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Purple Fabrics and Garments in Akkadian Documents

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Abstract: The following examination of the textual evidence for purple dyeing in late Bronze Age Syria and Mesopotamia highlights a disconnect between the written sources and the physical remains for colored textiles recently unearthed at Qaṭnā (Tell Mishrife). By charting the relationship between developments in the dyeing industry against wider economic forces in this period, this essay addresses the impact of Bronze Age technologies on the evolution of Akkadian color language.

Keywords: purple, murex, dyes, textiles, color, Mesopotamia, ancient Near East

The fragments of colored textiles discovered in Bronze Age royal tombs at Qaṭnā (Tell Mishrife) are the earliest known archaeological evidence for the use of murex purple and madder to dye wool in the ancient Near East.¹ The written evidence for dyed textiles from Bronze Age Syria and Mesopotamia includes terminology for purple dyed fabrics, the types of commodities produced with them, as well as their relative prices. Of interest here are references to shellfish dyes and the plant-based purples available to craftsmen of the ancient Near East. By highlighting the ambiguity in the terminology for purple colored wools and the diversity in dyeing techniques practiced in the late Bronze and early Iron Ages, this article questions whether indeed murex purple enjoyed the exclusive prestige and high commercial value that it did in later periods of Near Eastern and Mediterranean history.

1 A brief history of colored fabrics in the ancient near east

Linen and wool were the two most important textile fabrics of the ancient Near East. The earliest cloths were made from flax, which was cultivated in this

¹ The recovery of the textile fragments from their excavation context and the subsequent biomolecular analysis conducted on selected samples are discussed in James et al. (2011).

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region beginning around 9000 BCE, and other vegetal fibers. Animal fibers, especially wool, rose in importance with the domestication and breeding of sheep around the late 5th to the early 4th millennia. In the Akkadian written record, garments made of linen (Sum. **gada**, Akk. *kitû*) are frequently mentioned in royal inventories and as gift items exchanged among kings in the Bronze Age.² Linen textiles from Egypt (**gada** ša ^{kur}*mišri*), where this industry had flourished since Old Kingdom times, were especially valued.³ The finest quality of this fabric was known as ‘king’s (i. e. top quality) linen,’⁴ no doubt because it was originally reserved for royalty and the wealthy elite. Two varieties of linen dyed red, *tabarru* and *ami*, are itemized among the gifts sent from pharaoh Akhenaton to king Burnaburiash of Babylon in the mid-fourteenth century BCE.⁵ Archaeological evidence for dyed linen has been reported in Egypt, although these textiles post-date the earliest written references.⁶ Rudolf Pfister (1937) identified mummy wrappings in burials dating to the 21st Dynasty (c. 1050 BCE) that were dyed a shade of pink with safflower, findings later confirmed by Renate Germer (1992). However, very little written evidence exists to suggest that linen was ever colored purple with the dye of the murex snail in ancient times. A rare case of “lapis lazuli(-colored) linen” is alluded to in a letter, probably sent by Rib-Hadda, the king of Byblos in mid-fourteenth century BCE, to pharaoh Akhenaton.⁷ How exactly the expression **gada** *eḫ-li-pa-ki*

² For instance, 1092 pieces of linen garments of various qualities were sent from Egypt to king Burnaburiash of Babylon (EA14: iii 11–33; Moran 1992: 32). Similarly, the Mittanian king Tušratta mentions various Hurrian-style linen garments (EA 22: ii 39–41), linen clothing with multicolored trims (iii 27) and linen shoes (ii 35) among his gifts to the pharaoh of Egypt on the occasion of his wedding (Moran 1992: 53 and 55). The attestations of linen in Hittite texts are listed in Vigo (2010: 290 n. 1).

³ See Jones (2010): 81–109 and references therein. In his discussion of linen in Hittite texts, Vigo (2010: 290 ff.) also surveys the evidence for linen from Egypt, Cyprus and Anatolia.

⁴ Sum. **gada lugal**, Akk. *kitû šarri*, Egyptian šš *nsw* (Vigo 2010: 291). **Lugal** is one among the many terms that designated textile qualities. Allowing for regional variation, the scale was as follows: **lugal/šar**₃ “royal/top quality,” **sig**₅ “good quality (not in Ur-III texts),” **sag** “top, first quality” (not in Ur-III texts), **us**₂ “next, second quality” (followed by **3-kam us**₂ “third quality,” **4-kam us**₂ “fourth quality” and occasionally **5-kam us**₂ “fifth quality in Ur-III texts),” **gen** “current, normal quality,” **murub**₄ “medium quality,” and **murgu_x/egir_x** “inferior quality” (Veenhof 1972: 203–13).

⁵ EA 14: iii 27, 29, 30 and 32 (Moran 1992: 32).

⁶ Germer (1992: 66–67) identified linen textiles dyed with iron oxide in the Workmen’s Village at Amarna.

⁷ The sender of the letter was probably Rib-Hadda, king of Byblos in mid-fourteenth century BCE, the receiver is pharaoh Akhenaton. ‘Abdi-Aširta is the king of Amurru:

i-nu-ma ia-nu sig₂ a-na ša-šu-nu ù ia-nu gada za.gin₃ na⁴mar: bu-bu-mar a-ma ša-šu(!) a-na na-da-ni gu₂.un a-na kur-mi-ta-na (EA 101: 6–10; Moran 1992: 174)

should be understood (sometimes translated as “dyed purple linen” when it appears in Hittite inventories) is still up for debate.⁸ Since dyes do not fix especially well onto linen, it is conceivable that costlier and less commonly available dyes like murex were not used to color this material in ancient times.

Worn by all members of society, wool was one of the most important commodities in ancient Mesopotamia. In cuneiform documents from the late third and second millennia BCE, the terminology for artificially colored wool seems to be distinguished from those for un-dyed wools. The four most common Sumero-Akkadian color words designated the latter. Thus, lighter shades of undyed wool were called “white wool” (**sig₂ babbar**, *pešû*) and black or darker shades “black wool” (**sig₂ gi₆**, *šalmu*). Natural colors of fleece in the red-brown and yellow ranges were classified **sig₂ sa₅**, *sāmu* and **sig₂ sig₇**, (*w*)*arqu*. Both the large quantities of the fabric denominated in this manner as well as the fact that they are never associated with the raw materials necessary for dyeing indicate that **sig₂ pešû**, **sig₂ šalmu**, **sig₂ sāmu** and **sig₂ (w)arqu** refer to naturally pigmented wools.⁹ Dyed wools are mentioned more and more frequently in Akkadian language texts beginning from the early second millennium BCE onwards. In Old Assyrian and Old Babylonian records, artificially colored wools are either specified as “dyed” (*šarip*, *bašil*) or else are given the names of substances. For instance, the names of valuable stones are given to the wools called “calcite(-colored)”¹⁰ (**sig₂ duḥ.ši/šu₂.a**, *duḥšu*), “lapis lazuli(-colored)” (**sig₂ za.gin₃**, *uqnātu*) and “amethyst(-colored)” (**sig₂ sag.gil.mud**, *ḥašmānu*), no doubt because such fabrics were dyed in manner that evoked the vivid hue and luster of these costly and esteemed minerals.¹¹ It is unclear if “apple wool” (**sig₂ ḥaš.hur**, *ḥašḥūru*), also attested from the early second millennium BCE onwards, takes its name from the color of the fruit or because the apple tree was

“[Now, the ships of the army are not to enter the land of Amurru, for they have killed ‘Abdi-aširta], since there was no wool for them and no linen (the color of) lapis lazuli or MAR-stone: *bubumar* for him to give as tribute to the land of Mittani.”

It seems then that the Mittanians were receiving purple cloth from the kingdom of Amurru, situated in the northern Levant where most of the archaeological evidence for shellfish dyeing comes from. The Mittanian king also sent finished garments made of purple wool to the pharaoh of Egypt (EA 22: ii 18, 29, 36, 42 discussed below).

8 E. g. in IBoT I 31: obv. 10. For a brief discussion, see Vigo (2010): 295 and n. 47.

9 This argument was made by Waetzoldt for the Ur-III period (2010). Wisti Lassen has observed the same for the Old Assyrian period (2014: 259). Landsberger too did not consider these dyed wools because they are listed separately in the lexical literature (1967: 155–56).

10 For the identification of *duḥšu* as yellow calcite, see Thavapalan, Forthcoming).

11 As Durand observed, the naming of manufactured objects was an intellectual endeavor in Mesopotamia and so, they are frequently evoked through metaphor rather than described in tangible terms (Durand, 2015).

the dye source. Typically colored with locally available species of madder, although dye sources changed from the second to the first millennium, *tabarru*-red wool (Sum. **sig₂ hē.me.da**) remained the most popular if not valuable dyed fabric in Mesopotamia and Syria. A few unique Hurrian terms for dyed cloths that are unattested elsewhere, *kinahḫu*, *šurathu* and *tamkarḫu* for instance, appear in texts from Nuzi (Yorghnan Tepe). Terms for shades of red, blue and purple fabrics are the most abundant in the written sources from all periods, a clear indication that the people of the ancient Near East were particularly fascinated with these colors.

