNUZ 1/2 BÁN ^{na4}NU[NUZ]
[LÚ] ^{meš} ^{uru}Ma-a-ša ^{m}Ša-li-iq-qa-aš *I–DI* 3 URU[DU]
[x ^{giš}ŠU] KUR 2 ^{urudu}du-pí-ja-li-iš x ^{giš}BAN 1 *ME* ^{gi}KAK.Ú. [TAG]
A–NA ^{m}Pí-ha-A.A ^{lú}[DUB.SA] R? ^{m}Ta-ki-LUGAL-ma ^{m}Zu-zu-[li] *I–DI*
5 1 GUN URUDU 3 *BI–[IB–R]U* ^{na4}NUNUZ 1/2 BÁN ^{na4}NU[NUZ]
lú.^{meš}$_{par-wa-la-aš}$ LUGAL SUM-ir 3 GUN URUDU x GUN AN.NA
2 u[^{urudu}PIS] AN 6 ^{urudu}KIN 5 ^{urudu}$_{wa-ak-šur}$ 2 *BI-IB-RU* ^{na4}NUN[UZ]
1/2 BÁN ^{na4}NUN[UZ $^{lú.meš}$ par-w]a-la-aš LUGAL EGIR-an-da SUM-ir
^{m}Zu-zu-l [i ^{m}Hu-wa-mi-ti-iš-ša *I–DI* 74 URUDU KI.LAL–*ŠU* [

3 *uddû CAD* s.v. *idû* "to mark, to identify, to assign."

10 9 MA.NA [ ]al?-an-za ^{md}U.SUM-aš *I–DI*
6 KAxUD AM.SI 1 ^{giš}ESI ^{m}Ja-ar-ra-SUM-aš *I–DI*
14 ^{giš}ESI ^{m}Pí-ha-A.A-aš *I–DI* ^{uru}Ša-ri-pí-ja pí-e?- [hu-te]-ir
1 URUDU GUN ar-ha du-wa-ar-nir 20 MA.NA 1 KI. [LAL]
DU-an-zi 6 MA.NA ^{urudu}za-pí-iš-ku-ri [(–) DÙ-an-zi]
15 ^{md}U.PAP *I–DI* 15 MA.NA 10 ^{urudu}za-[pí-iš-ku-ri]
7 MA.NA 20 GÍN 10 ^{urudu}GÍR DÙ [-an-zi]
[^{lú}].^{meš}par-wa-la-aš 3 MA. [NA]
[x] ^{urudu}GÍR 2 ^{urudu}GÍR [ ]

"[1] 1 (ingot of) copper (of) 1 talent (in weight), 3 rhyta (of) beads (Laroche 1966b:183) (containing) 1/2 BÁN of beads: [2] the people of Maša (delivered it), Šaliqqa checked it. 3 (ingots of) copp[er], [3] x spears, 2 javelins, 5 bows, 100 arrows (were given) [4] to Pihamuwa the [scri]be, Takišarruma and Zuzuli checked it. [5] 1 talent of copper and 3 rhyta of beads (containing) 1/2 BÁN of beads [6] the *parwala*-people gave (to) the king. 3 talents of copper and x talents of tin, [7] 2 copper [pi]pes, 6 copper sickles, 5 copper *wakšur*-vessels and 2 rhyta of be[ads] [8] (containing) 1/2 BAN of beads the *parwala*-people gave (to) the king in addition: [9] Zuzuli and [Huw]amiti checked it. 74 (ingots of) copper – each of them weighs [x] – [10] 9 minas [ ]-x-anza: Tarhundapija checked it. [11] 6 elephant tusks, 1 (piece of) ebony: Jarrapija checked it. [12] 14 (pieces of) ebony: Pihamuwa checked it (and they) were transported to Saripija. [13] They broke up (=divided) 1 copper (ingot of 1) talent (in weight, dividing it into): (from) 20 minas in wei[ght x x] [14] they make; 6 minas [they make into] *zapiškuri*;[15] Tarhundazalma checked it; 15 minas (they use for) 10 *zapiškuri*;[16] (from) 7 minas 20 shekels they manufacture 10 daggers."

