TEXTILES FROM AT-TAR CAVES: PART II-(1): CAVE 16, HILL C

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Foreword

The fifth excavation survey of Cave 16, Hill C, at-Tar Site Group Caves was carried out by the Japanese Archaeological Expedition to Iraq directed by Hideo Fujii from October 25 to December 20, 1977. The report *Excavations at at-Tar Cave, The Fifth Working Season: Cave 16, Part 1* in Japanese [Ii, 1986: pp.1-21, Pls.1-8] has been already made on the location of the cave, structure, deposits, excavated situation of the textiles and other archaeological goods uncovered here. Thus, the present report, Part II-(1), deals with the textiles uncovered at Cave 16, Hill C as the second report following both the first one by Ii and the report *Textiles from at-Tar Caves, Part I.* However, the current report has been divided into two, with the research required for their analysing and identifying work duly taken into consideration. Hence, in the first place, the present report covers pile textiles, and secondly, unpiled textiles, rush mats and leather goods will be reported in the forthcoming volume of this journal.

In relation to the excavated situation of Cave 16, Hill C, as is reported in detail in the Ii's report mentioned above, it has been made clear that Cave 16 was much more disorderly confused than any other cave. Thus, it is next to impossible for us to determine the compound relationship between human remains resulting from burials (3 adults; 2 infants) [Fujii, ed., 1980: p.171] and the textiles.

In fact, the fragmentary textiles which should be identified into a single identical textile each and all the other burial goods were in dreadful disturbance, thrown away here and there inside the cave, and also the burial facilities including burial beds were found completely devastated. The result is that large fabrics have been scarce in number and most of them have been reduced to fragments, instead. Consequently, it made us difficult to grasp the whole information from each cloth as to the full-length size and pattern, though everything was the one of more excellent quality in weave technique and more elaborate in design composition than those of any other cloth uncovered at other at-Tar Caves.

As a result of examining and identifying carefully these fragmentary textiles, they have been classified as the ones made of the following materials:

Sheep fiber and other beast fiber textiles:		
Pile textiles		8
Unpiled textiles		36
Cotton:	Unpiled textiles	5
Linen:	Unpiled textiles	2 (One of them uses sheep fiber in the weft thread of the pattern)
Rush mat:		1 (Grandrelle thread[1] of sheep fiber and camel fiber is used

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in the warp; sheep fiber and common goat fiber are used in the pattern weft)

One of the questions we have been in mind under course of conducting this investigation is why grandrelle thread, which is produced by twisting two or three yarns of different colors together, was used for the warp of many pile textiles and all the rush mats. We see the wefts for the pile textiles and the rush mats cover the warps. That is to say, the grandrelle warp thread does not appear on the surface of the pile textile or that of the rush mat. Thereby, it has not been thought that the grandrelle warp thread was used for the decorative purpose [Fujii, Sakamoto and Ichihashi, 1989: p.151]. And it has been proved as a result of the light microscope observation that Textile 17 from Cave 12, Hill C, contains grandrelle warp thread which is produced by twisting sheep fiber yarn and camel fiber yarn [Fujii, Sakamoto and Ichihashi, 1989 : p.137].

In order to solve the aforementioned question completely, we asked Fibers & Textiles Research Laboratories, Toray Industries, Inc. to analyse the fibers used in the pile textiles from Cave 16. On the basis of their analytical results, we have decided to propose a new notion against the one in which we have meant 'wool' by sheep fiber and 'hair' by beast fibers other than sheep fiber. Thus, we have tried in the present study to classify all the fibers by animal species, thinking that 'wool' and 'hair' can coexist among beast fibers.

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Pile textiles from Cave 16, Hill C

Textile 1 Rug with stripe border: Representative Specimen No.V-79-5 (P1.1-a)
Textile 2 Rug fragment of rough finish: Representative Specimen No.V-39-2 (P1.3-c)
Textile 3 Monochrome rug fragment: Representative Specimen No.V-97-1-a (P1.2-e)
Textile 4 Pile fragment of twill ground: Representative Specimen No.IV-W-66-1 (P1.1-c, d)
Textile 5 Double faced rug fragment: Representative Specimen No.V-62-3 (P1.3-d, e)
Textile 6 Small red fragment: Representative Specimen No.V-47-13 (P1.2-d)
Textile 7 Fragment of carpet with wave pattern and geometric pattern: Representative Specimen No.V-70-1 (P1.3-a, b)
Textile 8 Green rug fragment with staircase pattern: Representative Specimen No.V-116-3 (P1.2-a, b)

Identification

As already mentioned in *AL-RĀFIDĀN* Vol.X [Fujii, Sakamoto and Ichihashi, 1989: pp.110-111], we notice some irregular weavings in pile textiles wich cannot be commonly shared with the weavings in unpiled textiles.

One of the most extraordinary features of these pile textiles in weaving is that warp threads of different twist directions can be sometimes seen in a piece of fabric. And a piece of fabric often contains the 2-plied warp twisted with a single yarn of the same color and material each, the 2-plied warp twisted with a single yarn of different colors and materials each, and the 2-plied warp twisted with a single yarn of different colors and the same material each mixed together[1]. This is probably because any thread close at hand was made use of by joining it

with main warp, based on the fact that the warp used for a rug and a carpet was invisible since it was hidden behind the pile thread. Some warps and wefts contained in a single fragment are very different in thread thickness, thus resulting in an uneven ground-weave density. And also, sometimes, we see the wefts of different kinds of materials and colors in a single fragment.

As for the tiny textile fragments, if we are to strictly relying on the result of our examination of thread thickness, twist count and density, we are in danger of classifying the textile of supposedly the same origin at the time of its production into the ones of utterly different origins, and, on the contrary, in danger of identifying several pieces of supposedly closely related textiles into a single one, in view of the fact that the irregular weavings exist in pile textiles. This is why we are not necessarily able to determine the number of identified pile textiles in every cave. Accordingly, what is more important in identifying pile textiles lies in the pile knotting type, the color and thickness of the pile thread and the type of its ground composition, rather than the thickness, twist count, twist direction and ground density of the warp and weft threads.

As a result of identifying the Cave 16 pile textiles, there are two groups of fragmentary specimens with Type A-2 knotting. One of the pile thread colors is gold in a group while the other is dark grayish brown (only one fragmentary specimen: V-39-2). They are different in ground composition, i.e., the former is variation of plain weave (warp 2, weft 1) whereas the latter is variation of plain weave (warp 2, weft 2). Thus, the former has been identified into Textile 1 (P1.1-a) and the latter, Textile 2 (P1.3-c), respectively. In addition, Representative Specimen No.V-79-5, Textile 1, has a stripe border, so that the stripe fragments (Nos.V-58-7,V-62-4, V-65-7, V-95-3) of the same color as that of V-79-5 have been identified into Textile 1.

In the second place, there are two groups of specimens with Type B-2 knotting. One of them has pile tufts appearing on a single side, while the other has pile tufts on both sides. Both of their pile thread colors are dull reddish yellow. One of their ground compositions is plain weave (warp 1, weft 1) while the other is variation of plain weave (warp 1, weft 3). So, the former has been identified into Textile 3 (P1.2-e) and the latter, Textile 5 (P1.3-d,e), respectively. We can easily recognize them to come from plural origins at first sight, since the warp, weft and pile threads of the latter except for the weft in the border are generally at least 1 mm thicker than those of the former, besides the differences in their ground compositions.

There are two groups of pile textiles whose pile knotting types cannot be defined. One of them is composed of twill ground, and its pile threads are dark brown, and the other is composed of plain weave ground with its pile threads beautifully dyed strong yellowish red. Thus, we have identified the former into Textile 4 (P1.1-c,d), and the latter into Textile 6 (P1.2-d).

In the meantime, there is one fragmentary textile with Type C knotting on both surfaces. This is a cut pile with a wave pattern on it, which is among unique pile textiles uncovered in at-Tar. We have classified it into Textile 7 (P1.3-a,b).

