

# Verbal and Non-Verbal configurations of textiles: a diachronic study

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## 1. Introduction

This presentation examines the terminology of textiles from a linguistic and archaeological point of view, and endeavours to demonstrate how studies in the field of terminology may prove very useful to studies of ancient scripts and societies.

In the first part, we will present the methodology and give the main founding principles of terminology regarding concepts, concept structures and synonymic variation of this specific subject area. The second part of the presentation exemplifies the verbal and non-verbal representations of basic concepts in the field of textiles.

Words and semantic fields change according to languages, but also according to geography and chronology. Some textile terms have long lives and can be traced over wide geographical areas and through the millennia.<sup>4</sup> For example, the Greek word for a long shirt, *khiton*, attested in 2<sup>nd</sup> millennium Greek as (Linear B script) as *ki-to*, derives from the Semitic root *ktn*. The Akkadian term for linen is *kitûm* which is also found in the Old Assyrian textile term *kutānum*, though, it designates a fabric made of wool. The modern Arab (el cotton), Spanish (algodón) and English word for cotton have the same root. Another significant example is the Indo-European term for linen which is connected to Latin *linea*, the linen thread used for measuring. In some European languages, we see a shift from the flax-based textile linen, the Greek *linon*, to a modern meaning which has derived into the usage of linen in beddings and underwear (as in the French term *linge*) with a shift toward the meaning of white furnishings for the domestic sphere, today often made of cotton. The terminology of linen is also interesting since it has developed different terms for the plant and fibres, and for the textile products, respectively, at least in modern English and German: *flax* (Engl.) and *Flachs* (Germ.) for the plant, and *linen* (Engl.) and *Leinen* (Germ.) for the cloth, whereas in French *lin* is the term used for both the plant and the cloth. Parallel terms may reflect various end products such as linseed oil and textile fibres. Understanding of such phenomena in the past is only possible if we combine linguistic, archaeological and technical knowledge. When the textile terminological enquiries, technical analyses of tools, and archaeological textiles are woven together with the historical, ethnographical, and linguistic

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<sup>4</sup> Barber 1991. Michel & Nosch 2010.

knowledge and theoretical frameworks, the result yields not only stimulating perspectives but also new knowledge about textile terminologies and textile production in ancient societies.<sup>5</sup>

### 1.1. Terminology – the study of concepts

“Concepts are mental constructs, abstractions which can be used in classifying the individual objects of the inner and outer world.”<sup>6</sup>

One of the founding principles of terminology is that the study of concepts and concept structures or concept systems is essential. Any work concerning terminology is based on concepts and their delimitation.

Concepts are not independent phenomena. They are always related to other concepts in one way or another, and form concept systems which can vary from fairly simple to extremely complex. In work concerning terminology, an analysis of the relations between concepts and an arrangement of the concepts into concept systems, are prerequisites for the successful drafting of definitions.<sup>7</sup>

Moreover, concepts are made of what are called *notional elements*, also called *notional* or *conceptual characteristics*. In terminology theory, conceptual characteristics are regarded as the smallest elements of concepts which serve to identify these concepts and to distinguish them from each other. Conceptual characteristics, which can be considered concepts themselves, can be used for describing, classifying and defining concepts.

There are common and delimiting characteristics that correspond to the objects they describe.

### 1.2. Delimiting characteristics

There are usually a great number of characteristics in any concept. Many of these characteristics are so *common* or so *atypical* that they alone are not adequate for identifying a concept or differentiating it from other concepts (for example **CARDIGANS** and **BLANKETS** can be both be soft and white).<sup>8</sup> *Delimiting characteristics* are those *typical* or *relevant* characteristics which alone determine a concept, and differentiate it from other concepts. Therefore, only a small number of conceptual characteristics are usually selected and named in terms. Which characteristics are selected in a term changes from one culture to another and from one language to another, and one concept existing in one linguistic community may not exist at all or only partially in another linguistic community.<sup>9</sup>

## 2. Textile terminologies and technologies: a methodology

In the field of textile terminology, classifications, concept systems and term collections usually include first the fibres, and then the yarns and the structures such as weaving or knitting. As a large number of derivatives and variations from weaving can be created, it is almost impossible to find terms for each of them, and even more complicated to translate them from one language to another.<sup>10</sup> Part of the solution to this problem resides in the use of non-verbal representations.<sup>11</sup> This method, however, has disadvantages. The origin and use of a fabric cannot be represented easily by using graph components, but the characteristics of form, structure and colour can conveniently be represented graphically. This solution is employed today in the modern textile industry and trade, and was also

<sup>5</sup> Gillis & Nosch 2007. Breniquet 2008. Desrosiers 2010.

