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LEAD IN CUNEIFORM DOCUMENTS FROM MESOPOTAMIA AND ELAM

The intersections between material culture and language are the foundation over which human communication is built. Real things stand on their own and could be the object of human action. Words can also stand on their own with a power that can fascinate (e.g., in incantations, Ephesia grammata, grammelot, and nonsense) but usually have to be understood in their relationships with concepts, actions, and real things. At the same time, real things can be better understood in their cultural meaning if put in the context provided by language, i.e. oral traditions, written stories, technical knowledge, etc. In historical and anthropological research, the prerequisite is the identification of the word(s) used to name a real thing and to deal with it, i.e. one of the intersections mentioned above. Labels are surely the easiest way to ascertain such intersections: they can be written on real things or on their container, attached to them (as tags) or correlated to their representation in relief, drawing, etc.[1]

Ownership inscriptions often embed the data of labels, even if the focus is on the owner of the object rather than on designating it. A random example is represented by the Achaemenid trilingual royal inscriptions DPi and XPi, written on objects which are defined as *mayukha-* (Old Persian), *like* (Elamite), and *sikkat karri* (Babylonian) in the first words of each version. This example is representative of the case where we have the object

[1] Labels are sometimes introduced by a deictic pronoun referring explicitly to the correlated object or its representation, as in the minor inscriptions of the Bisotun monument (DBb-k; see also DNc-d), starting with 'This (is)' followed by the name of the individual represented in relief.

and its name (in three languages, each given with a linguistically independent term, i.e not using loanwords as it is customary in Achaemenid royal inscriptions even for very common concepts and things, especially from Old Persian to Elamite), but we cannot completely understand either the function of the object or the meaning of its name.[2]

A feature which is often recorded in labels and ownership inscriptions is the material in which the correlated object is made. In DPi and XPi the name of the text carrier is qualified as *kasakaina-* (Old Persian), *(i)knuaš-na* (Elamite), and ^{na4}ZA.GÌN (Babylonian).[3] All these lexemes point, more or less obviously, to the same material, lapis lazuli, even if the object is not in lapis lazuli but in a composition made by a binding agent mixed with Egyptian blue, called today 'blue composition'. This example is meaningful because the material designated in the text is not the actual material but the material that had been purportedly imitated. Therefore it is tempting to emend the text translating the material as 'semi-precious stone'[4] or 'lapis lazuli-like stone', but the intent of a royal inscription is to convey the idea of power and richness, not of second-class quality and imitation.

Sometimes, the word pointing to the material was used by modern scholars to single out the name of the object. It is the case of *sit šamši*, considered to be the name of a three-dimensional bronze model because this syntagm is immediately followed by *sah-ia* 'in bronze' and *huta-h* 'I made' in the correlated inscription (in Elamite).[5]

Another emblematic example is the foundation deposit discovered in the palace of Sargon II at Khorsabad by Victor Place in

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[2] See Basello 2012, pp. 31-42.

[3] The logogram in Babylonian was read *uqnû*; the corresponding Elamite word is probably a loanword from Babylonian. On the corresponding Old Persian word, see Basello 2012, p. 39.

[4] Schmitt 2000, pp. 65 and 96; 'Halbedelstein(imitat)' in Schmitt 2009, pp. 120 and 169.

[5] EKI 56:5-6. See Basello 2004.

1854.[6] Five textual carriers of different size and materials were found, one unfortunately lost in the Tigris later. Three (the silver, gold, and magnesite tablets) of the extant four mention explicitly the act of depositing (*kânu*, D form) inscribed tablets (*ṭuppu*) bearing Sargon's name (MU) in the foundations (*uššu*).[7] As B. Landsberger put it, 'a lexicographical optimum, viz. the finding of an object bearing an inscription that discloses its material, was almost reached' in this case,[8] since the materials of the tablets are given in the text. 'Almost' because each of the three above-mentioned tablets provides the materials all together, in a list, not separatedly for each tablet: KÙ.SI_{22} 'gold', KÙ.BABBAR 'silver', URUDU 'bronze', AN.NA 'tin', A.BÁR 'lead', ^{na4}ZA.GÌN 'lapis lazuli', and ^{na4}GIŠ.NU_{11}.GAL '(a kind of) alabaster', for a total of seven materials (five metals and two stones), while the discovered tablets were five. So two tablets were never put into that very deposit, according to J. Bjorkman.[9] The extant four, now in the Louvre, are in gold, silver, bronze, and magnesite. The lexical correspondence is clear for the first three materials. Bjorkman has shown that magnesite is the stone called *gišnugallu* (GIŠ.NU_{11}.GAL), a term which can be translated as 'alabaster', i.e. 'a non-technical, suitable

[6] Ellis 1968, pp. 101-102 with references to previous publications on p. 194, no. 78 (add Berthelot 1887, pp. 10-14); Bjorkman 1987; Landsberger 1965, pp. 285-286. See also Ambos 2004, p. 71, Text 3.