2 Purple wools

The ancient city of Qatnā (Tell Mishrife) was discovered in 1924 and excavation began thereafter led by Robert du Mesnil du Buisson (1924–1927 and 1929). After a prolonged break, work at the site resumed in 1999 under the auspices of an international cooperation between the Syrian *Direction Générale des Antiquités et des Musées* in Damascus and the Universities of Udine (Italy) and Tübingen (Germany). During the 2002 season, the team led by Peter Pfälzner made the remarkable discovery of thousands of millimeter-sized fragments of textiles in a series of royal tombs, which were in use for a period of 300–400 years, until the invasion of the Hittites around 1340 BCE. Samples of purple textile, now preserved as mineralized gypsum replicas, were found in context with gold jewelry and beads, indicating that these remnants represent the garments that once adorned the entombed nobility. Chemical analysis of fifteen samples of these “purple extracts” has revealed the presence of indigoid and brominated indirubin, the characteristic markers of the dye derived from the *Hexaplex trunculus* (formerly known as *M. trunculus*) species of murex snail (James et al. 2009: 1114–16; James et al. 2011: 450–60). The finds from Qatnā further testify to a range of colors—pink, bright purple, light blue, and deep blue—achieved by dyeing wool with certain species of sea mollusks in the late Bronze Age (James et al. 2009; James et al. 2011). Multiple shades of purple wool are likewise distinguished in Akkadian texts from contemporary sites in Syria and Mesopotamia.

2.1 *Takiltu* and *argamannu*

In the Akkadian dictionaries, as in Assyriological literature, the terms **sig₂ takiltu** and **sig₂ argamannu** are understood as blue- and red-purple varieties of precious

wools colored with the dye extracted from marine snails.¹² This interpretation is based on the archaeological evidence for shellfish dyeing at Bronze and Iron Age sites on the Levantine coast as well as the later meaning of these terms in Biblical Hebrew.

It is well known that shellfish dyeing was practiced on a large scale in the Bronze Age Aegean and the Levant beginning in the first centuries of the second millennium BCE. Deposits of mollusk shells have been found on Crete and its surrounding islands (19th-seventeenth centuries BCE)¹³ and at various sites along the Phoenician coastline, notably at Sarepta (thirteenth century), the harbor at Ugarit (Minet el-Beida, 15th-fourteenth centuries),¹⁴ Tyre and Sidon.¹⁵ Purple dye material has been detected on ceramic shards, perhaps from dyeing vats, at Sarepta,¹⁶ Tell Keisan (eleventh century), Tell Shiqmona (9th-eighth centuries) and Tell Kabri in Israel (c. Seventh century),¹⁷ compelling testimony to the fact that craftsmen were able to manufacture this colorant on an industrial scale in ancient times. Based on modern-day experiments and the distribution of mollusk shells recovered at Sarepta, Tyre and Sidon, some scholars now suppose that the distinctive hues of *takiltu* and *argamannu* were achieved by dyeing with different species of the murex snail. According to this hypothesis, the *Hexaplex trunculus* (formerly known as *M. trunculus*), which mainly contains blue-purple colorant, yields *takiltu*-colored wool, whereas red-purple-containing *Bolinus brandaris* (formerly known as *M. branderis*) and *Stramonita haemastoma* (formerly known as *T. haemastoma*) could have been utilized for *argamannu*-colored wool (James et al. 2011: 458–59 and nn. 33–38).

Analysis conducted on the textiles recovered from Qaṭnā suggest the strong possibility that the *Hexaplex trunculus* species was used to color the various shades of purple clothes; samples containing higher proportions of 6,6'-dibromoindigo, the

12 CAD T 70–73 and A 253; AHw I 67 and III 1306. Argued by Landsberger in his essay on Sumerian and Akkadian color terminology, which included a thorough examination of words for dyed wools, and generally since (1967: 164). Most recently, see Quillien (2015): 107.

13 At Knossos (Hutchinson, 1962), Mallia (Volger, 1984), Palaikastro (Stieglitz 1994) and at Kastri, on the island of Kytherai (Coldstream and Leonard-Huxley, 1973).

14 Schaeffer, 1951: 190–92.

15 McGovern and Michel, 1984; Cardon, 2007: 571.

16 The purple sediment on the amphora was identified as 6,6'-dibromoindigotin (McGovern and Michel, 1984: 67–68).

17 Briend and Humbert, 1980; Karmon and Spanier, 1988: 184–86; Koren, 1995. The pots were found encrusted with a ring of dibromoindigotin, suggesting that it was used as a dyeing vat. The ring pattern occurs because only the liquid exposed to the air would have turned purple due to oxidization (Cardon, 2007: 564).

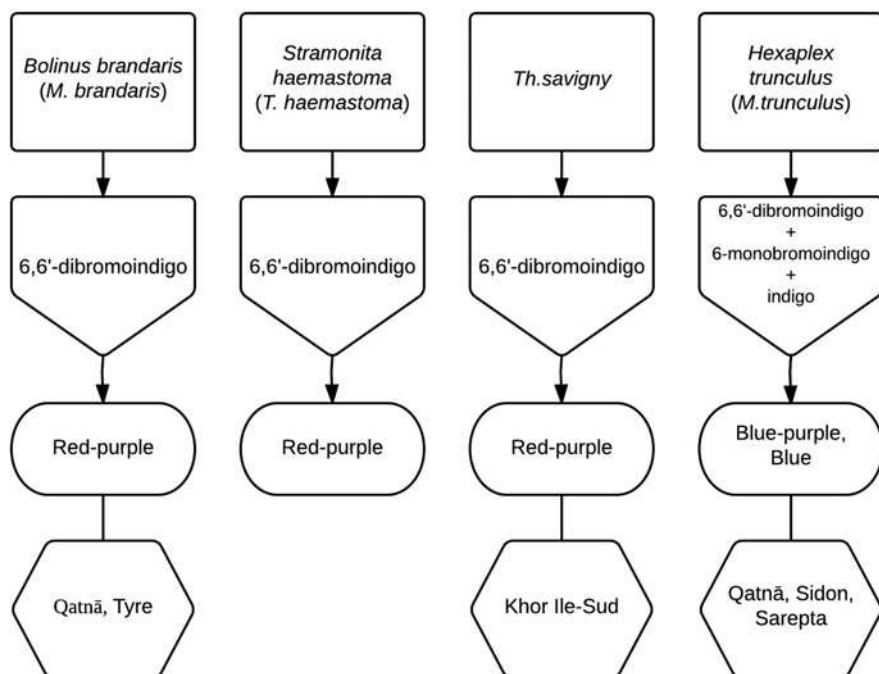


Figure 1: Murex species and shades of purple.

reddish and pinkish textiles, could have been dyed with a mixture of *Hexaplex trunculus* and *Bolinus brandaris* (*ibid.* 459) (see Figure 1).

By contrast to the material record, the art of shellfish dyeing is never mentioned explicitly in the written sources from the Near East nor has the Akkadian word for the murex snail been identified.¹⁸ All of the evidence pointing to **sig₂ takiltu** and **sig₂ argamannu**¹⁹ being murex-dyed wools in the second millennium BCE is circumstantial or else dates to later periods. In the Hebrew Bible, *tēkēlet*, which is

¹⁸ The Ugaritic word for “murex” is *ḡlp* (DUL 321; Dietrich, 2010: 44). The Ugaritic reference to murex appears in the *Epic of Aqht*, where a character is said to rouge (*ʿdm*) herself “with the (essence of the) *ḡlp* from the sea, whose living space extends over a thousand dawns in the sea.” (KTU 1.19: iv 41–43; Dietrich, 2010: 43).

¹⁹ Syllabic spellings of the dyed wool called *argamannu* are only attested from the first millennium onwards. Red-purple wool is designated as **sig₂ za.gin₃.sa₅** in Middle and Neo-Assyrian texts, although the Akkadian equivalent of this term is not given in the contemporary lexical literature (Landsberger, 1967: 161). In Assyrian texts from the second millennium BCE, **sig₂ za.gin₃.gi₆** literally “dark lapis-colored wool” is used to designate *takiltu*, whereas in Neo-Assyrian and Neo-Babylonian texts, **sig₂ za.gin₃.kur.(ra)** is the conventional logogram for it.

etymologically related to Akkadian *takiltu* and Aramaic *tkiltā*, is specified as the color of wool required to make the tassels of the traditional, four-cornered prayer shawl known as the *ṭallīt*.²⁰ According to the Talmud, the one *tēkēlet*-thread that was to be attached to the shawl was colored with the dye from a “sea snail,” *ḥillazon* in Biblical times (Tosepta *Menachot* 9: 16).²¹ In Rabbinic commentary to the passage in Numbers that mentions the *ṭallīt* (15: 38–39), the woolen tassel is described as being dyed with a substance called *qēlā’illān*, now thought to be a mixture of kermes and indigo, when authentic *tēkēlet* was not longer available (Ziderman 1987: 28). That the two dyes resembled each other in hue is remarked upon in the following passage: “One should not say, ‘Behold I place dyes and *qēlā’illān*, and they resemble *tēkēlet*, and no one can inform on me’” (*Sifre* on Numbers 15: 41). In the Septuagint, the word *tēkēlet* is transmitted into Greek *hyakinthinos*, a shade of light blue, which is why this color of wool is called hyacinth purple by Greek writers. Akkadian *argamannu* manifests as *’argāmān* in Hebrew and is also mentioned in the Bible (Ziderman 1987: 25).²² This shade of red-purple colored wool was called Tyrian purple by the Romans (Cardon 2007: 554–55). The art of dyeing textiles with the stomach content of muricidae was forgotten after the Arab conquest of the Middle East in the mid-seventh century CE and was only rediscovered again in the nineteenth century.²³

Given that dyed wools are frequently named after valuable gemstones in Akkadian, it is significant that **sig₂** *takiltu* and **sig₂** *argamannu* are not designated with the logogram for a mineral that is characteristically purple in color, such as amethyst. Instead, the word sign for the most expensive and sought after gemstone, lapis lazuli (**za.gin₃**), is used. When written logographically, *takiltu* is

20 A passage in the Book of Numbers describes the *ṭallīt*: “(God said to Moses) Speak to the Israelites and say to them: ‘Throughout the generations to come you are to make tassels on the corners of your garments, with a *tēklēt*-colored cord on each tassel. You will have these tassels to look at and so you will remember all the commands of the LORD, that you may obey them and not prostitute yourself by chasing after the lusts of your own hearts and eyes.’” (Numbers 15: 38–39).