<sup>6</sup> *British Standard Recommendation for the Selection, Formation and Definition of terms*, BS 3669, 1963.

<sup>7</sup> As also shown in part 3 below, non verbal elements like drawings or formulas are also considered vital elements for the successful drafting of definitions.

<sup>8</sup> Weissenhofer 1995. Boisson 1996. Béjoint & Thoiron 1997.

<sup>9</sup> Dury 2008; 2009; Dury & Lervad 2008.

<sup>10</sup> Dury & Lervad 2010. CIETA 1997.

<sup>11</sup> Lervad 1999.

used in ancient societies, for example in the form of logograms in the Aegean syllabic and logogrammatic writing systems of the 2<sup>nd</sup> millennium BC such as the Linear B script.<sup>12</sup> Likewise, in Egyptian hieroglyphs, the “textile” category includes artefacts verbs, adjectives and also expressions, which today at least seem to have developed so far that they seem foreign to the concept of textiles.<sup>13</sup>

### 3. From fibers to structures

In the definition of the term *man-made fiber*, details are given on the most essential conceptual characteristics:

“*Staple fiber and filament of polymers produced by manufacturing processes*<sup>14</sup>”

In this case, the definition does not mention the term *man-made*, but it uses the term *manufacturing*. A number of other synonyms also correspond to these conceptual characteristics given in the definition above. This is the case for *manufactured fiber* which can also be directly derived from the definition and which is often understood as a short version of the definition. The terms *synthetic* and *artificial fiber* are often used as synonyms as well, which can sometimes prove problematic.

The next phase in textile production corresponds to the *construction* or the *structures*.

The examples chosen to illustrate synonymy in this case arise from weaving. Susanne Lervad inherited a background in weaving from her parents and grand-parents who produced looms for hand-weaving for a century. Furthermore, she studied silk fabric, notably in Lyon, France where the collections of these textiles and the documentation are very rich. The patterns of these silk fabrics and the terminology was described in her Ph.D. thesis and the experience in the trilingual terminology of fibers, threads and fabrics acquired while researching, has shown how non-verbal aspects can be used to describe concepts in fields such as textiles.<sup>15</sup>

#### 3.1. Non-verbal aspects

This work of terminology is both traditional, using primarily verbal definitions, and innovative in its aim to unify the definition and the designation. The innovative nature of this work is that it shows that representing a concept using an illustration can unify the designation and description of this concept. To put it another way, what is traditionally identified as a designation (most commonly a term), and the concept descriptions (definition) disappear in some of the examples studied. Representing textile concepts in a “multimodal” manner therefore seems to be a constructive and useful approach. Discrepancies between definition and designation vanish when conceptually united.

There are several methods/types of illustrations used to represent a concept:<sup>16</sup>

- Symbols and numerical designations
- Pictograms
- Diagrams
- Line drawings / sketches.

In the field of textiles, representing a concept using an illustration is more universal than using a given language, but the effectiveness of these signs is dependent on a common understanding. Both the party who transmits and the party who receives the sign must share this understanding.

The diagrams below show how concepts in this field are represented in the terminology. The diagram also works as a step-by-step guide to producing fabric. We will also demonstrate the limits of

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<sup>12</sup> Del Freo, Nosch, Rougemont 2010.

<sup>13</sup> Herslund 2010.

<sup>14</sup> USTC-01-Nomenclature.

<sup>15</sup> Lervad 1991. See also Lervad 1998.