The fragmentary specimens tied with Type A-1 knotting are of plain weave in ground composition, and their pile threads are colored dark grayish green. In spite of their showing no marked differences in their thread thickness and their identical twist direction, here are three different sorts of warp threads such as A (2-plied thread of dull reddish yellow), B (grandrelle thread of dull reddish yellow and dark brown) and C (2-plied thread of dull orange). In this case, a fragmentary specimen (V-87-1) has three kinds of warp threads, A, B and C, while the representative specimen (V-116-3, P1.2-a) and a few fragmentary specimens (V-68-1, V-95-7, IV-

W-31-1) have two kinds of warp threads, A and B, respectively. The result is that we have identified them into Textile 8 (Pl. 2-a,b), concluding that these fragments with various sorts of warp threads and the fragments with warp threads of A, B and C each come from a single identical source at their initial stage of production.

Weave structure

The fibers spun into thread for the use of pile textiles vary in thickness from very fine ones (15 μ) to very thick ones (45μ), most of which are 20−35μ in thickness (See p.70). Generally, their diameters are more irregular and thicker than those of the unpiled textiles. They are mostly sheep fiber and others are camel, cashmere and alpaca fibers. Here are used various sorts of threads differing in thickness, ranging from a single thread of 0.4 mm thick (Textile 4, Pl. 1-c,d) to a 3-plied thread of 6 mm thick (Tetile 5, Pl. 3-d,e), which finally makes up the pile textiles with great variety of textures in touch, depending on the use of fine thread and that of thick thread, respectively. A single thread, whose twist is loose, is used for all the wefts except for those of Textile 7 (Pl. 3-a,b). The 2-plied thread is always used for the warp and Textile 5 takes up a 3-plied thread for its warp. The warp twist is stronger than the weft twist. Grandrelle thread, where a single sheep yarn and the other beast yarn are sometimes plied together, is used in five out of the eight textiles (See data list).

As for the sheep fiber, crimps are more remarkably visible, thereby making it more elastic and larger in milling because of its more crenated scale shape in longitudinal view, where change in size is more apt to occur, accordingly. As for the other beast fiber, on the other hand, crimps are less remarkably visible, thereby making it less elastic and smaller milling because of its more flattened scale shape, where change in size hardly occurs, accordingly.

The predominant use of the grandrelle thread evidenced in the warp threads of pile textiles and rush mats may have been firstly because of the necessity required for warp toughness.

At the same time, with a view to realizing their combining effects onto a single plied yarn, the ancients probably intended to make better use of such excellent properties as the toughness and less milling of camel, cashmere and alpaca fibers in order to make up for the milling caused by sheep's scales.

We have found that the ground structures of these pile fabrics include plain weave (Textiles 3,6,7,8) and its variations (3 kinds: Textile 1, warp 2, weft 1; Textile 2, warp 2, weft 2; Textile 5, warp 1, weft 3) and twill (Textile 4, 1/2 twill). As for pile textiles, it is observed that most of them unearthed at at-Tar Caves are quite naturally weft-faced in thread spacing with the weft threads strongly beaten to prevent the pile threads from falling off, since the spacing of the pile row in relation to another is rather large (the one from Cave-16 : 8 mm or more), between which a lot of wefts are inserted. We presume that the way of knotting piles with an ample space open from one row to another was solely due to the at-Tar weavers' point of view that they wanted to give their products more importance to the practical use of floor-rug, rather than the decorative use of pattern representation. That is why the weavers of at-Tar chose the production method of making as many textiles as possible quickly, that is, the method of giving large spaces among the pile rows and covering the field with long pile tufts, without taking up such laborious way to complete elaborate pattern representation into high-density pile thread knotting by making individual pile knotting rows much closer. In particular, the warp, weft and pile threads of the textile with Type A-2 knotting are altogether thick, and the pile tufts are extraordinarily long. It is customary that the pile textile patterns are represented by

knotting pile threads together. In Textile 8, however, we see a staircase pattern woven with dovetailed tapestry on its ground composition. Most of the at-Tar textiles have their pile rows spaced so large that the ground color is apt to be seen through the pile tufts for the pattern. To sum up, the use of the onecolor ground wefts all over will cause their overlapping with the pattern color to be depicted with the pile tufts of different color on the pattern portion. In order to avoid this, the same color has been used both in the ground weft thread on the pattern portion and the pile tufts for pattern representation.

Selvages survive in Textiles 1 (Pl.1-a), 3 (Pl.2-e) and 8 (fragmentary specimen V-68-1). All of them belong to Type 2 [See *al-Rāfidān* Vol.X: p.116] (Fig.1). The repetition work of the weft threads at the selvage section makes the selvage thicker than the ground. The weave edge remains in Textile 5, from which we can learn the weave start method of that day [See *al-Rāfidān* Vol.X: p.115] (Fig.2). It is deducible from this method that warps of this fabric were in the state of continuation on the loom when they were ready for weaving operation. Also, such weave start portions similar to the above have survived in some unpiled textiles discovered at the other at-Tar Caves, which can tell us the procedures to get ready for weaving operation in those days. At first sight, the starting border is apt to be mistaken for the warp cord finish [See *al-Rāfidān* Vol.X: pp.115-116]. Actually, at the beginning, the starting border has two thick weft threads in the twisted way interlacing with warps, as shown in Fig.2 (Textile 5: three 3-plied warps are further twisted together). It is conceivable from the close contact of the wefts with the warps at the turning point that some device to make this feasible was adopted at the warping[2] or on the loom. One presumable technique is, for example, that the warp was not directly from beam to beam, but was turned back with the use of a string or a hook-like slender one on the beam, and the weft was put into place while twisting it by hand. Another presumable technique is that both the warping and the weft twisting were practiced by using a tablet at the same time, and the warp insertion was practiced while twisting wefts [Bergman, 1975 : Fig.25, p.30].

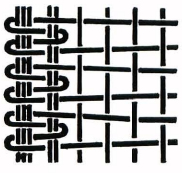


Fig.1 Selvage Type 2

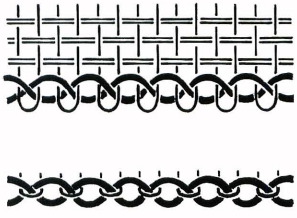
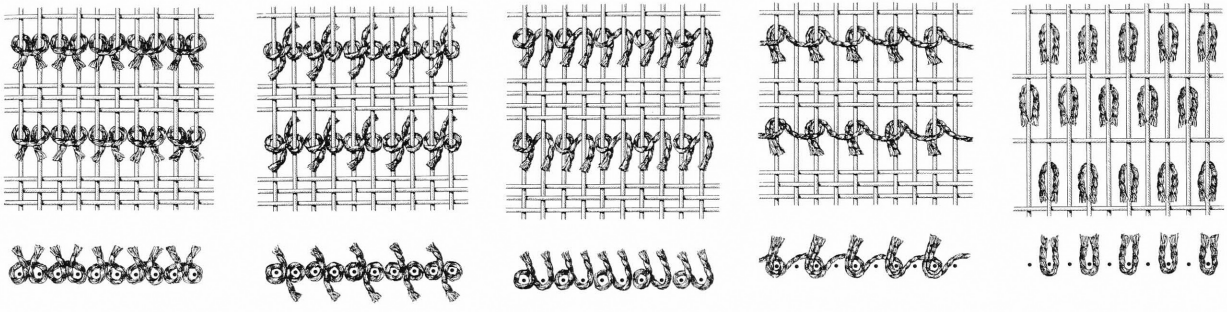


Fig.2 Starting Border

The pile textiles uncovered at the at-Tar Caves have five types of pile knotting methods, such as A-1, A-2, B-1, B-2 and C, as mentioned in *al-Rāfidān* Vol.X: pp.116-117 (Fig.3)[3]. Type A-1 and A-2 knots are symmetrically formed around two warps. Type B-1 and B-2 knots are asymmetrically formed around two warps. Type C loops are formed around only one warp. This classification has been given not through the technique based on presumption but solely through the state observation made on the pile threads from the at-Tar materials. As regards Type B-2, judging from the existent condition of the at-Tar specimens, there is no probability of its pile yarn slippnig. In general, Type B-2 is called slip loop, sharply distinguished from knot group, but we do not think it to be appropriate to the occasion. Taking up an example in this connection, it has been found among Coptic pile textiles that loop-like ones of Type B-1 and



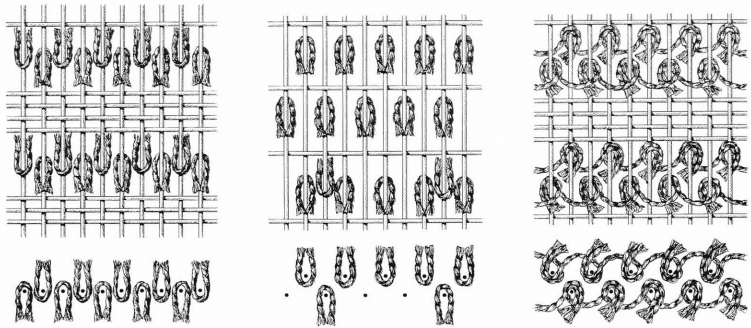


Fig.3 Types of Pile-knotting

variation Type B-2, of which we have formed a definition, coexist in the same knotting row (Textile No.173904 the Field Museum in Chicago). Cave 16 contains A-1, A-2, B-2 and C types, but not B-1. Moreover, they have yielded double-face knotting piles. Double-face knotting piles are the ones whose pile tufts come out on both surfaces of the fabric. But we also define the piles as double-face knotting ones if their reverse surfaces were used for another purpose, because they were different in their pile tuft length and pile 'knot'[4] density (Textile 7: the reverse side, Pl. 3-b). The ones with their both surfaces intended for obverse sides are also defined as double-face knotting piles.