21 Herschberg, 1924: 267–77; Feliks, 1962: 138 and 1981: 18–20.

22 In Judges 8: 26, Jeremiah 10: 9 and Ezekiel 27: 7.

23 The zoologist Henri de Lacaze-Duthiers (1821–1901) supposedly “rediscovered” murex dye as he happened upon a fisherman in a coastal village in Spain breaking open a sea-snail’s shell and covering his shirt with its contents. To his fascination, the yellow smudge gradually changed to a brilliant purple color. Recalling the descriptions of shellfish dyeing in Aristotle and Pliny the Elder in the fisherman’s performance, Lacaz-Duthiers conducted further experiments on sea mollusks. Through them, he was able to isolate the species of mollusks whose secretions from a small gland in the digestive system could produce a range of brilliant hues, from pale pinks and blues to darker blues, violets and black-purple. The Viennese Egyptologist Alexander Dedekind was the first to connect the *tēkēlet* used in Biblical times with the dye of the murex *T. trunculus* in his *Ein Beitrag zur Purporkunde* (4 vols 1898–1911. Berlin: Mayer Müller).

designated either as “lapis lazuli wool (of the foreign) land” (**sig₂ za.gin₃.kur(.ra)**) or else as “dark lapis lazuli wool” (**sig₂ za.gin₃.gi₆**).²⁴ *Argamannu* is only written syllabically in the first millennium BCE. In the late Bronze Age, it is designated as “red(-tinged) lapis lazuli wool” (**sig₂ za.gin₃.sa₅**).²⁵ Even if they were purely graphic conventions, these ideographic labels inform us that from the perspective of Akkadian-speakers, purple wools were thought to resemble or else evoke the vivid hue and brightness of lapis lazuli.²⁶ No doubt the precious nature and exotic value of this beloved stone also lay behind this choice in scribal convention.²⁷

In sum, in light of the ample and diverse forms of physical evidence for shellfish dyeing in the Near East and Mediterranean during the Bronze Age—heaps of mollusk shells, remains of dyeing installations, and murex-dyed textiles—as well as the meaning of both terms in later Jewish tradition, it

²⁴ This description of *takiltu* as a dark color differs from the later Jewish tradition, where *tēklēt* is a shade of light blue.

²⁵ The similar convention of attaching a basic color term to the word for a substance is used to name colored glass as well. Thus, ^{na⁴}**za.gin₃.sa₅** is “red(-tinged) lapis lazuli(-colored) glass” and ^{na⁴}**duḥ.ši.a.sig₇** is green(-tinged) calcite(-colored) glass.

²⁶ The hue of lapis lazuli from Badakhshan is highly variable, ranging from “a deep, almost violet blue through the royal blue of the gem quality to light blue, a turquoise and finally a few pieces of brilliant green” (Herrmann, 1968: 24). Based on the evidence of cylinder seals, Porada observed that the people of the Near East tended to prefer the purplish-blue shades of the mineral, as opposed to the Mycenaeans and Cypriotes, who favored royal blue (1981: 6). Winter emphasized the dark and lustrous nature of this stone as its most important aesthetic qualities from the point of view of the ancients (1999).

²⁷ Landsberger was unable to account for this confusion in color terminology. He suggested that Akkadian-speakers used the word for lapis lazuli (a dark blue stone in his view) to designate purple wools because they were unable to express the thought in any other way: “Daß die bab.-ass. Schreiber, als Purpur in ihren Gesichtskreis trat, das Ideogramm ‘Lapis-lazuli’ dafür geeignet fanden, ist keineswegs selbstverständlich; sie mögen aber danach gegriffen haben, weil sie die fremdartige Farbenpracht, sowohl hinsichtlich Glanz wie Färbung nicht besser ausdrücken konnten” (1967: 166). He suggested further that the label **za.gin₃** was not a designator of color, but rather indicated that the wool was dyed with murex purple (*ibid.* 163). As we shall see, this latter claim can no longer be accepted.

I suggest instead that the idea of lapis lazuli functioned as a kind of linguistic prototype for categorizing dyed wools of blue, blue-green, blue-purple and red-purple colors. In these cases, the ideographic label **za.gin₃** designates a color category and not a single chromatic reality. Similar tendencies toward color categorization have been observed in other languages. Based on her field experiments on the Dani language of Papua New Guinea in the 1970s, anthropologist Eleanor Rosch argued that human beings tend to categorize by comparing the referent to the object or experience best representing a category, as opposed to using abstract definitions (Rosch Heider, 1972; Heider and Olivier, 1972). In this way, it would be possible to categorize multiple color experiences despite not having multiple words for color (the Dani only have two color words).

is conceivable that **sig₂** *takiltu* and **sig₂** *argamannu* did indeed refer to the bluish and reddish purple wool achieved with murex dye in ancient times. Pre-dyed wool was probably imported from the western centers, as there is no evidence within Mesopotamia proper for the practice of shellfish dyeing. As the following discussion will demonstrate, however, the color purple was not exclusively tied to the murex industry. Not all textual references to **sig₂** *takiltu* and **sig₂** *argamannu* denote, as it is generally assumed, murex-dyed wools; alternative methods of dyeing purple with vegetal matter were also known and practiced concurrently. What is more, the Mesopotamians themselves never distinguish between “genuine” and “fake” purples on the level of language.

Tagged with the cuneiform semantic indicator for “wool” (**sig₂**) or further clarified as “dyed” (*širip*), attestations of the terms *takiltu* and *argamannu* appear beginning in the last centuries of the second millennium BCE. References to unprocessed wool as well as to finished items of clothing are found in the textual record. A variety of *takiltu*-colored garments and woolen trims, for instance, was among the gifts the Mittanian king Tušratta sent to pharaoh Amenhotep III (c.1391–1353 BCE) on the occasion of his marriage. An inventory of these gifts is preserved in a tablet from the El-Amarna correspondence (EA 22: ii 18, 29, 36, 42):

ma-at-ru-ú-šu gun₃ ša t[a]-kíl-ti “[a dagger...] its handle (with) a multicolored (trim) of *takiltu*”

1 **šu** ^{kuš}**e.sir₂** *ša ta-kíl-ti* “one pair of leather sandals of *takiltu*”

1 **tug₂** *ša ta-kíl-ti* “one garment of *takiltu*”

1 ^{tug₂}**sagšu** *ša t[a-k]íl-t[i]* “one cap of *takiltu*”

The leather sandals “of *takiltu*” (*ša takilti*) most likely refers to an embellishment worked in wool, for there is no evidence to suggest that leather was ever dyed in such a manner. The royal destination of the gifts as well as the relatively small quantities of the *takiltu*-wool mentioned here suggests that, within this corpus at least, textiles dyed with genuine murex purple were meant by this term.

At the Hurrian city of Nuzi, the most common textile produced with *takiltu*-wool was the multicolored trim (*birmu*), which was fastened to various types of garments.²⁸ Again, relatively small quantities of wool would have been required for such a task. *Takiltu*-wool was also used to make *mardātus*, a patterned cloth

28 HSS 15: 221 6–8: 1 **ma.na** *ta-ki-il-tù* 1 **ma.na** *šu-ra-at-ḫu a-na bi-ir-mu meš* “One mina of *takiltu*-wool and one mina of *šurathu*-wool for multicolored trims.” For *birmu* see CAD B: 257: “trim woven of several colors (used to decorate garments).”

woven out of several colored wools and used to make sashes,²⁹ cushions,³⁰ bedclothes³¹ and other textiles.³² While there are no data for the prices of dyed wools from Nuzi, context makes it nonetheless clear that only upper-class Hurrians would have been able to afford such fabrics. On the subject of value of dyed wool, Abrahams notes that the commodity was also traded at Nuzi (Abrahams 2014: 299).³³ Finally, and not surprisingly, the beauty and high value of purple wool also made it a suitable offering to the gods. A *takiltu*-colored headpiece, perhaps a wig, is mentioned among a list of votive offerings from Ba'al-malik to Ninurta in a text from Emar (Tell Meskene, late 13th-early twelfth centuries BCE).³⁴

Given the archaeological evidence for shellfish dyeing in Syria and the Levant discussed above, one would expect the texts from Qatnā (Tell Mishrif) and Ugarit (Ras-Shamra, 15th-thirteenth centuries BCE) to contain the most references to murex-dyed purple wools. Unfortunately, the famous royal inventories of Qatnā list only precious stones and glass objects and omit references to textiles. Woad- and madder-dyed wools are mentioned in an inventory list of Napši-abī from the Idadda-Archive from Qatnā.³⁵ At Ugarit, *takiltu*-wool is well documented as a high-demand commodity among the

29 HSS 15: 221 3–5: 2 **ma.na** *ta-ki-il-tù a-na 2 ta-pa-lu* **ib₂.meš** *mar-da-tù* “Two minas of *takiltu*-wool for two sets of *mardātu*-sashes.”

30 HSS 13: pl.9 B rev. 23 and A7.

31 HSS 15: 220 18–23: 2 **ma.na** 30 **gin₂** *ta-ki-il-tù ta-bar-ru ki-na-aḥ-ḥa ù šu-ra-at-ḥa a-na mar-da-tù ša* **giš.nud.meš** “Two mina, thirty shekels of *takiltu*-wool, *tabarru*-wool, *kinahḫu*-wool and *šurathu*-wool for *mardātu* of beds.”

