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Nubian textile features: wool fragments from Hisn al-Bab and a tunic from Fag el-Gamus, Egypt

Abstract

Excavations carried out by the Cairo Branch of the Austrian Archaeological Institute since 2012 at the site of Hisn al-Bab, a military settlement 10 km south of Aswan in Egypt, revealed an abundance of textile fragments dating from the late sixth to early seventh centuries CE. A study group of 80 textiles was selected of which 60 wool examples were analysed and compared with wool textiles from Lower Nubia and Egypt. Research into the typical features of Nubian textiles also led to the discovery of what may be an exceptional Nubian wool tunic unearthed at the cemetery of Fag el-Gamus at Fayum in Egypt.

Keywords: Egypt, Nubia, wool, tunic, weft twining

Introduction

The Marie Skłodowska Curie research project 'TUNICS' investigated the impact of cultural cross-fertilisation between the diverse populations in Egypt in the Early Medieval period (sixth to tenth centuries CE) through a comparative study of the clothing worn in that period. This research is foremost an object-based study of tunics and other garments from various settings: several museum collections as well as the cemetery of Fag el-Gamus (Fayum) and the excavation of Hisn al-Bab on the Egyptian-Nubian border.

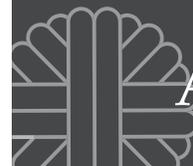
Permission was granted to study the textile finds of the military settlement Hisn al-Bab in March 2019. In particular, the wool fragments from this border settlement appeared to be relevant material for this research project, and a comparative study was conducted between these finds and wool textiles excavated in Egypt and Lower Nubia (in modern Egypt and Sudan) from the same period. The technical features of the wool fragments from Hisn al-Bab mainly correspond to the features of Nubian wool

textiles. Similarities have also been identified with one exceptional tunic find from a burial of the cemetery of Fag el-Gamus, Fayum.

Textiles from Hisn al-Bab

The site of Hisn al-Bab, a military settlement on a rocky slope and plateau on the east bank of the Nile, is situated at the south end of the first Nile cataract near Philae, 10 km south of Aswan. There were no constant boundaries in this area during the first millennium CE, as the occupation of the border area by different populations changed often. The archaeological site consists of two fortresses (Gascoigne and Rose 2014; Rose 2012). Research into the history and the occupation of the military post is still ongoing. It is assumed that the earlier fort is probably of late Roman date, and that the use of this fortress came to an end during the seventh century CE. After a period of abandonment, a new fort was built in the ninth century, partly over the earlier structures.

Excavations carried out by the Cairo Branch of the



Austrian Archaeological Institute (ÖAI) since 2012 under the leadership of Pamela Rose have focused on the earlier fortress. An abundance of textile fragments from ten different areas within this fortress have been recovered. Pottery finds (unpublished research by Gillian Pyke, Yale University, USA) and coins (unpublished research by Hans-Christoph Noeske, University of Frankfurt, Germany) from the same areas indicate that these textiles date to the late sixth or early seventh centuries CE.

From the thousands of textile finds, 80 textiles were selected for technical analyses of the weaving structures. These were mainly small fragments from ten different areas in the fortress. The selection was made in the context of the intended comparative research. No complete textiles were found in Hisn al-Bab. The larger fragments and those with visible technical features (other than tabby weave) were chosen for further investigation. As a result, this research does not provide a systematic overview of all the textiles excavated on the site but it does discuss a number of striking technical features apparent in the study group under examination. A systematic survey of the Hisn al-Bab textiles is currently being conducted by Amandine Mérat (independent Egyptologist and textile specialist).

Linen, which was a basic material in Egypt during the Byzantine and Early Medieval period, was found only to a limited extent in Hisn al-Bab. This probably indicates that these linen fabrics were not usually worn or used in the settlement. Linen is mainly found in tapestry fragments not as a yarn for the ground weave of garments or utility textiles.

Cotton finds are also scarce in the late sixth century CE at Hisn al-Bab. Both S-spun and Z-spun cotton yarns



Fig. 1: Detail of 550-1750-0079AK showing the difference in the spinning of the warp and the weft. The warp yarn has a very high twist degree while the weft is rather loosely spun (Image: Anne Kwaspen)

are present including a head covering made from likely reused cotton textile scraps with threads spun in both directions (inventory number 906-M-0082AK). A great deal of discussion regarding the spin direction of cotton is still ongoing. In Nubia, the spin direction was mainly S whereas in Egypt both S-spun and Z-spun cotton have been found. One of the assumptions is that Z-spun cotton (as with Z-spun wool) is of foreign origin (Bouchaud et al. 2019). This could mean that the cotton yarns at Hisn al-Bab may have a mixed origin, both local and imported.