<sup>16</sup> Wüster 1984.

illustrations and non-verbal signs: it is clear that the image and text are complementary and the text dictates our conception of the image.

In the field of textiles, texts are particularly useful in explaining the characteristics which cannot be easily conveyed by means of an image – for example the softness of the fabric or other aspects requiring a verbal explanation. The examples below deal with the micro-structure of the fabric - the weave. The macro-structures (for example the design) are not dealt with here.

- **“Weave:** *System of interlacing the threads of warp and weft according to defined rules*<sup>17</sup>”.

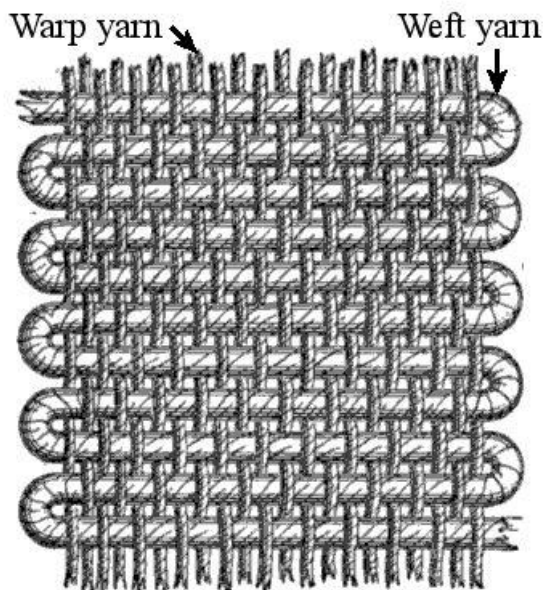
- **“Weave unit** - *The smallest cycle of interlacement of warp and weft that is constantly repeated in a weave or a binding system*<sup>18</sup>”.

- **“Binding system:** *System in accordance with which ends and picks are bound*<sup>19</sup>”.

The illustrations used may be representative images (photos, paintings, drawings) or abstract images (diagrams, line drawings, etc.). The degree of abstraction determines the function of the graphic components. The graphic components can explain or clarify verbal definitions, or function independently providing a full representation of the concept in question. In this case, the verbal component serves only to provide a complementary explanation.

The examples below show how the graphic components replace the verbal definitions in each case to a greater or lesser extent in each case. The diagrams represent the structure of the fabric.

In order to describe a fabric as a concept and its characteristics, one should always start at the most basic level i.e. the point at which two threads meet - the weave. The combination of basic weaves creates a wide variety of textures perfected in fabric production in French silk factories in Lyon. The weave can be represented using pictograms or diagrams of varying degrees of abstraction (see Figure one).



**Figure 1** - Plain weave

<sup>17</sup> Burnham, 1980, 179.

<sup>18</sup> *Ibid*, 179.

<sup>19</sup> *Ibid*, 6.

The first figure shows how a fabric is made up of vertical threads – the warp - and horizontal threads which cross over – the weft -. There are an extremely large number of ways of combining different types of crossovers. Figure one shows the simplest of these crossovers / weaves – plain weave. Another example is a diagram in binary form, the language of computers. Each thread has a numerical value of 0 or 1, *i.e.* one thread over or one thread under, which easily translates into the binary system. In his book (1982), Hugues deals with the common ground occupied by one of the most ancient crafts, weaving, and the modern world of computers:

*“Indeed, a piece of fabric is constructed from combinations based on binary code resulting from the structure of the weave (one thread over, one thread under), and computers function using combinations translated by a code consisting of a series of 1 or 0<sup>20</sup>”.*

This binary system in the form of punch cards was used very early in the French textile industry in the Jacquard weaving mechanism created in the *Croix Rousse* district of Lyon, France two hundred years ago, and which could be considered as one of the world's first computers.

The diagrams representing concepts are mainly about the weave – the smallest unit which is used to multiply and repeat structures in order to create the surface of the fabric. The examples below show the three basic weaves: *plain, twill and satin*.



**Figure 2** - Tabby/Plain weave

This weave is different from any other as the horizontal and vertical threads cross over alternately. This basic unit is made up of 2 x 2 threads.