32 Durand (2009: 63 and 107). Wisti Lassen (2010: 279–80) has argued that the *mardātu* is a kind of tapestry.

33 HSS 5: 32; AASOR 16: 77, 78.

34 BLMJ 1136: 3, 4, 8, 14–16 (Westenholz, 2000: 61):

suḫur ša sig₂ ti-kil-ti suḫur ša-ni-ta ša sig₂ ḫe₂.me.da 5 ib₂.la₂ ša sig₂ ḫe₂.me.da.meš tug₂ ku-ut-mu ša sig₂ ḫe₂.me.da a-na ^dwe-’-da

“A wig of *takiltu*-colored wool; another wig of *tabarru*-colored wool; 5 sashes of *tabarru*-colored wool, a *tabarru*-colored cover-cloth for We’da.”

35 TT 12: rev. 32, 34, 36 (Richter and Lange, 2012: 84):

2 *ta-pal sig₂ za.gin₃ šu-wa-an-na* “Two pairs of *uqnātu*-(colored) wool, *šuwanna*-type.”

3 **sig₂ za.gin₃ ša-ba-ag-gi-na** “Three pairs of *uqnātu*-(colored) wool, *šabakki*-type.”

2 *me-tim sig₂ za.gin₃ ḫe₂.me.du* “Two hundred *uqnātu*-(colored) wool, *tabarru*-(colored) wool.”

The editor of the text was unable to provide an explanation for the terms *šuwanni* and *šabakki*, except to say that they somehow specify the dyed wool (Richter and Lange, 2012: 85). Red colored *tabarru*-wool was generally dyed with madder and alum in the Bronze Age, as described in records from Mari (e. g. ARM 23: 148; ARM 21: 306; in ARM 21: 310 madder and alum appear together; in ARM 21: 311 alum is used to fix the dye on hide). In the first millennium, several dyes were employed to dye *tabarru*-wool (e. g. BM 114,464, 114,511, 114,649). For woad as a dye source, see below section III.

wealthy elite and royalty,³⁶ notably the queen.³⁷ The frequency of these attestations notwithstanding, it is doubtful if the term **sig₂ takiltu** actually denoted murex-dyed fabric at Ugarit. Both the large quantities and the low price of the wool speak against such an interpretation. For instance, roughly 300 kilograms of *takiltu*-wool are cited in the following text, which might represent a list of tribute items for Hatti³⁸:

[10 **gu**n **si**[**g₂** **z**]a.[**gi**n₃ *t*[*a-kil*]-*tu*₄ [10 **g**un **sig₂ za.gin₃** *haš*-[*ma-n*]i 10 **gun sig₂ za.gin₃** *ha-sé?-e*]r-ti 10 **gun sig₂ he₂.me**.[**d**]a? (RS 34.180, 4; Van Soldt 1990: 338)

“Ten talents of *uqnātu*-wool of *takiltu* (shade), ten talents of *uqnātu*-wool of *hašmānu* (shade), ten talents of *uqnātu*-wool of *hasertu* (shade), ten talents of *tabarru*-wool”

Allowing for the estimate that some 12,000 snails were required to extract 1.4 grams of dyestuff,³⁹ it is hardly conceivable that such a massive quantity of wool was ever dyed with murex. It is also noteworthy that the quantity of *takiltu*-wool mentioned here is comparable to those of wools dyed with vegetal matter, namely woad (*uqnātu*) and madder (*tabarru*) (for dye sources, see below Section 3). In Ugaritic texts, the term *takiltu* is spelled syllabically but is at the same time qualified with the word signs **sig₂ za.gin₃** as here:

[**(x)**] **munus.lugal** [**x**].**meš** 5 **tug₂.gada** 3 *me-at sig₂ za.gin₃ ta-kil-tu₄* [...] x [**tug₂**].**gada** 2 *me-at* ^{na4}*hi-li-ba-a'* [**x**] [...] *a-na šul-ma-ni munus.lugal-t*[*i ...*] (RS 17.354: 7–10; Van Soldt 1990: 330)

“X the queen: ..., five linen garments, three hundred (shekels of) *takiltu*-wool ... linen garments, two hundred (shekels of) *hiliba*-stone, ... for a greeting gift for the queen”

³⁶ The evidence for dyed wools at Ugarit has been discussed by Goetze (1956); Landsberger (1967: 158–59); Dietrich and Oswald (1966); Van Soldt (1990); Dietrich (2010); Vita (2010) and Matoian and Juan-Pablo (2014). An overview of the syllabic texts containing references to *takiltu*-wool is given in Van Soldt (1990), 329–31 and 335–38. The alphabetic texts are given in 338–39.

³⁷ A gift of one hundred shekels worth of *takiltu*-wool is mentioned in RS 12.33. In RS 17.354, the queen is presented with three hundred shekels worth.

³⁸ This interpretation was proposed by Huehnergard (1989: 10). The list of wools appears on the reverse, whereas the obverse contains a list of minerals, including *mekku*-glass and alum. Exactly ten talents of each item are listed.

³⁹ Friedländer (1909). Far less dyestuff would have been required with the vat dyeing process, a development that is generally dated to the last centuries of the 2nd millennium BCE (James et al., 2011: 458; Cardon, 2007: 562). According to a more recent estimate, “it should be possible to produce uniform purple dyeings with a ratio of 1 g wool; 7 medium size snails; 70 mL alkaline solution.” (Koren, 2005: 142). According to this estimate, the 10 talents (300 kilograms) of wool would have required the 2 100 000 snails!

Among the several colored wools designated in this manner at Ugarit are “amethyst-wool” (**sig₂ za.gin₃ ḥašmānu**), “*ḥandalatu*-stone wool” (**sig₂ za.gin₃: ḥandalatu**), “*dupaššu*-stone wool” (**sig₂ za.gin₃: dupaššu**)⁴⁰ and “*ḥasertu*-wool” (**sig₂ za.gin₃: ḥasertu**). The glosses indicate that *ḥandalatu*, *dupaššu* and *ḥasertu* are qualifying the concept **sig₂ za.gin₃**. Given that **sig₂ za.gin₃** on its own refers to *uqnû/uqnātu*⁴¹ “lapis lazuli (blue)-wool,” probably dyed with woad, it is reasonable to suppose that these terms refer to three distinct colors achieved by dyeing with woad.⁴² Alternatively, the blue-based **za.gin₃**-wool could also have been double dyed in the manner described in the Sippar Dye Text and in the Leyden and Stockholm Papyri (below, Section 3). The common dyes for *takiltu* and *ḥašmānu*-wool at Ugarit were probably plant-based. The extremely low price of *takiltu*-wool, one talent (28.2 kilograms) for five and one third shekels of silver, given in one text confirms this supposition.⁴³

By contrast to blue-purple *takiltu*-wool, red-purple colored *argamannu*-wool is attested less frequently in the written sources from the second millennium BCE. It is missing in the El-Amarna letters and in the archives from Nuzi and Ugarit.⁴⁴ In the following rare reference to *argamannu*-wool from Assyria, the material seems comparable to and yet distinct from *tabarru*, i. e. madder-red wool, in color and/or quality:

1 ma.na sig₂ za.gin₃.gi₆ ša ša₃.uru 1 ma.na sig₂ za.gin₃.sa₅ ki-i-mu-ú ta-bar-ri ša ana 1 tug₂ lu-bâr² (VAS 19 24: 8')

“One mina of *takiltu*-wool from Ashur, one mina of *argamannu*-wool instead of the *tabarru* (-wool) for one *lubāru*-garment.”

Perhaps the irregularity of textual attestations to **sig₂ argamannu** is to be explained by the fact that local terms were employed to describe reddish shades of purple wool. It is possible, for instance, that the Hurrian word *kinahḫu* served to designate reddish-purple wool at Nuzi.⁴⁵ In records from the first millennium on the other hand, *argamannu*-wool is cited frequently. In Assyrian royal inscriptions, for example, it is often listed as an item of tribute or booty alongside precious materials, such as elephant hides, ivory, linen garments, aromatics, expensive

⁴⁰ RS 19: 20.

⁴¹ **Sig₂ za.gin₃.na/meš** = *uqnātu* (Huehnergard, 1989: 72–73, nn. 161 and 412).

⁴² On this, Landsberger noted, “Die Lesung von ugaritisch Akkadisch SĜ.ZA.GÎN *ta-kil-tum* als *uqnû takiltu* ist unbewiesen und unwahrscheinlich, selbst wenn sie bewiesen wäre, sagte sie für das nicht provinzielle Akkadisch nicht das Mindeste aus.” (1967: 157 n. 96).

⁴³ KTU 4.341: 3 f. (= RS 18.28).

⁴⁴ The only exception known to me is the **sig₂ za.gin₃.sa₅** in RS 16.259.

⁴⁵ This term is frequently attested as a color of textiles and wool at Nuzi but nowhere else. Abrahami considers this a shade of red that is distinct from *tabarru* (2014: 295 and n. 95).

wood (boxwood, ebony) and metals (bronze, tin).⁴⁶ Nothing aside from its obvious value, which can be surmised from the fact that it is listed with other exotic and costly objects, suggests that the wool was dyed with genuine murex in this period.

Ḥašmānu

In Assyriological literature, the color⁴⁷ of *ḥašmānu*-wool has been variously identified as blue,⁴⁸ blue-green,⁴⁹ “apple-colored”⁵⁰ and “glowing charcoal-colored.”⁵¹ Since Benno Landsberger’s (1967) seminal treatment of Akkadian and Sumerian color words and the publications of the Akkadian dictionaries, however, compelling new evidence has surfaced that points to this popular wool being a shade of reddish purple.

