

Technical Analysis of the Supplementary Weft Weave In Archaeological Textiles.

*Dr. Marouf, M. A. **

Abstract

Supplementary weft technique is considered one of the most important techniques of the archaeological compound textiles which were known in Egypt. This technique may be the first try to produce ornamental textiles. There are many resemblance appearances between this technique and other several techniques, such as embroidery technique or brocade cloth, so there are many mistaken concepts in regard to this weave. Also this technique is called as an Extra or Additional weft. This study aims to show the main characteristics of the supplementary weft and explain differences and resemblance appearances in this technique, by using of some recent means to exanimate the weave structure exactly, such as Stereo microscope, binocular microscope, and scanning electron microscope (SEM). The study introduces many important results that lead to an understanding of ancient textiles, their weave textures and their distinctive characteristics.

2. Introduction

Egypt is one of the earliest civilizations to manufacture textiles. Ancient Egyptian weavers were familiar with many of the techniques, such as plain, and twill weaves, in addition to tapestry textiles. They also understood other several techniques of compound textiles, such as weft-looping and supplementary weft techniques, which appeared in Egypt 5000 years ago. But then there are some

* Assistant Professor of Organic materials Conservation (Archaeological Textiles)
Conservation Dept. Faculty of Arts, Sohag University, Egypt. E mail:

Marouf30@yahoo.com , Tel: 00202 093 2349850-Mobil: 0106869465- Fax: 002 02 093 4601179

techniques which were not known in Egypt especially before Islamic period, such as the knotted pile (carpets), satin, brocade (*damask* textile), and wrapped weft techniques (*Soumak*). These techniques came to Egypt at least after Arabic conquest (*Maher, S.1977*). This research focuses on one of these techniques: it is the supplementary wefts, because the supplementary weft textile is like brocade weaves entirely, some studies point out that the first technique is a kind of embroidery techniques although there were many differences among the two techniques. So this study aims to show their differences and resemblances appearances.

Keywords:– supplementary weft- textiles- brocade- warp and weft threads- twill and satin weaves, weft loops- carpets – rugs.

2. Types of the Weave Structures in the Ancient Textiles

There are four main kinds of the archaeological weave structure, normal textiles, compound textiles, weft-face textiles, and pile textiles. Each one is divided into several branches according to interlacing method of the weft and warp threads in the weave textures as the following: Fig (1), and Figs (2- 8).

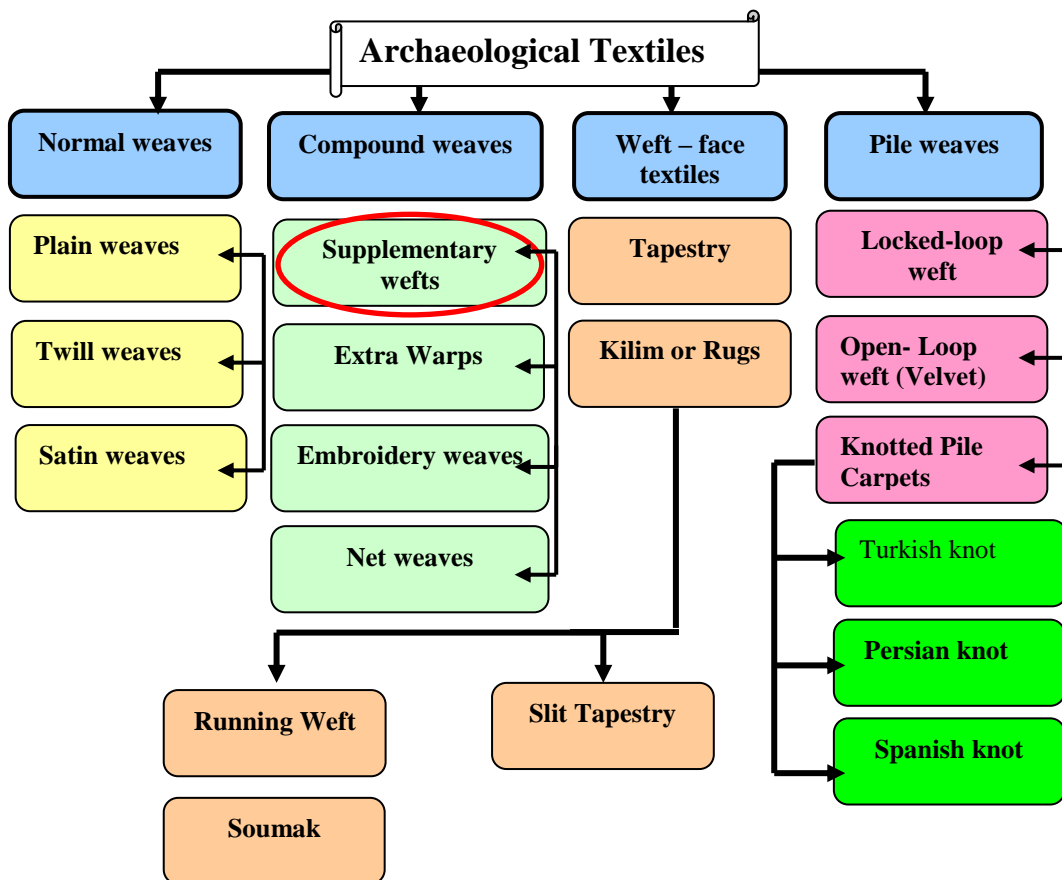


Fig (1) Common Division for the Archaeological Textiles.

