

## TEXTILE FROM AT-TAR CAVES, IRAQ\*

Hideo FUJII<sup>1)</sup>, Yutaka TAKAGI<sup>2)</sup>, Kazuko SAKAMOTO<sup>3)</sup>,  
Hiromi OKADA<sup>4)</sup> and Mikizo ICHIHASHI<sup>5)</sup>

The archaeological site of At-Tar Caves is situated 110km south-west of Baghdad, Iraq. This site complex consists of some 400 caves which were carved on the flanks of a series of marly escarpments developed along the salty lake called by the name of Bahr al-Milh (Razaza lake).

At-Tar is located about 80km west of the ancient capital of Babylon and occupies the easternmost border of Iraqi South-western Desert (Syrian Desert), and therefore it has been

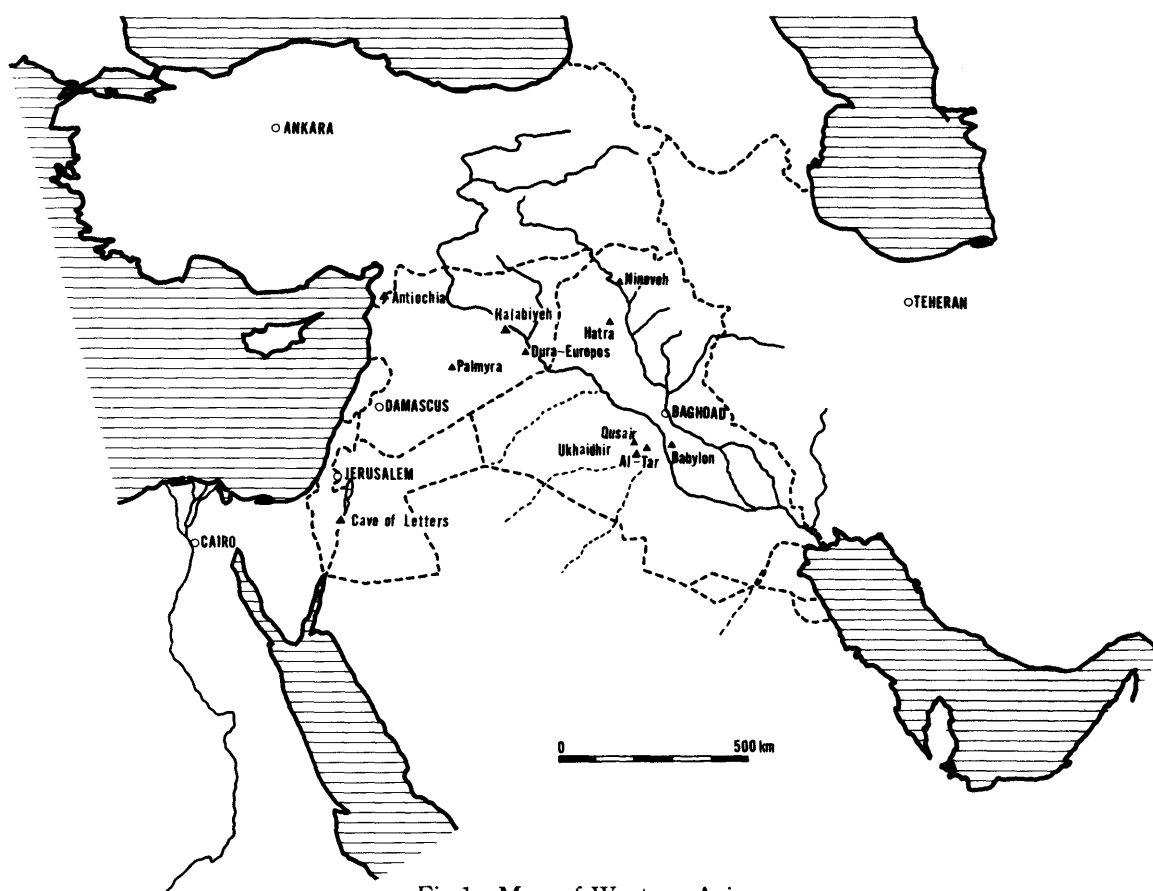


Fig.1 Map of Western Asia

\* Full text of the lecture given at the 31st International Congress of Human Sciences in Asia and North Africa (Seminar-A2) held in Tokyo and Kyoto from 31 August to 7 September 1983