In Akkadian, *ḥašmānu*, Sumerian ^{na4}**sag.gil.mud**,⁵² is a stone that lends its name to a particular shade of dyed wool and leather. Because the relevant

⁴⁶ For instance, see: Tukulti-Ninurta II (RIMA 2: 175, 176 (Text 5: 72, 99)), where one talent (30 kilograms) of *takiltu*-wool (**sig₂ za.gin₃.gi₆**) is mentioned. Assurnasirpal II mentions taking *takiltu* (**sig₂ za.gin₃.gi₆**) and *argamannu*-wool (**sig₂ za.gin₃.sa₃**) as booty (RIMA 2: 199, 200 (Text 1: 88, 97)). Shalmaneser III (858–824 BCE) extracted 20 talents (600 kilograms) of *argamannu*-wool from the king of Patina (RIMA 3 18). Tiglath-Pileser III (RINAP 12 1'; RINAP 15 3) and Sennacherib (RINAP 004: 56) also mention purple wool as booty.

⁴⁷ Durand has also put forward another possibility. As it frequently appears in connection with belts and shoes, he proposed that the term *ḥašmānu* might not refer primarily to a color, but rather to a certain treatment of the fabric, to make stronger: “(un) tissu renforcé et protégé contre une usure trop rapide.” Durand’s suggestion is difficult to accept in light of the fact that *ḥašmānu* appears with other colored wools in the Sippar Dye Text, discussed in section III below (2009: 172).

⁴⁸ This is based on the CAD’s identification of the stone as azure because of it is said to make up the “middle sky” of the world in the mystical text KAR 307:31: “The identification of *ḥašmānu*-stone with azure *saggilmud*-stone establishes its color as bluish, while its connection with apple-colored wool indicates a greenish hue” (CAD H 142). AHw I 334: “ein bläulicher Stein.”

⁴⁹ Akkadian *ḥašmānu* appears in Ugaritic texts as *ḫm* “charcoal.” Based on the evidence of a Greek papyrus that reports on how to prepare woad dye, in which the term *anthrax* is both “charcoal” and “woad,” Dalley proposed that *ḥašmānu* might be blue/green-colored wool dyed with woad (1991: 124).

⁵⁰ Landsberger demonstrated that a connection between three terms for “apple-colored,” *ḥašmānu*, *ḥašḫūru* and *urūtu* was made in the lexical literature, though he cautiously did not propose color values for these terms (1967: 172–73). Payne (2008) has shown convincingly that at least in the first millennium BCE, “apple-colored” denoted a shade of red.

⁵¹ Van Soldt concluded that this probably indicated a reddish color (1990: 341–42).

⁵² This is based on the following pairings in the lexical literature:

^{na4}**sag.gil.mud**: [*ḥaš-ma-nu*] (Hh XVI 329 [MSL 10, p. 13]).

^{na4}**sag.gil.mud**: *ḥaš-ma-[nu]*: *sag-gi-li-mud* (Hg to Hh XVI 113 [MSL 10, p. 33]).

entries in the Mesopotamian stone and plant lists are badly preserved, it is not possible to determine the identity of *ḥašmānu*-stone and thereby its color based on the lexical literature alone.⁵³ Jeremy Black's (2001) proposal to identify *ḥašmānu* as amethyst is based on the assumption that the phonetic similarity between Akkadian *ḥašmānu* and Egyptian *ḥsmn* represents an etymological link.⁵⁴ Further evidence supporting the claim that *ḥašmānu* is a shade of purple can be found in the texts from Ugarit. There, *ḥašmānu*-wool is designated with the word sign for lapis lazuli, as **sig₂ za.gin₃** *ḥašmāni*, in the same manner as *takiltu*-purple wool. The Ugaritic word for the same wool, *pḥm*, is a cognate of Akkadian *pemtu* "(glowing) charcoal,"⁵⁵ an indicator that **sig₂** *ḥašmānu* was closer to a reddish rather than bluish shade of purple. In brief, *ḥašmānu*-wool is the earliest purple wool attested in the written sources of ancient Mesopotamia and Syria and, as we shall see, it was never produced with the dye of the murex snail.

The earliest textual attestations for **sig₂** *ḥašmānu* date to the eighteenth century BCE. In the records from the Syrian kingdom of Mari (Tell Harīri) *ḥašmānu*-wool is associated with the verb "to dye" (*ṣarāpu*) and it appears together with other dyed red wools such as *tabarru* and *ḥašḥūru*, clear evidence that the color of this wool was achieved artificially. Leather is also designated as *ḥašmānu*-colored at Mari. There is, nonetheless, no explicit reference to either the color or the dye source for this wool and leather within the Mari corpus. The type of textile items generally produced with *ḥašmānu*-wool and the fact that a shawl of second quality (**us₂**) was reused to make a *ḥašmānu*-colored cloak in the receipt quoted below suggests that this was not considered a luxury good in the early second millennium:

53 *Ḥašmānu*-stone is mentioned in the stone list *Abnu šikinšu* 88 (Schuster-Brandis, 2008: 30) and in the stone section of the plant list *Uruanna* III 169 (MSL 10, p. 70): **na4gar-šú gin₇ [] 'x¹ 'x¹ ni [n]^{a4} sag.gi[l].mud mu.[ni]** "The stone whose appearance is like ... its name is *saggil-mud*-stone."

54 Harris and Sadek demonstrated that Egyptian *ḥsmn* was amethyst based on the evidence of Middle Kingdom inscriptions found in the Wadi el Hudi region, situated in the southern part of the Arabo-Nubian massif, that refer to mining operations for this substance. Since the Wadi el-Hudi is known only for yielding amethyst, it seems very likely that in Middle Egyptian the term *ḥsmn* was indeed this precious stone (Harris, 1961: 121–22). As with the textual attestations, the archaeological evidence for amethyst in Egypt is mainly from the Middle Kingdom period (c. 2000–1700 BCE).

55 (Goetze, 1956; Dietrich and Oswald, 1966; Van Soldt, 1990).

1 ^{tug²}ú-ṭub-lu **us₂**(sic) 1 ^{tug²}ú-ṭub-lu **us₂** a-na še-er-ṭi ša **gu₂.e₃.a** ša a-na ḥa-aš-ma-nim iṣ-ša-ar-pa a-ḥ[u]-wa-qar am-ḥu-ur 1 ^{tug²}ú-ṭub-lu **us₂** a-na še-er-ṭi ša 4 **gu₂.e₃.a** ša a-na ta-nu-ba-tim iṣ-ša-ar-pa na-bi-ì-lì am-ḥu-ur (ARM 21: 354 1–15)

“I received from Aḥu-waqar two *uṭuplu*-shawls of ‘second quality’: for (tearing into) strips to be used for a *naḥlaptu*-cloak (that is) dyed *ḥašmānu*-(color). I received from Nābi-ilī one *uṭuplu*-shawl of ‘second quality’: for (tearing into) strips to be used for four *naḥlaptu*-cloaks (that are) dyed *tanubātum*-(color).”

In a mass order for textiles from the same city, a hundred *ḥašmānu*-colored *naḥlaptu*-cloaks are mentioned alongside two hundred cloaks of madder-dyed wool (*tabarru*), one hundred of apple-wool (*ḥašḫūru*), one hundred of (un-dyed) light wool and one hundred of (un-dyed) dark-wool.⁵⁶ The relative quantities indicate once again that *ḥašmānu* textiles were as commonly available as madder-dyed and un-dyed woolen garments. It is alluded to at the end of the letter that the textiles were for a religious ceremony. Unlike certain other imported dyed wools, *ḥašmānu*-purple wool was locally manufactured at Mari.⁵⁷ As already noted, *ḥašmānu* also describes the color of certain leather products such as belts⁵⁸ and shoes.⁵⁹ In the following case, where two minas of glue- or gum-based paint (**še.gin₇**, *šimtu*) are used to color (*šarāpu*) a belt, it is unclear if the dye or a pigment was used (ARM 21: 305 1–6):

1/2 **ma.na** **še.gin₇** a-na ša-ra-ap 2 pa-ti-in-ni ša ḥa-aš-ma-nim **šu.ti.a** a-bi-sa-ma-[à]s
“Abi-samas received half a mina of paint (lit. glue) to color two *patinnu*-belts *ḥašmānu* (colored).”

56 Extract from a letter dating to the reign of Zimri-Lim (ARM 18: 11 5–10):

2 **me gu₂.e₃.a** ša tá-ba-ri-im

1 **me gu₂.e₃.a** ḥa-a[š-m]a-nim

1 **me gu₂.e₃.a** s[u₁₃.a]

1 **me {x}** **gu₂.e₃.a** gí₆

ù 1 **me gu₂.e₃.a** šī-ri-ip [t]a*-[nu]*-ba*-ti[m*] ḥa-aš-ḥu-ri-im

“Two hundred *tabarru*-(colored) *naḥlaptum*-garments, one hundred *ḥašmānu*-(colored) *naḥlaptum*-garments, one hundred (un-dyed) light *naḥlaptum*-garments, one hundred (un-dyed) dark *naḥlaptum*-garments, and one hundred *ḥašḫūru*-(colored) *naḥlaptum*-garments.”

The word *tanubātum*, attested elsewhere as a dye (e.g. ARM 21: 354: 12) has been replaced by *ḥašḫūrum* in the last line.

57 This is implied in ARM 18: 13, in which the letter writer says, “as soon as you receive this letter ... have (two *patinnu*-belts of *ḥašmānu* color) made and sent to me.”

58 ARM 22: 314 obv. 2: two *patinnu*-belts of *ḥašmānu*-leather; ARM 21: 365 8–9: two *patinnu*-belts and two *kabālu*-shoes of *ḥašmānu*-leather. Likewise in the inventory of textiles and garments ARM 24: 277 rev. 37, *ḥašmānu*-colored *kabālu*-shoes are listed with *duḫšu*-colored *patinnu*-belts.