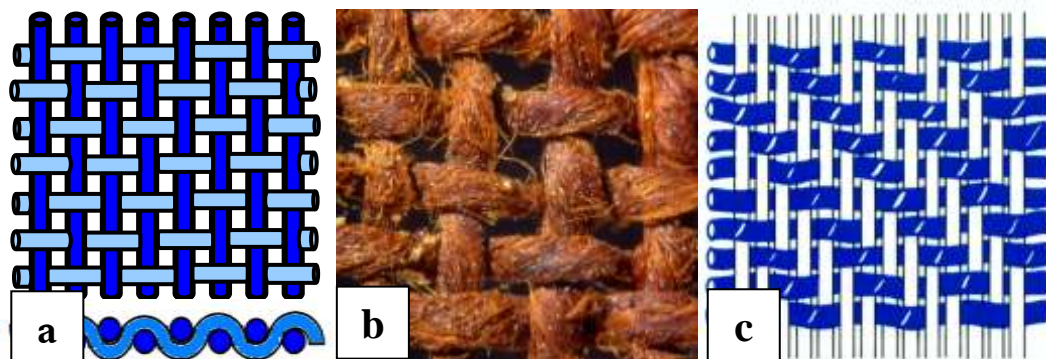


Fig (2): The surface Features of The Normal Textiles: a- plain weaves, b-plain weave by binocular microscope (70 x) c-Twill weaves

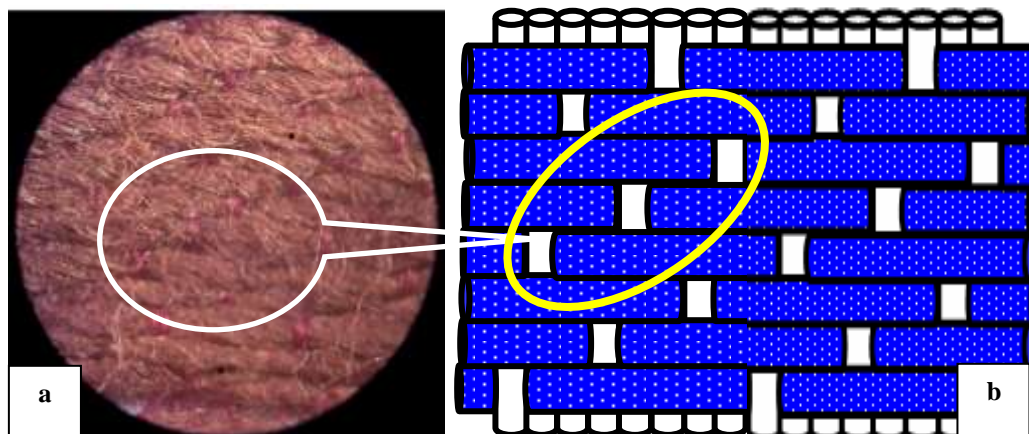


Fig (3) The Normal textiles - Satin weave (a) photo by binocular microscope to satin weave, magnifying (60X), (b) the surface appearance of satin weave



Fig (4) The Compound Textiles: a- Net weaves, b- Embroidery weaves (Rococo Stitch).

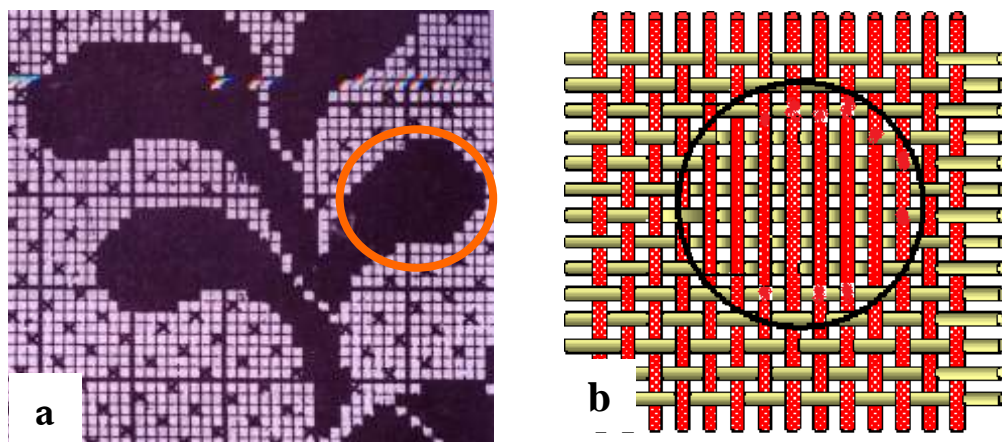


Fig (5) The Compound Textiles: a- Extra warp (design) , b- Extra warp (surface appearance)

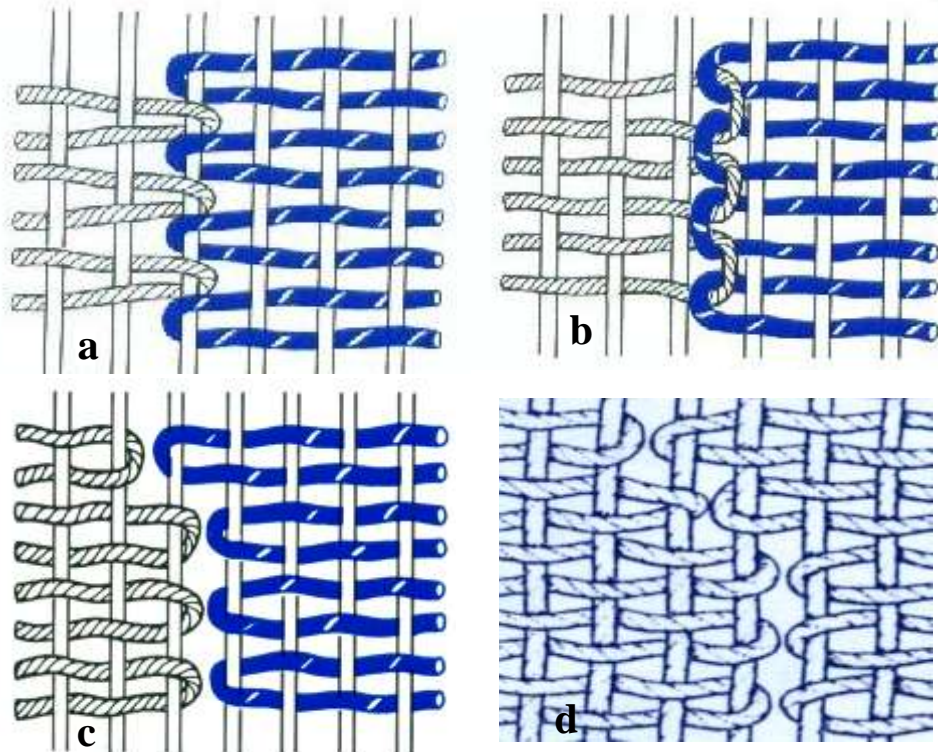


Fig (6) The Weft -Face textile (Tapestry): a, b- dovetail wefts tapestry, c, d- Slit Tapestry