The concept is designated by two terms in the literature, *plain weave* and *tabby*, but this does not cause any ambiguity.

*“Tabby: The binding system or weave based on a unit of two ends and two picks, in which each end passes over one and under one pick. The binding points are set over one end on successive picks<sup>21</sup>”.*

There is a large number of plain weave derivations such as *rib weave / rep weave* and *panama /hopsack weave*. These are difficult to designate and describe in words and terms; they require a very large amount of wordings in order to grasp their exact meanings and technical differences. However, they are very easy to illustrate graphically, in diagrams. Alternatively these weave derivatives can easily be expressed in numerical codes.

### 3.2. Formulation of a numerical code

The expression of weaves in numerical codes can be found in the international standard ISO 9354 which establishes a code for the systematic numerical notation for basic weaves and their simple derivatives.

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<sup>20</sup> Hugues, 1982.

<sup>21</sup> Burnham, 1980, 139.

The code for any basic weave or one of its simple derivatives is made up from digit number elements that are separated from one another by hyphens. These elements indicate, in sequence, the following characteristics of the weave:

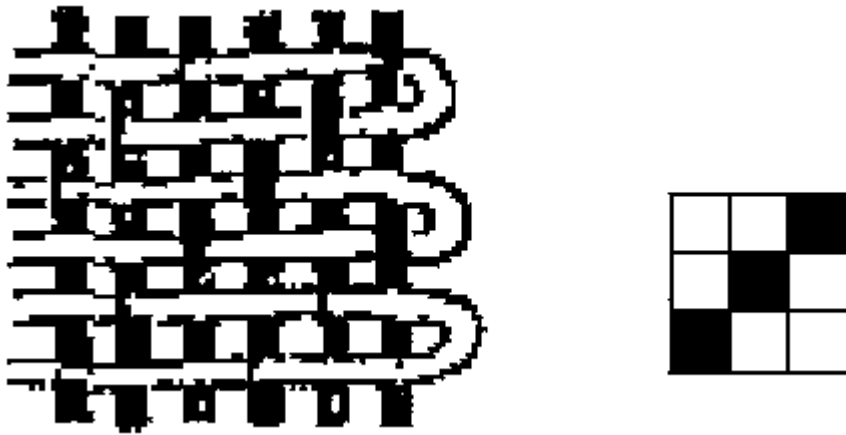
First element: the kind of weave,

Second element: the sequence of interlacing of the yarns, i.e. warp up or down,

Third element: the warp thread grouping, i.e. the warp yarns weaving singly or in groups,

Fourth element: the step or move number.

For plain weave, the code is 10 010101 00 (ISO 9354 standard).



**Figure 3 - Twill weave**

The second basic weave is *twill*. Basic twill weave consists of 3 x 3 threads with four possible combinations, one of which is shown above: *2/1 twill*, in which each time a weft thread passes over a warp thread, it then passes below the next two warp threads. In addition, there are four possible 2/1 – 1/2 twill weaves Z or S spun. Both weft twills and warp twills exist, and the points at which the threads cross over to create a diagonal pattern.

There are a large number of variations / derivatives of basic twill weave such as the *5-end stitched twill*, “Z” direction.

These figures can be written separated by points 3.1.1.1 or a slash 3 1/1 1 representing the point of intersection.

The derivatives are easy to represent in diagrams and codes but almost impossible to translate from one language to another using verbal components. The code for 3/1 twill, “Z” direction is: 20-01 03-01-01 (ISO 9354)

The third basic weave is satin and in figure 4 we show the diagrams, the definition and the code:

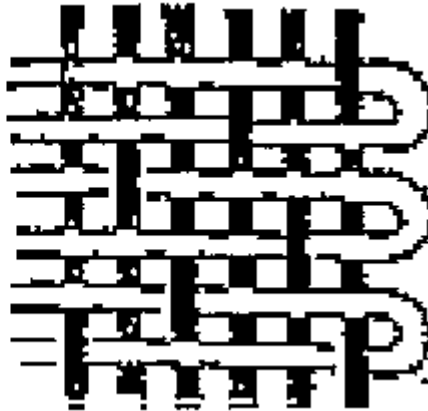
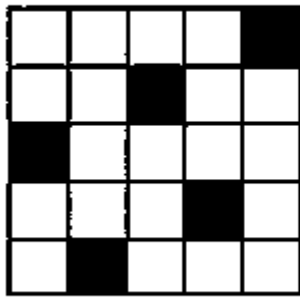


