

Plate 1. Weaving shop from the tomb of Meket-Ré, in Thebes, about 2000 B.C.
Courtesy of the Metropolitan Museum of Art.

TEXTILES FROM GORDION

By
Louisa Bellinger

THE Museum of the University of Pennsylvania is engaged in a widespread program of excavation in many parts of the world. One of their most interesting long-term projects has been the excavation of grave mounds at Gordion in Turkey, which they began in 1950. The mounds belong to the Phrygian Kingdom, which fell before an invasion of Cimmerian barbarians early in the seventh century B.C. At that time Gordion was burned and never flourished again as the capital of a powerful and independent state.

Rodney S. Young, director of the Gordion Expedition from its inception, and Curator of the Mediterranean Section of the University Museum, writing in 1958 of the tomb found in the royal grave mound, says, "Our tomb, then, demonstrated that by the end of the eight century the Phrygians had attained to unexpected heights of skill as architects and engineers; that they were past-masters at cabinet making, inlaying, and small woodworking; that they had a bronze-working industry which could compete with the workshops of Assyria and Urarto. They had wide connections toward the east and south, importing flax or linen thread, perhaps cotton, glass, bronzes and vessels of faience and pottery. These objects attest wide connections and developed culture, but they cannot speak for themselves. Let us hope that future work in the city will give us some of the contemporary archives to fill in details of the picture of a people hitherto all but unknown, now shown to have been among the leaders of the civilization of their time."

Among the "minor arts" which were found at Gordion are fragments of fabrics. A great many of the fragments are charred and most of the samples which came for analysis were of sizes to be housed comfortably in cotton batting in cigarette boxes! However, as the making of fabrics entails inducing many small fibers to cooperate with each other to become yarns, and weaving requires a certain amount of machinery to assist in interlacing the yarns into fabrics, it may be that careful study of even small bits of fabric may provide interesting, if mute, information. In fact, since the Phrygians had wide connections to the east and

south it may be useful to archaeologists if we treat these specimens as the basis for a chapter of "What in the World" and try to determine what is domestic and what imported.

To begin with, hardly anyone stops to think of the fact that the making of a woven fabric is entirely different from the crafts of metal-working or wood-working. When a craftsman carves wood he removes certain portions to get the shape he wants. The result is stable, and, unless pieces crack off, it will be the same next year as last. Bronze cast in a mold comes out in a prearranged pattern and may be duplicated by casting more bronze in the same mold. Cast bronze is stable. But fabrics are not stable. Yarns are built up by inducing a mass of fibers to cooperate, but individual fibers can change their positions within the yarns, for there is nothing in the crafts of spinning to keep fibers from trying to behave as nature dictated, and nature dictated an active role for each fiber. Vegetable fibers move characteristically when getting wet or drying. Wool absorbs and desorbs moisture, swelling and contracting in the process. The yarns in a fabric are interlaced in a certain order, but can be pulled out of line or removed entirely. The Phrygians of the eighth century B.C. seem to have been well acquainted with the behavior of the fibers they used, or they imported yarns from areas where the fibers were understood, for they were induced into making various types of fine fabrics any one of which, if not too charred, can still be unravelled today and have its yarns unwound, so that the original fibers are entirely free once more to act as nature, rather than man, dictates. Our first task, then, is to set forth the natural behavior of each fiber and the particular ways in which each was made into yarns in various areas.

As it seems to be true that in all parts of the world vegetable fibers were spun before animal fibers, let us start with a study of the vegetable fibers. Linen is a bast fiber, coming from the stem of the flax plant. When the plant has matured, it is gathered and soaked in water until the outer portion of the stem has rotted away, releasing the long fibers beneath. These linen fibers are strong so as to hold the flax stem upright, and their sides are smooth to let them lie closely together in the stem of the plant so that moisture can travel up them from the ground to the flower and leaves by capillary attraction. Flax may be retted in still or running water, or, where the dew is heavy, flax may be laid out

flat to be alternately wet by the dew and dried by the sun, as is recounted in Joshua 2:6 "But she (Rehab) brought them (the two spies sent by Joshua) up to the roof, and hid them with the stalks of flax which she had laid in order on the roof." Linen retted this way by dew usually turns out white or silver-grey, but is apt to be harsh and brittle, whereas linen retted in the Nile turned out yellow, soft and pliable. Egyptian linen was comfortable for clothing and, when made into sails, would not cut itself in a gale. Egyptian linen, then was in great demand and was a major export.