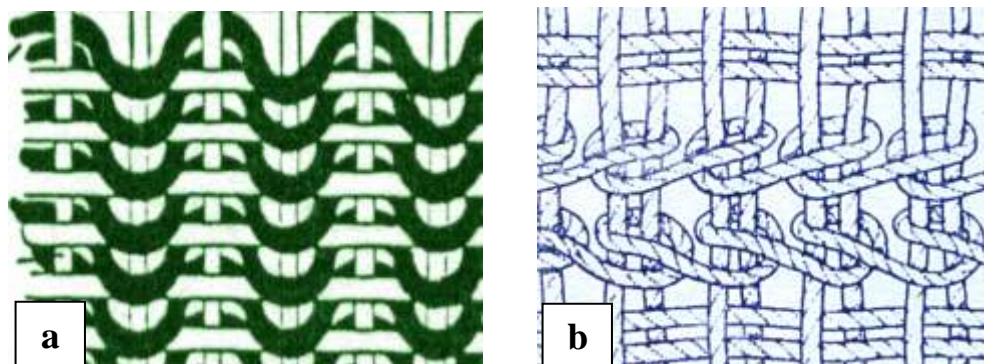


Fig (7) a-the looping-weft textile, b- the wrapper weft technique (*Soumak*)

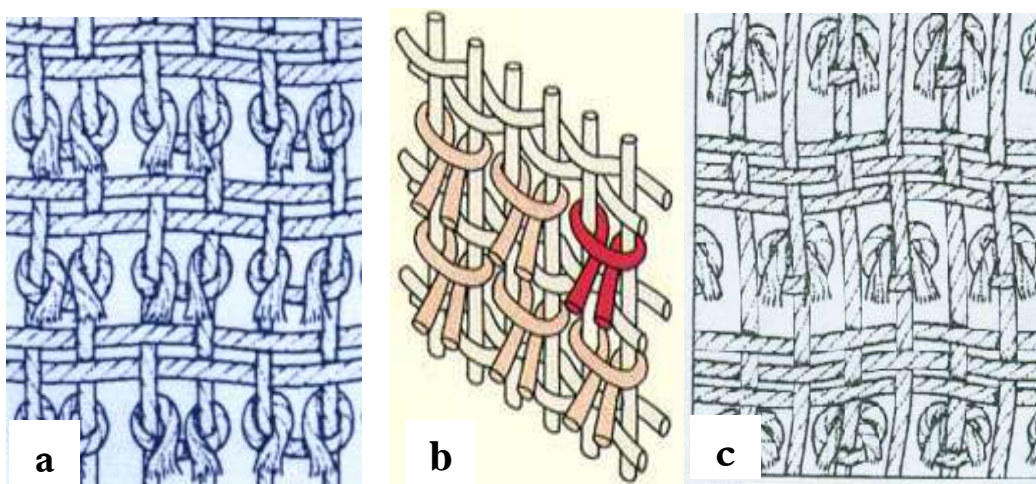


Fig: (8) The knotted pile Carpets:

a-Turkish /*Ghiordes* knot) , b-

three dimensions of the

Turkish knot. c- Spanish knot,

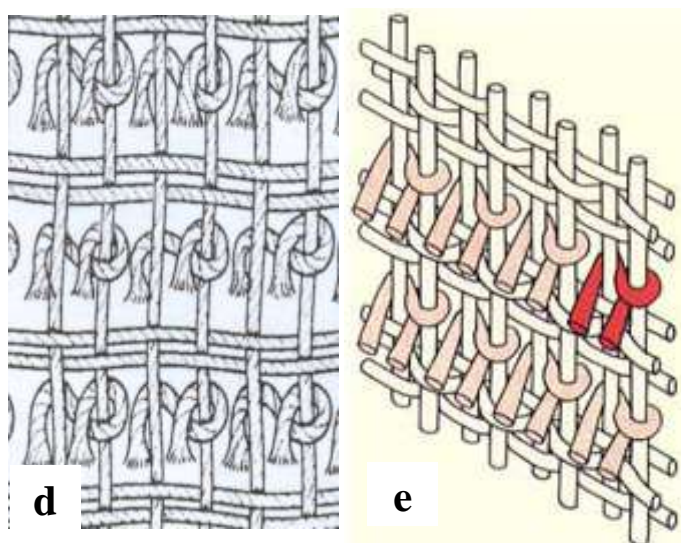
knotted by single warp.

d- Persian (*Senneh* knot)

knotted by double warp.

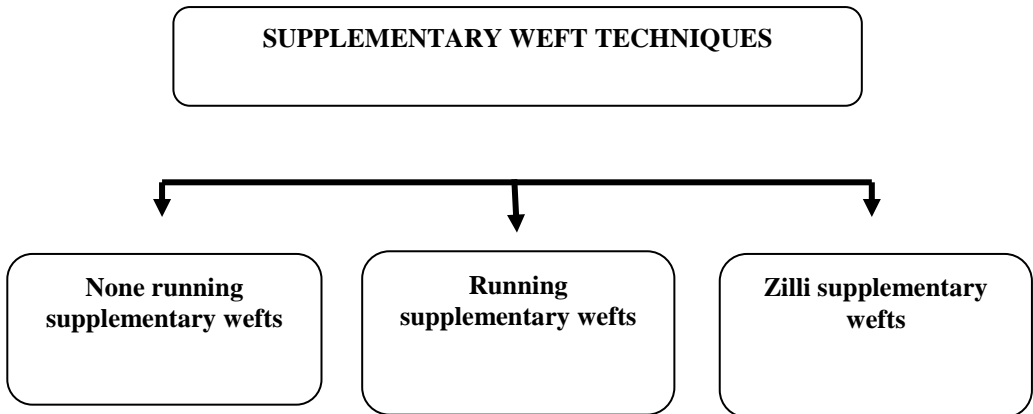
e- - three dimensions of the

Persian knot.