[7] Silver tablet: Louvre AO 21371:40-42; text in Fuchs 1994, pp. 48-50 (transliteration) and 298-299 (translation), no. 1.2.2. Gold tablet: AO 19933:32-32; text in Fuchs 1994, pp. 51-52 (transliteration) and 299-300 (translation), no. 1.2.3. Magnesite tablet: lines 18-30; text in Fuchs 1994, pp. 52-53 (transliteration) and 300 (translation), no. 1.2.4. The fourth tablet (Fuchs 1994, pp. 45-48, no. 1.2.1), in bronze, could have the list of materials in one of the damaged parts.

[8] Landsberger 1965, p. 285.

[9] Bjorkman 1987, p. 96. Cf. Landsberger 1965, pp. 292-293, where it is suggested that the tin tablet had disintegrated.

vague term for decorative white stone',[10] and has suggested that the tablet lost in the Tigris was the lead one.[11]

In truth, several scholarly essays were needed in order to accept that A.BÁR and its corresponding Akkadian reading *abāru* (written also A.LÙ)[12] mean 'lead', due to a persisting confusion with *annaku*, the term currently understood as 'tin'. Landsberger devoted to the matter a magisterial discussion in 1965.[13] Indeed, the issue is not entirely settled, since it reflects different usages (in different places and periods) and, possibly, also confusion of the ancient authors, just like we use the names of animals, plants, and materials in a rather imprecise way when we are not specifically concerned with singling out or differentiating one of them.

In the above-mentioned examples, the inscription was coterminous with the correlated object, i.e. the text carrier of the inscription is the object itself. This fact explicitly prompts the collaboration of archaeologists (as specialists of material culture) and epigraphists. However, often the object was not suitable to act as a text carrier and the inscription had to be written on a separate item (a tag) attached to the correlated object. Often the physical connection with the correlated object has been broken later so that it is no more surviving or recognizable. Therefore, in most of the cases the objects are without such correlated inscriptions. Actually, the collaboration between archaeologists

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[10] Bjorkman 1987, p. 93.

[11] Bjorkman 1987, p. 97 (see also the table on p. 92).

[12] Read also A.GAR$_5$, which is considered as 'a "conditioned" writing and should not be used outside the vocabularies; still it sheds some light on the original form of this substratum word' (CAD A/I, p. 38, s.v. abāru A). A.BÁR, which 'appears in Lugale, in royal inscriptions, and (beside A.LÙ) in S[tandard]B[abylonian], has to be considered a late variant, possibly a pseudo-logogram (A.BÁR for *abāru*) suggested by the similarity of the signs LÙ and BÁR' (ibidem).

[13] Landsberger 1965. Cf. Moorey 1994, p. 295: 'Despite Landsberger's magisterial discussion (1965), ambiguity still surrounds the terminology for lead and tin in Akkadian, notably in the second half of the second millennium BC'.

and epigraphists should be required also when an object is not paired with a text describing it or when a text does not refer to its carrier. This desideratum can be easily justified considering that there is (nearly) always a word to designate an object.

[…] Here the Elamite and Mesopotamian worlds, the first being strictly tied to the latter from the cultural and technological points of view,[14] will be taken into account on the ground of their textual evidence.[15]

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One of the oldest occurrences of 'lead' (or, at least, of the term that is later used for 'lead') is in the archaic lexical corpus, in the exemplars of a lexical list of metal objects written in Sumerian[16] and dated around 3000 BCE. A brief section deals with words for metals on lines 59-61, where lead, antimony, and an unknown metal (še-lù) are listed.[17] Later versions of this list are also known from the Early Dynastic.[18]

In the Sumerian literary corpus, lead (a-gar$_5$) appears in the *Cursing of Agade*, in the framework of the following curse towards the Akkadian city (line 244, Old Babylonian version):

> May your gold be bought for the price of silver, may your silver be bought for the price of pyrite (?) (níĝ za-ha-am), and may your copper be bought for the price of lead.[19]

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[14] See, e.g., Ascalone & Basello 2018.

[15] For general treatments of metals and metallurgy in Mesopotamia, see Joannès 1993, Muhly 1993, Moorey 1994, pp. 216-301, and Potts 1997, pp. 164-184; on Iran, see Helwing 2013 and 2018, and Bridey 2018.

[16] A specialist like R.K. Englund holds that the language is unknown (Englund 1998, pp. 73-81, §4.4; see also Veldhuis 2014, p. 29).

[17] Veldhuis 2014, p. 41, §2.2.1.4.

[18] Veldhuis 2014, pp. 82-83, §3.2.4.

[19] ETCSL, <http://etcsl.orinst.ox.ac.uk/cgi-bin/etcsl.cgi?text=t.2.1.5&display=Crit&charenc=gcirc&lineid=t215.p16#t215.p16>.