In the tomb of Meket-Ré who was buried in Thebes about 2000 B.C., H.E. Winlock, excavating for the Metropolitan Museum of Art, found a model of a weaving shop which he published in 1955 in MODELS OF DAILY LIFE IN ANCIENT EGYPT (Pl. 1). Here we are shown how linen fibers were made into yarns in the country where linen was the chief fiber. Three girls sit against the wall, each with a heap of flax in front of her. These girls take two very small bundles of linen fibers and overlap their ends by about two inches. This overlap, or splice, they roll in the "S" direction on their right thighs. This process follows the natural habit of the fiber, for when a linen fiber or single yarn has been wet it will turn slowly in the direction of the center part of a letter "S" as it dries. In New Kingdom times in Egypt there seems to have been no spinning of linen yarn, just the rolling on of new fibers at stated intervals. (The term spinning connotes drawing out while turning.) The Egyptian roving was neither drawn out nor turned throughout its length. Each new bundle of fibers was spliced on in the same way as the first, and the yarn was rolled into a ball. When the ball was sufficiently large, it was put into a pot of water in which an eye or handle had been incorporated near the bottom through which the end of the yarn was run, so that the ball would be held down in the water as the roving was twined with others, from the same pot or other pots, by craftsmen with spindles. Here we see warp and weft being made by three craftsmen for the sheets which are being woven on the two looms in the shop. For sheets, three rovings are twined together in the "S" direction; only two are used for some of the sheer scarves or transparent tunics shown so graphically in Egyptian murals. Among natural fibers, only bast fibers can be prepared in this fashion, for only they are

designed to lie closely side by side and act in concert in the stem of a plant. Silk filaments will lie smoothly side by side, especially if the gum sericin is not entirely boiled off, but as 400 to 1000 yards of silk can be reeled from a single cocoon, it is not necessary to splice silk to make continuous yarns. However, bast fibers can be spun from a distaff as the other natural fibers have to be. A vase from Orvieto (490 - 480 B.C.) shows a girl spinning from a distaff and wetting the thread between her lips as she spins. This must mean that she is spinning a vegetable fiber. In the Mediterranean region linen was spun, like the Egyptian twining, in the "S" direction and there was no plying of yarns spun from a distaff, which were usually as large or larger than the twined rovings from Egypt. (In early Christian centuries the Persian-Mesopotamian tradition of spinning a single yarn in one direction and plying two or more in the other direction seems to have worked its way west over the trade routes.)

Some hemp is found at Gordion which seems to have been spun from a distaff. It is comparable to linen, being a bast fiber, although it turns by nature in the "Z" direction and does not absorb moisture so readily.

There seems to be no cotton in the fragments so far excavated at Gordion, but we should say a word about it, for, being the vegetable fiber most widely used in India and Asia, it seems to have been responsible for the "Z" spinning tradition. Cotton is a seed hair. Its duty in life is not to transport moisture, but to protect a cotton seed from excess moisture in its embryonic condition after the boll has opened. It is a flat fiber with convolutions in it. This formation insures that each fiber will patrol its own territory, for no two fibers can lie closely together. It also insures that moisture will not travel along the sides of two adjacent fibers by capillary attraction. Even when tightly spun, unbleached cotton fibers make excellent water barriers. Cotton fibers as they dry do not turn sedately like linen, they move energetically in many directions. However, a cotton yarn when drying will usually roll in the "Z" direction, and we have noticed when washing very old fabrics that cotton with yarns "Z"-spun washes well, while cotton with yarns "S"-spun has a tendency to pull apart unless handled very gently. In India, where the spinning of cotton seems to have begun,

yarns were spun in the "Z" direction. The cotton fibers of India and the Near East generally ran from about $\frac{3}{8}$ " to 1" in length, and so were about half the length of a dynastic linen splice. These short fibers were first removed from the cotton seeds and then were carded into slivers with all fibers lying in the same direction. The sliver was rolled onto a distaff in such a way that fibers could be drawn from it by the spinner. The first few fibers were attached to the spindle which was then twirled with one hand to spin the yarn, while more fibers were drawn from the distaff with the other hand. When spinning cotton, the point of the spindle usually rests on the ground or in a bowl, so that no sudden jerk would be likely to break the fragile cotton thread. Hemp was longer than cotton, but seems to have been spun from a distaff also. However, because of its added length, the spindle may have been allowed to hang free, as was shown on the Orvieto vase.