- 1) Professor of Oriental History, Director General of the Institute for Cultural Studies of Ancient Iraq, Kokushikan University
- 2) Ph. D. specialized in dyestuff analyses and professor at Osaka Kyoiku University
- 3) Co-researcher of textile at the Institute for Cultural Studies of Ancient Iraq, Kokushikan University
- 4) Research fellow of textile at the Institute for Cultural Studies of Ancient Iraq, Kokushikan University
- 5) Research staff of textile at Kawashima Textile School and the Institute for Cultural Studies of Ancient Iraq, Kokushikan University

standing on an important portion of the desert road, with many wadis and oases nearby, in that it has been situated between Arabian Desert in the south and Babylon in the east. Standing magnificently 15km W-S-W of At-Tar is the Ukhaidhir Palace which is said to have been built in the 8th century A. D., and 17km west of At-Tar lies a site called by the name of Qusair which is being excavated now by Iraqi archaeologists and has unveiled several Christian churches and Syriac inscriptions (Fig. 1). From March 1971 to December 1977, At-Tar was excavated by the Japanese Archaeological Expedition in Iraq, headed by Prof. Hideo Fujii of Kokushikan University, Tokyo.

The At-Tar caves consist of four groups of hills: A, B, C, and D (PL. 8-1). The caves at Hill A have the following characteristics.

1. The structure of caves is characterized by the horizontal ceiling and the extremely uneven digging of the floor. Some caves even have sudden descents as deep as 4m.
2. The caves were carved in such a way that they are conducted each other just like a maze.
3. Some of the caves had been filled up absolutely from the floor up to the ceiling with crushed stones, but others had no such filling, for example in the caves dug at the central portion of this hill.
4. Sand is accumulated on these crushed stones especially near the cave entrances, which has been blown in from the desert by wind.
5. According to carbon 14 datings, it appears most probable that the primary carving of these caves is dated to the middle of the 2nd millennium B. C.
6. Although we have very few archaeological findings datable to the primary carving, a number of burials were unearthed in the crushed stones, which are dated by the carbon 14 datings to the time ranging from the 3rd century B. C. to the 3rd century A. D.
7. These burials were unearthed associated with human skeletons and some 4000 fragments of textile, some leather goods and rush mats.
8. These burials were found in three different ways explained as follows: 1) bones wrapped with textile were placed on rush mat which was laid on crushed rocks, 2) bones wrapped with textile were placed on pile textile which was laid on crushed rocks, and 3) bones wrapped with textile were placed on pile textile on rush mat which was laid on crushed rocks. It appears probable that leather was sometimes used for the purpose of covering the bones, textiles, rush mat, and pile textile.

#### I. Outline of the textiles

##### 1. General description

##### 1) Material

Woolen textiles predominate in number. Textiles of cotton and flax or hemp were also found, though much fewer than the woolen textile. No silk textile (including embroidery) was found. Generally speaking, each of the above material is used individually, but in some cases, combined weaving is recognized which used warp and parts of weft yarns of different materials like cotton and wool, flax or hemp and wool, and rush and wool.

##### 2) Yarn

Woolen fiber of which yarns are made is sometimes as fine as 13 to 20 $\mu$ m and rather long. The yarns sometimes have an apparent diameter of less than 0.2mm (graded from the 60th to the 70th in the International (metric) yarn Numbering). The spinning technique is too consistent, spun regularly hard and soft, for us to imagine these yarns to have been spun with hands. There are yarns made by being twisted many times and those made by few times of twisting, but generally speaking warp yarns are made by more twisting than in the case of weft yarns.

The yarns can be classified into single yarns, 2-ply yarns, 3-ply yarns and 4-ply yarns. There is a single example of slub yarns. Dyeing unspun wool is confirmed, because where there is color gradation there are yarns spun with different colors. There are other examples of yarns which were spun with an appropriate combination of different colors of undyed wool and the wool which was dyed before it was made into yarns. In the case of cotton yarns, dyeing in yarn was executed, judging from the fact that the yarn core is not dyed on some parts of cotton textiles. Mixed spinning using hair and wool is also confirmed.