Figure 4 - Satin

*“Satin: Binding system or weave based on a unit of five or more ends, and a number of picks equal to, or a multiple of, the number of ends. Each end either passes over four or more adjacent picks and under the next one, or passes under four or more adjacent picks and over the next one. The binding points are set over two or more ends on successive picks and are distributed in an unobtrusive manner to give a smooth appearance<sup>22</sup>”.*

Example:

8-end warp satin, step 5. The code 30-07 01-01-05

The step number indicates the number of threads by which the point of intersection is offset each time. Regular satins are produced by consistently using the same step number. Irregular satins are produced using several different step numbers in succession.

Example: 6-end cross warp satin, steps 3,4,4,3,2.

The code is: 30-05 01-01-03 04 04 03 02

The number of possible combinations of the basic plain, twill and satin weaves is extremely large. The use of graphic components to represent the weaves, as recommended in the ISO 9354 standard, bypasses the need to use long and complicated terms which are of little use in conveying the concept. The image of the weave can be combined with a code, thus minimizing the need to produce a definition and verbal term.

The characteristics reflecting the origins and use of a fabric cannot be represented easily, but the characteristics of form, structure and color can be represented graphically.

The work to create international standards within the framework of the ISO 9354 also shows, that in this field, definitions are being replaced by diagrams, and terms by codes. When work on the standard started, a verbal explanation of the code was included, but this verbal element only served to explain the code itself. There is therefore a global consensus that the representation of derived weaves in the form of diagrams greatly facilitates work on the terminology, as shown above.

As a large number of weave derivatives and variations can be created it is almost impossible to find terms for each of them, and even more complicated to translate them from one language to another. The examples above show this clearly and part of the solution to this problem resides in the use of non-verbal representations. This solution is not new: non-verbal representations of textiles have been integrated and used in various languages and scripts for the past four thousand years.

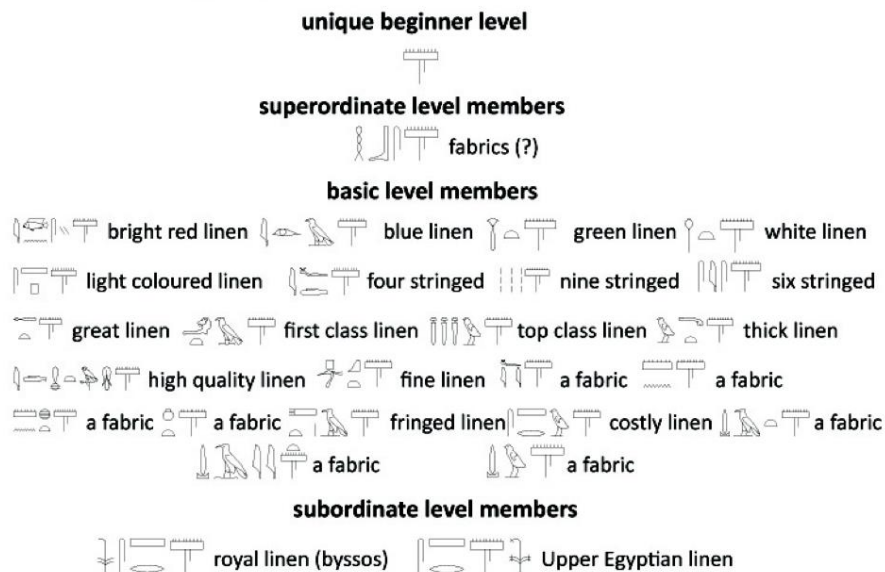
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<sup>22</sup> Burnham, 1980, 113.