Wool also was longer than cotton. The wool on the varieties of sheep native to the Near East had prominent scales. In fact, centuries before wool was spun and woven, it had been made into felt in Central Asia, with nothing but its scales to hold it together. We must remember that, until shears were invented in the Iron Age, wool was plucked from a sheep with a tool resembling a comb, and it was easier to mat these flocks of wool still further, into felt, than it was to card them into slivers and spin them into thread, which then had to be woven into a fabric. Also the yield per animal was much lower when the wool was plucked instead of being sheared. Therefore spinning and weaving of wool was not as much of an industry as it later became. The material available from goats followed the same rules, but the scales on goats-wool are not prominent and goats-wool has no felting properties. There is one advantage of plucking over shearing. The wool obtained by plucking sheep or goats is apt to be the fine undercoat and not the coarse hair, so the craftsmen using plucked wool can spin a very fine thread. Since wool is an animal fiber, it has no preference as to the direction of spinning. A spinner having learned to spin cotton in the "Z" direction, or one having been taught to spin by a cotton spinner, would probably spin in the "Z" direction. If he had been trained on linen in Egypt, he would have learned to turn his spindle in the "S" direction. Along the trade routes, we sometimes find wool fabrics with warp spun in one direction

and wefts in the other, particularly if a dense fabric is wanted. No matter which way the wool spinner turned his spindle, he could make a good yarn, and wool was long enough so he did not need to rest his spindle in a bowl to keep from breaking his thread. In fact, wool spinners found that, though they could stand still and spin with the spindle in mid-air the act of walking helped to keep the spindle in motion. Shepherds could and did spin as they tended their flocks and walked them from pasturage to pasturage. Perhaps this is one reason why so many areas in the Near East spin in the "Z" direction, started in India. Distaff spinning may have come over the trade routes brought west with the sheep whose original home was Asia, and have spread around the Mediterranean with them, to lands which had not already learned the sedentary methods of Egypt.

Here then we have the chief fibers native to the Near East which were used to make fabrics. Each fiber made a different type of yarn. Linen yarns were sturdy, smooth, and would not stretch. Hemp yarns were much the same but not so pliable. Cotton yarns were fragile and were not smooth. Wool yarns were springy, not very strong, and were weaker when wet. They would stretch and contract, for it was the natural duty of a wool fiber to provide an equable atmosphere for its sheep or goat, and therefore it absorbed and desorbed moisture, swelling and contracting in the process.

The next thing to concern us should be the types of looms extant. The model from Meket-Ré's tomb shows a horizontal loom. However, about 1450 B.C., the Egyptians began to set this loom upright, so that gravity would help beat down the weft yarns in their wide webs. Therefore, in the 8th century B.C., the typical Egyptian loom was vertical and had two beams, the lower one being the cloth beam. Herodotus remarks that Egyptian weavers beat their wefts down whereas everyone else beat up, for the Greek loom was vertical too, but the cloth beam was at the top and there were loom weights at the bottom. Except that very tightly packed fabrics could not be made on this loom because gravity tended to make the wefts sag, this was a very versatile loom. The tension on the warp ends was uniform whether a shed was open or not, and it was possible to pull ends out of line when weaving, if the

weaver wanted to shape his fabric. In Palestine, and undoubtedly in other places as well, a narrow horizontal loom was used, just wide enough to be worked by one person. One end might be tied to a tree or tent pole and the other end, the cloth beam, was held either by two pegs in the ground or by a belt which went around the weaver's waist. When weaving on this horizontal loom, or on the Greek loom with loom weights, the craftsmen were in front of the loom in positions from which they were able to work patterns in their webs at any time. The Egyptian weavers, on the other hand, sat on either side of the loom and had to make special preparations to weave a pattern. The wall paintings of this loom (Pl. -- 2) also make it clear that, as there was no reed to keep the warp spaced, the ends were pulled together during the weaving. A definite characteristic of Egyptian linen is that it has more warp than weft to the centimeter.