The most important textile fibre used at Hisn al-Bab was wool (Mérat 2021). Among the selected 80 textiles, 60 are wool. The term wool is used here to include fibre from other animals as well as sheep. The material and technical weaving features of these are described and parallels from Nubia and Egypt discussed. The frequency of fibre use in the textiles of Hisn al-Bab reported is consistent with the findings of previous textile studies focusing on Lower Nubia in the sixth and seventh centuries CE, including the region between Gamai and Faras (Bergman 1975) and Ballana and Qustul (Mayer-Thurman and Williams 1979). These studies reported that mainly wool textiles were found during the periods referred to as the “X-Group” and the “Early Christian”. The fact that the textiles in Hisn al-Bab are mainly made of wool may be the first indication that they are of Nubian origin.

Wool fibres and yarns

The short study period of ten days and the prohibition on exporting samples from Egypt made scientific analyses of the wool fibre impracticable. However, the range of colours (from off-white to dark brown) corresponds to undyed natural wool colours. The use of camelid fibres in Late Antique Egyptian textiles has not yet been thoroughly investigated. However, several textile finds from Nubian medieval sites indicate that camelid fibres were likely used (Bergman 1975, 10; Fiedler 1979, 49–51; Yvanez et al. 2021, 36–40), making dromedary camels a probable fibre source in Hisn al-Bab alongside sheep and goats (Mérat 2021).

In general, the wool fibres found at Hisn al-Bab are S-spun. It is striking that many of the textiles show a difference in the spinning of the warp and the weft (fig. 1). The warp yarns tend to have a very high twist, sometimes even an over-twist, while the weft is spun rather loosely. A yarn spun with a high twist degree is typical of the warp needed for weaving on a warp-weighted loom in order to sustain the weight and tension created by the loom weights (pers. com. Demant 2021). The warp-weighted loom was commonly in use in Nubia in the Meroitic period