#### 4. Textile logograms – a diachronic view on non-verbal terminology

Scripts and administrative systems developed rich terminologies for textiles in the Bronze Age, and the use of textile logograms is a testimony to the means of an extensive and systematic knowledge organization.<sup>23</sup> Aegean and Egyptian scripts employ both phonetic signs (syllabograms designating open syllables and vowels) and logograms (sometimes also called pictograms or ideograms) to express the complex textile world. The Aegean writing systems termed Linear A and Linear B combine syllabograms that give the phonetic value of a word with logograms, which indicate an exclusive membership in the textile category.<sup>24</sup> Egyptologists have explored the nature, structure and development of hieroglyphic systems.<sup>25</sup> According to their analyses, within a category, determinatives or graphemic classifiers help to structure the meaning of words and to represent a system of classification. Some determinatives classify the specific meaning of a term into a classification system, while other determinatives functionally only repeat the information found in phonetic writing and thus reiterate the meaning of the sign. Thus there are several parallels to the Linear B system, in particular to the use of signs and classifiers employed to describe textiles.

### The sign as classifier for "kinds of fabrics"



**Figure 5**

The sign depicted in figure 5 stands for the textile category in Egyptian hieroglyphs and represents a textile seen in profile with a fringe used for many different types of lexemes such as nouns for textiles, garments and textile-based items, as well as certain divinities and verbs related to textile manufacture.<sup>26</sup>

<sup>23</sup> Michel & Nosch 2010.

<sup>24</sup> Del Freo, Nosch, Rougemont 2010.

<sup>25</sup> Herslund 2010, 68.

<sup>26</sup> Herslund 2010. Jones 2010.



## The sign as classifier for "kinds of garments"

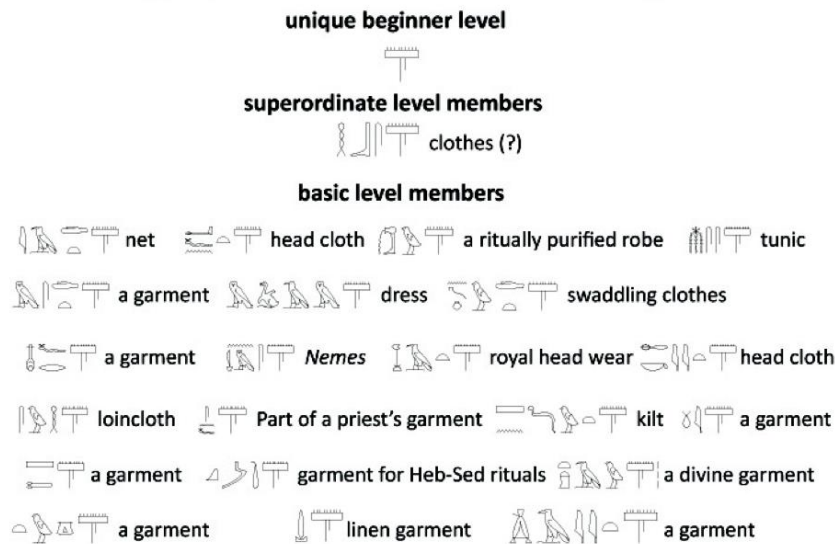
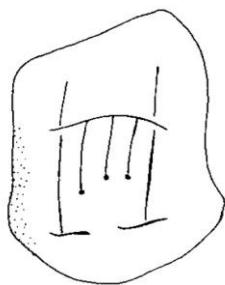


Figure 6

In the Aegean writing systems termed Linear A and Linear B, the prototypic textile sign is a rectangle with fringes on the lower edge. The cloth logogram *TELA* is representative of the high degree of coherence among the Aegean scripts. It is attested as the Linear A sign AB 54,<sup>27</sup> and in the Late Bronze Age script Mycenaean Greek Linear B logogram \*159 *TELA* "cloth". The similar Cretan Hieroglyphic logogram \*163 is considered to be the precursor of the Linear A and B cloth signs.