3. The Supplementary Wefts Techniques (subject of the study).

The structure of a fabric is classified as "simple textile" when composed of only one set each of warp and weft elements, and as "compound textile" when there is more than one set of either or both, additional warps and wefts added to simple weave, which in itself serves as a complete "Foundation" or "Ground" are by their very nature supplementary. Other more complex compound structures, however, have at least two sets of one type of element either warp or weft, which are complementary to each other. (Barnard, N. 2000) If the weave structure consists of two sets of warp threads, it is classified as supplementary or extra warp textile, while the weave structure which is from two sets of weft threads, it is classified as supplementary or extra weft textile. The last technique can be divided into basic three types as the following:



3.1 None running supplementary wefts

In this technique, the weft- float patterning is a way of decorating a simple weave with supplementary wefts. The coloured extra-weft threads are woven into the fabric to create either a scattered motif (Fig. 9), while the embroidery's threads in the brocade are added on the basic fabric by the needlework (Fig 11). So this technique is often mistakenly thought that the extra wefts from which the pattern is formed are embroidered into the piece after the ground weave is finished, for example, Geijer pointed out

that the additional pattern weft may be known as brocaded weave. (Geijer, A. 1982) They are interlaced as the work progresses, Since the extra yarn is generally thicker than the warp and the weft raised or couched pattern forms (Barnard, N. 2000, p. 47 (Fig. 10) This technique was not used in Egypt in Pharaonic times, but it was used after that in Islamic times in all areas, from Morocco to Afghanistan, but extensively in Turkey.

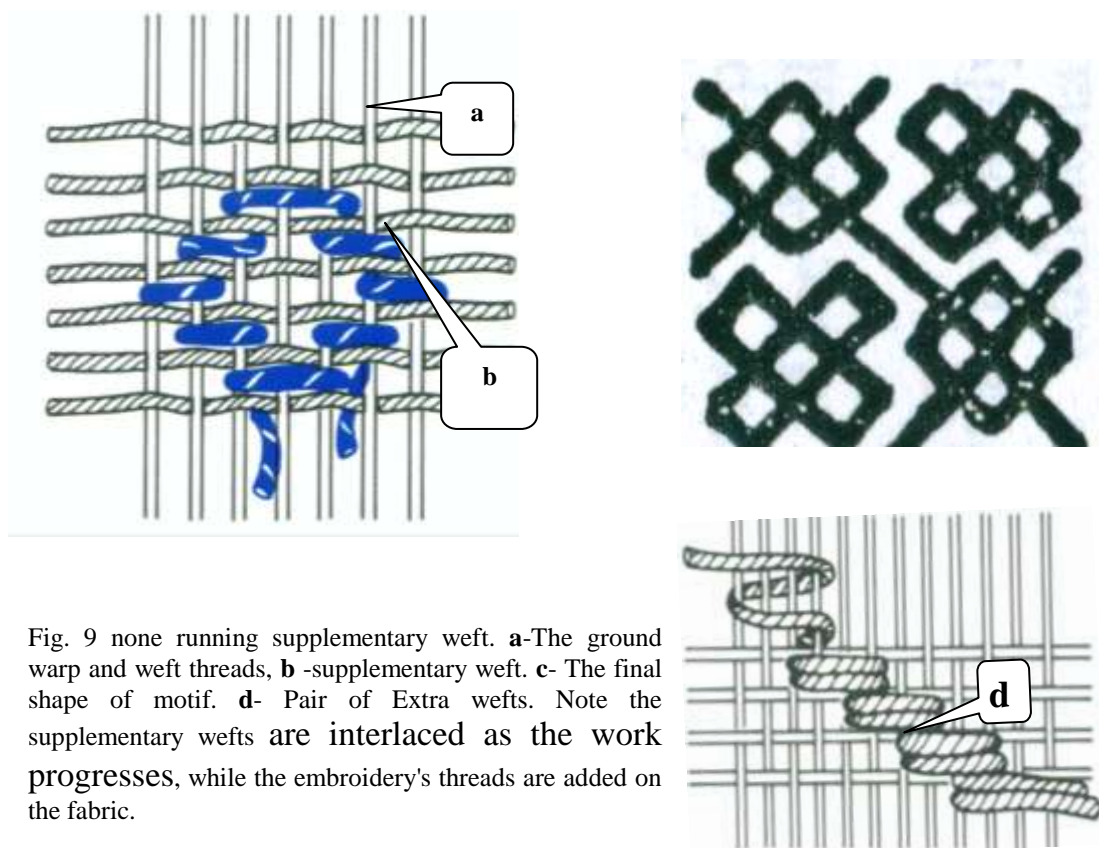


Fig. 9 none running supplementary weft. **a**-The ground warp and weft threads, **b** -supplementary weft. **c**- The final shape of motif. **d**- Pair of Extra wefts. Note the supplementary wefts are interlaced as the work progresses, while the embroidery's threads are added on the fabric.