One other detail must be reviewed before we have finished this preamble, which, though over simplified, will give us a basis for classifying the bits of fabric which were found at Gordion. This point is the preparation of the warp to be threaded on the loom. The craftsmen in the weaving shop who are preparing their warps are winding yarn around pegs in the wall in such a way as to make alternate passes of the yarns cross each other, so that the ends could be threaded in order to form two sheds, one containing all odd yarns, the second all even yarns. When a longer warp was wanted, it was wound over more pegs. This is an excellent way to prepare a linen warp which will not stretch, one which was to be held against a cloth beam. However, when a warp was being arranged for a warp-weighted loom, a narrow heading was woven in the process, so that the fabric would have a sturdy edge against which to begin the normal weaving. Peter Collingwood writing on Neolithic weaving techniques* gives an interesting explanation of the starting edges of the New Stone Age linen fabrics found in the Swiss lake dwellings. In the heading there are two weft yarns -- which become warp ends in the material proper -- in each shed. Collingwood thinks that that is because it is easier to draw a loop through the shed and pass it

*Quarterly Journal of the Guilds of Weavers, Spinners and Dyers, No. 35, Sept. 1960, London.

around a measuring stake, leaving a ball of yarn on the right of the narrow web, than it would have been to pass a shuttle through a shed, around the stake and back through the next shed, with the necessity of unwinding the yarn, possibly ten feet of it each time, from a shuttle. Provided the weaving of the heading is carefully done, the warp ends for the piece will be evenly spaced – an important consideration when there is no reed nor even a second beam to keep the warp in line. This heading also gives the fabric woven on a warp-weighted loom three finished edges, for the two sides have the usual selvages.

With this data at our command, let us see how it can be applied to the fragments from Gordion. It may be that we shall find other elements in these fabrics beside spinning, weaving, and our usual division of fibers.

The first group that we examined were a number of specimens marked in the inventory as "doilies" or "studded plaque-doilies" with an occasional notation of "leather backing". These looked like bronze studs surrounded by a knotted fabric of some sort. Under the microscope they turned out to be, in fact, bronze studs of reasonable sizes surrounded by incredibly small bronze studs applied to a leather backing. The little studs, most of which were only 0.001m in diameter, were made just like the large ones, with a prong on either side, which were put through tiny slits in the leather and were then bent inward like a staple. The large studs are from 0.012 to 0.015m in diameter. Smaller ones are 0.002, 0.001 and 0.0005m respectively. Though these can not properly be called textiles, we illustrate them (Pl. 3) to explain the natural confusion.

The next group of specimens were marked "blankets" or "bed cover samples". These turned out to be felt of various types. In Central Asia, wool is laid out on a large mat, the first layer going in one direction, the second at right angles to the first, and so on until the desired thickness is achieved. The mat is then rolled up tightly and unrolled again. Next it is rolled from a different point. When the rolling and unrolling has been done from all points of the compass, the wool has become a fabric. The felt here at Gordion has been made by a variation of this method, as far as we can discover from these tiny chunks. In

Phrygian times in Asia Minor, it would have been customary to spin wool and to weave it also. Therefore, we are not surprised to find that these "blankets" show spun yarns at least in some layers, woven into sheer fabrics upon which wool flocks were laid out and to which they were felted. Where the blanket is thick, there seems to have been one or more woven fabrics to which the wool was felted. Apparently various patterns were laid out, using one or two colors on a ground of a third color. For instance, the "mattress cake from the bed", which was the #1 sample in 1957, seems to be felt, with an occasional layer of tan wool very loosely woven with 8 warps to the centimeter and 40 wefts. The warps are "S" spun and the wefts "Z". Between these layers are layers of dark-grey – which looks like purple-brown, apricot and red unspun flocks lying in a solid color layer, or arranged in patterns, now beyond interpretation. This whole aggregation seems to have been rolled together into a single thick fabric. Other specimens have slightly spun yarns of various colors loosely interlaced and then felted. We illustrate the tan wool which seems to be the base of blanket #1; a photomicrograph of the wool laid out to be felted; a cross section of the blanket; and various fragments which show different consistencies (Pls. 3-4).