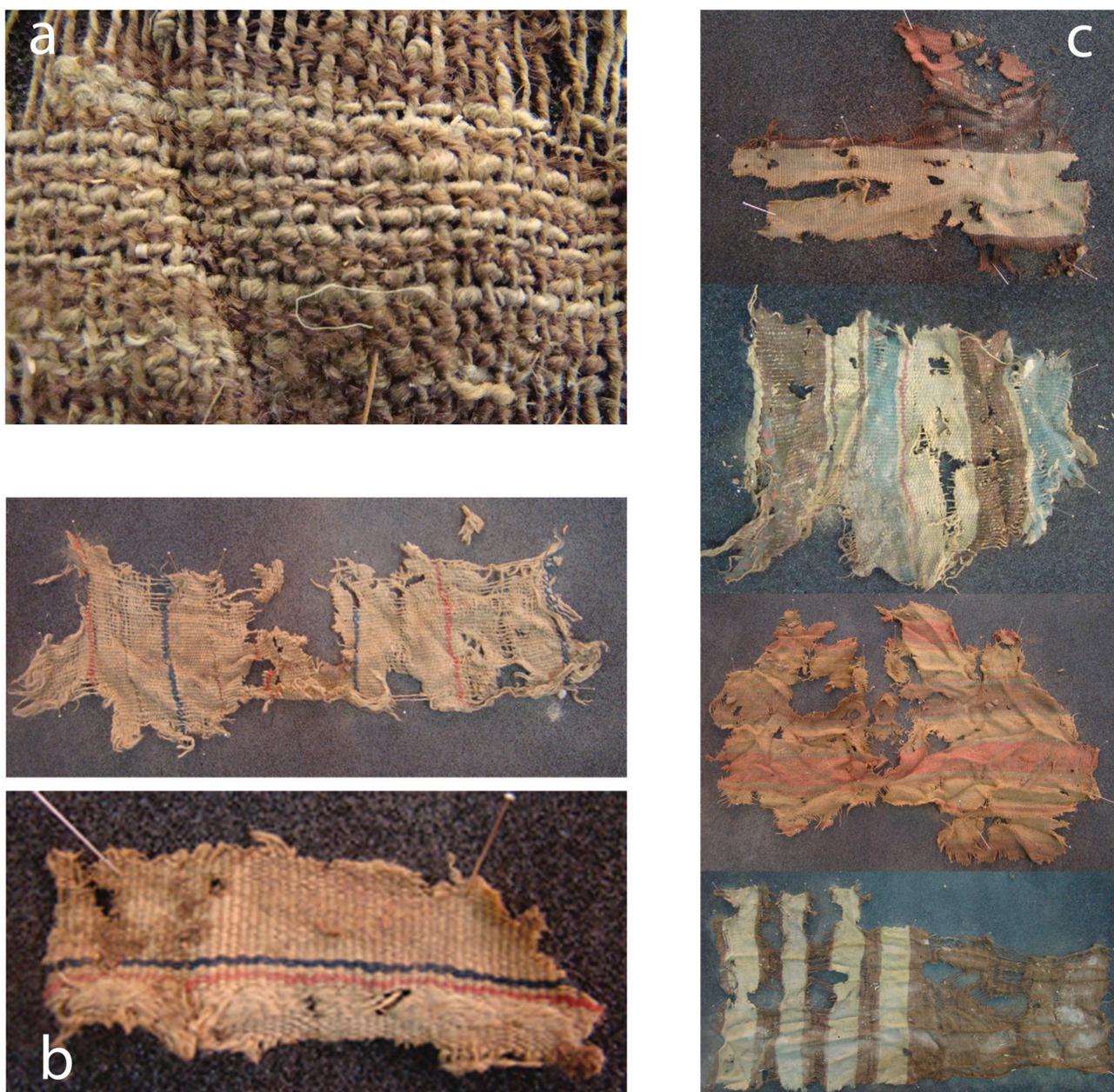


Fig. 2: a – Detail of 877-0699-0060AK with a striped pattern of alternating wefts in light and dark brown; b – fragments 794-0894-0042AK and 938-0898-0024AK with fine coloured stripes; and c – fragments 728-0898-0027AK, 877-0699-0061AK, 2014-0036AK and 732-0898-0034AK with wide stripes (Image: Anne Kwaspen)

(Wild and Wild 2014, 76) but less often in later periods. The use of high twist warp yarn may still be indicative of this tradition.

Besides textiles woven with single spun wool warps, fragments were also found with warp yarns plied S2Z (that is, two S-spun yarns plied together in the Z direction). The use of plied yarns for the warp is mainly known from Egyptian linen tapestry weaves and from supplementary weft brocaded (*broché*) wool

bands which were both produced for application on tunics. The three examples found at Hisn al-Bab in this study are monochrome or striped tabby weaves. The samples are too small to determine their function.

Ground weave

The wool fabrics from Hisn al-Bab showed extensive use of undyed, naturally coloured wool. Among the 60 fabrics only four have a dyed warp. Another four

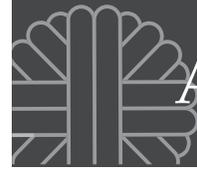


Fig. 3: a – Fragment 722-0898-0014AK in plaid weave in weft-faced tabby; and b – fragment of a plaid weave 1045-0699-0058AK (Image: Anne Kwaspen)



fabrics have a striped warp in which undyed wool is alternated with red, yellow, and blue warps.

The main weaving structure for the wool fragments is tabby weave. The majority are in weft-faced tabby, with the weft covering the warp and an average density of six to ten warps per cm and 16 to 27 wefts per cm. There are also weft-predominant tabbies with more weft than warp yarns per cm but with the warp still visible. Only four of the fragments have a balanced weave: two of these are open structured weaves made with very fine wool yarns. By way of comparison, it is noteworthy that Egyptian wool fabrics are also commonly weft-faced tabbies, yet there are only two fragments that are very similar to the typical wool cloths from Egypt with a warp density of eight to nine yarns per cm and a weft density of 38 and 50 yarns per cm. A large number of the Hisn al-Bab wool fabrics differ from Egyptian wool weaves because of the degree of difference in the spin of the warp and weft. Owing to the loosely spun weft, these fabrics are thinner and more flexible than the usual wool finds from Egypt.

One example has bands in balanced weave, alternating with bands in weft-faced tabby. In another example, the weft predominant structure alternates with half basket weave, where two weft threads are worked together.