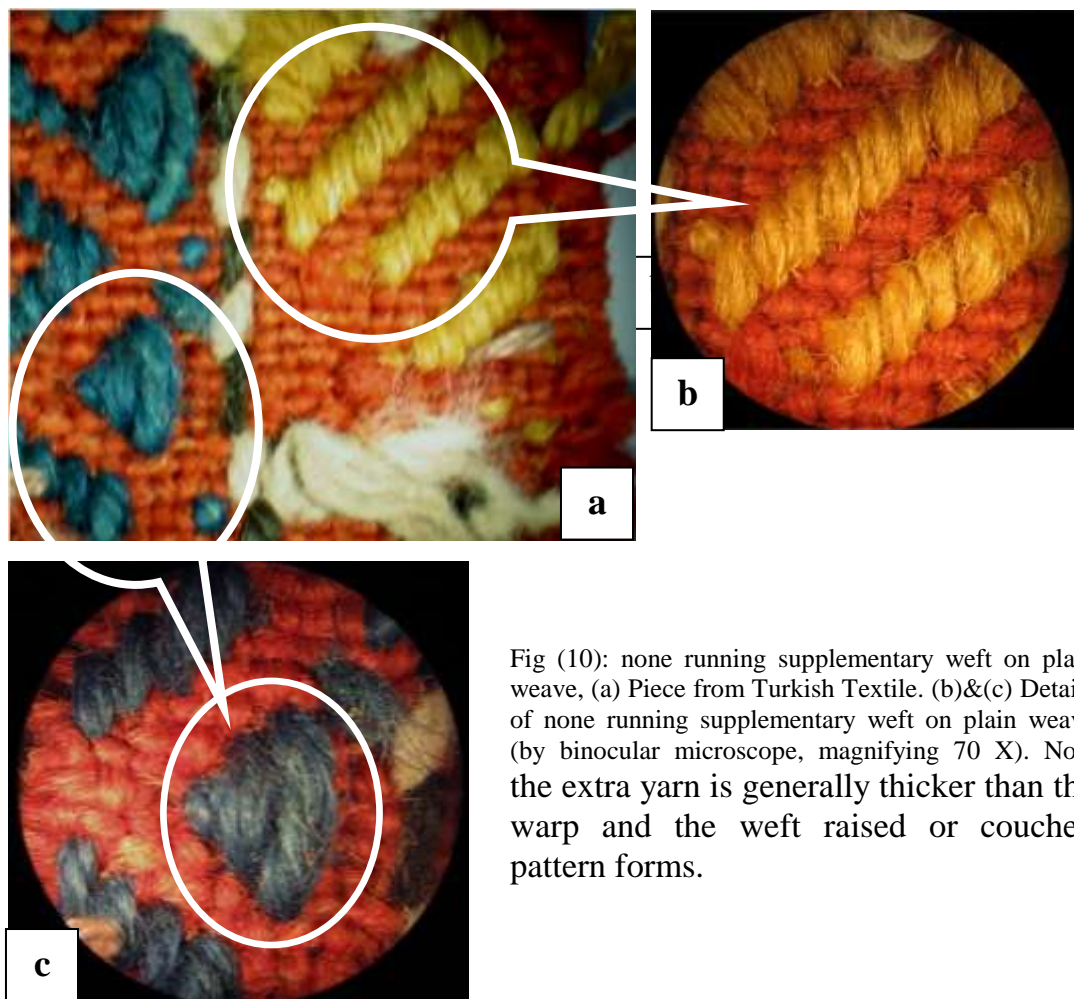


Fig (10): none running supplementary weft on plain weave, (a) Piece from Turkish Textile. (b)&(c) Details of none running supplementary weft on plain weave (by binocular microscope, magnifying 70 X). Note the extra yarn is generally thicker than the warp and the weft raised or couched pattern forms.

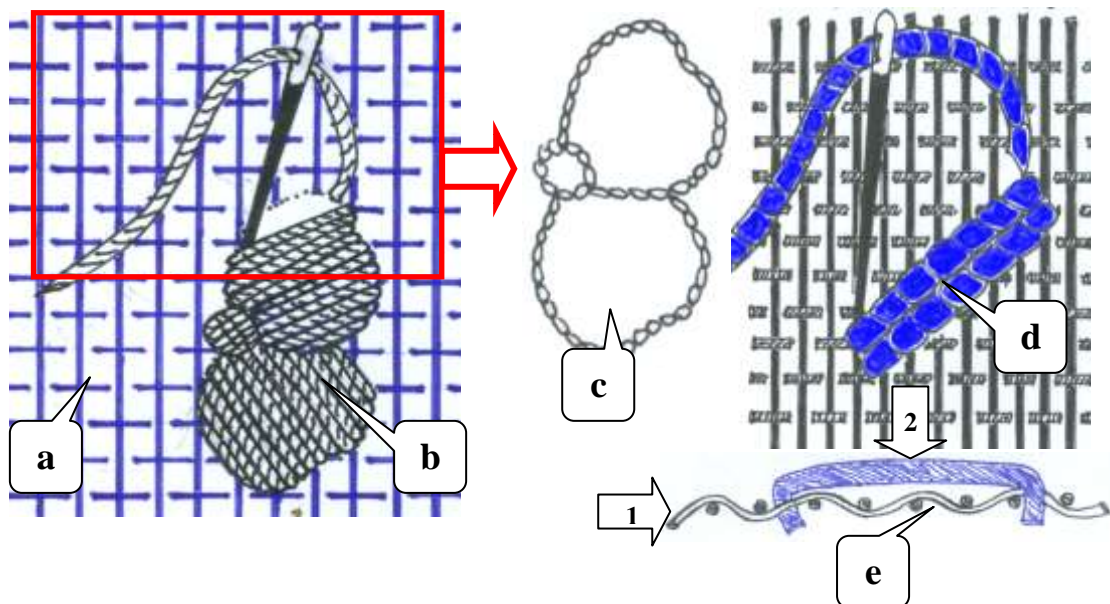


Fig. 11: Brocade Technique, a – the basic textile, b – the used threads in embroidery's Process. c- The motif from back. d- Details the embroidery's technique. e- Cross section of the brocade. (1-The basic fabric. 2- Embroidery Threads). Note the embroidery's threads were added on the basic weave by the Needlework.

Another kind of this technique was used in Egypt in some of the Middle Kingdom linens. In this kind, the weavers used heavy supplementary wefts to amplify along the selvedge of the cloth by laying an additional bundle of thread into the shed at edge of the cloth for a short space, then bending it back in a U-shape. The weaving technique of laying a supplemental thread into the regular shed for ornamental purposes – called *inlay* (Fig 12). This technique was found in the 11th. Dynasty cloths in the Egyptian Museum in Cairo. Also, there is another type from non running extra weft. This type found on Egyptian linen from the Middle Kingdom to Roman times. In this technique, a heavy supplementary weft threads were laid into the shed along with the ground weft for a ways, then suddenly given a right or left- angle turn so as to become supplementary warp. (Barber, E.W., 1991, p.152) (Fig. 13)