3) Weaving technique

a) Textile weave (Fig. 2)

There are such types of weaving as plain weave (A), its variants like rib weave (B) and basket weave (C), and twill weave. Types of twill weave are of 2/1 (D) and 2/2 (E) in which four harnesses are used. Warp crossing was sometimes used to alter the textile weave in the case of textiles with designs. This kind of textile includes one which produces rib weave through using two weft yarns. Such techniques were intended for making most effective the expression of designs and probably for making the cloth soft.

b) Types of weave (Fig. 3)

In observing the surface of the textiles, there are several types of weave like so-called tapestry

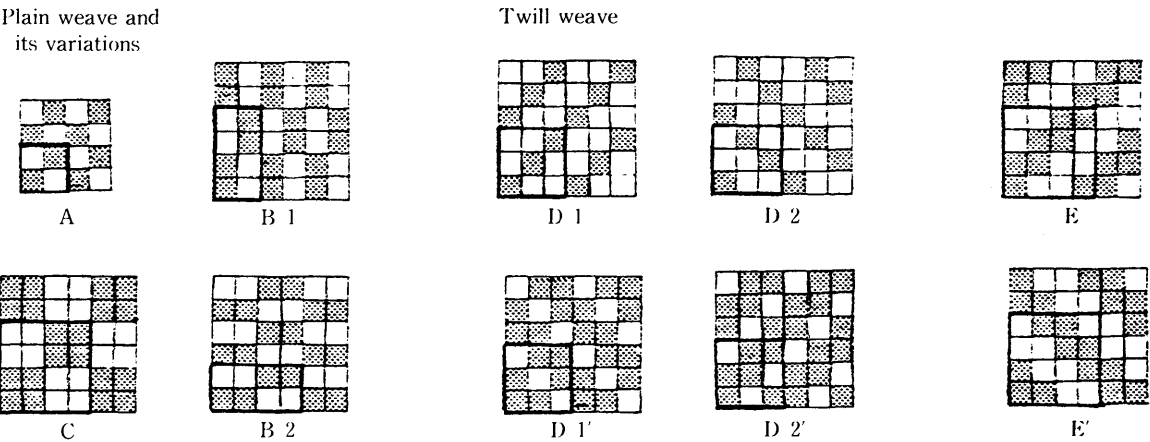


Fig.2 Textile weave

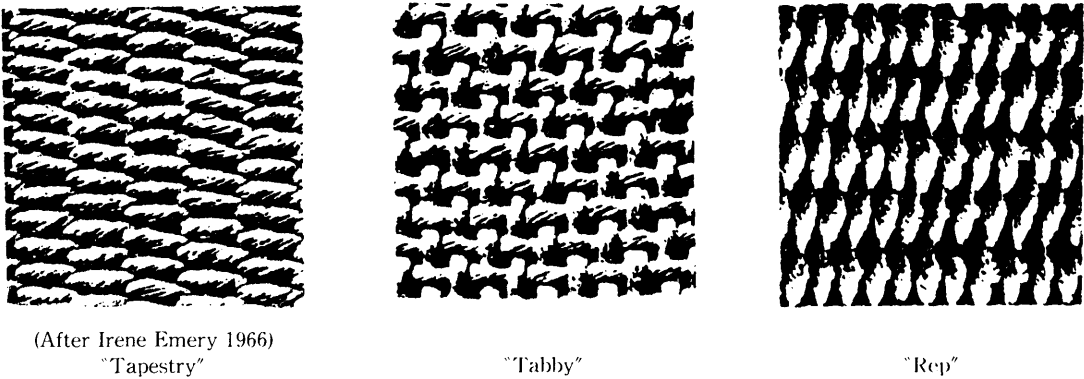


Fig.3 Types of weave

(A: weft-faced), tabby (B: balanced) and rep (C: warp-faced).

c) Selvage (Fig. 4)

Selvage includes one using simple turning of weft yarn (A) and one using additional turning (B) as well as that which uses additional yarns (C) probably intended for protecting the weft yarns at selvage and preventing the cloth from alteration.

d) Finishing of warp (Fig. 5)

There is a bordering way like fringe (A). There is also the way in which one of warp ends of about 3 cm in length is left and two to six warp yarns are worked into twisted cord, 2 to 5 mm in diameter, along one edge (B).