KBo 16:83 vs 5–10 1 SI KUBABBAR GAR.RA ^{m}Ki-i-da LÚ ^{uru}Ka-aš-ta-ma [6] 1 SI KUBABBAR GAR.RA ŠEŠ ^{m}Ka-wa-ar-na-i-li 2 *ŠUL-PÁT* KUBABBAR [7] 2 SI KUBABBAR GAR.RA LÚ^{meš} ^{uru}Tu-úm-ma-an-na 4 GAL KUBABBAR [8] 6 *ŠUL-PÁT* KUBABBAR LÚ^{meš} ^{uru}Lu-uq-qa-a 1 *ŠUL-PÁT* KUBABBAR ^{m}Kam-ma-li-ja [9] LÚ ^{uru}Tu-u-ma-an-na ^{m}Hi-eš-ni-i-iš *I-DI* 1 *ŠUL-PÁT* KUBABBAR [10] ^{m}AMAR.MUŠEN-na ^{lú}NAGAR ^{m}Sag-ga-na-aš *I-DI*
"1 horn mounted in silver: Kida of Kaštama (delivered it);[6] 1 horn mounted in silver: the brother of Kawarnaili (delivered it); 2 silver tubes (and)[7] 2 horns mounted in silver: the people of Tummanna (delivered it); 4 silver cups (and)[8] 6 silver tubes: the people of Lukka (delivered it); 1 silver tube: Kammalija[9] of Tumanna (delivered it). Hešni checked (all this). 1 silver tube: [10] Harana the carpenter (delivered it): Saggana checked it."

An example for a memorandum: *KUB 26:66 III 9–17* (Duplicate, *KBo*:18:153). 2 MA.NA KUBABBAR 1 KI.LAL Á^{mušen} ^{m}UR.MAH-LÚ ^{m}Pu-pu-liš-ša har-kir [10] na-at SAL.LUGAL ka-ru-ú ša-ra-a da-a-aš nu 1 MA-NA KUBABBAR [11] *A-NA* SAL har-na-wa-aš ^{m}Lu-ul-lu-uš ^{lú}pa-ti-liš pí-e-da-aš [12] 1 MA.NA KUBABBAR-ma *A-NA* DINGIR^{meš} ^{uru}Ú-ri-ki-na [13] ha-liš-šu-an-zi EGIR-an-da pí-i-e-ir/ [14] na-aš-ta nam-ma ha-an-di-i 3 MA.NA KUBABBAR da-a-ir [15] na-at a-aš-ga-za GAL DUB.SAR^{meš}

^{m}Pu-pu-liš-ša har-kán-zi[16] na-aš-ta 10 GÍN KUBABBAR da-u-en na-at-kán EZEN ku-ša-ru[17] *A-NA* ^{lú}tu-hu-kán-ti ~~UR-ŠA~~ ti-ja-u-en

"Walwaziti and Pupuli held 2 minas of silver in eagle weight (Otten 1954–1956:130) and the queen took them formerly up and gave 1 mina to the mid-wife and to Lullu the *patili*-priest, (while) 1 mina of silver was given to the gods of Urikina for mounting (Ose 1944:18). – Furthermore, 3 minas of silver were taken separately and the chief scribe[4] and Pupuli held them outside (i.e. separate from the treasury account). We took 10 shekels of silver and gave them at the *kušaru*-festival (Hoffner 1967:40 n. 54) into the tuhukanti's lap".