59 M.12189 rev. 22 (ARM 30, 299–300): this inventory of king’s wardrobe includes shoes (*kabālu*) made with *ḥašmānu*-colored wool or leather. M.12668 (ARM 32, 433–49) is a similar inventory, again with the *ḥašmānu*-colored leather belts and shoes.

Ḥašmānu is infrequently attested as a dyed wool color at Nuzi (Abrahami 2014: 294–299). It was used to make multicolored trims with other dyed wools:

17 **tug₂.meš** ša *ḥa-aš-ma-nu* ša [b]i-ir-[mu] 10 (erasure) **tug₂.meš** ša *du-uḥ-ši-wa* [ša] bi-i[r-mu] [x] + 1 **tug₂.meš** ša *ta-wa-ar-ri-wa* ša [b]i-ir-[mu] [x] + 1 *ta-pa-lu ḥul-la-an-nu* ša *ḥa-aš-[ma-ni]* ... [x] + 1 **tug₂.meš** ša *ḥa-aš-ma-[n]u-uḥ-ḥé-na te-g[i-be]* (HSS 13: 431 49–56)⁶⁰

“Seventeen garments with multicolored trims of *ḥašmānu*-(colored) wool, ten garments with multicolored trims of *duḥṣu*-(colored) wool, x garments with multicolored trims of *tabarru*-(colored) wool ... x number of *ḥašmānu*-(colored) *tegibe*-sashes.”

The only attestation of *ḥašmānu*-colored wool from Assyria in the second millennium is from a letter in the private archive of Bābu-aḥa-iddina, the son of Ibašši-ilī, a high official (the *sukkalmahḥu*) for some forty years in the city of Assur during the reigns of Adad-nirāri I (1307–1275 BCE), Shalmaneser I (1274–1245 BCE) and Tukulti-Ninurta I (1243–1207 BCE).⁶¹ His household produced and stored textiles on a large scale, which explains the sizable quantity—20 minas of *ḥašmānu* and 25 minas of *tabarru*—of dyed wool mentioned. This information is consistent with the idea that while *ḥašmānu*-colored wool, like all dyed fabrics, was in demand, it was produced and circulated in quantities comparable to wools colored with locally available plant dyes. At Ugarit likewise, the massive quantities of *ḥašmānu*-wool mentioned make it unlikely that this was an overly expensive fabric.⁶² At ± 4 shekels of silver for one talent (28.2 kilograms), the price of *ḥašmānu*-wool was more or less comparable to that of *takiltu*-wool at Ugarit (KTU 4.132: 1–5).⁶³ It becomes clear that neither *ḥašmānu*-wool nor *takiltu*-wool (Ugaritic *iqnu*) could have been dyed with murex in these cases when we consider that the price of one talent of raw wool ranged between two and seven shekels, depending

⁶⁰ See also HSS 15: 168a rev. 22, where it appears with *tabarru*-colored wool.

⁶¹ KAV 99: 43–45 was discussed by Landsberger (1967: 161) and recently by Postgate (2014: 413):

25 **ma.na** *ta-bar-[r]i-ba* ša **dir** 20 **ma.na** *ḥa-ál[š-m]a-na ul-te-bi-la-ku-nu*

“I am delivering to you twenty-five minas of *tabarru*-(colored) wool of ‘exceedingly (good) quality’ ... and twenty minas of *ḥašmānu*-(colored) wool.”

⁶² For instance, ten talents are mentioned in RS 34.180, 4 (Van Soldt, 1990: 338).

⁶³ Van Soldt, 1990: 345 and Stieglitz, 1979: 19. The prices for *takiltu* and *argamannu*-wool in the Neo-Babylonian period are much higher, ranging between 6.22 and 10.31 shekels of silver per mina of *takiltu*-wool and 12 and 15 shekels per mina of *argamannu*-wool. Given the price as well as the fact that the wool was destined for the cult in these cases, it seems reasonable to assume that genuine murex-dyed wool is meant in these cases. The price of *argamannu*-wool is mentioned in BIN 1, 4 (538–530 BCE), CT 55, 360 and CT 55, 862 (548 BCE). The price of *takiltu*-wool is mentioned in YOS 17, 210 (583 BCE); VS 20, 15; NCBT 758; YOS 19, 218; GCCI 1, 382; Nbn 1101 (555–539 BCE); YOS 6, 168 (550 BCE); CT 55, 868 (549 BCE). The texts and prices have been discussed by Payne (2007: 139) and Quillien (2015: 117).

on quality and type (Stieglitz 1979: 19). Un-dyed woven wool (Ugaritic *š'rt štt*) cost five shekels per talent (Stieglitz 1979: 19).⁶⁴ The association of the various shades of purple-colored wool with alum in the following text also speaks against it being colored with shellfish purple because murex does not require a mordant:

a-ma-tum an-ni-tam gašan-ia li-iš-mi sig₂ za.gin₃ haš-ma-mi sig₂ za.gin₃: ha-an-da-la-ti ù sig₂ za.gin₃: du-pa-aš-ši ù^{na4} ga-bi ma-'a-di-iš gašan-ia li-še-bi-la (RS 20.19: 8–13; Ugaritica 5: 48 135–36)

“May my mistress hear this: may my lady send me *uqnātu* (colored) wool of *hašmānu*, *handalatu* and *dupaššu* shades (?) and alum in large quantities.”

One thing is clear: distinguishing among the various shades of blue and purple wools was clearly important in the Bronze Age Near East. The various qualifications of *uqnātu* (**sig₂ za.gin₃**)-wool at Ugarit—*takiltu*, *hašmānu*, *handalatu* and *dupaššu*—recall the following passage in Pliny the Elder, in which he too is most conscientious in discussing the various shades of purple dyes:

I observe that these are the three principal colours: red, as in the coccum [the kermes-insect], which ranges in colour from the elegant grace of dark rose into Tyrian purple, to double-dyed purple, and to Laconian purple, if looked up at [in the light]; the colour of amethyst, which ranges from violet into purple, and which I have labelled ianthinum [violet-blue] ... The third colour strictly belongs to the purple of the murex [cochylum], with many shades: one in the colour of heliotrope, in some cases light, but usually a darker shade; another in the colour of mallow, tending towards purple; another in the colour of late violet, the most lively of the murex shades. (*Natural History* 21: 45–46; Humphrey et al. 1998: 359).

3 Purple dyestuff

Dyed cloth is mostly described by color in Akkadian sources. As observed above, while the written sources from the second millennium frequently allude to the raw materials required for dyeing wool red, similar information is scarce in the case of purple wool. One reason for this might be that the genuine purple wool was imported into Mesopotamia from the West.⁶⁵

⁶⁴ Other data concerning the price of *hašmānu*-wool quoted by Stieglitz includes the following: The price of a linen garment plus 2500 shekels of *hašmānu* = *phm*-wool cost 1 1/2 shekels; the cost of a Tyrian linen garment with a quantity of *hašmānu* = *phm*-wool cost 2 shekels (Stieglitz, 1979: 19).

⁶⁵ This is assumed because, as discussed, the archaeological evidence lies to the West, along the Levantine coast. Abrahams notes, “There is no indication of the origin of the coloured wool

According to Pliny the shade known as “amethyst purple” was obtained in Roman times through shellfish dyeing. Pliny claims that 68.4 kilograms of *bucinum* (perhaps a variety of the murex *H. trunculus*) and 35.6 kilograms of *pelagia* (the murex *B. brandaris*) were necessary to produce this remarkable color (*Natural History* 9: 133–134). In the Bronze Age Near East, however, it appears that Akkadian “amethyst purple” = *ḥašmānu*-wool, was dyed with vegetal matter. Two plants, *urṭū* and *ḥizarību*, are associated with *ḥašmānu* in the Mesopotamian lexical literature.⁶⁶ Small quantities of each substance are likewise mentioned in a receipt for colored textiles from Nuzi (c.fourteenth century BCE), confirming that they were indeed employed as dyeing agents in the second millennium:

and the dyeing product in these [i. e. the Nuzi] documents. It is probably that some of these products came from the Levant as suggests by AASOR 16 77 which mention cedar wood among the products that Ili-ittiya is expected to bring back to the palace. But it should be kept in mind that dyeing could be performed locally with vegetal dyes. This is clearly suggested for instance by CT 51 12 (2.5.1 g), JEN 125 (2.5.1e) and HSS 13: 302 (2.5.2) which shows that dyes are available for use in various household which therefore could produce their own dyed wool” (2014: 299). Recent excavations at the site of Khor Ile-Sud in Qatar reveal that the Gulf region may have supplied Mesopotamia with murex dye. In Level III of the site, a midden containing some 2.9 million individual mollusk shells has been excavated (Edens, 1999: 71–79). Exclusively of the *Th. savignyi* species, these shells had been crushed in a homogeneous manner. The enormous quantity and crushed state of the shellfish strongly hint at a connection to the murex dyeing industry. *Th. savignyi* contains a predominance of 6–6’ dibromindigotin, which yields a red-purple hued dye. The shellfish finds have been dated by the excavators to Late Kassite Babylonia (c.13th-twelfth century BCE) based on pottery typology.

Aside from private and institutional commercial ventures, tribute and gift exchanges also facilitated the movement of dyed wools in the Bronze Age. It is highly unlikely that purple dyes were imported in raw form and subsequently used for dyeing in Mesopotamia proper since it is difficult to preserve the colorant for such an extended period of time. As for the first millennium, the archaeological evidence suggests that Tyre and Sidon were large production centers. The written evidence for the flow of purple into Mesopotamia has been discussed by Dalley (1991: 124), who notes that the Phoenician city-state of Arvad was an important source of *takiltu* and *argamannu*-wool for the Assyrians, and Quillien (2015). It seems that between the 9th and seventh centuries, the Assyrians acquired large quantities of purple wool as tribute from Phoenecian cities, especially Tyre, Biblos, Arvad, and the city of Patinna, situated on the mouth of the Orontes, although the commodity was also moved along independent trade networks operated by Arab merchants. The Babylonian temples and palaces were the largest markets for wools after the fall of the Assyrian Empire, in the seventh century; these institutions financed and facilitated long distance trade with merchants (Quillien, 2015: 110–13).