Cave 16 has not only the double-face knotting piles with Type A-2 whose tufts come out on both surfaces, but also the double-face knotting ones whose tufts are knotted on both surfaces with Types B-2 and C. Such double-face knotting piles have been unearthed at Dura Europos (the obverse: Type B-1; the reverse: Type C) and Lou-Lan, Central Asia (double faced: Type C) [Pfister and Bellinger, 1945: p.49, No.233, Pls. IV, XXIV; Stein, 1921: pp.433, 438, Pl. XXXVII; 1928, p.252; Fujii, ed., 1980: p.76]. Type A-1 is equivalent to the so-called 'Turkish knotting', while Type B-1, 'Persian knotting'. In the meantime, Type B-2 can be often found in the archaeological carpets from Nubia and Egypt. Nevertheless, Type A-2 is peculiar to at-Tar as far as our comparative research including surveys on the materials from the Near East is concerned.

Designs

In the pile textiles uncovered at Cave 16, there are several types of designs such as stripe (Textile 1), chequered pattern (Textile 5), staircase (Textile 8), and the combination of wave and geometric patterns (Textile 7). The chequered pattern is composed of alternate shifting of comb patterns (picket-fence patterns) one by one into two rows up and down in the weft direction. The stripe and checkered patterns are represented along the unpiled weave edge of the pile textiles for the use of floor-rug as border decoration. All the border decorations of the at-Tar pile textiles are seen only at the starting and finishing portions, except for the double face pile textile (Type C) from Cave F-6, Hill A (C-04-3), where square patterns of different colors are designed along the selvage [Fujii, ed., 1976: p.182, Textile No.132; Fujii, ed., 1980: pp.65-66] (Pl. 1-b). The way of representing such border decoration for the rug use is different from that of the carpet coming from Antinoe, four sides of which are border-decorated [Dimand, 1933: pp. 151-161, Figs.1,2] and that of the carpet unearthed at Pazyryk, four sides of which are surrounded with border decorations in fivefold way [Руденко 1968: Стр. 41-55, илл. 31; Rudenko, 1970: pp.300-302, Pl.174]. The pile textile fragments with border decorations presumably woven at the weave starting or finishing borders can be cited among the ones from Dura Europos [Pfister and Bellinger, 1945: pp.48,49, No.231, Pl.IV].

As for the staircase pattern, the one in Textile 8 from Cave 16 is so fragmentary that its allocation is impossible (fragmentary specimens: V-86-2, V-127-9). Deduced from the example from Cave 17, Hill C (IV-MK-1382) [Fujii, ed., 1980: pp.60-62] (Pl.2-c), however, there is a strong possibility that it can be positioned at a corner of a textile. The staircase pattern which is woven on the ground uses dovetailed tapestry technique. It seems that purple-like pile thread used to be knotted at the staircase pattern. It can be thought that the pattern section took the shape of triangle as a whole.

Wave patterns can be traced in lots of archaeological materials such as on the pottery from the Chalcolithic Period in Anatoria and Mesopotamia as decorative patterns. As for pile textiles, wave border decorations can be seen in the carpet fragments uncovered from sites such

as Lou-Lan [Stein, 1928: pp.232,251,252, Pl.XLIV], and Grave 34 of Qum-Darya Delta [Sylwan, 1949: pp.47-49, Pl.23], as well as in the carpet uncovered at Sampula, Lop county, Xinjiang, China in 1983 [Egami, 1983: No. 50]. The carpet from Sampula contains a wave pattern, an indented geometric pattern (whose slant lines are in the staircase way because of their short pile knots) or a parapet design, which are used as twofold border decoration. Such instances as the wave pattern and the indented geometric pattern are doubled as border decoration, which have also been confirmed in the mosaic layer of the paved floor uncovered at Antioch [Levi, 1947: Pl.VIIb]. In this way, the Greco-Roman representation technique came to finally exert an influence upon the craftsmen for their creation of the Lop Desert goods. It seems likely that this is also true of the at-Tar pile textiles with the combination of wave pattern and geometric pattern arranged in them.

General outline on the identified textiles

Textile 1 (Pl.1-a): It has been uncovered in fair preservation with its large cloth size, pile tufts and color surviving pretty well. It is a thick pile textile bordered with stripe patterns. The area of border decoration is of plain weave without any pile tufts, while the ground of the pile knotted field is of variation of plain weave, where paired warps are interworked with a single weft. But, the boundary shifting from the former to the latter does not take the method of altering the weave structure by warp crossing which has been seen in the H-shape pattern [Fujii, Sakamoto and Ichihashi, 1989; pp.140-143]. Most of the warps are grandrelle threads and several wefts are mottled ones. The wefts used on the border decoration are a little finer than those used in the field. A selvage on one side still remains (Pl.1-a: left side). The selvage has been strengthened by the repetition of interlacing two cords of a set of 3-warps each with weft thread (Type 2). Type A-2 pile knotting is used here with its tufts coming out on both surfaces.

There is an interval of 1-2.3 cm (10-23 wefts) between the pile knotting rows. The pile tufts coming out on both surfaces and the use of thick warps and wefts have resulted in the fabric's formation of rather heavy, coarse texture in touch. It seems that the pile textiles of this sort were used for a saddle cover besides for a rug spread out on the open ground and/or on the floor. The pile textile with such border decoration can also be observed among the pile textile fragments unearthed at Dura Europos, as referred to in the preceding item, 'Designs'. Similarly, among the at-Tar finds, there are some pile textiles with such stripe border decorations along their weave edges, e.g., the pile textile from Cave 12, Hill C bordered with green and red stripes (IV-OH-368) [Fujii, Sakamoto and Ichihashi, 1989: pp.135,146], and the pile textile from Cave 17, Hill C which has a staircase pattern on its corner (IV-MK-1382). Textile 1 and the aforementioned textile from cave 12, Hill C have no pile tufts on their borders, while the textile from Cave 17 contains three stripes, only one of which, nearest the field, uses pile thread, but the rest outside two have no pile tufts at all. Type A-2 knotting method is used for the former two specimens, of which grounds of border decoration are of plain weave, and in which variation of plain weave (warp 2, weft 1) is taken for their grounds of knotted parts, where a unit of pile knot is practiced on two paired warps. In this way, there are a number of similarities among them such as heavy finish. Thus, it is apparent that Textile 1 shows an outstanding feature common to the pile textiles with Type A-2 knotting.

Textile 2 (Pl.3-c): This is also a thick cloth with Type A-2 knotting just as Textile 1. It has been found poorly preserved with most of its pile tufts coming off. Its ground is composed

Table 1 Comparative Data of the Monochromatic Textiles with Type B-2 Knotting Method

Cave No.	F6	F6	C16
Textile No.			Textile 3
Representative specimen No.	C-39-19-b	C-40-(C)	V-97-1-a
Color	Gold	Gold	Dull reddish yellow
Ground thickness (mm)	2. 10—2. 45	2. 40—2. 60	2. 30—2. 90
Density	9. 0×22. 0	7. 0×10. 0	3. 60×23. 0—25. 0

of variation of plain weave, warp 2 ad weft 2, by using ratnher thick threads. A unit of five pile threads each is knotted at an interval of 5-6 paired wefts (0.8-1 cm interval), resulting in the making of a single big knot. The pile knot density is rather low, but a unit of knot makes a lot of pile tufts come out on the obverse and the reverse.