Another more exceptional structure among the textile finds of Hisn al-Bab is a yellow wool with a looped weave. It is a pile weave with a row of wrapped pile (Verheken-Lammens 2009, 134) every 2 cm. The wefts between the pile rows are executed with paired threads.

Although many of the recovered wool textile fragments are monochrome, their fragmentary nature makes it difficult to conclude that they also come from a cloth which is monochrome throughout. The striped wool fabrics are the most common finds. They appear to have full-width (weft) stripes in each case. There are different patterns of stripes including cloth with an alternating stripe pattern per two picks in light and dark brown natural-coloured wool (fig. 2a); cloth with narrow stripes which are only a few weft picks high (fig. 2b); and cloth with patterns with wide coloured stripes (fig. 2c). Some larger fragments have clear evidence that the stripes are only at the starting/finishing ends of the fabric whereas other examples have a striped pattern throughout. Most of these striped textiles have the natural-coloured wool as the basic colour. The colours that occur most frequently are red and blue but yellow, pink, and a lilac-ish purple were also found, as well as a colour, which after deterioration, can be described as light grey.

There are some notable weaves, which at first glance look like striped weaves, where the warp is threaded in different colours, making them plaid weaves (fig. 3a). Because these fabrics have a weft-faced tabby structure, the colour variation in the warp is almost imperceptible. However, it would have been visible in the starting/finishing borders, which are no longer preserved. In addition, there are three plaid fabrics with a balanced or weft-predominant tabby structure, in which the intersecting colour combinations are visible (fig. 3b).

The edges

The starting and finishing borders

The assumption that the fabrics with a very tightly spun warp were woven on a warp-weighted loom suggests that many starting borders would be found among the textiles. Ingrid Bergman described eight main types of starting borders on the textiles during the Scandinavian Joint Expedition to Sudanese Nubia (Bergman 1975, 28–31). However, there are only two starting borders in this Hisn al-Bab study group, even though this was an important criterion for selection. This could be an indication that the fabrics are woven on two-beam looms rather than the warp-weighted loom. One fabric has a light brown warp and weft and a starting border in blue S4Z-ply wool yarn in which a countered twining was first made followed by another row with single twining (fig. 4). The other example was difficult to analyse because only one centimetre of the starting border was preserved. It comes from one of the plaid fabrics. Its starting border is executed in either tablet weaving or band weaving; the fragment is too small to determine the technique with certainty.

Finishing borders can be found more frequently in



Fig. 4: Detail of 795-1120-0084AK with a twined starting border in blue S4Z-ply wool yarn (Image: Anne Kwaspen)

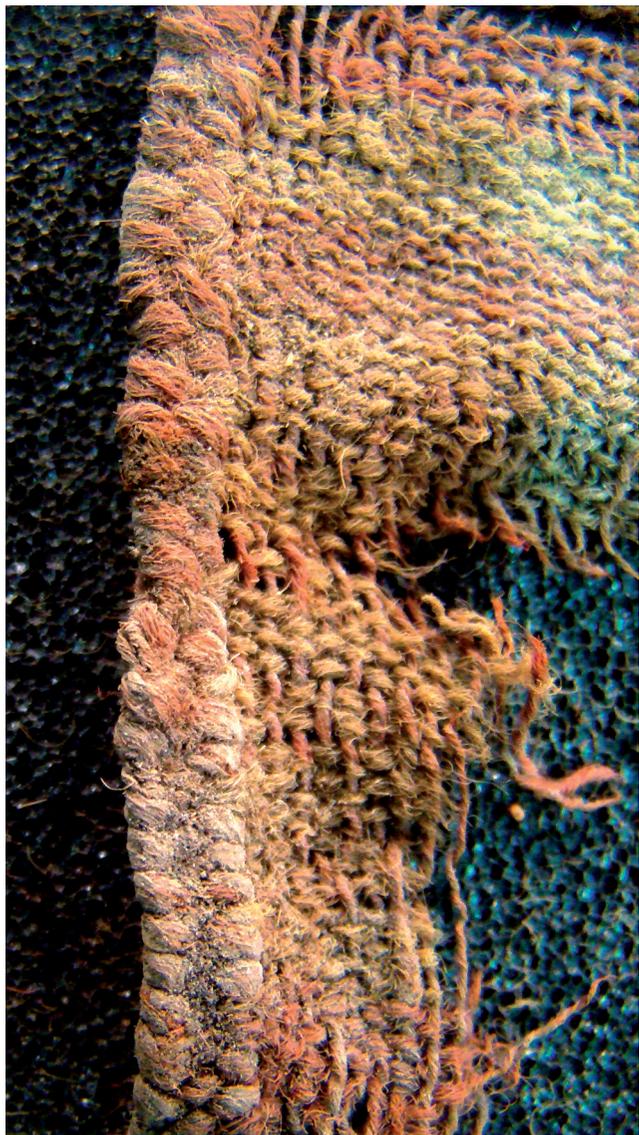


Fig. 5: Detail of 730-0898-0032AK with a reinforced selvedge (Image: Anne Kwaspen)