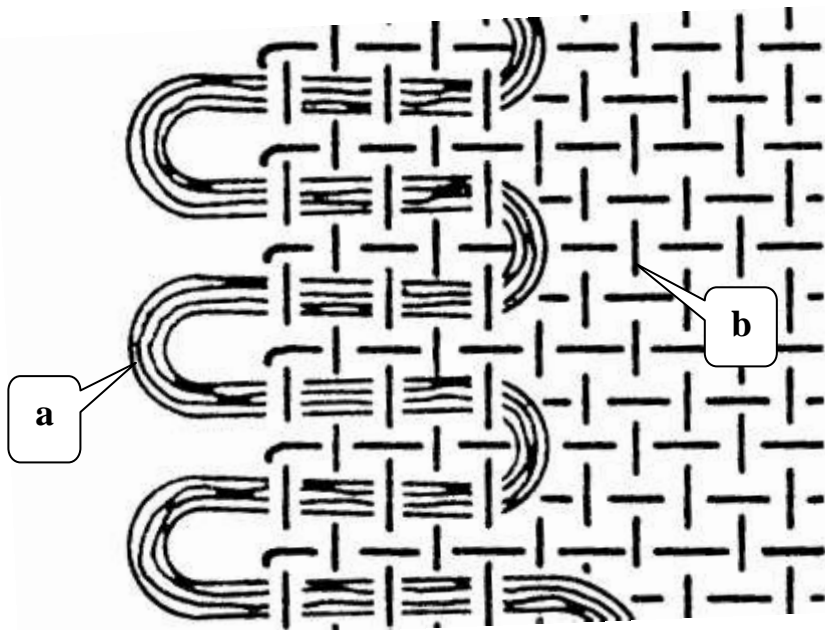
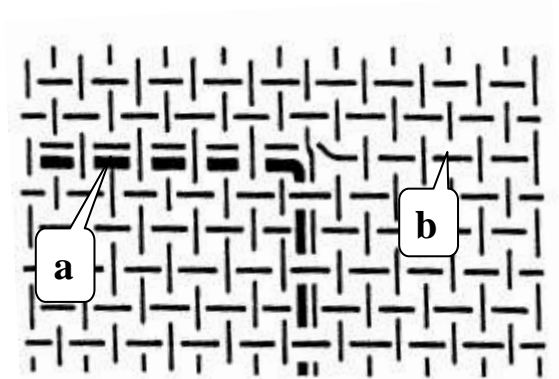


Fig 12 Diagram of type of Egyptian inlaid edge done with none running supplementary weft to produce a strong edge. a- none running supplementary weft in a U- shape. b- the basic weave.

Fig. 13 Supplementary weft laid into the shed, then turned to become warp, (a- extra weft, b- the ground weft). A weaving trick found on Egyptian linen from the Middle Kingdom to Roman times



This technique was found on one of linen cloth in the Egyptian Museum in Cairo, Serial No. 16/1/26/21. This piece was a part from linen dress; it was woven from linen threads as a ground weave and blue linen threads as supplementary weft (Fig. 14).

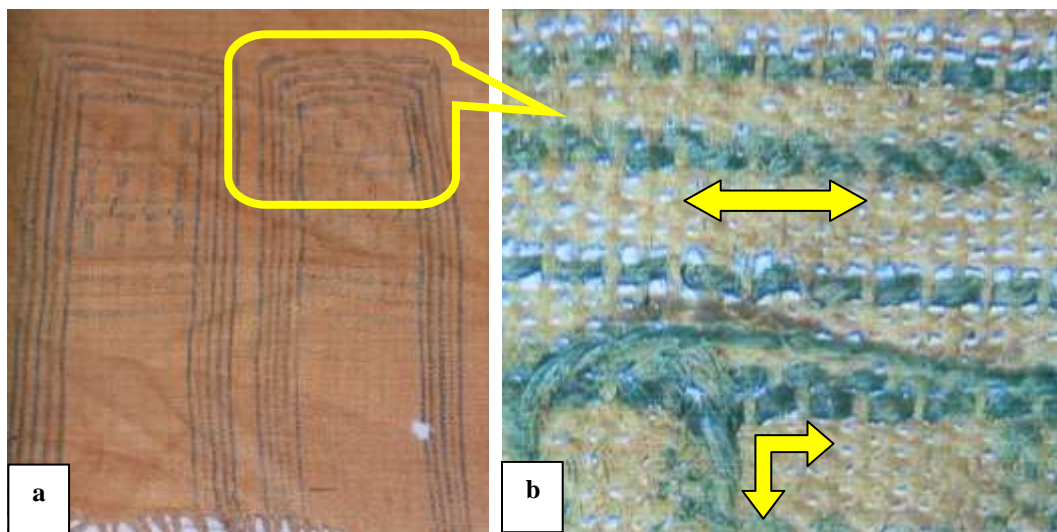


Fig. 14 a- piece of linen dress was woven from linen as a ground weave and Supplementary weft which laid into the shed, then turned to become warp, The Egyptian Museum in Cairo. b- Photo by binocular microscope (40 x).

In this technique, the coloured extra weft threads are woven into the fabric continuous across the fabric from selvedge to selvedge. This technique in English termed "weft-patterned tabby". The "weft-patterned tabbies" are characterized by long floats of weft passing over and under the ground weave as a rule the pattern yarn is shuttled. (Fig. 15) Usually this technique is used to produce horizontal stripes from supplementary wefts which are interlaced with balanced plain weave. In Swiss National Museum there are two pieces of Egyptian linen clothes, in balanced plain weave with supplementary-weft stripes: ca.3000 B.C. (Fig.16). But it may also be brocaded to produce regular geometric ornamentation (*Geijer, A. 1982*). Usually these ornamentations are forming on a zigzag shape or (X) letter shape (Fig. 17). Also it may be used to produce other regular geometric ornamentations such as the hexagonal shape (Fig.18). In all these motifs the supplementary wefts float over and under specific number of the warp threads with balanced plain weave, since the extra wefts appear in the decorative areas only.