This passage establishes a descending hierarchy from more to less valuable metals. In *The debate between Copper and Silver*, lead makes its appearance in one of the answers of Copper against Silver (Segment D, line 43), in a context where Silver is considered precious but not useful, so that it is buried underground or put in a grave but not used in banquets or in the making of divine statues:

> Silver, to make lead shine (?) is not an important achievement.[20]

As regards the written evidence in Akkadian, *abāru* is attested in administrative tablets dealing with metals (weighed quantities of lead are usually mentioned together with other metals like gold, silver, copper, and tin), royal inscriptions (as tribute or, like in the foundation deposit at Khorsabad, as text carrier), medical texts (as ingredient in pharmacopoeia and as material of which medical instruments were made), technical texts (as an ingredient to make glass), lists of coefficients (where its *igigubbû* 'coefficient' is provided), and rituals (where lead tools or figurines were employed).[21] Each textual typology provides different data about the usage of lead.

Administrative texts dealing with raw materials are useful only if finished products to be manufactured with lead are mentioned. Texts dealing with finished products are usually more useful in this respect. Rarely, business letters refer to seeking lead, like the Old Assyrian tablet TMH1 3b: the emissary of a trader had to look for gold, but he could not find it; he found only lead (a-ba-ri-im) in a place named Hurama[22] (a city-state to

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[20] ETCSL, <http://etcsl.orinst.ox.ac.uk/cgi-bin/etcsl.cgi?text=t.5.3.6&display=Crit&charenc=gcirc&lineid=t536.p17#t536.p17>.

[21] CAD A/I, pp. 36-38, s.v. abãru A.

[22] Barjamovic 2011, pp. 180-187, §4.10. See also Nashef 1991, pp. 60-61, s.v. Ḫurama.

the south-east of Kanesh) but, apparently, lead was not valued, so that silver and copper were preferred to it in lack of gold.[23]

Besides attesting to the (rare) usage of lead as text carrier (see above the lost lead tablet from Khorsabad), royal inscriptions mention occasionally lead as tribute. An inscription of Tiglath-pileser I (reigning 1114-1076 BCE), known from numerous octagonal prisms and fragments, mentions a tribute of lead from the city of Milidia (v:33-41):

> In the course of that campaign I marched to the rebellious and insubmissive city Milidia of the land Ḫanigalbat. Frightened by my strong belligerent attack they submitted to me and I had mercy on them. I did not storm that city (but) I took hostages. I imposed upon them as uninterrupted annual tribute one homer of lead ore (kur-ba-ni ša a-ba-ri).[24]

The city of Milidia has been identified with Arslantepe (near Malatya, Turkey),[25] which should not be too far from Hurama of the Old Assyrian tablets. It is therefore quite certain that this area of Anatolia was one of the primary sources of lead for Mesopotamia.[26] The above-translated passage from Tiglath-pileser's inscription specifies also the form in which the lead is provided, recurring to the Akkadian word *kirbānu* 'lump of stone, metal or slag' (translated above as 'ore' by A.K. Grayson).[27] This Akkadian word, together with *kubtu*[28] and *šibirtu*,[29] could have been used also in reference to the lead lumps.

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[23] CAD A/I, p. 36, s.v. abāru A a ('TuM 1' = TMH1); partially quoted also in Barjamovic 2011, pp. 193, with transliteration in fn. 711.

[24] Grayson 1992, pp. 22-23.

[25] Nashef 1982, p. 196, s.v. Milidia. Arslantepe is ca. 250 km east-south-east of Kültepe (Kanesh) as the crow flies.

[26] Moorey 1994, p. 293, (b) (1). Cf. Forbes 1964, p. 218: 'The Kültepe tablets (...) prove that during the nineteenth century much lead ore was shipped from northern Assyria into Anatolia where the necessary fuel for smelting and desilvering the lead could be obtained'.

[27] CAD K, p. 403, s.v. kirbānu 2b.

An Akkadian letter from Mari (ARM13 3:5-6), part of the correspondence from Mukannishum, a high official in the service of Zimri-Lim (reigning 1711-1697 BCE), to the king,[30] was written to confirm the delivery of – and probably to go with – 10 talents of lead (a$^{!}$-ba-[r]i-<-im$^{?}$>) as 20 *kubtu* (ku-ub-di) of 30 minas (nearly 15 kg) each. The correspondence of Mukannishum as a whole attests to his role as overseer of crafting processes involving metals, goldsmithing, fabrics, and wood, in order to decorate statues, vessels, etc.