Textile 3 (Pl.2-e): It is woven with the same kind of warp, weft and pile threads altogether by using undyed, natural material. The at-Tar textile finds are abundant in such pile textiles as made of undyed, natural wool. This is a monochromatic textile which makes us feel rather simple. Its ground is of plain weave with selvages of Type 2. It has Type B-2 pile knotting method as shown in Fig.3, whose knotting opens to the left. Also, the other monochromatic textiles with Type B-2 pile knotting like this textile have been uncovered at Cave F6, Hill A (C-38-19-b, C-40-(C)) (See Table 1). However, we see these pile knots open to the right, which is just in the reverse direction from that of Type B-2 shown in Fig.3.

Textile 4 (Pl.1-c, d): It has been discovered broken to tiny pieces, but is very unique in that its ground is the only one twill weave in the pile textiles that has been ever uncovered at at-Tar. To our regret, almost all the pile tufts have been lost, so it is still uncertain as to its pile knotting type. The threads used here are very fine and its ground thread density is high, compared with the other pile textiles. There is the possibility of its use with the pile tuft side on the obverse of a clothing. Otherwise, its use with the pile tuft side on the reverse of a clothing while putting the weft float of the twill on the obverse is also feasible. Some other uses like a rug use are also presumable. Deduced from the mechanism of the weave-loom, the pile threads seem to come out on the reverse side during the weaving operation since the weft float side, i.e., the side where warps are lifted by heddles in smaller number, is regarded as the obverse. Therefore, it is likely that the vertical loom required somebody to work as assistant on the opposite side. If a single weaver handles a loom, the weft float side should be made as the reverse at the time of weaving operation while a weaver uses a loom with treadles. Did a loom equipped with depression heddles actually exist in those days? In Western Asia, we see several persons working at a single vertical loom still today. It is presumed from this that several workers may have been engaged in a single loom at the same time also in that

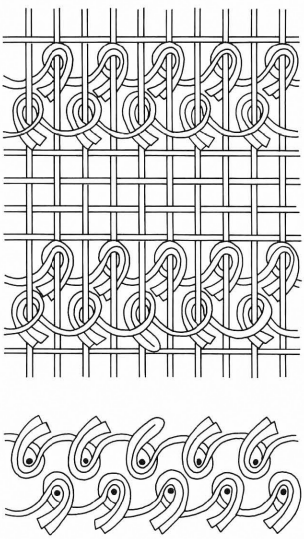


Fig.4 Structure of Textile 5

period. Moreover, the pile textiles with the ground of twill weave as this have also been given in the report of Palmyra [Pfister, 1937: pp. 24, 28, Pl. Ve,f, Pl. VIe] and Dura Europos [Pfister and Bellinger, 1945: pp.48,226].

Textile 5 (Pl. 3-d, e, Fig.4): This is also among outstanding pile textiles uncovered at at-Tar. It is a thick fabric with chequered border decoration, and pile threads are knotted on both sides in the field. Interworking a single 3-plied warp with three wefts has led the fabric to be made extremely thick in texture. Grandrelle thread is used for all the warps. The chequered border decoration along the weave start is adorned with the pattern where deep purplish red and gold threads pass alternately by using two shuttles, and then reversing the color order of the threads about midway of the chequered pattern. There are no pile knots on the area about 10 cm away from the weave start, which is equivalent to border section, whereas, on the field there are pile threads knotted on both sides with Type B-2 knotting method. They are thick 3-plied pile threads whose rows have an interval of 4 picks (1.0-1.2 cm apart), which combine 3-weft threads each. We have found only one of the pile tufts coming into a loop (Pl.3-e). It is considered that this was originally a pile textile with looped tufts, all the rest of which seem to have been damaged with the progress of years, or this may be the only evidence with its cutting missed. This is the textile whose starting border still remains, presenting important data from which we can learn the weave start technique done in those days (Fig.2). The presumption from the weave start technique is that the warp threads were in the state of loop also at the weave end portion on the loom. The strong tying of the pile threads at both sides results in the presence of two level warps on the pile thread knotting-field (See section of Fig.4). But such two level warps are absent on the border.

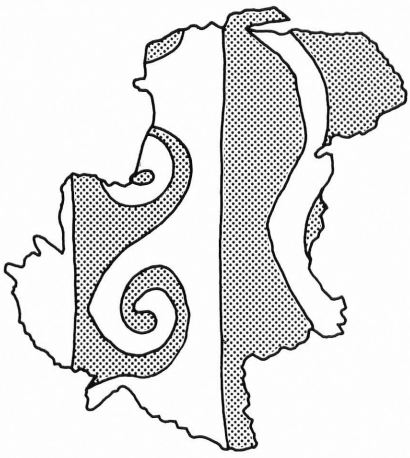


Fig.5 Pattern of the Obverse, Textile 7

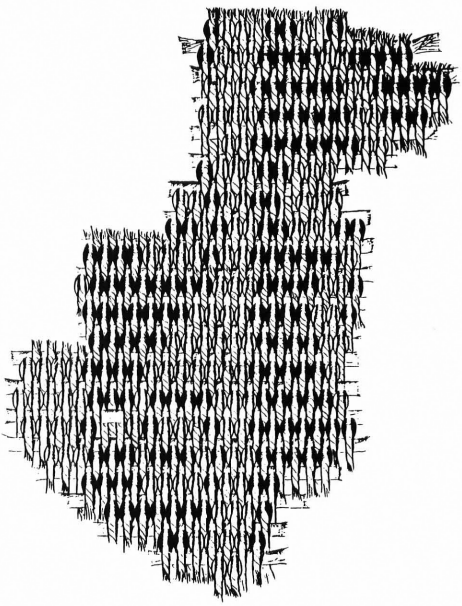


Fig.6 Allocation of Pile Color Threads for Pattern Representation (the obverse of Textile 7)

Textile 6 (Pl.2-d): This is a very tiny fragment, whose wefts become so loose that some change occurs in its weft density. In spite of its being so fragmentary, we fortunately see brilliant colors still remain there.

Textile 7 (Pl.3-a, b, Figs.5 to 7): This is a small double-face 'knotting' pile fragment, where wave and geometric patterns are depicted on the obverse. The pile threads with Type C 'knotting', which are trimmed as short as 1-2 mm in length, are used for representing the wave and geometric patterns. The carpet fragments with wave patterns on them have been uncovered in Central Asia. Though they are common to Textile 7 in their way of representing patterns, their knotting method takes Type A-1, and their cut tufts are slightly longer. We think that the difference in making method results from the difference in production area. In the days of Alexander the Great, it seems likely that there existed two sorts of carpets such as the one with long tufts and the other with short-trimmed tufts [Rudenko, 1970: p.299]. The very specimen of short trimmed tufts with the wave pattern is by far the most extraordinary among the at-Tar finds, most of which are of long tufts. It, as a whole, looks more like the carpets excavated in Central Asia. Textile 7 is different from the other pile textiles in the way that a slender pile thread and a thick weft thread pass through the warp by turns. Here, fine warp threads are used, and because of the high pile density, the trimmed pile tufts are thickly clustering. The weft, which is two times as thick as the warp, is strongly beaten in, so that the warps resultantly become meandering. The sectional view of the warp threads shows two levels. The allocation of the pile color threads for pattern representation seems to have been properly made just according to the programmatic design (Figs.5,6). In the reverse of the very textile, there are the Type C 'knots' with the use of pile threads several times thicker and stronger than the ones in the obverse, which are 'knotted' at an interval of 5-6 warps and 5 wefts, respectively (Fig.7). This way of 'knotting' is regarded as a device to prevent the rug from slipping. The textile is provided with 'knots' on its both surfaces. But its obverse and reverse function separately as their individual purposes.