HT Wc 3019

AB 54



TEL Zb 1

AB 54 + AB 04



Malia #103.b

Figure 7

### 5. Mycenaean textile terminology merging logograms and textile terms

Inside the textile logogram *TELA* is a sign for a syllable: it designates the first syllable in the cloth name. Therefore we know that the logogram *TELA* with the syllable *TE-* inside (*TELA+TE*) was the abbreviation for the cloth type called *te-pa*; *TELA+PU* was *pu-ka-ta-ri-ja* cloth; *TELA+PA* was *pa-we-a* cloth, a type also known from Homeric terminology where it signifies a cloak, and \*146 which contains the endogram *WE* is the abbreviation of *we-a<sub>2</sub>-no*, *wehanos*, also a cloak.<sup>28</sup> These cloth names often have non-Greek etymologies.

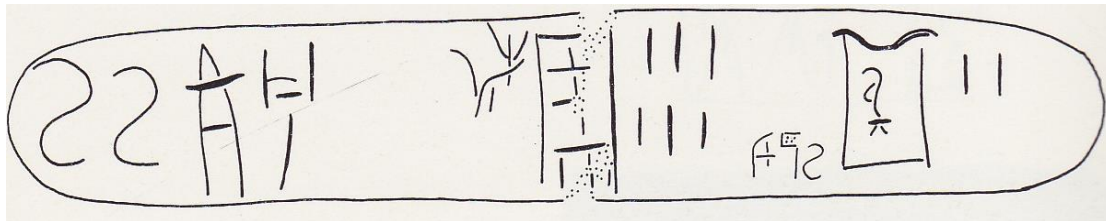
<sup>27</sup> Del Freo, Nosch, Rougemont 2010.

<sup>28</sup> Van Wees 2005.

Other Mycenaean textile terms are expressed in terms of the neutral and empty cloth logogram *TELA* combined with the cloth name: this is the case for *TELA ki-to*, *TELA to-mi-ka* or *TELA tu-na-no*.

It is significant that the textile logograms are so closely associated with fabric names. On the other hand, vital textile information concerning colours, dyes,<sup>29</sup> decoration, and fibre type is sometimes added but this is not done systematically. Information about weaves is totally absent. Furthermore, measurements of size are almost absent, except for a few very rare cases of *me-ki-ta/megista*, ‘large size’, or *me-sa-to/messatoi*, ‘medium size’.

One tablet from Knossos is exceptional because it provides information about fibres, textile terms and how to wear the items.



**Figure 8**

**KN L 178 + 281** ("124"/RCT)  
*we-we-e-a* '\*161' *TELA*+PA 6 / *u-po-we* *TUN+RI* 2

This tablet records a total of 8 textiles: six items are woollen (*we-we-e-a*) of the type *pa-we-a* which is abbreviated *pa-* inside the textile logogram *TELA*, and this textile type is furthermore qualified by the additional textile logogram \*161, the meaning of which is unknown.

The remaining two textiles are tunics designated by the logogram for tunic with the syllable *RI* inside which denotes *ri-no* / *linon*, linen. These two tunics are for wearing under the clothing (*u-po-we*).

The scribes only seem to feel the need to note the woollen *we-we-e-a* fibre types when a cloth is recorded in the immediate context of *TUN+RI* or *TUN+KI*, tunics, which at least in the case of *TUN+RI* is clearly of plant fibre, *i.e.* linen. This is one of the few examples of a denomination of the fibre types wool and linen.

The weight, size, dyes, weave and decoration significantly effect the value of a textile, and the absence of these data can be explained by the standardisation of Mycenaean textile types. It seems that by the end of the Bronze Age, Mycenaean textile terms condensed all relevant fabric information into a standardised textile term repertoire. To any Mycenaean scribe, a fabric term like *te-pa* would, *e.g.* signify a large woollen, un-dyed and coarse fabric, and only deviations from this would be noted. This makes the exploration of textile terminology extremely challenging for the researcher 3500 years later.