Medical tablets mention that lead was used as material of which medical instruments were made.[31] An example is the lead tube (MUD A.BÁR) used to blow drugs into the body of a pregnant woman.[32]

In the tablet BM 120960, one of the oldest glass-texts (technical procedures to make glass) dated to the reign of an obscure king of the First Sealand dynasty, Gulkishar (16th century BCE),[33] lead appears as an ingredient of different types of opaque red glass. See, e.g., the beginning of the text (lines 1-3):

> To a mina of *zukû*-glass (thou shalt add) 10 shekels of lead, 15 shekels of copper, half (a) shekel of saltpetre, half (a shekel) of lime; thou shalt put (it) down into the kiln (and) shalt take out *santu* (red) glass of lead.[34]

Lead served to different purposes in glass making: according to P.R.S. Moorey, '[t]he glass was more brilliant as high-lead

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[28] *kubtu* developed the secondary (?) meaning of '(rich) tribute' (CAD K, p. 487, s.v. kubtu 2).

[29] Additionally, the word *lišānu* 'tongue' was used to refer to ingots (CAD L, p. 215, lišānu 6 c), presumably of that shape.

[30] Bottéro 1964, p. 17.

[31] CAD A/I, p. 37, s.v. abāru A c 3′.

[32] Thompson 1936, p. 118.

[33] Moorey 1994, p. 213.

[34] Forbes 1966, p. 133. See also Thompson 1936, p. 197, Appendix II, (a). On opaque red glass, see the exhaustive treatment in Moorey 1994, pp. 212-214, iv.

glasses have a higher refractive index and a higher dispersion or 'play of colours''; moreover, '[t]he lead may have softened the glass, making it easier to cut'.[35] Another kind of red glass is qualified as Elamite:

> one mina of *zukû*-glass, 15 shekels of [. . .], ten shekels of lead: material for Elamite (e-lam-me-ti) [red glass].[36]

Red glass is known also from the archaeological record of Takht-e Jamshid/Persepolis where, through chemical analyses, it has been ascertained that '[t]he important ingredients that established the character of this red glass were the copper, lead, and antimony (expressed in their oxide form–Cu_2O, PbO, and Sb_2O_3)'.[37]

According to the few extant lists of coefficients (sort of constant tables serving a wide range of calculation purposes), the coefficient of lead is 1,52,30 (in sexagesimal notation).[38] The meaning of this coefficient, as for the ones provided for copper (1,12), gold (1,48), iron (2,12), etc., is not known; according to E. Robson, '[t]hey may refer in some way to molten metal to be poured into moulds' since a same coefficient is sometimes qualified with *rāṭu* 'mould[?]'.[39]

Lead had also ritual usages and implications. In the ritual *When the wall of the House of the God collapses* (*Enūma igār bīt ili*

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[35] Moorey 1994, p. 213.

[36] CAD A/I, p. 37, s.v. abāru A d 2′ b′, from Thompson 1925, p. 138, Section U (transliteration), and pl. 5, K. 4266+8976rev.,iii:15-17 (cuneiform copy); photo available on CDLI at the address <https://cdli.ucla.edu/P395468>. See also the similar passage in Thompson 1925, p. 140, Section DD (transliteration; note that line 20 is actually line 21 in the cuneiform copy, line 21 is line 22 and so on), and pl. 5, K.4266+8976rev.,iv:16-19 (cuneiform copy).

[37] Matson 1957, p. 131.

[38] See the comprehensive treatment (with sources) of metal coefficients in Robson 1999, p. 125-129, §8.1.

[39] Robson 1999, p. 129. On the meaning of *rāṭu*, cf. CAD R, p. 220, s.v. rāṭu d.

iqâpu), the 'first brick' (*libittu maḫritu*) has to be removed from the remains of the masonry with a lead axe (*ḫaṣṣinnu*):

> he places a tin bracelet on his wrist and takes an ax of lead and removes the first brick and puts it in a secluded place, in front of the brick you prepare an altar for the god of the foundation and offer sacrifice.[40]

In the protective ritual *House of Confinement* (*Bīt mēseri*), a 'figure of death of lead' (NU ÚŠ šá A.BÁR)[41] is mentioned together other figurines to which an incantation had to be spoken. According to F.A.M. Wiggermann, the lead figure 'is not apotropaic; it probably plays a part in the ritual of dismissal of death and other evil to the netherworld'.[42] Even if the lead axe of the (re)foundation ritual may be explained considering that lead is soft and therefore the axe would not damage too much the 'first brick', it is clear that in rituals lead has a symbolic function which should be understood not only as a transposition of its physical specificities (softness, malleability, heaviness, etc.)[43] but also as an element in a collection of materials which acquired meaning as a whole in their diversity. A comparison is provided by Neo-Assyrian deposits from the corners of the main ziqqurat of Assur, consisting of ca. 1000 beads, small fragments of iron and lead, and a pair of small disks of gold and

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[40] CAD S, p. 221, s.v. semeru 1 a 3′; CAD L, p. 177, s.v. libittu 1c 2′. Text and translation in Ambos 2004, pp. 178-179, no. II.D.1.3.A:14; see also the ritual *When Anu created the heaven* (*Enūma Anu ibnû šamê*) (Ambos 2004, pp. 180-181, no. II.D.1.3.C:16). On the 'first brick', see Ambos 2004, pp. 77-78, §I.11.4.6.