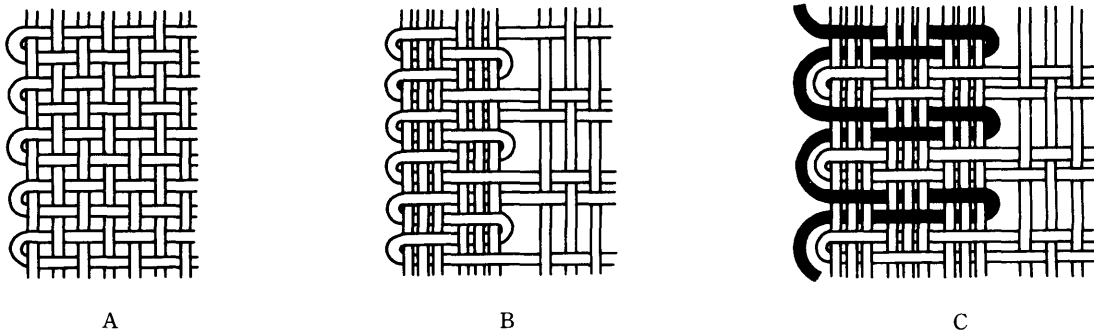


Fig.4 Selvage

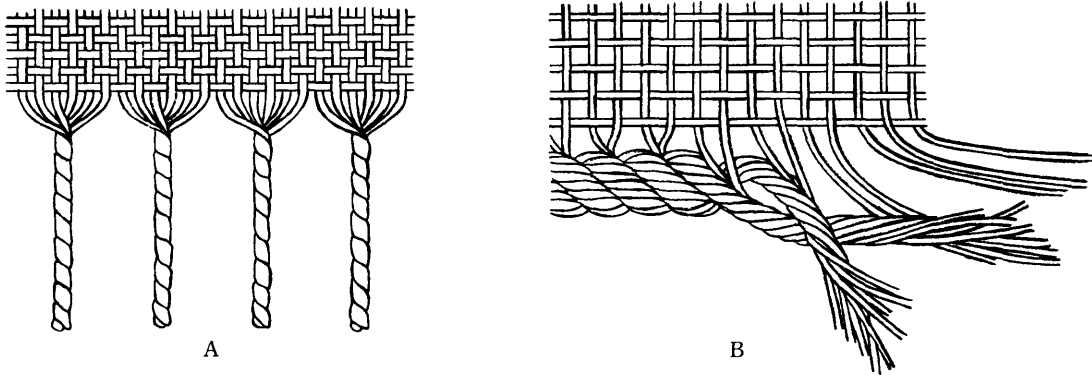


Fig.5 Finishing of warp

4) Design

a) Types of design

There are such types of designs as human figure like portrait, floral designs like arabesque, foliage, flower and fruit, and geometric designs such as stripe, color-graded stripe,  $\Sigma$ , H,  $\Gamma$ , square, chequer, staircase, indentation, running dog, and  $\Sigma$  meander.

b) Technique of design making

(1) Designs in colors differing from those of the ground are mostly expressed in tapestry. There are some tapestries in which designs are realistically expressed by the usage of weft yarns obliquely interlaced with warp yarns. Also, there are designs of weft stripes including color-graded stripes which were produced with an appropriate combination of two bundles of unspun wool of different colors.

(2) Design making by dyeing



Resist dyeing on cotton textile was found.

(3) Design making by embroidery

Meander design is embroidered with the chain stitch.

(4) Several marks seen at the cloth edges seem to represent either the weaver or the place of weaving.

5) Dyestuff

The yarns dyed with Tyrian purple were used for the designed part of several large cloths. But it is proved that weft yarns of those parts which look the same color as this purple were dyed with "Indigo" and "Madder". The designed part of one of the large cloths was dyed with Lac or Kermes. It is also proved that the red yarns of cord were dyed with "Madder", most likely originated from *Rubia tinctorum*, but the problem still remains with whether or not all of the "Madder" is from *Rubia tinctorum*. It seems that the blue textile was dyed with one of Indigo plants, but it is not clear if its origin was *Indigofera spp.* or *Istatis spp.* (woad). The yellow color of textile is too faded to tell what dyestuff was used. The green one was double-dyed with yellow and blue dyestuffs. The black yarns are thought to be naturally-black materials, but some of them were apparently dyed with a certain kind of dyestuff which has not been identified yet.