The bags or cloths in which fibulae were found, as well as the fabrics adhered to bronze bowls or situlae, seem to have been made mostly of linen or hemp. In their present state they are very hard to tell apart. We show excavation photographs (Pls. 5-8) of the head of the bed with a large linen cloth out of which fibulae have spilled – probably when the bed collapsed – and the lion situla with a piece of linen behind his ear. There are details also of the lion situla and the ram situla with a piece of hemp on his horn. These fabrics, used for wrapping, are quite sturdy and they are among the coarser woven fabrics found in this mound. They may have been woven on either a horizontal loom or a vertical one with loom weights.

Another group of sturdy fabrics are made of golden-brown goats-wool, probably mohair, and show the heading usually denoting a fabric woven on a warp-weighted loom. It is interesting to see (Pl. 9) that the heading is as described for the neolithic fabrics from Switzerland. However, the wefts-turned-into-warps are not set up on the loom proper, as in Switzerland. The two yarns which lay in a single shed are threaded

on the loom next each other, rather than crossing with yarns from the next shed. We, therefore, either have to do with the warp-weighted loom, but a local system of set-up, or we have the traditional heading for a warp-weighted loom applied to a horizontal loom. The latter suggestion seems more probable, as the fabric is quite dense and the thread count is fairly even. When we came to examine the fabrics from the 1959 campaign, there was a specimen of linen tabby with a heading, almost like the goats-wool one, with the whipping still in place which must have held it to a cord attached to the loom. However, this heading differs from the goats-wool one in that, every once in a while, there is for two sheds, only one yarn in the shed of the heading. If the linen warp was a long warp, these might be the places where a new yarn was attached. Or, when the ball got small, it may have slipped through the shed and have been put back in the next one. At any rate, this linen heading was only attached to a cord instead of to a warp beam, for the whipping is pulled beyond the heading just far enough to accommodate a cord, which has been pulled out when the fabric was taken from the loom. Therefore, the fabric may quite possibly have been woven on a horizontal loom.

The last group of fabrics from the 1957 campaign were very fine and usually a brownish-grey. For the most part the warp ends ran in the neighborhood of forty to the centimeter – 100 to an inch – and the weft count was either about forty or about thirty. These fabrics were all mohair. Other mohair fabrics were woven with the same fine yarns spaced further apart, giving thread counts of 16 to 16, 24 to 24, 33 to 22 and 20 to 16. Warp ends from the linen specimens were about 20 to the centimeter, with the wefts from 16 to 18; hemp warp ends ran from 14 to 24, the wefts from 14 to 20, and sheeps-wool warps were only 8 to 10, but their wefts ranged from 40 to 60. In other words, some mohair fabrics were made with relatively low thread counts like linen and hemp, but most of them were considerably finer, and all the mohair yarns were spun in the "S" direction of Egypt. The wool fabrics had widely spaced "S" spun warp ends, but their "Z" spun wefts were much closer set (Pl. 9d). These would seem to be the precursors of tapestry weaving, which was such a favorite wool technique in the early Christian cen-

turies. Two pieces from Tumulus P (1956) are exceptions. They both have an even count of 10 to 10 and all the yarns are "Z" spun.

A somewhat different set of fabrics was recovered in the 1959 campaign. Besides the linen tabby with the heading and whipping intact, there were several fragments of charred wool tabby, one piece of which we show in its entirety as well as in detail (Pl. 9). There were also three pieces of linen tape in much better condition. These were made on a narrow loom, undoubtedly horizontal (Pl. 10d). Other fabrics also point toward the use of an horizontal loom. There is one pile fabric which must have been made on a loom with two beams, for an extra yarn carried at the back was pulled to the face of the fabric, apparently over a gauge, after every warp end. Then ten shots of weft were inserted over two, under two, and packed down tightly. This piece is too charred to photograph well, so there is a drawing of back and front (Pl. 10a).