[41] W 23266 rev.II,§30, published in Von Weiher 1988, p. 66.

[42] Wiggermann 1992, p. 110, sub 13+d. Cf. the lead figurines used in ancient *defixiones* (see, e.g., Gager 1992, pp. 15-16, 'Figurines').

[43] See Forbes 1950, pp. 177-178: 'Lead plays a very peculiar part in magic. Its dark colour and high specific gravity must have led to the superstition that it had chtonic connections. ... It was considered eminently suitable for magical tablets containing inscribed curses or prayers for the sick; lead being used for "defixiones" from Assyrian times onwards'. On the use of lead as text carrier for ancient *defixiones*, see, e.g., Gager 1992, pp. 3-4, 'The Materials'.

silver (each disk bearing the same inscription of Shalmaneser III).[44] The archaeological data is confirmed by building rituals mentioning the materials to be buried, even if lead is attested only in the Khorsabad tablets mentioned above.[45] Starting from the textual evidence, C. Ambos discussed extensively the function of beads and metals, concluding that they represented *materia magica*, acting as amulet chains (attested with the same materials).[46]

The archaeological evidence reveals that lead was employed in Mesopotamia for a variety of objects. Sometimes this evidence is confirmed or complemented by texts.

Slingers were an important part of armies and sling bullets were usually made in lead, which is 'obviously the most efficient material for such projectiles', since lead is 'easy to cast, and provides the maximum weight in a small voume'; 'with their density and shape', these projectiles could carry over as much as 400 m.[47] An almond-shaped lead bullet, 36 mm long and 22 thick, weighing 40.423 g (ca. 5 shekels), allegedly found in Lydia, is inscribed (as it happens with such weapons[48]) with the Iranian name TIϚϚAΦEP[...],[49] i.e. Tissaphernes, probably the Persian satrap in Sardis during the reigns of Darius II (423-405 BCE) and Artaxerxes II (404-359 BCE), commander in chief of the Achaemenid forces,[50] who played a central role in the defeat of the army of Cyrus the Younger, as recounted by Xenophon with a specific reference to slingers (*Anabasis* III.4.14):

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[44] Ellis 1968, pp. 132-133 (in the upper deposits, six courses higher than the bedrock where the lower deposits were set).

[45] See Ambos 2004, pp. 71-72 and 72-73, table, for a list of sources and materials respectively.

[46] Ambos 2004, pp. 74-75, §I.11.4.3.1. See also Tsouparopoulou 2014, p. 18, fn. 4.

[47] Foss 1975, p. 27.

[48] Foss 1975, pp. 27-28.

[49] Foss 1975. See also Kuhrt 2007, p. 368, fig. 9.2.

[50] Schmitt 1992, pp. 636-637, no. 3.

> From there, they (sc. the Greeks) marched one stage four parasangs. During this stage Tissaphernes appeared. He came with his own cavalry, the troops of Orontas, husband to the king's daughter, the barbarians who had come up with Cyrus and the ones whom the king's brother had brought to the king's aid. In addition, there were all the troops the king had given him, so that the army seemed huge. When he came close, he placed some of the contingents at their back, while moving others to their flanks. Because he did not dare nor wish to run risks, he ordered them to hurl and shoot forth with their slings.[51]

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The textual evidence about lead from Elam is scant.

The main administrative corpus in Elamite dealing with metals is surely represented by the tablets from Tall-e Malyan, dated around 1000 BCE, even if it is not particularly vast (ca. 100 tablets) and known.[52] Some tablets record quantities of a-na-ku, probably a loanword from Akkadian *annaku* 'tin' but also, in some cases, 'lead'.[53] Other metals are attested there: lu-(ú-)lu, probably from Akkadian *lulû* 'antimony'; gold and silver, written respectively with the usual Mesopotamian logograms KÙ.BABBAR and KÙ.GI; za-bar, from Sumerian *zabar*, Akkadian *siparru*, 'bronze' or, as in some later Akkadian texts, 'copper'.[54] After the weighed quantities of metal, sometimes the name of an object (even if often it could not be properly understood) follows, suggesting that the listed metals were used to produce that object. For example, in TTM1 67, copper, tin, copper and antimony (the last two together[55]) were weighed out

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[51] Kuhrt 2007, p. 367, text no. 9.27.

[52] See Basello & Giovinazzo 2018, pp. 487-488, for a general introduction to this corpus (with further references).

[53] Stolper 1984, p. 10.

[54] Stolper 1984, p. 10.

[55] Cf. TTM1 87 where the columns with weighed quantities of copper (za-bar^{MEŠ}) and antimony (lu-ú-lu^{MEŠ}) are separated.

and received in order to produce *like* ('bolts' in M.W. Stolper's translation),[56] while in TTM1 79:2 a quantity of 2 minas and 56 shekels of tin is recorded.