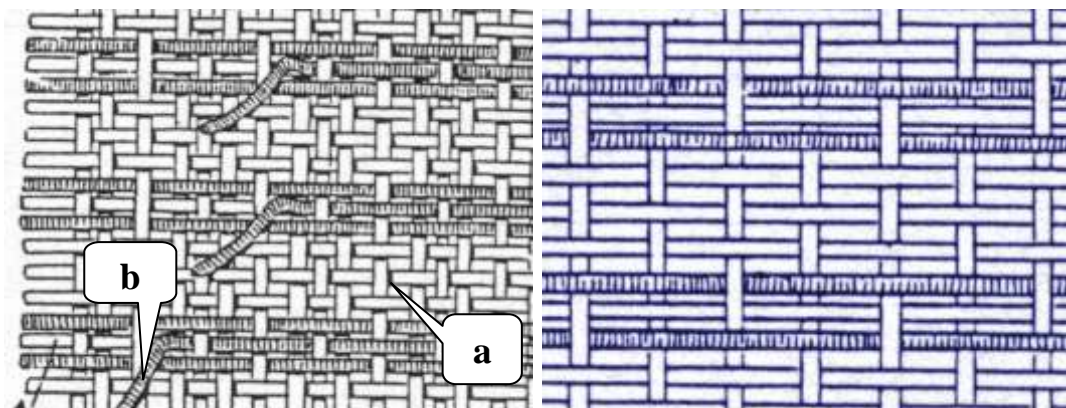


Fig. 15 The running extra weft, a- the ground weave, b- the supplementary weft

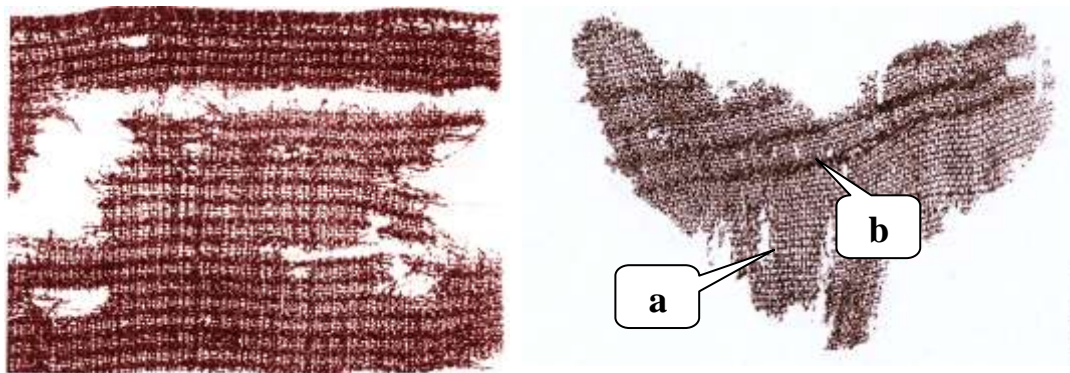


Fig. 16 Two pieces of Egyptian linen clothes, in balanced plain weave with supplementary-weft stripes: ca.3000 B.C. (a- balanced plain weave, b- Supplementary-Weft) in Swiss National Museum. (*Barber, E.W., 1991, p.134*)

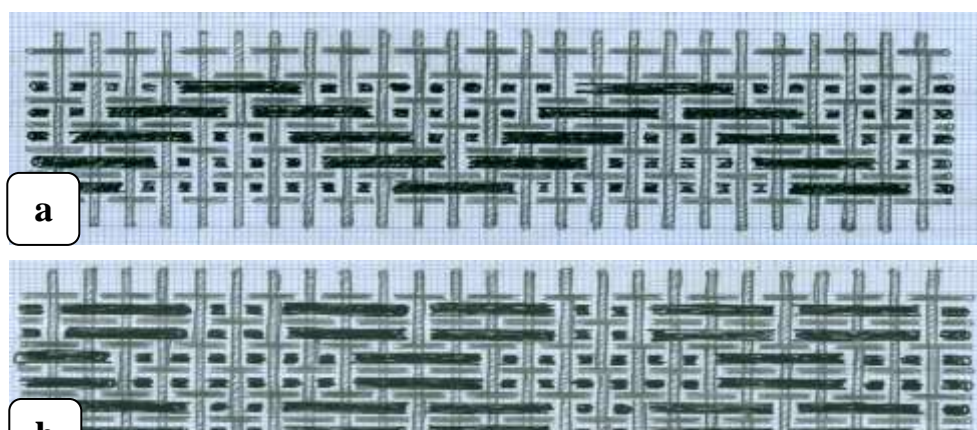


Fig. 17 the supplementary wefts are used to produce a regular geometric ornamentation. Usually these motifs are forming on zigzag shape (a) or (X) letter shape (b)

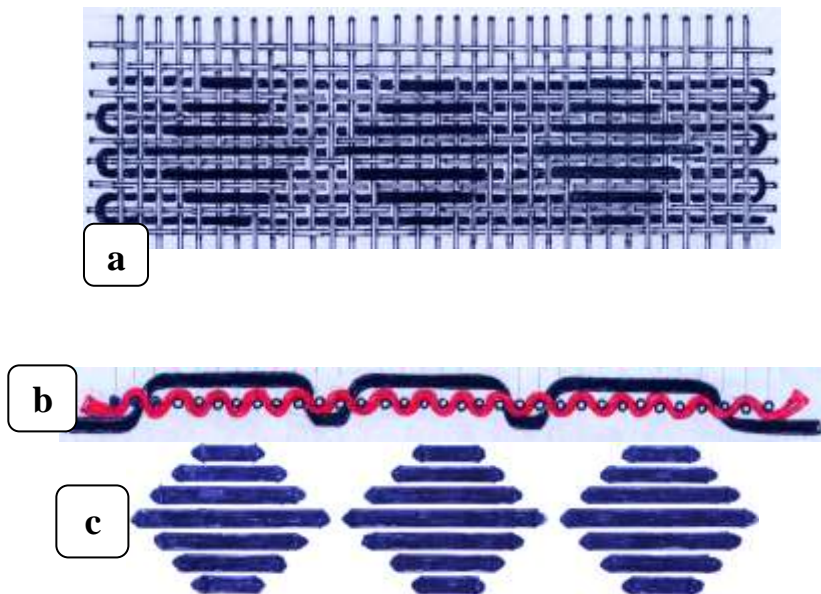


Fig (18) Using supplementary weft technique in making hexagonal geometric ornamentations.

- a- the weave structure of the running supplementary weft technique
- b- Cross-section of the weave structure
- c- The surface appear of the hexagonal geometric motifs

3-3 Zili Supplementary Weft

There is a supplementary weft technique that, like-faced patterning is also a Float weave. The so called *Zili*, a Turkish word meaning "small bells or chimes" is a method used exclusively in Turkey, especially in making the kilim. (*Barnard, N.2000, p.48*). It gives a distinctive cording or contoured look to the front of the Kilim (running parallel to the warps). Sometimes employed as a generic name for unattributed items woven using this technique. (*Allane, L.1995, p.24*). Extra wefts are wrapped round the warps in a common 2:1, 3:1, or 5:1 with the longer float in thick-spun wool on the face of the rug.