the textile finds of Hisn al-Bab. In the study group, there are nine fabrics with the most typical finishing border in which the warp yarns are processed in a twined cord that runs along the fabric edge (Kwaspen 2020, 25; Bergman 1975, 32–33). One fabric has a more complex border combining twining and braiding.

The selvages

The preserved longitudinal edges of the wool fabrics show that all are reinforced selvages. As a basis for reinforcement, some units of combined warp yarns have been created. Most commonly, these are two or three units of two to five yarns together, used as outer warps on both sides of the weave. In addition, most



Fig. 6: Detail of 722-0898-0014AK with selvedge (Image: Anne Kwaspen)

cloths also have a reinforcement of the selvedge made in the weft direction. This was done in two ways. A first method used the weft of the ground weave to make extra turns in the selvedge section. In the second method, an extra weft yarn is added that only makes turns in the selvedge section. This can result in a thicker and stiffer border, in some cases highlighted even further by the construction of a polychrome design. This decoration has so far only been identified in these Hisn al-Bab textiles (fig. 5).

The longitudinal edge of one fragment deserves more attention (fig. 6). In this fragment, two warp units have been created 3 cm from the side, each consisting of two yarns together. The regular weft ends wrap around these warp units in the dovetailing technique. The outer 3 cm are then woven in blue wool up to the outer edge which is formed by three warp units of three yarns together. On these warp units, the blue weft ends in a triangular shape in the dovetailing technique to connect again with another weft colour. The outer edge is woven in red with the opposite dovetailing. Uniquely, the stripe pattern does not extend to the edge of this fabric because of the way the broad blue border is formed.

The seams

There are very few seams on the textiles from Hisn al-Bab. Most relate to patches for repairs rather than the construction of clothing. This lack of seams is more evidence that these textiles are probably of Nubian



Fig. 7: Details of 877-0699-0061AK, 722-0898-0013AK, 927-0600/0621-0055AK, 927-0600/621-0054AK, 730-0898-0033AK, 730-0898-0032AK, 707-0895-0022AK, 718-0898-0018AK and 707-0895-0023AK - all textiles with (countered) weft twining near the finishing border (Image: Anne Kwaspen)

origin. Nubian clothing usually consisted of one-piece cloth tunics with openings for the head or rectangular or triangular cloths that were draped around the body, such as loincloths and the so-called mantles (Bergman 1975; Mayer-Thurman and Williams 1979). Different types of seams occur as run and fell seams, overlap seams, and flat seams. Two textiles have two fragments joined at selvages, where the selvages are placed next to each other and sewn together with top stitch. This method is known from the shoulder seams of Roman wool tunics which are constructed from two rectangular fabric pieces (Sheffer and Granger-Taylor 1989).

Decorative weaving techniques

For this study, nine fragments with tapestry were selected. All these tapestry fragments are woven with a wool warp (with an average thread count of nine to 11 warps per cm). Wool is also used for the weft (with an average thread count of 42 to 60 wefts per cm). Therefore, it can be assumed that all these

tapestries were woven directly as ornamentation in the ground weaves, since textiles woven separately for appliqué were extremely rarely made on a single wool warp. Most of the fragments are so small that little information is available to understand their figuration or to compare them with other tapestry weaves from Egypt and Nubia. In three cases, the tapestry is combined with a flying thread brocading technique executed with wool yarn.