About four centuries later, in the Susa Acropolis tablets (ca. 600 BCE),[57] few documents record metals, especially AN.BAR 'iron' and za-bar-ru 'bronze'. Already V. Scheil recognized the word *anu/ak-*$^{?}$*r-na* (written an-nu-uk-ir-na, ⌈an⌉-nu-kur-ir-na, and ha-na-ak-[ki]-ir-na), apparently a loanword from Akkadian *annaku* with the suffix *-na*, as 'tin' or 'lead'.[58] W. Hinz tentatively suggested that ri-kur, attested in MDP9 95:11, could be the Elamite word for 'lead' or an alloy,[59] but it seems rather difficult to ascertain it.

Lead is not attested in the rich documentation of Achaemenid period, except incidentally. This could be expected since the major corpus of administrative tablets, the Persepolis Fortification tablets, deals with food rations (except for one tablet, PF 335).[60] The only two occurrences of lead are in the syntagm *šupmaš niški-p* (šu-ip-maš nu-iš-ki-ip), etymologically 'keepers/guardians of lead', found in the Persepolis Treasury tablets.[61] The word for 'lead' is not derived from the Mesopotamian tradition nor is linguistically Elamite, but it is dressed in Iranian garb as *šupmaš*, from Old Persian **çubva* (an unattested

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[56] See Basello 2012, pp. 27-30, on *like* at Tall-e Malyan.

[57] See Basello & Giovinazzo 2018, pp. 488-489, for a general introduction to this corpus (with further references).

[58] Scheil 1907, p. 57. See also Hinz & Koch 1987, p. 62, s.v. an-nu-uk-ir-na. Cf. the anthroponym or office/title ^{HAL}an-nu-ik-ru-iš (Hinz & Koch 1987, p 61, s.v. hh.an-nu-ik-ru-iš), possibly 'the one (*-r*) of (i.e. in charge or bringing?) tin'.

[59] Hinz & Koch 1987, p. 1038, s.v. ri-kur.

[60] See Basello & Giovinazzo 2018, pp. 489-492, for a general introduction to this corpus (with further references). On PF 335, see Basello 2011, pp. 75-78, §2.4.2.

[61] See Basello & Giovinazzo 2018, pp. 492-494, for a general introduction to this corpus (with further references).

word, reconstructed comparing Young Avestan *sruua-* and Pahlavi *srub*).[62] Each of the two occurrences has some spelling issues: gal ^{HAL}kur-taš šu-uk$^{!}$-maš nu-iš-ki-ip ^{AŠ}ši-um-ba-ra 'rations of the workers (who are) keepers$^{?}$ of lead at Shimpar' (PT-1963 12:5-6); gal ^{HAL}kur-taš ^{GIŠ}GIŠ^{MEŠ} nu$^{!}$-iš$^{!}$-ki-ip a-ak ^{HAL}šu-ip-maš nu$^{!}$-iš$^{!}$-ki-ip ^{AŠ}ba-ir-šá-an 'rations of the workers (who are) keepers$^{?}$ of wood and keepers$^{?}$ of lead at Parsa/Persepolis' (PT-1957 2:4-5).[63]

While these textual occurrences remain somewhat uncertain, the archaeological evidence assures that lead was known and used in Persepolis. Several lead objects are listed in the excavation report, see, e.g., the earrings.[64] There are also few items, found in the so-called Treasury, defined as weights, even if tentatively, by E.F. Schmidt. One of these (PT6 640) is similar 'plano-convex disk' in shape.[65] Unfortunately the weight and size are not recorded by Schmidt. However, it is possible to roughly deduce the size from the drawing, since the scale is provided, resulting in a diameter of ca. 5 cm and a maximum thickness of ca. 1 cm. The other lead weights[66] are smaller than PT6 640.

A final textual remark is prompted by Strabo who stated that οἱ δὲ Δράγγαι ... γίνεται δὲ παρ᾽ αὐτοῖς καττίτερος 'the Drangiani-

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[62] I. Gershevitch in Cameron 1965, pp. 178-179. See also Tavernier 2007, p. 438, no. 4.4.8.6. Cf. the anthroponym srby in Aramaic (Tavernier 2007, p. 314, no. 4.2.1607).

[63] Cameron 1965, p. 178, sub 1963:12 (i.e. PT-1963 12), where the new transliteration of PT-1957 2 is also provided.

[64] Schmidt 1957, p. 79, tab. VI.

[65] Schmidt 1957, pl. 82, no. 8; shape description in Schmidt 1957, p. 105. The material is described as 'Lead (with silver?), purplish-gray patina'. The findspot is Room 83 near the south-east corner of the building, Plot IG 25 (see also Schmidt 1953, p. 194, in correspondence with the marker of fn. 390; plan in, e.g., Schmidt 1957, fig. 2 or 3, facing p. 5).