An example of a *MANDATTU*-text: *KBo 7:24 II 5–14* [5] 17 MA.NA 18 GÍN AN.NA [6] 1 *ME* ^{urudu}KIN GAL *MAN-DÁ–[TUM]* [7] 14 GÍN AN.NA KI.LAL [8] 4 ^{urudu}KIN GAL IGI.DU[$_{8}$.A] / [9] 4 MA.NA 2 GÍN AN.[NA] [10] 2 *LI-IM* 1 *ME ŠU-Š[I*] [11] *MAN-DÁ-TUM* [12] 30 GÍN AN.NA KI.L[AL] [13] 1 *ME* 50 ^{giš}KA.[Ú].TAG.G[A] [14] ^{uru}Ar-x-hu-x[

These excerpts were chosen because they are relatively the best preserved. Others are even more fragmented, containing only items without any context. From the metallurgical point of view, we are concerned with the kinds of metals, quantities and types of artefacts:

Gold. Gold bars appear in the list *KBo* 18:153; the quantities are given at the beginning of the lines but, unfortunately, the margin is broken off. Nevertheless, the gold is calculated in minas and represents considerable amounts. It is mostly mixed with copper, i.e. "red gold", but in one instance it is specifically mentioned as "no copper (added)" (*KBo* 18:153 vs 16); it might be of some interest for trade that vs 19 mentions "gold from Babylon". *KUB* 42:81 lists at least a dozen ~~golden battering rams~~[6], ~~probably votive~~, and 43 bows mounted in gold.

Silver. Large quantities are given, calculated in minas and intended for the manufacturing of various objects, mainly cups (*KUB* 42:10), sun discs, pectorals, etc. (e.g. *KUB* 26:66, with at least 19 minas of silver listed); other silver objects mentioned are daggers "mounted in gold", vessels, drinking tubes (*ŠULPATU*). Silver is also used for mounting statues (*KUB* 26:66 III 12 f.), drinking horns and copper vessels (*KBo* 16:83 *passim*).

Copper occurs in the lists in the largest weight units (GUN "talent", *KUB* 40:95 II 5,6,13). It is the material for vessels, pipes (PISAN), spears, adzes, sickles and arrow points.

4 The chief scribe referred to here together with Pupuli is Walwaziti himself (see Laroche 1966:no. 1757–8). Both serve here as private treasurers to the queen (Puduhepa?). That these two high officials held the 2 minas later given "outside", must mean that this account was separated from the general account referred to in the list.

5 Lines 5 and 7 have 2 *ME* MA.NA and 8 MA URUDU added above the line. The text is too fragmentary for translation. As for the terms IGI.DU$_{8}$.A and *MANDATTU*, these will be discussed in a forthcoming publication.

6 [For ^{giš}BAR.HAR, see Labat 1952: No. 74.]

Tin occurs only in ingot, sometimes in considerable amount (*KBo* 7:24, 17 minas 18 shekels, 5 minas 2 shekels, 5 minas 10 shekels, etc.); it is very rare in other texts of this group.

Iron is mentioned only once (*KUB* 26:66 IV 3, in minas).

The dating of these texts presents relatively few problems. The prince Hešni (*KUB* 40:96 III 11) appears also in the Ulmi-Tešub treaty (CTH 106) while the prince Hešmi-Šarruma (*KBo* 16:83 vs 5)) could be Tudhaliya IV himself before he succeeded the throne. The period of the last years of Hattušili III, or more precisely, the reign of Puduhepa and the early years of Tudhaliya IV, is confirmed by a whole range of documents mentioning some officials who appear in our texts, e.g. Palla, Gaššu, Šippaziti, Alalimi, Taki-Šarruma, Zuzuli, Kaškaili and Walwaziti, the chief scribe. These personnel are closely connected with the court proceedings (Werner 1967: *passim*), the Ulmi-Tešub treaty and Šahurunuwa document (CTH 225). It might be of interest to note that the concentration of all administrative documents at Boğazköy in the period between the last years of Hattušili III Puduhepa and the first years of Tudhaliya IV's reign is probably a reflection of the transfer of the court and administration from the south (Tarhundašša) back to Hattuša. This might explain the large proportion of people connected with the cities of Tarhundašša and Urikina, mentioned twice in our texts. Also the silver for mounting statues in Urikina fits into the general framework of temple restoration carried out towards the end of the Empire period (Laroche 1975a:87 ff.).