These dyes were identified by the methods as follows: (a) original color, (b) fluorescence under U. V. light, (c) coloring test by  $\text{SnCl}_2$ , (d) solubility in solvents and (e) extraction, if extractable, and identification by thin layer chromatography.

6) Sewing

Sewing is rather awkward despite the fact that most of the textiles are finely produced.

2. Pile textile

Most of the warp yarns are of 2-ply, one being wool and the other brown hair in cases of thick pile textiles, and are spun with hard twisting. Most of the weft yarns are single and made with soft twisting. All of the pile yarns are of 2-ply. Basically, there are five types of knotting shown in Fig. 6: Types A-1, A-2, B-1, B-2 and C. There are some pile textiles which are knotted on both surfaces (Fig. 7), which are divided into two types: one in which the same knotting is executed on both surfaces, and the other in which the reverse surface has the knots which are distributed at intervals and probably aimed for the prevention of slipperiness. Some of the pile textiles have such designs as squares, wave pattern and staircases. Colored borders of plain weave are recognized on some of the pile textiles.

3. Rush mat

Judging from the fragments of mats, it seems that the mats were woven with 2-ply warp

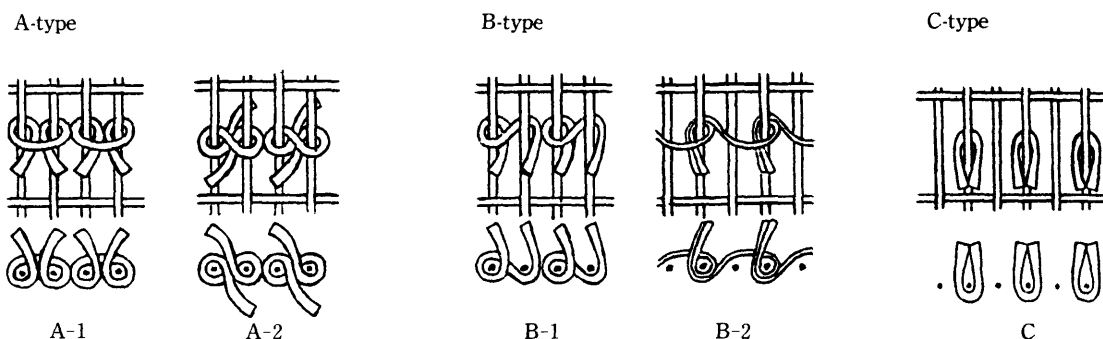


Fig.6 Types of pile knots

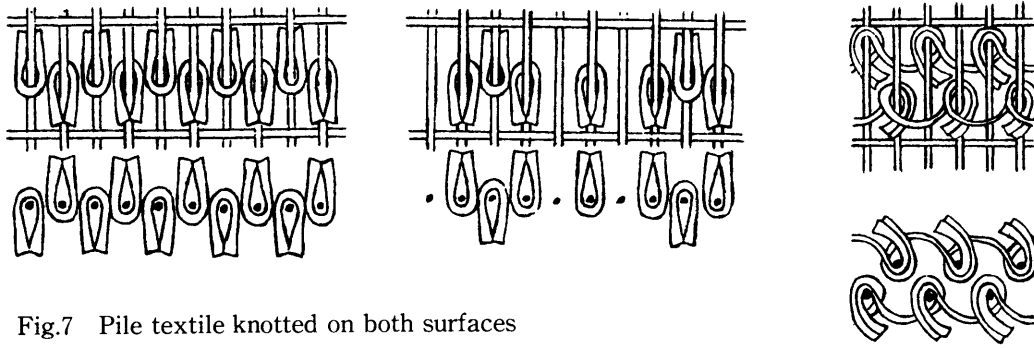


Fig.7 Pile textile knotted on both surfaces

yarns of wool and hair and weft yarns made of rush and that the woolen weft yarns of several different colors were used at their border.

#### 4. Embroidery and cord

Several examples of embroidery and cord are recognized.

### II. Typical examples of textiles unearthed

#### 1. Large cloth with H design (PL. 8-2)

The designs depicting H and squares are woven in tapestry on a yellow ground. Weave alteration is recognized in which the ground itself is made in plain weave and in which the designed part, the only part woven in tapestry, is made in rib weave. The warp crossing is executed at the part where this weave alteration is seen. This cloth is regarded to have been a manteau. The yarns of designed parts are dyed with Tyrian purple.