[66] PT6 259, PT6 174, PT6 649, and PT5 452 (respectively Schmidt 1957, pl. 82, nos. 5-7 and 9). Their weight ranges from 8.2 to 133.5 g (PT6 259 is actually 1 shekel, PT6 649 is very close to 3 shekels).

ans ... have tin in their country' (Strabo, *Geography* XV.2.10).[67] The Greek word is κασσίτερος (in the Attic form καττ-) which is translated 'tin' in Greek dictionaries and is used nowadays to name 'cassiterite', a tin oxide mineral (SnO_2) which is the main source of tin.

It has been quite astonishing to find that an Elamite etymology is reported for this word by a Greek-English dictionary like Liddell/Scott/Jones (LSJ) and therefore often repeated.[68] According to LSJ, κασσίτερος is an 'Elamite word, cf. Bab. *kassitira*: hence Skt. *kastīram*'.[69] Bibliographical references are supplied by Greek etymological dictionaries,[70] which refers to an old note by G. Hüsing (1907) published in the *Orientalistische Litteratur-Zeitung*. Hüsing's assumption is based on (1:) an Elamite explanation of the name, i.e. **kasi-ti-ra* interpreted as 'kassi-länd-isch', (2:) the apparent need of a halfway source between the forms attested in Greek and Sanskrit, and (3:) the discoveries of astounding bronze artefacts (tin is needed to make bronze) from Susa.[71] However, Hüsing did not make any linguistic connection with Babylonian. At some point, the Elamite hypothesis advanced by Hüsing merged with another line of re-

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[67] On the alleged tin sources in Sistan see Muhly 1985, p. 283 (with further references in fn. 74), and Moorey 1994, p. 299, both citing Strabo. See also Berthelot 1887, p. 16, fn. 1: 'Strabon indique cependant des mines d'étain dans la Drangiane, vers les limites occidentales de notre Afghanistan, mais nul voyageur moderne n'en a parlé'.

[68] E.g., Giumlia-Mair 2005, p. 360.

[69] LSJ, p. 882, s.v. κασσίτερος. The etymological section was added in the 9th edition published in 1940 (the previous edition was published in 1897).

[70] Frisk 1973, p. 798, s.v. κασσίτερος; Chantraine 2009, p. 484, s.v. κασσίτερος. Perhaps Hüsing's note reached Indoeuropean scholars through the endorsement of Pokorny 1913 (written against the alternative proposal of a Celtic etymology).

[71] Hüsing 1907. It has to be stressed that a word **kasitira* is not attested in Elamite sources and Hüsing was aware of this, even if he forgot to put the asterisk in front of it.

search, according to which a word for 'tin' is attested in 'Assyrian' as '*kasazatirra*' and in 'Akkadian' as '*id-kasduru*'. This line of research is repleted with mistakes, starting from the typo '*kasayatirra*' since one of its first publications.[72] Unfortunately, it has been rarely reported that the identification of these two words, advanced respectively by J. Oppert[73] and F. Lenormant,[74] is based only on one occurrence each, in a royal inscription of Shalmaneser III (reigning 858-824 BCE)[75] for '*kasaza-*

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[72] Oppert 1868, p. 317, fn. 2; repeated in Lenormant 1870, p. 23.

[73] Oppert 1868, p. 317, fn. 2; this is only a mention, provided in transcription as '*kasayatirra*', en passant. Perhaps Oppert did not write a full treatment of this identification, even if he wrote many articles (a 'tentative bibliography' [wording used in the heading on p. 529] is in Muss-Arnolt 1894) and I could check only some of the ones written between 1861 (discovery of the related inscription; see below fn. 75) and 1886 (G. Bapst reported that Oppert had recognized his interpretation as wrong; see below fn. 78). Oppert's identification was recalled several times by Lenormant (1870, p. 23; 1874, p. 147, fn. 1; 1878, p. 337, in connection with '*id-kasduru*').

[74] Lenormant 1878, p. 337.

[75] British Museum BM 118884 (Grayson 1996, A.0.102.2), a stela found at Kurkh (nearly 30 km to the south-east of Diyarbakır) by J.G. Taylor in 1861 (Grayson 1996, p. 11; see also Taylor's lecture at the Royal Geographical Society of London [Taylor 1865]). Oppert referred to it as 'la stèle retrouvée aux sources du Tigre' (Oppert 1868, p. 317); marginally, Taylor became aware of the Assyrian monuments at Bırkleyn (also known as Tigris-Tunnel, ca. 70 km to the north of Diyarbakır), one of the sources of the Tigris, in 1863 (Schachner 2009, pp. 7). To my knowledge, the inscription on the stela was first published in 1870 as 3R pls. 7-8 (cuneiform copy only). Probably Oppert saw it in the British Museum or relied on some draft copy circulating among scholars. The signs read as '*kasazatirra*' by Oppert (who did not provide a line reference) were probably SÍK.ZA.GÌN.SA_5 'red purple wool' (*argamannu*) in A.0.102.2,ii:23, part of an annual tribute; the sign SA_5 can be transliterated as ṭir; the other signs (except perhaps za) were wrongly read or, if Oppert had a cuneiform copy, wrongly drawn at least. Oppert used '*kasazatirri*' as a transcription of A.BÁR in his interlinear presentation of the text of the silver tablet from Khorsabad (AO 21371:41) in Place 1870, p. 305.