One very specific type of decorative element stands out among the Hisn al-Bab textiles: lines of countered weft twining often found close to the finishing borders of the weave (fig. 7). Countered weft twining is a well-known feature in Egyptian wool tunics from the late Roman period onwards. Its function is to reinforce the weak points under stress in the woven-to-shape tunics such as the corners of the woven-in neck slits and the armpit point where the sleeve merges into the front and back parts. Countered twining is often used to insert or eliminate extra warp threads into the weave. However, the appearance of countered twining in



the Hisn al-Bab wool textiles appears to have had a primarily decorative rather than strengthening function. Its placement near the start and finishing borders is a remarkable feature. The countered weft twining on these textiles is often executed in two alternating colours, made with two S2Z or S3Z plied yarns. The structure is weft twining 2-2, 3-3 or 4-4, which means that every yarn always goes over and under the same number of warps, creating V-shaped figures with one V starting where the previous V stops. The twining yarns can be naturally coloured, red, blue or yellow. Only one textile (inventory number 720-0898-0039AK) was found with a single weft twining. It is naturally coloured monochrome and executed with two yarns but these go irregularly over and under the warp yarns.

The decorative use of weft twining has already been published with the countered twining chiefly discussed as part of the starting borders (Bergman 1975, 25–28; Mayer-Thurman and Williams 1979, 39–41). The weft twining at a short distance from the end borders (as is strikingly common in the textiles from Hisn al-Bab) is not mentioned even though it is clear from these publications that the stripes in weft twining are typical for wool cloth in Lower Nubia.

Although the decorative use of countered weft twining next to the end borders is not a recognised feature in Egypt, an instructive small fragment was unearthed in Berenike (inventory number BE97 099; pers. com. Wild 2021). In this blue wool fragment, counter twining was introduced a few wefts behind the finishing border in white and red wool, making it very similar to the Hisn al-Bab fragments but with the significant difference that this textile is executed with a coloured warp.

A Nubian tunic found in the Fayum (inventory number 1992-SW-39.13)

The identification of the countered twining decorative stripes as a typical feature for Nubian textiles has led to the discovery of what may be an exceptional Nubian tunic unearthed at the cemetery of Fag el-Gamus (Fayum). It is now in the study collection of archaeological textiles at Brigham Young University (BYU) in Utah (USA). Fag el-Gamus is located 90 km south of Cairo, in the desert just east of Fayum. BYU holds the concession for the cemetery, which was in use from the Ptolemaic period until the Early Medieval period (Muhlestein et al. 2020). The author was in the excavation team from 2018 and was in Utah to study the textiles in storage in 2020 as part of the TUNICS project. During investigation of the textiles in an exceptionally rich burial with Kristin South, a large fragment of a wool tunic (inventory



Fig. 8: A fragment of tunic 1992-SW-39.13 from Fag el-Gamus (Image: Anne Kwaspen)

number 1992-SW-39.13) was identified as completely different from the typical woven-to-shape tunics that are frequently found in Fag el-Gamus.

The preserved part (46 cm x 46 cm) consists of a fragmentary rectangular piece running from the side edge to approximately centre front of the tunic with a half preserved woven-in slit as a neck opening at centre front (fig. 8). The tunic is what is called a sleeveless woven-to-shape tunic, which is a very common type of garment in Egypt. These tunics are woven from side edge to side edge, then turned 90° to be worn. In the finished tunic, the warp runs horizontally. The selvages are located on the hems at the front and back. A first striking feature of this tunic is that it is extremely short. The full weave width is only 46 cm, making the front and back each only 23 cm long. No sewing marks were found on the selvages, which are strengthened with two warp units, making it unlikely that any pieces would have been sewn on to make the tunic longer.

Technical features

The ground weave of this garment is composed of a naturally coloured S-spun wool warp with a count of 10 yarns per cm and a naturally coloured S-spun weft with a count of 32 to 35 yarns per cm. The weave structure is therefore a weft-faced tabby. The starting border is preserved: it is countered twining which



Fig. 9: Detail of the starting border and counterwoven twining of tunic 1992-SW-39-13 from Fag el-Gamus (Image: Kristin South)

always goes over two and under two warp yarns made with red S3Z-ply wool yarn. This is followed by three wefts in red wool and then seven wefts of naturally coloured wool (fig. 9). Subsequently, a row of counterwoven twining was introduced over the entire width of the cloth. This twining also goes over two and under two warp yarns and is made of alternating yellow S2Z-ply wool and red S3Z-ply wool yarn. It is this bicoloured twining near the starting border that strongly resembles the textile finds from Hisn al-Bab. There are other remarkable features including the



Fig. 10: Detail of clavus and neck opening of tunic 1992-SW-39-13 from Fag el-Gamus (Image: Anne Kwaspen)

clavi, the vertical stripes that run along the neck opening from the front over the shoulders to the back. In this tunic, the *clavi* are executed in a vertical stripe pattern with six purple-brown stripes, each with a bicoloured counterwoven twining down its centre (fig. 10), five of which are made with a combination of red and white wool, and one in red with yellow wool. Comparison with a corpus of more than 400 Egyptian tunics suggests that this type of *clavus* is unique among Egyptian finds but is echoed in the Nubian textile tradition.