#### 2. Portraits sewn on cloth (PL. 9)

Portraits are expressed in tapestry using many colors. These portraits are expressed with the technique in which weft yarns are interlaced obliquely with warp yarns to produce shade by using two kinds of woolen yarns of different colors and to produce the most emotional effect. In the case of the portraits with frames of indentation, the orientation of the portrait agrees with warp direction (PL. 9-1). On the contrary, the portraits having frames with wave pattern have an agreement in the orientations of the portraits and weft yarns (PL. 9-2 to 4). The former show the Greco-Roman artistic style, whereas the latter seem to show a local style. On one of the portraits of the former type, there are seen green leaves and two red bunches of grapes on both sides, probably meaning hair ornament (PL. 9-1). A similar example is recognized on a mosaic pavement at Antioch, and this person could be the representation of Bacchus. One portrait of the latter type seems to show a golden crown and large earlings looking like egg (PL. 9-3), and another (PL. 9-4) has a facial appearance which resembles the woman portrait depicted on a mosaic pavement at Bīshāpūr, Iran.

#### 3. Textile with chequer design (PL. 10-1)

This very thin textile has chequer design in reddish orange and dull reddish yellow, with small design in tapestry. There are recognized fringes at its ends. This textile seems to have been large and colorful.

#### 4. Textile with arabesque designs (PL. 10-2)

Although this is too decayed to tell the whole appearance, it is rich in decoration and was woven with a complicated technique in which designs of arabesque and wave pattern were expressed in tapestry, and weft stripes in graded color were added to them. There are leaves and bunches of grapes in the middle, wave pattern to the outer side, and color gradation

further outside. This kind of decoration which is produced with bands of floral designs resembles those recognized on the textiles from Palmyra and Dura-Europos, and the decoration with wave pattern and color-graded stripes is recognized among the textiles unearthed at Dura-Europos.

5. Double-faced pile textile (PL. 11-1)

Seven or eight pile yarns are used together to make pile tufts on both surfaces by the method illustrated in Fig. 8. Squares of different colors are expressed along the selvedge. This pile textile is very thick and is thought to have been used as a saddle seat on horse or camel.

6. Thin pile textile (PL. 11-2)

Both of the warp (0.73mm) and weft (0.87mm) are very fine, differing in this respect from other pile textiles. Pile yarns are knotted with the method of B-2. The usage as clothing is thinkable.

7. Pile textile with wave pattern (PL. 11-3)

The wave pattern is expressed with pile yarns. Density of pile knots is very high ( $40 \times 48 \text{ dm}^2$ ). The type of knotting is C, and thick yarns are pulled out at intervals on the reverse surface, probably for the purpose of preventing slipperiness.

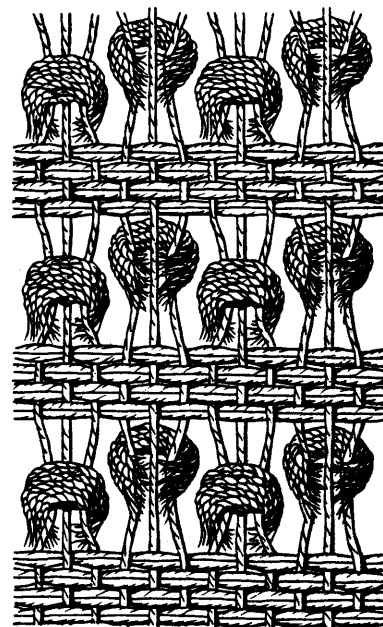


Fig.8 Double-faced pile textile

The textiles from At-Tar present considerable resemblances in their material and decoration pattern to those found at Palmyra and Dura-Europos, which suggests at least a certain cultural connection between these sites and At-Tar. Cotton textiles, resist dyeing, and varieties of knotting ways of pile yarns are other characteristics, and so further research is expected to clarify relations of At-Tar to other sites. We adopted the research method mentioned briefly in this report to clarify the culture exchange history related to At-Tar, with the focus on the techniques of weaving and dyeing. Textile is not like pottery which has been analyzed on established scientific bases, though it is not less important than pottery in that it is more mobile. In this view, we think that the textiles from At-Tar present considerable importance in the studies of their material, decoration pattern, and techniques of weaving and dyeing.