Next there was a group of two-color patterns, which were probably woven on a horizontal loom (Pls. 10 - 12). An extra weft is floated across the back of the web taking the place of the ground weft in the pattern areas. The Beduin weaves such patterns in the warp direction, setting up two yarns together where there is to be a pattern in the stripe and then pulling the pattern warp forward with his fingers when it is needed. However, these patterns seem to have been worked in weft bands, for the bands are occasionally edged with a wide border of sumak wrapping, which cannot be done up a warp, but must be done across the web. A weft yarn passes forward in front of two warp ends and back under one, making a "Z" slant in one row and an "S" slant in the next. After two rows of sumak, two shots of tabby weft are inserted. The materials in these patterns with the floated wefts seem to be a wool warp with wool and linen wefts. The wool is "Z" spun, the linen "S". As a great many specimens at Gordion are mohair rather than sheeps-wool and are "S" spun, it may be that this "Z" spun wool is an import from the east. They were found in the same Tumulus with two pieces of "Z" spun linen which must be imports. At any rate, these may have been the inspiration for a number of exciting patterns made out of wool and mohair in a slit tapestry technique, which may have been the ancestor of some of the darned openwork on linen ascribed to Persia at a much later date. At any rate, the warp and one weft are "S" spun wool, the other weft is

“Z” spun mohair. Their color now is brown and grey, which were probably the natural colors of the material. Some of these also have a sumak edge and one or two have braided fringe, the ends of the braids being wrapped with a ring of the pattern weft. A great many of these pieces seem to have been wadded up to act as a pillow, or possibly they were just folded neatly for storage. They are now so brittle that it is hard to unfold them without cracking them at the folds and losing the pattern. We illustrate a few by drawings as well as photographs (Pls. 11-16).

To recapitulate: the fabrics found at Gordion are much finer than fabrics in the early Christian period. There is wool felt in several colors, a great deal of woven goats-hair, a little linen and less hemp (Pls. 17) Plain tabby fabrics predominate. When there are patterns, they also are woven over one, under one. Sewing consisted of basting with paired yarns. The examples, except for one rolled and whipped edge, are mostly basting four layers of fabric together (Pl. 18). There is nothing like tailoring or the felling of seams which is found at Dura. The spinning is very fine, both in quality and in size of yarns, the goats-wool being spun generally much finer than the vegetable fibers. The coarsest weave has at least 20 yarns to the inch and much of the mohair has 100; there are even a few pieces of wool with 150. This is as remarkable in its way as making bronze studs half a millimeter in diameter. Certainly the Phrygians were remarkable craftsmen making excellent use of simple tools; and they obviously understood all about the materials they used.



Plate 2. Wall painting of women weaving and twining yarn. Egyptian, Dyanasty XII.
Courtesy of the Metropolitan Museum of Art.

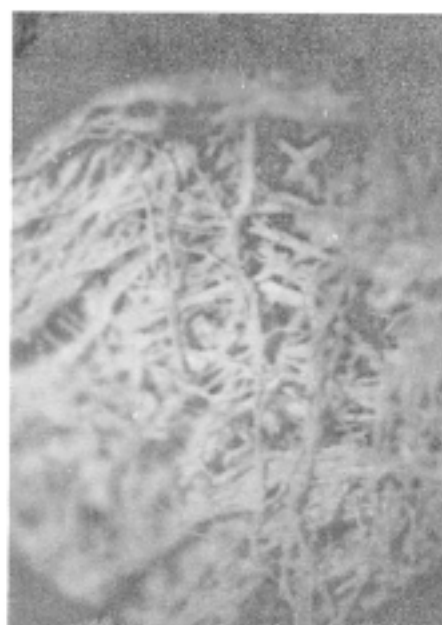
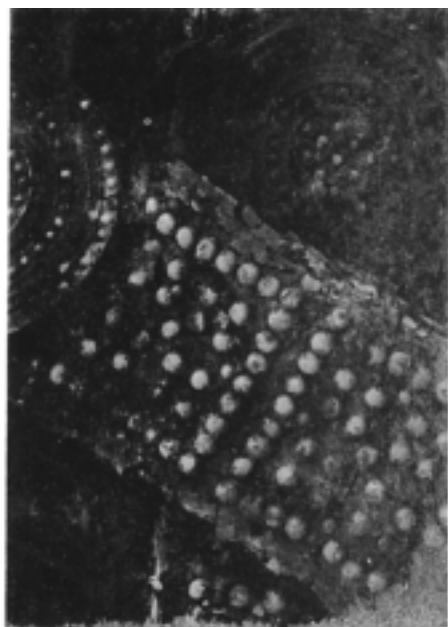


Plate 3. a (above left): bronze studs as found. b (above right): photomicrograph of small bronze studs, 0.002m and 0.001m. c (below left): tan wool, basis of felt. d (below right): photomicrograph of wool laid out for felting.