Two or three rows of hidden ground weft are shot between each row of floating weft and the surface is completely covered with float over two, three or five warps,(Fig.19) with each color turning back in its own color block: contours may be created with the same 'floating two, three or five system. *Zili* is an easy technique for weaving horizontal and vertical lines. The weaving of diagonals is a good deal more complicated and can only be done by offsetting the weft floats with a single warp. The plain ground of most *Zili* can be distinguished by its colored, a characteristic raspberry red, dark grey or white, depending on the area of origin. Also, there is another type of the supplementary weft technique: that is, extra thread could be zigzagged back and forth in the plain weave Fig. 20 (*Barber, E.W. 1991, pp: 139-140*). But it was known in Europe, 3000 B.C.

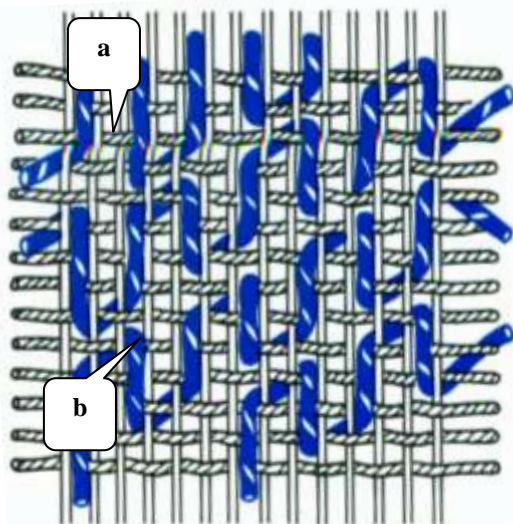


Fig. 19 Zili Horizontal supplementary weft patterning.
a- the ground weave, b- the supplementary weft.

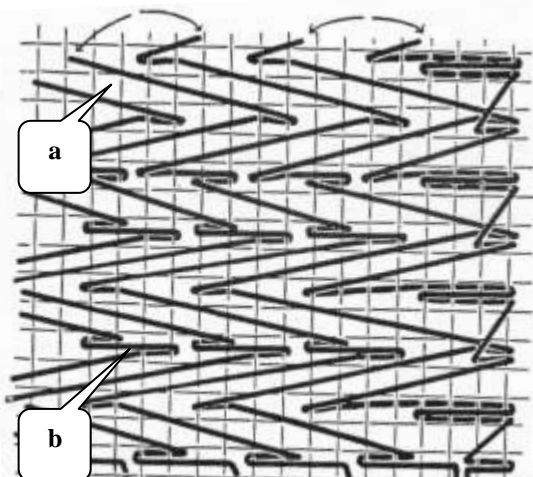


Fig.20 Diagram of some of the supplementary weft techniques known in Europe, Switzerland; ca. 3000 B.C.

4. Discussion

The supplementary weft technique is one of the most important techniques that are used in the archaeological textiles, because it was considered the primary attempt to make simple ornamentations before discovering the tapestry textiles or none running weft technique which could be used to make ornamented textiles. There are three important types from the supplementary; the running supplementary weft, none running supplementary weft, and *Zili* supplementary weft now we can recognize among them easily. This study introduces all types which can be used in weaving the supplementary weft technique. In addition, showing the distinguished differences between the supplementary weft and embroidery technique (brocade), for example, in the first technique, the weft- float patterning is a way of decorating a simple weave. The colored extra-weft threads are woven into the fabric to create either a scattered motif, while the embroidery's threads in the

brocade are added on the basic fabric by the needlework. So the supplementary weft technique is not the brocade.

In contrast to other opinions, the Egyptian weavers knew the supplementary weft technique. Also they could employ it in several techniques such as Egyptian inlaid edge done with none running supplementary weft to produce a strong edge for their textiles and a heavy supplementary weft threads were laid into the shed along with the ground weft for a ways, then suddenly given a right or left-angle turn so as to become supplementary warp. These types found on Egyptian linen from the Middle Kingdom to Roman times.

Acknowledgements:

The author wishes to thank Mr. Ezat Salip (Textiles Conservator in the Coptic Museum in Cairo). Mr. Medhat Saber (Textiles Conservator in the Egyptian Museum in Cairo) and Dr. Enaas Ameen (Faculty of Fine Arts, Minia University) and Dr. Dahi Shaban Painting Conservator, Sohag, for their assistance in preparing this study.

5. References:

Allane Lee, "Kilims- A Buyer's Guide" Thames and Hudson Ltd, London, 1995.

Barber, E.J.W. "Prehistoric Textiles – The Development of Cloth the Neolithic and Bronze Ages" Oxford, 1991.

Barnard, N. "Kilim- The Complete Guide, History, Pattern, Technique, Identification" Thames and Hudson Ltd, London, 1st. edition, 2000.

Benardout, D. "The Care and Repair of Antiques- Rugs and Carpets" CHANCELLOR PRESS, London, 1990.

Black, D, "The Atlas of Rugs and Carpets" London, 1994.

Collingwood, P. "The Techniques of Rug Weaving" 1st. published, London, 1968.

Geijer, A. "A History of Textile Art" 1st. published, London, 1979.

Ginsburg, M. "The Illustrated History of Textiles" London, 1991.

[http://www.squidoo.com/Needlewoven Necklaces](http://www.squidoo.com/Needlewoven_Necklaces) Basic Soumak Weaving.

Maher, S. "Islamic Textiles" Dar Al Shaab press, Cairo, 1977

Maher, S. "Coptic Art" Dar Al Shaab press, Cairo, 1977.

Marouf, M. A. "Technical Analysis of Tapestry" International Conference in field of Conservation (The Concept of Conservation and Restoration of Objects: An Applied Study of the Ekhnaton Museum) 17-18 march 2005, Faculty of Fine Arts, Al Minia University.

Miller, J. "Care & Repair of Antiques & Collectables - Textiles" Mitchell Beazley, New York, 2002.

Petsopoulos, S. "Kilim, The Art of Tapestry Weaving in Anatolia, The Caucasus and Persia" Fribourg, 1979.

Stone, P. F. "Rugs of the Caucasus, Structure and Design" Chicago, 1984.

Symmetry of Rugs - Major Rug-Producing Regions of the World.mht.