We propose for a unification of research method on archaeological textiles as well as that of terminology for better understanding among textile researchers and better research results.

## DISCUSSION

Professor D. J. WISEMAN (University of London, England):

Were the textiles of At-Tar Caves locally made or imported from abroad (outside Mesopotamia)?

Professor Hideo FUJII:

Thank you very much.

The field of textile is still new for archaeologists. Textile is unlike pottery which has been analyzed and studied on scientific bases, although it is not less important than pottery in that it is more mobile. According to our limited knowledge, we believe that the motives and weaving

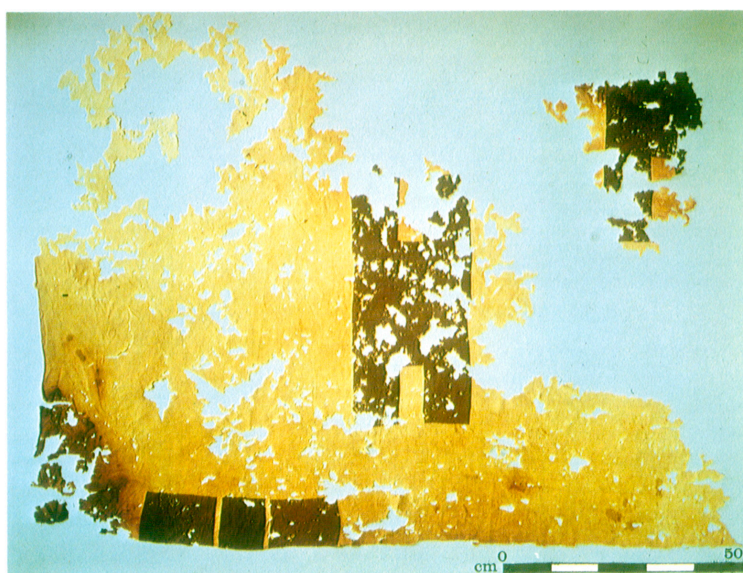
technique of the discovered textiles were influenced by their makers. So, we are analyzing these materials in order to give our definite answer. There is, however, definite relationship between the textiles which we discovered and those found in the Arabian Gulf, the coast of the East Mediterranean, the Red Sea area including Egypt and Nubia, and the southern part of Anatolia including Antioch. The pile textiles are related especially to the Central Asia. At-Tar is geographically located at an area closely connected with these areas. We have proposed this study in a hope that we can begin comparative studies of textiles in the area. We appeal for a terminological unification in the study of the archaeological textiles for better communication among textile researchers. Finally, we like to emphasize that textiles can be an important key to a clarification of ancient culture exchanges.

#### BIBLIOGRAPHY

- Emery, I., 1966, *The Primary Structures of Fabrics*, The Textile Museum, Washington, D. C.
- Fujii, H., ED., 1976, *Al-Tar I: Excavations in Iraq, 1971-1974*, The Institute of Ancient Iraq Culture, Kokushikan University, Tokyo.
- , ED., 1980, "A Special Edition on the Studies on Textiles and Leather Objects from Al-Tar Caves, Iraq" *Al-Rafidan* Vol. I., The Institute for Cultural Studies of Ancient Iraq, kokushikan University, Tokyo.
- Pfister, R., 1934, *Textiles de Palmyre*, Les Éditions d'Art et d'Histoire, Paris.
- , 1937, *Nouveaux Textiles de Palmyre*, Les Éditions d'Art et d'Histoire, Paris.
- , 1940, *Textiles de Palmyre: III*, Les Éditions d'Art et d'Histoire, Paris.
- , 1951, *Textiles de Halabiyeh (Zenobia)*, Librairie Orientaliste Paul Geuthner, Paris.
- Pfister, R. and Bellinger, L., 1945, "The Textiles" (*Part II*) *The Excavations at Dura-Europos: Final Report IV*, edited by M. I. Rostovtzeff, A. R. Belliger, F. E. Brown, N. P. Toll and C. B. Welles, Yale University Press, New Haven.
- Schweppe, H., 1979, "Identifications of dyes on old Texiles" *A lecture note (April, 1979)* at the American Institute for Conservation, Toronto, Canada.
- Takagi, Y., 1969, "A Chemical Study of dyes "Jodai" Textiles (4)" *Bulletin (Study on the Japanese Culture in Relation to Imperial Family and Court)* No. 21, Archives and Mausolea Division, Imperial Household.
- Uemura, R. and Takagi. Y., 1959, "A Chemial Study of dyes "Jodai" Textiles (1)" *Bulletin (Study on the Japanese Culture in Relation to Imperial Family and Court)* No. 11, Archives and Mausolea Division, Imperial Household.
- , 1962, "A Chemical Study of dyes "Jodai" Textiles (2)" *Bulletin (Study on the Japanese Culture in Relation to Imperial Family and Court)* No. 14, Archives and Mausolea Division, Imperial Household.
- , 1967, "A Chemical Study of dyes "Jodai" Textiles (3)" *Bulletin (Study on the Japanese Culture in Relation to Imperial Family and Court)* No. 19, Archives and Mausolea Division, Imperial Household.
- Yadin, Y., 1963, *The Finds from the Bar Kokhba Period in the Cave of Letters*, The Israel Exploration Society, Jerusalem.