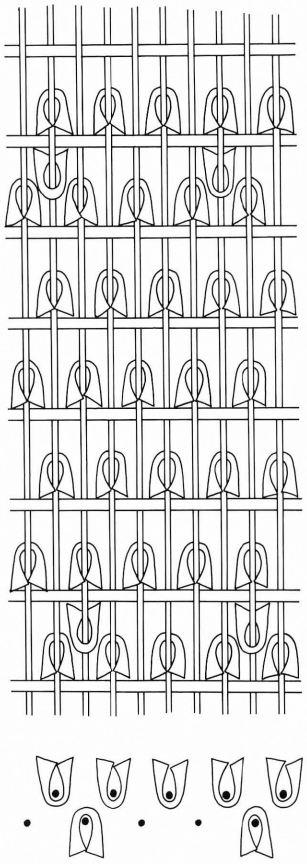


Fig.7 Structure of Textile 7

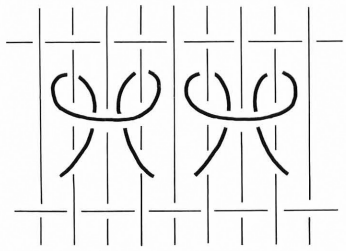


Fig.8 Knotting Method of Textile 8

Textile 8 (Pl.2-a,b, Fig.8): Several fragments are identified as this textile. Two of them have a staircase pattern of brown color on the ground whose original color seems to have been purple (V-127-9, V-86-2) (Pl.2-b). And the staircase pattern is woven with dovetailed tapestry-technique. Its knotting method is of Type A-1, where a single unit of three warps each has a knot whose

Table 2 Comparative Data of the Textiles with Reddish Purple Staircase (Brown) Pattern on Green Field

Cave No.		F4	C9	C16	C17
Textile No.				Textile 8	
Representative specimen No.		C-25-a	IV-OH-1-⑨	V-116-3	IV-MK-1382
Knotting type		B-2	Uncertain	A-1	B-1
Color	Weft (1) : Ground	Olive	Dull green	Dull green	Deep reddish orange
	Weft (2) : Derign	Dark red	Reddish brown	Reddish brown	Dark red
	Field pile thread	Dark yellowish green	Deep green	Dark yellowish green	Deep reddish orange
Pattern		Staircase	Uncertain	Staircase	Staircase
Pattern pile thread		None	None	None	Dark red pile tufts
Ground thickness		1.80	2.00	2.00—2.10	2.00—2.50
Density		5.0×32.0—35.0	4.5×20.0	4.6—4.8×17.0—20.0	3.5—4.7×13.0—20.0
Warp diameter		0.80—1.10	1.10—1.30	1.10—1.80	1.00—1.20
Weft diameter (1)		0.40—0.70	0.6—1.00	0.80—1.10	1.00—1.30
Weft diameter (2)		0.40—0.60	0.7	0.70—0.90	0.90—1.00
Pile thread diameter		1.00—1.20		1.00—1.50	1.50—2.00

resultant pile tufts come out from both sides of the single middle warp. And each unit of the pile knot is done at an interval of one warp (Fig.8). Almost all the pile tufts are lost today. One of the fragments so far identified (V-68-1) has its selvage, where we see a set of four warps each and a set of two warps each made into two warp codes, which are interlaced with weft threads at the selvage, where the wefts repeatedly turn back for selvage reinforcement, just as seen in Type 2 Selvage (Fig.1). Besides, the other textiles of this sort similar to Textile 8, such as the one with reddish purple (which is actually discolored into brown) staircase pattern on the green field or the one with part of the pattern, are discovered at Cave F4, Hill A (C-25-a) [Fujii, ed., 1976: p.180; Fujii, ed., 1980: p.290] and Cave 9, Hill C (IV-OH-1-⑨) [Fujii, ed., 1980: p.296]. But the specimen from Cave F4 is of Type B-2 knotting, and the pile threads of the specimen from Cave 9 are in poor preservation, so that it is still obscure about its knotting type (See Table 2).

Conclusion

Our researches in the field of the textiles coming from Cave 16 of at-Tar are now under way, following the report *al-Rāfidān* Vol.X, pp.109-165, Pls.27-37 on the textiles uncovered at Cave 12, Hill C, at-Tar. In this connection, it is generally believed that most of the finds from Cave 16, Hill C are superior in quality, weave technique, design and color, compared with those unearthed at the other at-Tar caves, so that they are rich in the data which may well be regarded as functioning as a standard helpful for our further study of the whole textiles coming from at-Tar. In studying closely the textiles from the other caves, therefore, it can be said that the textiles from Cave 16 possess several characters from which useful suggestions will be derived for our forming a proper judgment on the textiles from the other caves. In the present report, especially on the subject of the pile textiles unearthed at Cave 16, we have introduced our comparative

studies between the pile textiles from Cave 16 and the ones from the other caves additionally filled here as many as we can, while paying attention to the above matter. For useful reference, here are listed specimen numbers, already in public. In our next report in the forthcoming volume of this journal, we are to report on the rest of the textiles except for pile textiles which were uncovered at Cave 16.

As for the pile textiles from Cave 16, mentioned below are their outstanding features compared with those of the pile textiles from the other caves.

(1) The number of the finds from Cave 16 amounts to 8 when the individual fragments have been identified, which is the second largest in number next to the number of 10 in the Cave F6 (Hill A) finds. The other caves did not yield more than four. In view of an ordinary burial situation, it is observed that both the pile textile probably produced for the use of rug and the rush mat ('goza' in Japanese) were often used together as the dead's underlay. Otherwise, some burials took either of them. Thus, it is necessary for us to think of the possibility that nearly 8 persons' burials were actually conducted here, supposing that a single pile textile was used under a single dead body. In regard to Cave 16, however, it is rather hard for us to presume that all the pile textiles were made for the use of rug. This is because Textile 4, a twill ground pile, for instance, is apparently thought to have been made for clothing. In studying pile textiles, therefore, we find it necessary to ascertain what types of pile textiles were intended for the use of rug at the original stage of their production. Taking up some examples from Cave 16, it can safely be said that the pile textiles with borders (Textiles 1, 5) and the double-face 'knotting' pile textile with wave pattern, where trimmed pile threads are used on the reverse, too, to avoid slip at an interval of an ample space (Textile 7) were evidently made for the purpose of carpet. Moreover, it is possible to regard the textile with staircase pattern, Textile 8, as once a bordered pile rug, if we think that the staircase pattern existed at the corner, depending on the situation that this is similar to the bordered textile from Cave 17, Hill C (IV-MK-1382) in staircase pattern, design and color, as already mentioned.

(2) The study of pile thread knotting methods has made it clear that all the knotting types but Type B-1 can be confirmed at Cave 16. This is a remarkable feature incomparable with the

Table 3 Comparative Data of the Textiles with Type A-2 Knotting Method

Cave No.	B8	D7	D7	C12	C16	C16
Textile No.				Textile 17	Textile 1	Textile 2
Representative specimen No.	C-14-I-2	C-05-VI-2	C-05-I-d	IV-OH-368	V-79-5	V-39-2
Pile thread color	Dark grayish brown	Dark grayish brown	Dark grayish brown	Dark grayish brown	Gold	Dark grayish brown
Number of a unit of pile threads	4	4—5	5	3—4	4	5
Ground thickneds (mm)	3. 35	4. 20—4. 30	3. 45	3. 50—4. 35	3. 80—5. 00	4. 90—5. 20
Number of a unit of warps	2	2	2	2	2	2
Number of a unit of wefts	1	1	1	1	1	2
Pattern	Uncertain	Uncertain	Uncertain	Stripe border decoration	Stripe border decoration	Uncertain

finds from the other caves. What is more, it is noticed that there are at least two examples with Type A-2 knotting, which is a speciality in at-Tar. The other examples with Type A-2 knotting are one from Cave 12, Hill C, one from Cave B8, Hill A and two or three from Cave D7, Hill A. The one from Cave 12, Hill C owns a stripe pattern border combined with red plain weave and green variation of plain weave, and Textile 1 from Cave 16 is also a thick pile textile of stripe pattern border (plain weave). Type A-2 knotting is an exclusive speciality in at-Tar. The other examples with Type A-2 knotting have been discovered at Caves B8 (C-14-I-2), D7 (C-05-VI-2, C-05-I-d) and C12 (Textile 17: IV-OH-368). The features common to the textiles with Type A-2 knotting are: a unit of several pile threads each is knotted; unpiled border is of plain weave, but its ground of the field is of variation of plain weave (warp 2, weft 1) without warp crossing; despite its low pile density, there are pile tufts coming out long and clustering closely on the surface; all the pile threads but those of Textile 1 are natural, undyed black or dark brown (See Table 3). On the contrary, both the border and the field of the textile from Cave 17, Hill C (IV-MK-1382, Type B-1 knotting) are of plain weave. Textile 5 is quite rare in the way of knotting threads with Type B-2 on both sides; no other finds in at-Tar have such a unique knotting method as this.