It has already been pointed out that these texts are a heterogenous group, and consequently this survey does not reflect the expected proportions of metals used (note the absence of ZABAR and the small amount of iron mentioned). This picture might change if other fragments related to the group CTH 242, such as CTH 244 (*MANDATTU*-texts) and CTH 250 (fragments of miscellaneous inventories), were added. But not only the uneven distribution of metals is puzzling; a surprisingly large proportion of items are scarcely known from other texts; some, such as ~~the golden battering ram~~ and the *dupijala/i*-(perhaps javelins),[7] are not known at all; others, such as the silver drinking tubes, copper pipes and the *dammuri* – [8] are extremely rare. This raises the question: What is the significance of these lists? The answer may be partially surmised from the original find-spot of the texts. For example, fragments from the *KBo* series, which may easily be checked against their original position, come from various buildings and rooms of the royal citadel at Büyükkale.[9]

It is quite certain that the fragments discussed here have nothing in common with the royal inventories known from Nuzi (Lacheman 1955: nos. 2–11, 24, 155–158, 160–162, 228, 296, 300, 322–323), Alalakh (Wiseman 1953:nos. 366–408) or Ugarit

7 6 dupijališ *ANA* ^{giš}TUKUL *IKRIBI ŠA* ^{d}*IŠTAR* (*KBo* 16:83, 12'); these weapons are most probably javelins since they are listed in *KUB* 40:95 II 3 between spears and arrows.

8 We are grateful to Prof. Otten for calling our attention to *KUB* 13:35 III 4.

9 *KBo* 7:24 from Building D (South); *KBo* 8:65 West of Building A; *KBo* 16:83 from room 6 of Building C; *KBo* 18:153 from room 1 of Building C; *KBo* 18:153a from a room in Building M; *KBo* 18:162 from the southern part of Building D; *KBo* 18:164 from room 8 of Building A; *KBo* 18:201 South of Building M.

(Nougayrol 1955:177–186; 1970:135–168). Our documents do not show large quantities of materials; the fact that they were all found outside the main archives would suggest that we are not dealing with taxation lists of the imperial system which recorded the annual tributes of the entire empire, but rather with private and somewhat peculiar lists of presents and personal tributes to high-ranking officials and members of the royal family; it must be concluded that the official archives of Hattuša, providing information on the state economy are still to be found.

In view of the unusual assortment of items, it might be of interest to raise the question of their value. It was already mentioned that copper pipes (^{urudu}PISÀN), abundant in our group of texts, are practically not mentioned in other Hittite sources (Burde 1974:32). But there is an intriguing clue in the Hittite Code, par. II 45: "When a smith makes a copper tube weighing 1–1/2 mina, his wages shall be 100 *PARIṢU* of grain. If he makes an adze of 2 minas in weight, his wages shall be 1 *PARIṢU* of spelt." If the slightly lighter pipe is worth 100 times more than the adze, the enormous difference in remuneration can be explained only by the far greater effort and technical skill required to produce a pipe.[10] In other words, in view of the same amount of metal, it is the labour which sets the price. The question of the value of labour for the Egyptian society was recently raised by Janssen (1975:138 f.). He criticizes modern Western scholars for assuming that the profit motive in ancient economies played the same function as today. He believes that in Egypt there was "hardly any connection with the costs of production since its main component, labour, possessed only a very vague value." However, the above evidence indicates that the Hittites did incorporate labour costs into the price of the final product.

On the subject of weights of tools our texts provide a confirmation of Otten's observation (1955:126) that the weight of an axe in Boğazköy is 2 minas (980 g.). *KUB* 42:71 vs 1 mentions 64 *HAṢINNU* of 128 minas; vs 4 mentions the same ratio: 46 *HAṢINNU* of 92 minas.

The group of fragmentary texts considered here have shown that we must reconsider our concepts of Hittite administration and economy on one hand, as well as the products themselves. One would hope that more effort will be invested in these neglected subjects. It is quite astonishing to realize that although we know a great deal about the Hittite rituals and history, we have practically no information regarding their commercial and economic administration.

10 Goetze (1955:195) and Hoffner (1963:97) try to explain away this disproportion by assuming a scribal error. Although this rate in the Hittite Code is earlier than our texts, and the prices might have changed, ratios probably remained about the same.

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