1 General view of Hills A (left) and C (right) of At-Tar Caves



2 Cloth with H design





1 Portrait with frame  
of indentation



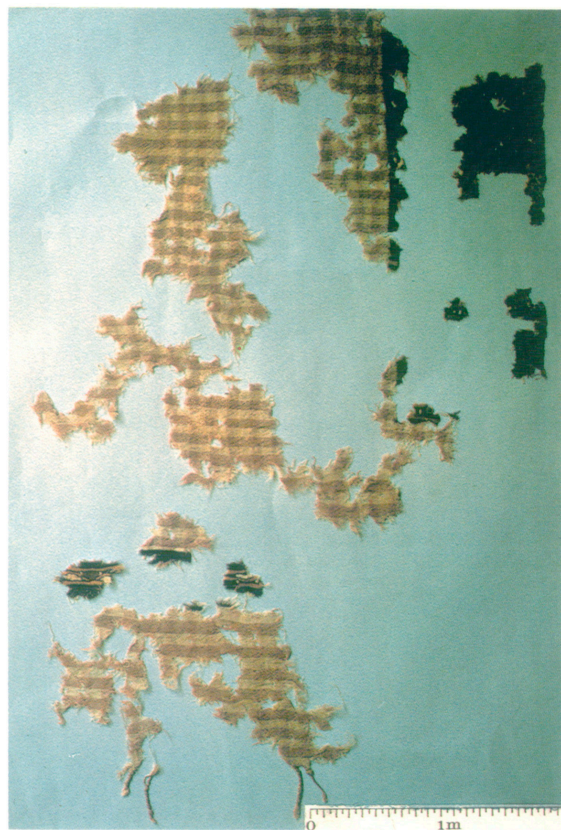
2 Portrait with frame  
of wave pattern



3 Portrait with frame  
of wave pattern



4 Portrait with frame  
of wave pattern



1 Textile with chequer design

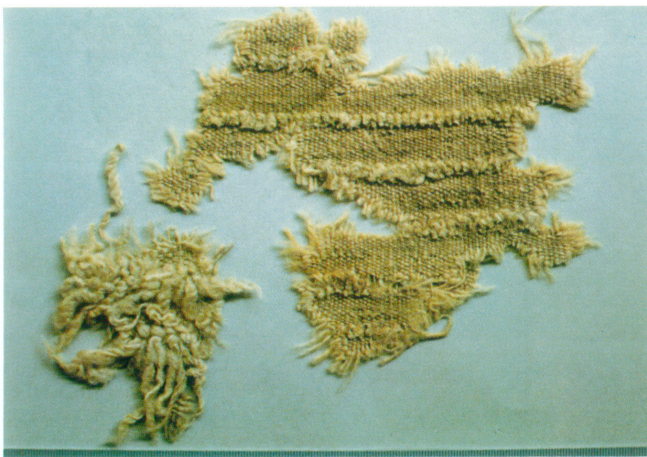


2 Textile with arabesque designs





1 Double-faced pile textile



2 Thin pile textile



3 Pile textile with  
wave pattern