The relative homogeneity and standardisation in the Mycenaean archives stands in contrast to the cuneiform documentation of the 2<sup>nd</sup> millennium BC. An example is the excavation of the Old Assyrian traders' archives found in their private houses in the commercial quarter (*kārum*) of the ancient Anatolian city of Kaneš (modern Kültepe) dated to the 19<sup>th</sup> to 18<sup>th</sup> centuries BC.<sup>30</sup> These documents contain numerous references to a large variety of textiles. These traders imported primarily woollen fabrics from the city of Aššur and were also trading Anatolian local woollen textiles. Despite the clear interregional nature of this trade, most of these textile names do not appear in contemporary sources from elsewhere. The other various cultures and population groups which used the cuneiform script for their local administrations and private correspondence each developed a specific vocabulary for textiles. In recent years, much research has been conducted on the textile terms in places such as Ebla,<sup>31</sup> Mari,<sup>32</sup> and Ugarit.<sup>33</sup>

<sup>29</sup> Nosch 2004. Cardon 2007.

<sup>30</sup> Veenhof 1972; Michel 2001; Michel 2006; Michel & Veenhof 2010; Wisti Lassen 2010.

<sup>31</sup> Archi 1999; Biga 1992; 2008; 2010; Pasquali 1997, 2005, 2010. Sallaberger 2009.

<sup>32</sup> Joannes 1984; Durand 2009;

<sup>33</sup> Ribicini & Xella 1985. Van Soldt 1990. Vita 2010.

These textile terms often appear typically local, despite the geographical proximities, trade networks, and linguistic connections which exist between Ebla, Mari, and Ugarit. It therefore seems plausible that the Mycenaean political and administrative entity played a conserving and standardising role for this technical vocabulary, while the disparate and even conflicting entities which used cuneiform script engendered more diverse textile terminologies with the emergence of isolated terms and local terminologies.

## Conclusion

Textiles are a delimited subject field but are present in all cultures and historical periods. Clothing is closely related to the body, as a second skin, therefore the terminology of textiles is made up of universal concepts which travel through time and were already present in ancient cultures.

We can perceive the technologies used by analysing this terminology but also touch upon the universal aspects of the perception of the body. This can be traced back to the 3<sup>rd</sup> millennium and the first written sources; furthermore textile terminology continues to “feed” vocabulary into the new sciences and technologies today. An example is the DNA string, tissue and histology in medicine. The ‘string’ theory in science; computer language is also saturated with terms from the textile world, e.g. the ‘world wide web’. As Sadie Plant states,

*“if computers are the power looms of modern industrial revolution, software is more like knitting. Programmers still toil in digital sweatshops coding software by hand, writing and rewriting one tangled line after another. Not surprisingly, they sometimes drop a stitch, which later unravels as a bug in the program.”*<sup>34</sup>

The international iconic representation for textile care - that is, the tiny white fabric tags sewn into any garment with instruction to maintenance and care - is another example of non-verbal representation of concepts in the field of textiles. These internationally accepted icons guide any language user to a standardised praxis of textile care and hygiene; they regulate temperature; and they also lead towards a consensus interpretation of a global use of laundry technologies, i.e. our compulsive use of washing machines, dryers and ironing and dry cleaning. The tacit knowledge of how to handle and maintain textiles is vanishing and now communicated verbally and non-verbally to the global community with the aid of icons on laundry tags. However, the meaning of the icons also seems to vanish for the ordinary consumer and has become an expert language.<sup>35</sup>

To conclude, we may underline two points of interest that emerge from the collaboration between terminologists and experts in ancient scripts that has taken place for this research work: the first is the need to create collaboration across domains and expertise in terminology, as such terminology work cannot be seen any longer as “reserved” for terminologists and linguists alone; the second is that the terminology - both past and present - of textiles makes an intensive use of non-verbal concept representations to generate and convey definitions. Non-verbal elements may actually represent one of the fundamental characteristics of the specialised field of textile terminology. The verbal and non-verbal representations of concepts, and the way the two forms of representations are combined as illustrated here, may offer a new and original path to terminologies and ontologies.

## Bibliography

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<sup>34</sup> Plant 1964, 127.

<sup>35</sup> As a humorous example of this global praxis, see the examples of Laundry Tags with extensive use of icon but followed by the text: “*Or Give It To Your Mother. She Knows How To Do It*”

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