(3) Besides, the instances which are incomparable with the ones from the other caves are the twill ground pile textile (Textile 4) and the cut-pile with wave and geometric patterns whose reverse has a device for avoiding slip (Textile 7). In the meantime, there are some pile textiles which are rather similar to the ones from the other caves. Textile 3 and the ones from Cave F6, Hill A, C-38-19-6 and C-40-(C), are all moderately thick pile textiles with Type B-2 knotting method, and are undyed wool monochromatic fabrics. Furthermore, Textile 8 as well as the textiles from Cave F4, Hill A (C-251) and Caves 9 (IV-OH-1-⑨) and 17 (IV-MK-1382), Hill C own reddish purple or the like colored staircase patterns by means of dovetailed tapestry technique on their green or the like colored fields. However, attention must be brought to the fact that Textile 8 is of Type A-1 knotting while the others are not (See Table 2).

We are sure that the characteristics of the pile textiles among individual caves will be gradually clarified through the pursuit of our researches. Systematic pigeonholing to a considerable extent will be expected by examining them from various angles, e.g., their knotting type, the way of using grandrelle thread, monochromatic one or not, the position of the staircase pattern, bordered one or not, and so forth. The evidence that the rush mat has stripe and chequered patterns on both ends of weave start and weave finish just like those of the bordered pile textiles will be good grounds for believing that the pile textiles with borders may have been made for the purpose of their rug use. The pile knotting rows of most of the pile textiles from at-Tar are not close with one another. We believe that this was one of the characteristics commonly seen around the at-Tar area of that day.

Acknowledgements

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We also thank Mrs. Maya Ikuma who kindly participated in the discussion for the completion of the English manuscript.

Notes

1) It is mentioned in *al-Rāfidān* Vol.X, p.151 that grandrelle yarn means a plied yarn where a single yarn of different quality is twisted together with the other. Besides, it has been concluded by the fiber analysis recently conducted by the Toray Industries, Inc. that a plied yarn composed of same quality but of different colors can also be included in this category [See *Report on the Analysis of Textiles Uncovered at the Ancient Iraqi Site* pp.69—92 of this volume].

2) Warping is a procedure that threads of equal length are stretched and laid parallel in the preparation of a warp for the loom.

3a) The diagram of Type A-2 knotting in the present report shows that Type A-2 knotting here duly agrees with all the Type A-2 knotting specimens coming from the at-Tar Caves in knotting direction. The diagram of double face of Type B-2 is also the same as above.

3b) The twist directions of pile threads from the at-Tar Caves do not always agree with the direction schemes shown in the diagram.

4) Type C is not knotted in the actual state, but we give it the term 'knot'.

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List of Data on Pile Textiles from Cave 16, Hill C

Explanatory notes

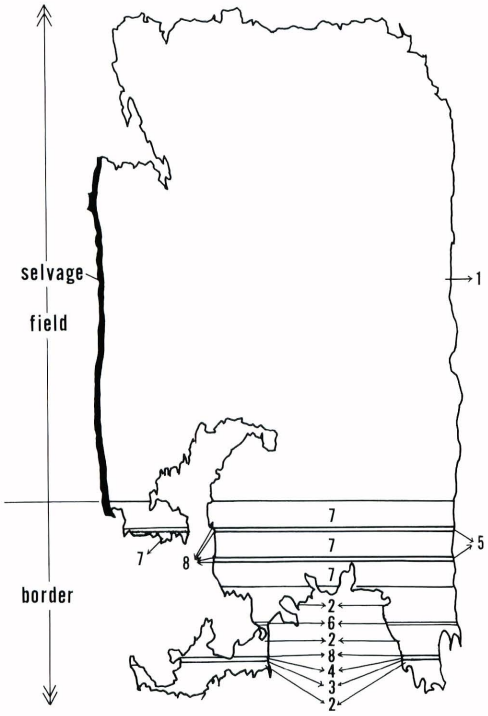
The following textile data indicate the analyses based on the research method specified in Chapter I, Textiles from at-Tar Caves Part I: Cave 12, Hill C [*al-Rāfidān* Vol.X, pp.110–112]:

1. The **Textile number** (for example Textile 1) indicates an identified series of fragmentary specimens, of which the representative one, most preserved and characteristic, is shown with its number registered when it was excavated.
2. 'Size' is determined by "the maximum length of warp direction × the maximum length of weft direction".
3. 'Thickness' is given by "Peacock dial thickness gauge, H 0.01–10 mm (OZAKI MFG. Co., Ltd.)".
4. The color of all the textiles is chiefly given to its representative specimen in accordance with 'Jacal color cards 220', following the signs shown in the revised Munsell Table. But, markedly discolored representative specimens are replaced by some other better preserved ones from among fragmentary specimens for naming, if available.
5. 'Thickness, diameter, twist count and thread density' are shown with their minimum-mean-maximum values. 'Diameter' shows the thread diameter measured with the 25-fold magnifier (Monocular 8×30, Asahi Pentax).
6. The weft density in the case of two or more wefts used at one shed is indicated as follows: It is shown by the number of shed and the weft number which is passed at a single opening operation. For example, the data description is: (12–13–14)×2/cm; the figures in the parentheses show the minimum-mean-maximum values at the spots where the frequencies of shed are measured. '×2' means paired weft; '×3' means three wefts. And the multiplied value is equivalent to the actual number.
7. The thread number of selvage cord is so arranged as to start from the selvage edge in regular order.
8. When a selvage or an edge is observed in the fragmentary specimen, its detail and specimen No. are additionally written.
9. The figures and photos shown here all accord with the warp direction, and textiles with edges and pile knots clearly identified are positioned with their weave finish up and weave start down in the warp direction. But, there are three specimens, Textile 4, Textile 6 and Specimen No.C-04-3, whose weave-start and weave-finish positions are difficult to determine due to damaged pile knots.
10. The description of 'raw material' entered in the report has conformed to the analytical results of Fibers & Textiles Laboratories, Toray Industries, Inc..

Textile 1: Rug with Stripe border

Representative specimen: Registered No.: V-79-5
Size (cm): 77.0×41.5
Structure: Field — Variation of plain weave: warp 2, weft 1, weft-faced
Border — Plain weave, weft-faced
Pile knot — A-2, double-faced, 4 pile threads together
Design: Stripe border
Thickness (mm): Field Ground — 3.80～5.00
7.10～9.30 (with pile)
Border — 2.20～2.70

	Warp (grandrelle thread)	
Raw material:	Sheep	Sheep
Color:	Pale reddish yellow 2.5Y 8.5/3	Dark brown 5YR 2.4/4
Diameter (mm):	1.60～2.00	
Twist, Twist No. (/cm):	Z>——S (2.0～2.5) Z>	
Density (/cm):	Field (1.6～1.8)×2	Border 3.5～3.6



	Weft (1) field (including mottled thread)	Weft (2) border
Raw material:	Sheep	Sheep
Color:	Light yellowish brown 9YR 6.5/5 (dark brown)	Dull blue green 5BG 5/4
Diameter (mm):	1.50～2.00	0.70～0.80
Twist, Twist No. (/cm):	—— Z (1.0～1.3)	—— Z (2.5～3.0)
Density (/cm):	10.0～11.0	18.0～20.0

	Weft (3) border	Weft (4) border
Raw material:	Sheep	Sheep
Color:	Deep red 4R 3.5/10	Dark greenish blue 5B 2/4
Diameter (mm):	0.60～0.70	0.60～0.70
Twist, Twist No. (/cm):	—— Z (4.0～5.0)	—— S (4.0～5.0)
Density (/cm):	18.0～20.0	18.0～20.0

	Weft (5)	Weft (6)
Raw material:	Sheep	Sheep
Color:	Light reddish brown 10R 5.5/6	Pale reddish yellow 2.5Y 8.5/3
Diameter (mm):	0.70～0.80	0.70～0.80
Twist, Twist No. (/cm):	—— Z (2.0～2.5)	—— S (2.0～2.5)
Density (/cm):	18.0～20.0	18.0～20.0

	Weft (7)	Weft (8)
Raw material:	Sheep	Sheep
Color:	Dark red 4R 2.4/5	Strong yellowish red 7R 45/12