66 In *Malku*: *šarru* (VI 179–87) and the Practical Vocabulary of Assur, where the *urṭū*-plant is associated with *ḥašmānu* and two other wools: “apple wool” (**sig₂** **giš.ḥašḥur**) and **sig₂** **ḥinziribu** (207–09). Landsberger considered *inzurātu*-dye as distinct from (*h*)*inzuribu*-dye, since they are mentioned as distinct entries in the Practical Vocabulary of Assur, entries 205 and 209 (1967: 156).

26 **gin₂** še-le-en šu-ú-ru⁶⁷ ʾ12ʾ g[in₂] [š]u-ú-ru ur-ʾa¹-a-i-ú2 ù ħi-in-zu-ur-ri-wa 25 **gin₂ ku₃**,
babbar ta-bar-ʾru¹ ù ki-na-aḥ-ḥu (HSS 15: 223 obv.1–7)

“Twenty-six shekels (worth of) ... twelve shekels (worth of) *šūru*-, *urṭu*- and *ḥinzūru*-(plant) dyes. Twenty-five shekels of silver (worth of) *tabarru*-(wool) and *kinahḫu*-(wool).”

Their association with the most common type of red wool in Mesopotamia, *tabarru*, further suggests that *urṭū* and *ḥinzurību*⁶⁸ were available locally. The identity of the *urṭū* plant is unknown. It features in medical prescriptions⁶⁹ and its appearance is alluded to in a medical commentary in the following manner: “The *urṭū* plant is like a tamarisk but red” (BRM 4: 32 10).⁷⁰ *Ḥinzirību* is thought to be related to West Semitic words for “apple” with the Hurrian suffix *-ibbe/-iwwe* attached to it.⁷¹ Such an accord would explain the equation of *ḥinzirību* with the Akkadian word for “apple,” *ḥašḫūru*, in the Synonym List *Malku*: *šarru*. An unidentified dyestuff called *tanubātum* is mentioned at Mari alongside *ḥašmānu*-colored wool (ARM 21: 354). Pomegranate (*Punica granatum* L.), a popular dyestuff in several Mediterranean civilizations, is also mentioned in a text from Mari: 20 liters (2 *sutu*) of pomegranate (*nurmū*) are cited in combination with 3 liters (3 *qa*) of madder for the production of half a mina (250 grams) of *šutū*-quality wool (ARM 21: 316). It is mainly the rinds of dried, ripe fruit that are utilized for dyeing, although the roots, branches and bark of the pomegranate shrub may also be harvested for the purpose (Cardon 2007: 481). With alum as a mordant, pomegranate-dye would imbue wool with a rich, golden yellow color, whereas with iron, shades of grey or black could be achieved (*ibid.* 483). Since iron is not attested as a mordant at Mari, we can only guess that the madder and pomegranate-dyed wool was fixed with alum, to produce a bright, orange-colored fabric.

⁶⁷ A herb, according to Haas (2003: 282). *Šūru* is a common fabric color in the Old Assyrian corpus and a dye attested twice in the Nuzi corpus (HSS 14: 253 and 15: 223). It might be an extract from the *urṭū*-plant or the *ḥenzūru*-tree (HSS 15: 223 1 f.) Michel and Veenhof suggest that this might refer to a black/grey color on the basis of the etymological comparison to Hebrew (2010: 244).

⁶⁸ The local Hurrian spelling takes a *w* instead of *b*.

⁶⁹ For instance, a salve is created by crushing the plant and mixing it with river water in two medical omens (Heeßel, 2000: 327 lines 81'–82' and 85'–86'). The name of the plant is written with the KINDA sign, which is interchangeable with KINDA₂ in the first millennium. In BM 56,605: rev. 35–37, a parallel to the omen in lines 81'–82', the plant is spelled with the KINDA₂ sign (Heeßel, 2000: 337).

⁷⁰ ⁶kinda₂ ki-ma šinīg u sa₃.

⁷¹ Aramaic *ḥazzōrā* “apple-(tree), Syriac *ḥazzūrā*. Gelb concluded, “It is possible that *ḥašḫuru* and *ḥenzuru* are not synonyms, but one and the same word, with the latter form borrowed from Hurrian” (Gelb, 1982: 79 and references therein).

A recipe for producing ‘false purple’ with a decoction of pomegranate blossoms, alum, lichen purple and orchil appears in the Stockholm Papyri (no. 95).

Several other plants native to the Middle East could have been used for dyeing cloth purple in ancient times. The root of alkanet or dyer’s bugloss (*Alkanna tinctoria*), for instance, contains alkannin, a purple-red colorant that could be used for dyeing cloth in a range of colors from lilac to violet to grey and grey-violet, depending on the mordant used (Cardon 2007: 62). Alkanet grows wild in most of the Middle East; the variety found in Anatolia, the Syrian Desert and northern Iraq is known as *A. hirsutissima* in scientific literature (Cardon 2007: 60–61). Alkanet is mentioned in the Leiden Papyrus X (recipes 96–100) as a substitute for true shellfish purple, although no Bronze Age textile dyed with alkanet has been recovered. In the recipe quoted here, the wool is first treated in alkaline water and the alkannin colorant in the plant is dissolved in acid:

P.Leid X no. 96 “Dyeing with Purple”:

Wet lime with water and let it stand for one night; having decanted, place the wool into the liquid for one day. Take it out and dry it. And after wetting alkanet with vinegar, put it to boil and throw in the wool; it will come out dyed purple. Boiling in water and natron releases the purple colour. Then dry the wool and dye it further in the following manner: boil seaweed with water and when it has been exhausted, throw in a bit of copperas [green vitriol] by the judgement of your eye to develop the purple, and then dip the wool and it will be dyed. If you add too much copperas, it will become darker. (Humphrey et al. 1998: 362)

It is also possible to obtain purple with woad. Two species of this plant, *Indigofera spp.* and *Isatis spp.*, are native to the Middle East, and were very probably exploited by the ancient Mesopotamians. A range of greens, blues and violets could be obtained from the indigotin-containing leaves of the woad plant (Cardon 2007: 373–374). In light of its use as a dye and herb for ointments in cuneiform sources, it is tempting to identify the so-called “lapis lazuli plant” (**u₂ za.gin₃.na**, *šammi uqnâti*) as woad.⁷² The archaeological evidence for woad-dyed fabrics from the Bronze Age Near East is scant but suggestive. Light and dark blue wool dyed with the colorant indigotin derived from the woad plant was reported among the finds from the tomb of Tutankhamun (Vogelsang-Eastwood 1985: 194–95).⁷³ The fragments of high-quality blue wool dating

⁷² This idea was first proposed by Thompson 1949: 171–71. The CAD states that it is “Probably to be identified with woad ... and the indigo pigment produced from it” (CAD U 195). Dietrich and Loretz were of the same opinion (1966: 227 ff.) and generally in scholarly literature since. Landsberger claimed that *uqnâtu*-wool was not dyed with murex: “SÍG.ZA.GÍN.NA = *uqnâtu* hat nichts mit Purpur zu tun” but only hinted that it might have been dyed with woad (1967: 163).

⁷³ The analysis of the fibers was conducted by Germer (1992: 65–66). Concerning the source of the indigotin, Vogelsang-Eastwood writes, “At present it is impossible to determine exactly the

between the 13th and tenth centuries BCE recovered at a copper smelting site in the Timna Valley in Israel were also probably dyed with woad (Sukenik et al. 2017).⁷⁴ Analysis of Coptic textiles indicates that shades of violet were produced with idigotin, again most likely from the woad plant, together with madder red (Cardon 2007: 62). This combination of dyestuff corresponds to the recipe given for *takiltu*-wool in the Babylonian dye recipe and the Middle Assyrian text (A.305) discussed below.

Takiltu and *argamannu* purple wools, by contrast to *ḥašmānu*-wool, are not associated with any dye source in either the lexical literature or the administrative documents from the second millennium, perhaps an indication that this information was not known in Mesopotamia. In one Middle Assyrian text, a large quantity of madder (*ḥurātu*) and alum (*gabū*) appear as raw materials in connection with a *takiltu*-colored royal throne cover of some sort:

1 *ma-ri-nu ša ta-kil-te* 'ša' **giš.gu.za** *ša lugal* 14 1/3 **ma.na ki.la₂** 14 **ma.na** *ḥu-ru-tu* 4 2/3 **ma.na ku₃.babbar** [...] *ša e₂.gal-lī* [ša] šu ^{md}*na-bi-um-en.pap* [lu₂].*agrig* [ša u]gu ^{md}*utu-am-ra-ni* [...] [ša] *e₂.gal-lī* 1 *ma-ri-ni* 'ša' **giš.gu.za** *ša lugal a-na ša-ra-pi ta-ad-na-āš-šu iti a-bu-lugal.meš ud.14.kām* li-mu ^m*mu-šal-lim-d_rim* ^d**dumu** ^{<m>d}*silim-ma-nu-ur.sag* (A.305; Donbaz 1988: 72)

"One *marīnu* of *takiltu*-(wool) for the king's throne. (Its) weight is fourteen and one third minas. Fourteen minas of madder (for) four and two third shekels of silver ... belonging to the palace, from the hand of Nabû-bēla-ušur, the *abaraku*-official, ... the responsibility of Šamaš-amranni ... [of] the palace. One *marīnu* for the king's throne, given for dyeing. Month of Abu-šarrāne, fourteenth day, eponym of Mušallim-^rAdad,¹ son of Šulmānu-qarrād."

origin of the dyestuff, but written sources suggest that it may well be woad rather than indigo." (2000: 278). Another possible source for blue colorant in Egypt was the seeds and pods of the sunt plant (*Acacia nilotica*) (*ibid.* 279).