tirra' and in a gloss of a Neo-Assyrian lexical tablet[76] for '*id-kasduru*'. In the end, even if with some missing link in the chain, it can be ascertained that they are both ghost words. This was stated at least in 1886 by Oppert himself for '*kasazatirra*'[77] and in 1892 by W. Muss-Arnolt for '*id-kasduru*',[78] but unfortunately it was misunderstood or forgot afterwards.[79] Further-

[76] K 197 (cuneiform copies in 2R pl. 7 and CT12 pls. 34-35, with swapped faces), a tablet belonging to the series sig_7-alan : *nabnītu* (Finkel 1982; on this series, see Veldhuis 2014, pp. 233-234, §5.1.4). On the obverse (the reverse in 2R) iii:17 (= sig_7-alan : *nabnītu*, tablet IVa:251, according to Finkel 1982), in a gloss to [a]n-na (paired with a-na-ku *annaku* 'tin'), the signs drawn by Rawlinson (2R pl. 7) are ID.KAS.DU.RU, while Thompson (CT12 pl. 34) clearly drew them as na-ag-ga (a 'late rendering' of AN.NA; see Landsberger 1965, p. 294, (d), and Mittermayer 2009, p. 223, commentary to line 18; discussed already in Jensen 1886, pp. 13-16). Thompson's copy can now be proved to be correct thanks to the photo available on CDLI (<https://cdli.ucla.edu/P365268>).

[77] Bapst 1886, p. 253 (without a reference; perhaps it was a personal communication): 'Or M. Oppert reconnaît aujourd'hui avoir donné une signification probablement erronée au terme de *kasazatirra* qui se compose de deux mots accolés signifiant tous deux des couleurs, et pour M. Oppert ces deux termes ne doivent point s'appliquer à un métal, mais à tout autre objet, peut-être à des étoffes'.

[78] Muss-Arnolt 1892, pp. 132-133. See also, for both words, H. Lewy 1895, pp. 60-61, reporting a personal communication of P. Jensen: 'In Wahrheit aber giebt es, wie mir Professor Jensen auf meine Frage gütig mitteilt, weder im Assyrischen *(anāku* „Zinn") noch im „Akkadischen" oder vielmehr Sumerischen (*ana*, *naga*, *em* „Zinn") ein Wort, das sich zu κασσίτερος stellen ließe'; O. Schrader cited, agreeing, Jensen apud Lewy (Schrader 1901, p. 993). Notwithstanding these clear statements, R.J. Forbes mentioned a 'Neo-Babylonian ... *kastira*' (referring to Schrader 1901, p. 995, where I was not able to find it) 'which must be derived from the Greek as there is no Assyrian *kâsaṣatira* or an Accadian *id-kasduru* as Bapst and some others have claimed' (Forbes 1950, p. 257).

[79] See, e.g., Médina 1900, p. 80, fn. 1, conflating Lenormant's and Oppert's identifications: 'Oppert prétend que ce mot n'a jamais existé

more, the connection with Sanskrit *kastīra* is not really meaningful, since this term occurs rarely and in late texts.[80]

Traces of tin have been actually documented geologically at several locations in Dasht-e Lut but large deposits were elsewhere, especially in neighbouring Afghanistan.[81] It is tempting to correct the reference of Strabo to lead instead of tin, considering also the usual confusion between the two metals. However, it is better to leave the matter as it is, waiting for further data and/or studies: otherwise, we would probably incur once more in the positivist fallacy,[82] i.e. to consider as directly correlated two relics of evidence that, once, were single drops in the *mare magnum* of the complexity of present.

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dans la langue arcadienne [sic!], mais Fr. Lenormant et Lepage-Renouf l'admettent'.

[80] *An occurrence is in the synonymical lexicon Abhidhāna-cintāmaṇi*, 1042, compiled by the Jain scholar Hemachandra (ca. 1100 AD) and published in Böhtlingk & Rieu 1847, p. 195, line 32; *kastīra* is one of 14 synonyms meaning 'tin', starting with *vaṅgaṁ*, *trapu*, etc. See already Muss-Arnolt 1892, p. 133: 'it is a late word and foreign to the language'; also Forbes 1950, p. 257.

[81] Pigott 1990, p. 457, referring to Stöcklin & al. 1972, p. 58, for the Lut. For Afghan sources, see Cleziou & Berthoud 1982 (mentioning Strabo and Drangiana on p. 17). See also Helwing 2018, p. 122.

[82] See Snodgrass 1987, p. 38, and also Lendering 2009 for a description of this methodological error.

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This paper

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IV

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