Diameter(mm):	0.70～0.80	0.5～0.7
Twist, Twist No. (/cm):	——Z (2.5～3.0)	——Z (2.5～3.0)
Density (/cm):	18.0～20.0	18.0～20.0

Pile

Raw material: Sheep
Color: Gold 9YR 6.5/11
Diameter (mm): 2.00～2.50
Twist, Twist No. (/cm): S/S>——Z (1.8～2.2)
Density: 5×8 (pile knot/dm)
Selvage: Type 2, cord (3.3) V-79-5
Edge: None
Others: Longest pile yarn 14.5 cm Interval between pile knotting rows 1.0～2.3 cm
Fragmentary specimens:
V-44-17 V-51-8 V-58-7 V-62-4 V-65-7 V-75-9 V-79-5
V-90-1 V-95-3

Textile 2: Rug fragment of rough finish

Representative specimen: Registered No.: V-39-2
Size (cm): 10.7×12.2
Structure: Ground Variation of plain weave, warp 2. weft 2, weft-faced
Pile knot A-2, double-faced, 5 pile yarns together
Thickness (mm): Ground 4.90～5.20 5.43～7.31 (with pile)

	Warp	Weft	Pile
Raw material:	Sheep	Sheep	Sheep
Color:	Dull reddish yellow 2.5Y 7.5/6	Gold 2.5Y 6/8	Dark grayish brown 5YR 2/1.5
Diameter (mm):	1.20～1.75	1.00～1.40	1.50～2.00
Twist, Twist No. (/cm):	Z/Z>——S (2.0～3.0)	Z (2.5～3.3)	S/S>——Z (3.0～4.0)
Density (/cm):	(1.7～2.0)×2	(5.0～6.0)×2	6.0×8.5 (pile knot/dm)

Selvage: None
Edge: None
Others: Longest pile yarn 3 cm Interval between pile knotting rows 0.8～1.0 cm
Fragmentary specimen: V-39-2

Textile 3: Monochrome rug fragment

Representative specimen: Registered No.: V-97-1-a
Size (cm): 17.8×9.5
Structure: Ground Plain weave, weft-faced
Pile knot B-2, open to the left
Thickness (mm): Ground 2.3～2.9

	Warp	Weft	Pile
Raw material:	Sheep	Sheep	Sheep
Color:	Dull reddish yellow 2.5Y 7.5/6	Dull reddish yellow 2.5Y 7.5/6	Dull reddish yellow 2.5Y 7.5/6
Diameter (mm):	1.00～1.85	0.80～1.10	1.50～2.00
Twist, Twist No. (/cm):	Z/Z>——S (2.0-3.0)	——Z (1.3-2.0)	S/S>——Z (2)
Density (/cm):	3.6	23.0～25.0	(8～9)×12 (pile knot/dm)

Selvage: Type 2, cord (3・2) V-97-1-a
Edge: None
Others: Longest pile yarn 5 cm Interval between pile knotting rows 1.0～1.2 cm

Fragmentary specimens:

IV-10-27-①	V-47-24	V-51-2	V-58-5	V-73-6	V-73-11
V-77-5	V-87-3	V-90-14	V-97-1-a	V-97-1-b	V-97-1-c
V-99-1	V-101-5	V-103-2	V-106-2	V-115-2	V-133
V-133-1	V-134-4				

Textile 4: Pile fragment of twill ground

Representative specimen: Registered No.: IV-W-66-①
Size (cm): 6.6×8.1
Structure: Ground twill (1/2), weft-faced
Pile knot unknown
Thickness (mm): Ground 1.65~1.90

	Warp (grandrelle thread)	
Raw material:	Camel	Camel
Color:	Dull reddish yellow 2.5Y 7.5/6	Dark brown 5YR 2.4/4
Diameter (mm):	0.50~0.70	
Twist, Twist No. (/cm):	Z>—— S (2.0~3.0) Z	
Density (/cm):	9.0	

	Weft	Pile
Raw material:	Camel	Camel
Color:	Dark brown 5YR 2.4/4	Dark brown 5YR 2.4/4
Diameter (mm):	0.40~0.50	0.7
Twist, Twist No. (/cm):	—— Z (1.0~2.5)	
Density (/cm):	51.0~54.0	10×(30~35) (pile knot/dm)

Selvage: None
Edge: None
Other: Interval between pile knotting rows 0.8~1.0 cm
Fragmentary specimens:

V-8-1	V-41-3	V-75-17	V-88-2	V-90-20	IV-W-66-①

Textile 5: Double faced rug fragment

Representative specimen: Registered No.: V-62-3
Size (cm): 25.0×21.0
Structure: Field Variation of plain weave, warp 1, weft 3, weft-faced
Border Variation of plain weave, warp 1, weft 3, weft-faced
Pile knot B-2, double faced, open to the left
Design: chequers
Thickness (mm): Field 4.80 7.90~8.93 (with pile)
Border 4.40~5.95

	Warp (grandrelle thread)	
Raw material:	Cashmere	Sheep
Color:	Dull reddish yellow 2.5Y 7.5/6	Yellowish brown 9YR 4/4
Diameter (mm):	2.10~3.70	
Twist, Twist No. (/cm):	S S>—— Z (1.7~2.3) S	
Density (/cm):	1.8~1.9	

	Weft (1) field	Weft (2) field
Raw material:	Sheep	Sheep
Color:	Dull reddish yellow 2.5Y 7.5/6	Dark grayish brown 5YR 2/1.5
Diameter (mm):	0.90~1.50	2.00

Twist, Twist No. (/cm): —— S (1.0~2.0) —— S (1.0)
Density (/cm): 3.0×3 3.0×3

	Weft (3) border	Weft (4) border	Pile
Raw material:	Sheep	Sheep	Cashmere
Color:	Gold	Deep purplish red	Dull reddish yellow
	2.5Y 6/8	1R 3/10	2.5Y 7.5/6
Diameter (mm):	0.90~1.50	0.90~1.20	3.00~6.00
Twist, Twist No. (/cm):	—— S (1.0~2.5)	—— S (1.0~2.5)	S, S —— Z (1.3~2.0), S
Density (/cm):	(6.0~7.0)×3	(6.0~7.0)×3	(5.0~6.0)×(8.0~9.0) (pile knot/dm)

Selvage: None
Edge: Weave start Cord-like (U-turn warp) V-62-3
Others: length of loop 6.5 cm Interval between pile knotting rows 1.0~1.2 cm
Fragmentary specimens: V-47-1 V-62-3 V-75-8

Textile 6: Small red fragment
Representative specimen: Registered No.: V-47-13
Size (cm): 2.5×2.0
Structure: Ground Plain weave, weft-faced
Pile knot Uncertain
Thickness (mm): 2.00

	Warp	Weft	Pile
Raw material:	Cashmere	Sheep	Sheep
Color:	Gold	Strong yellowish red	Strong yellowish red
	2.5Y 7/10	7R 4.5/12	7R 4.5/12
Diameter (mm):	1.00~1.35	0.70~0.80	1.30
Twist, Twist No. (/cm):	Z, Z —— S (3.0)	—— Z (3.3~4.0)	S, S —— Z (4.0)
Density (/cm):	4.0	27.0~28.0	

Selvage: None
Edge: None
Fragmentary specimens: V-41-16 V-47-13

Textile 7: Fragment of carpet with wave pattern and geometric pattern
Representative specimen: Registered No.: V-70-1
Size (cm): 6.8×6.4
Structure: Ground Plain weave, balanced
Pile knot C Double face
Design: Wave pattern, geometric pattern
Thickness (mm): Ground 2.20 4.50 (with pile)

	Warp (grandrelle thread)		Weft
Raw material:	Sheep	Sheep	Sheep
Color:	Dull reddish yellow	Yellowish brown	Dull reddish yellow
	2.5Y 7.5/6	9YR 4/4	2.5Y 7.5/6
Diameter (mm):	0.80~1.10		1.70~1.80
Twist, Twist No. (/cm):	Z, Z —— S (3.0~4.0)		Z, Z, Z, Z, Z, Z —— S (1.0)

Density (/cm): 9.0 4 wefts and 3 pile rows

	Pile (1)	Pile (2)
Raw material:	Sheep	Sheep
Color:	Deep purplish red 1R 3/10	Gold 2.5Y 6/8
Diameter (mm):	0.90～1.20	0.90～1.20
Twist, Twist No. (/cm):	—— Z	—— Z
Density (/cm):		36.0×48.0 (pile 'knot'/dm)