What is also rather remarkable is the placement of the circular ornamental elements, the *orbiculi*. There are no *orbiculi* placed at the height of the shoulder line, as often occurs on Egyptian tunics, but two are preserved (and probably four on the entire tunic) in the corners of the tunic. These *orbiculi* are woven in purple wool and decorated with geometric figures in flying thread brocade technique, executed with naturally coloured wool as are the flying thread brocaded fragments from Hisn al-Bab. In addition, these *orbiculi* are very similar to examples on textiles found at the Nubian site of Qustul, in grave Q 136 (inventory number 85) and grave Q 236 (inventory number 107) (Mayer-Thurman and Williams 1979, 98 and 108).

Tapestry technique was employed to depict animal figures between the two *orbiculi* and between each *orbiculus* and the selvages, probably representing crocodiles (fig. 11). These kinds of loose and connecting figurations between *orbiculi* is not seen on Egyptian tunics.

The neck opening is a woven-in slit with one unit of two warp yarns as selvedge. Over this selvedge a colourful decorative border is made in finger-weaving technique (Kwaspen 2017, 203–204) (fig. 10). This technique implies that twining threads are sewn with



Fig. 11: Detail of tapestry on tunic 1992-SW-39-13 from Fag el-Gamus (Image: Anne Kwaspen)



Fig. 12: Fragment 1992-SW-39-23 from Fag el-Gamus (Image: Anne Kwaspen)

one red S2Z-ply wool yarn. The twining threads are all S3Z-ply wool yarns, with the following colour combination: yellow, red, blue, red, yellow, blue, and green.

Other textiles in burial 1992-SW-39

The tunic fragment was found in the burial of a young adult woman in a shaft 127 cm deep. In Fag el-Gamus, from the beginning of the era to at least the sixth century CE, it was customary to bury the deceased in a shaft into which further burials were superimposed over a long period. The burial 1992-SW-39 was found in very good condition. An exceptionally large number of textiles were recovered during unwrapping. The fragment of the tunic was placed on the pelvis and legs of the deceased. Because of this, it was interpreted by the excavators as an apron. It is not possible to deduce from the notes in the field books whether there could have been more fragments on the upper body.

In the same burial, three fragments of another cloth in naturally coloured wool (inventory number 1992-SW-39.23) with a counter-twined stripe in alternating red and white wool located one centimetre from the finishing border were found (fig. 12). Long warp fringes finish the end edge. Narrow stripes in red and brown wool were woven into the structure as embellishment. From these characteristics, a Nubian origin for this textile could be hypothesised.

In addition to various linen wrapping sheets and ribbons, this burial also contained a pair of needlebound socks as well as a linen tunic with *clavi* and sleeve bands in purple wool and flying thread brocading in linen, which all frequently occur in Egyptian linen tunics. Ten hairnets were also found, both on the head of the deceased and placed elsewhere on the body (Kwaspen and South 2021).

Conclusion

Research into the political history of the border area between Egypt and Nubia is still ongoing. Analyses of technical features of the wool textile finds show that these textiles from Hisn al-bab correspond to finds of Nubian textiles from other settlements and cemeteries. This result may help in determining that Hisn al-bab was most likely a Nubian settlement at the time. However, it should be taken into account that most textiles were found in dump pits and that a minority of finds also resemble Egyptian textiles.

The most striking technical feature is the counter-twined bicoloured weft twining near the end borders of the cloths. This is clearly a feature found in Nubian textiles and unusual in Egyptian textiles. It was therefore remarkable to find this use of weft twining on two textiles in a burial at Fag el-Gamus. Both the tunic and the other wool fragments suggest that these could be Nubian textiles. It is with great caution that this conclusion is proposed given the great distance between Lower Nubia and the Fayum and that other textiles found in the burial are more in line with the Egyptian clothing tradition. Nevertheless, these two textiles form interesting sources for further research on trade and migration, or on the movement of people and craft knowledge.

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