74 Red and blue colored woolen textile remains were found during the 2013–2014 excavation season at Timna. Analysis revealed that the fleece was dyed with vegetal matter, namely madder and an indigotin-containing plant, prior to being spun. As no traces of either monobromoindigotin or dibromoindigotin were detected, it is quite certain that molluscan purple was not used to color the samples that were tested. Interestingly, a species of madder that was capable of producing a rich red color (*Rubia tinctorum* L.) was chosen for the Timna textiles over the locally available species (*Rubia tenuifolia* L.), which yields duller, brownish shades. The blue dye was likewise sourced from a non-native species of woad (probably *Isatis tinctoria* L.). Hence, it seems that the Timna textiles were produced and dyed elsewhere and only reached the site by long-distance trade (Sukenik et al., 2017). Unfortunately, the colors of textiles found at many other Iron Age sites, including at Kadesh Barnea, Tel Deir Alla (central Jordan Valley) and Khirbat al-Mudayna (southern Transjordan), are not preserved due to their carbonized state (see Sukenik et al., 2017: nos. 66–68).

If indeed the madder and alum mentioned here were actually used for “dyeing” (*ana šarāpu*) the purple fabric, this text is the only reference to both substances being employed in such a way. The earliest attested plant dye in cuneiform sources, madder is known to provide a wide array of colors in the brown (in combination with tannins), red, orange and pink ranges, depending on the variety, provenance and age of the plant used, the concentration of the dye, the pH of the dye-bath and the mordant. Darker shades such as brown and black could be produced either in combination with tannins or with indigotin extracted from woad (Cardon 2007: 114–15 and literature therein). From the Bronze Age Near East, madder has been detected in textiles recovered from Deir el-Bahri (twenty-first century BCE) and El-Amarna (c.1350 BCE).⁷⁵ At Qatnā, the madder-dyed textiles were found in same context as the murex purple fragments. Physical evidence for madder-based violet, imitating true shellfish purple, is attested from among the pieces of textiles discovered at the Jewish fortress of Masada (AD 66–74).⁷⁶ Given its abbreviated nature, we cannot know if the dyer made use of other raw materials in addition to the madder and alum mentioned in the text under discussion here; another possibility is that the *marīnu*-fabric was in fact originally dyed with genuine murex and was being sent for a “touch-up” because its color had faded.

Information about dyed wools and the raw materials necessary for producing them is much more abundant in Akkadian texts from the first millennium BCE. Administrative records from temples in southern Mesopotamia, especially from the cities of Uruk and Sippar, are particularly rich.⁷⁷ Such details as the various dyestuff and mordants utilized to color red and purple wools, the sources of alum and purple wool, as well as the relative prices of dyed wools are given in these corpora. According the records at the Eanna temple at Uruk, *takiltu*-wool was imported from Ionia (Jamanu) or the western Euphrates (Ebir Nāri)⁷⁸ whereas alum came from Egypt and Kašappu.⁷⁹ The records also reveal it was common practice to use several types of dyes to color a wool designated by

⁷⁵ Germer, 1992: 79–80 and 68–70.

⁷⁶ Cardon, 2007: 115 and n. 21.

⁷⁷ See Payne 2007; 2008 for texts from the Eanna temple archives in Uruk and Zawadski 2006; 2013 for the Ebabbar temple archives in Sippar. Quillien is currently preparing the publication of her doctoral dissertation, “Les textiles en Mésopotamie, 750–500 av. J.-C., techniques de production, circuits d’échange et significations sociale,” defended at the University of Paris-Sorbonne.

⁷⁸ See YOS 17: 253 and YOS 7: 63 discussed by Payne (2007: 136 and nn. 240–241). Quillien (2015: 113) notes that it is also possible that these toponyms designate the quality of the product and not its actual origin.

⁷⁹ See GCCI 1: 327 and YOS 19: 287 discussed in Payne (2007: 136 and n. 242).

a single term. Thus, to take one example, madder (*ḥurātu*),⁸⁰ *inzaḥuretu*⁸¹ and *ḥaṭḥūru/ḥaṭḥūri/ētu*⁸² were routinely employed to produce the red wool known as *tabarru*.

Aside from the administrative records, another essential source for ancient dyeing practices is the so-called Sippar Dye Text (BM 62,788 + 82,979), which was discovered in the ancient city of Sippar, located some 30 kilometers southwest of Baghdad.⁸³ The reverse side of the tablet contains a list of prescriptive recipes for producing shades of red and purple wools utilizing plant-based colorants. The neo-Babylonian manuscript of this unique text may be a product of an older scribal tradition. Like the recipes found in the Leyden and Stockholm Papyri, it is supposed that the Sippar Dye Text offers inexpensive alternatives for achieving the appearance of high-demand fabrics that were traditionally colored with costly and locally unavailable dyes. Recipes for producing all the three shades of purple wool considered in the present study, *takiltu*, *argamannu* and *ḥašmānu*, are given there. The recipe for *ḥašmānu*-wool appears to head the text, although the passage is broken. A reconstruction based on structural parallels and what is known about *ḥašmānu*-wool from elsewhere suggests that the color of the wool was achieved by over dyeing mordanted blue wool with the crushed elements of a red dyestuff. The name of the dye is unfortunately not preserved but the fact that alum is required to fix the dye onto the wool suggests that a plant-based source was used (rev. 2–5).⁸⁴ The color of *takiltu*-wool is likewise achieved through a process of over dyeing, although in this case, the name of the red dyestuff, *ḥaṭḥurētu*, is preserved (rev. 6–8). Some scholars take *ḥaṭḥurētu* to be a variety of madder (*ḥurātu*)⁸⁵ while others relate it to the apple tree (^{giš}*ḥašḥūru*).⁸⁶ The recipe for *argamannu*-wool calls for the use of either the *kasû*-plant (rev. 9–10) or the aforementioned *ḥaṭḥūru* (rev. 11–13) with mordanted, un-dyed white wool.

80 BM 114,649, which dates to the 14th year of Nabonidus, specifies that twenty-five shekels of red thread were dyed with madder (*ḥurātu*, written **giš.ḥab**).

81 In GCCI 2: 105 it is noted that red wool for a certain textile is dyed with *inzaḥuretu* (**tug₂ mi-iḥ-šu sig₂ ḥe₂.me.da šá in-za-ḥu-ri-e-tu₄**). In GCCI 2: 121, we are told that *inzaḥuretu* dye was extracted from a plant of the same name (^ú*in-za-hu-ri-e-tú*).

82 In YBC 9030 (edited in Payne, 2008) the dye for red wool is specified as *ḥaṭḥurētu*.

83 Edition by Leichty (1979). Translation by Finkel (Finkel et al., 1999: 64–65) and reproduced in Reifarth and Elisabeth (2013: 34).

84 Based on the assumption that *ḥašmānu*-wool was blue-green in color, Finkel and Granger-Taylor assume that the missing dyestuff is pomegranate (Finkel et al., 1999). Over dyeing woad-blue wool with the yellow dye extracted from pomegranate would yield a greenish colored wool. Cardon's citation of the use of pomegranate for dyeing in Mesopotamia is based on this chain of reasoning (Cardon, 2007: 483).

85 Reifarth and Elisabeth, 2013: 34.

86 CAD H 149.

4 Conclusion

The present study of the terminology for purple wools in cuneiform documents has made it clear that we should be cautious in our approach to understanding the vocabulary relating to colored fabrics in Bronze Age Syria and Mesopotamia. Explicit mention of murex dye is non-existent in the written sources and only through context is it possible to infer when a reference to molluskan purple wool is made. The people of the ancient Near East themselves do not appear to have distinguished between genuine, animal-based, fake and plant-based purples in the names for colored fabrics.

It has been observed that the written sources from Ugarit offer particularly valuable insight into the wide range of colors achieved in wool through shellfish dyeing in the late Bronze Age. According to Dietrich (2010: 51), “The array of colors of wool dyed purple is quite broad and ranges from light (yellowy-green, bright red) to strong (fiery red) to dark (red-brown, blue-violet).” Such an interpretation of the wool terminology would perfectly complement the archaeological evidence for shellfish dyeing discovered at Minet el-Beida, the harbor of Ras-Shamra. However, as the present discussion has demonstrated, the extremely low prices given for *takiltu* and *ḥašmānu*-purple wool in texts from Ugarit—between four and five shekels of silver for one talent of wool in some cases—speaks against the idea that such wools were always dyed with genuine murex purple. Babylonian administrative documents from the first millennium indicate that no such one-to-one correlation between wool color and dye source existed and such a link should not be assumed for earlier periods either. In other words, the terms *takiltu*, *argamannu* and *ḥašmānu* do not refer to a specific technical process, shellfish dyeing or otherwise; nor do they refer to a particular quality or type of fabric. The rise in demand for expensive fabrics dyed with genuine purple in the late Bronze Age would have prompted craftsmen to look for inexpensive and less labor-intensive alternatives for this costly dye. Although they might not have been able to mimic exactly the vivid brightness characteristic of murex purple, locally available, colorfast, and relatively cheap vegetal dyes were undoubtedly used to dye wool purple in the late Bronze Age, concurrent and in parallel with the murex dyeing industry.

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