Selvage: None
Edge: None
Others: length of tufts 0.1～0.2 cm Interval between pile knotting rows 0.18 cm
Fragmentary specimen: V-70-1

Textile 8: Green rug fragment with staircase pattern

Representative specimen: Registered No.: V-116-3
Size (cm): 24.0×15.0
Structure: Field Plain weave, weft-faced
Design Plain weave, weft-faced, tapestry-weave technique
Pile knot A-1
Design: Staircase
Thickness (mm): Ground 2.00～2.10

	Warp (1) (grandrelle thread)		Warp (1) (grandrelle thread)	
Raw material:	Sheep		Alpaca	
Color:	Dull reddish yellow	2.5Y 7.5/6	Dark brown	5YR 2.4/4
Diameter (mm):	1.10～1.80			
Twist, Twist No. (/cm):	Z / Z > —— S (3.0～4.0)			
Density (/cm):	46.0～48.0			

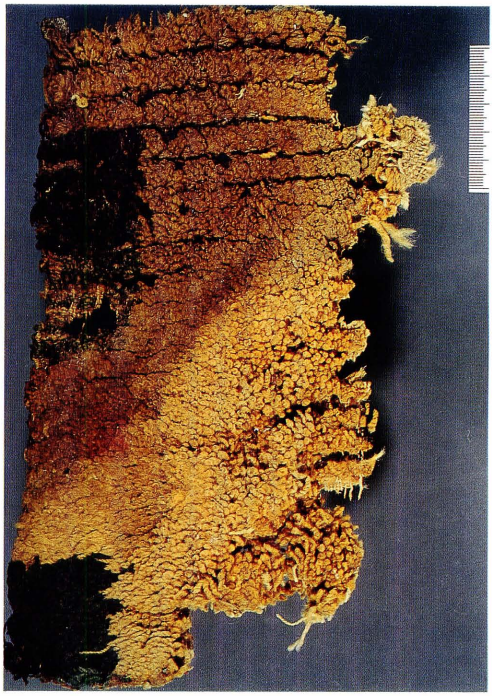
	Warp (2)		Warp (3)	
Raw material:	Cashmere		Cashmere	
Color:	Dull reddish yellow	2.5Y 7.5/6	Dull orange	5YR 7/4
Diameter (mm):	1.00～1.80		1.00～1.60	
Twist, Twist No. (/cm):	Z / Z > —— S (2.5～4.0)		Z / Z > —— S (2.0～2.5)	
Density (/cm):	46.0～48.0		46.0～48.0	

	Weft (1) field	Weft (2) corner	Pile
Raw material:	Cashmere	Cashmere	Cashmere
Color:	Dull green 5G 5/4	Reddish brown 10R 3/5	Dark yellowish green 10GY 3/4
Diameter (mm):	0.80～1.10	0.70～0.90	1.00～1.50
Twist, Twist No. (/cm):	—— Z (2.0～3.3)	—— Z (2.0～4.0)	S / S > —— Z (3.0～4.0)
Density (/cm):	17.0～20.0	15.0	(10.0～11.0)×(11.0～12.0) (pile knot/dm)

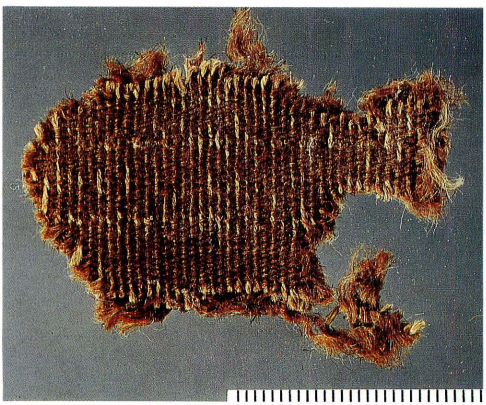
Selvage: Type 2, cord (4.2) V-68-1
Edge: None
Others: Interval between pile knotting rows 0.8～1.0 cm
Fragementary specimens:
V-21-7 V-62-5 V-68-1 V-75-15 V-86-2 V-87-1
V-95-7 V-116-3 V-127-9 IV-W-31-①

Pl. 1

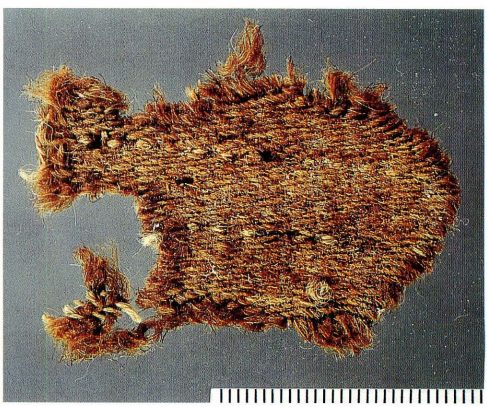
a. Rug with stripe border (Textile 1)



b. Square patterns along the selvage (Specimen No. C-04-3, Cave F-6)



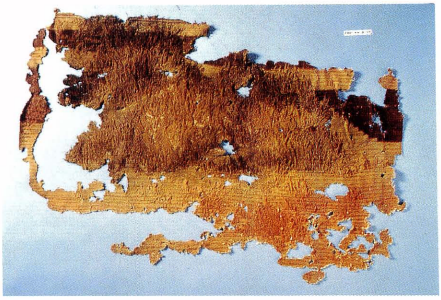
c. Pile fragment of twill ground (Textile 4)



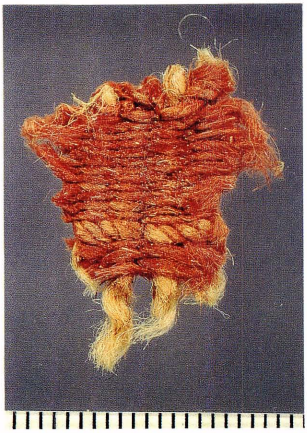
d. Reverse of Textile 4

a. Green rug fragment with staircase pattern (Textile 8)

b. Small fragment with staircase pattern (Textile 8)

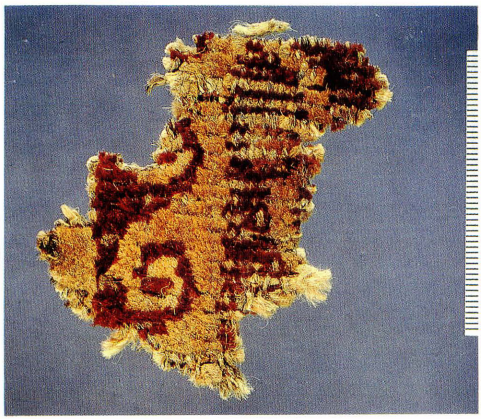


c. Staircase pattern at the corner (Specimen No. IV-MK-1382, Cave C-17)



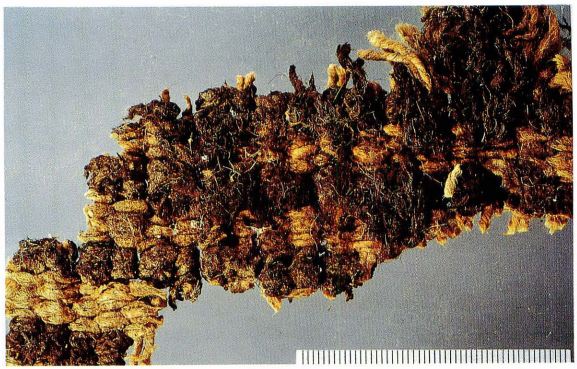
d. Red small fragment (Textile 6)

e. Monochrome rug fragment (Textile 3)

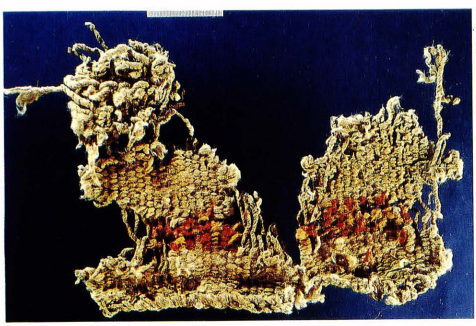


a. Fragment of carpet with wave pattern and geometric pattern (Textile 7)

b. Reverse of Textile 7



c. Rug fragment of rough finish (Textile 2)



d. Double-faced rug fragment with weave start (Textile 5)

e. One loop knot of Textile 5