Plate 4. a (above left): cross section of a blanket. b (above right): colors laid out in felt. c (below left): loose weave felted. d (below right): felt within a woven fabric.

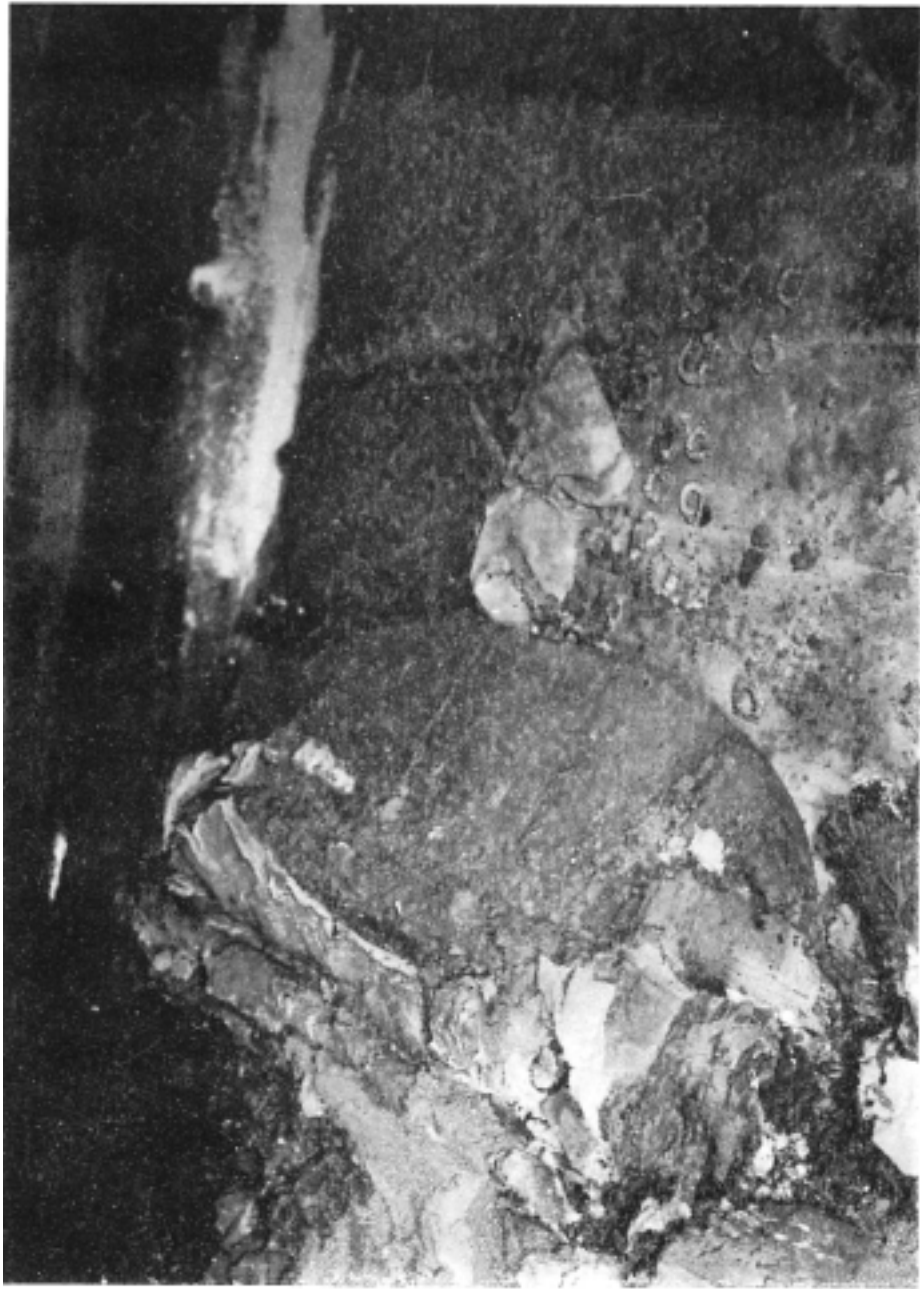


Plate 5. Collapsed head of bed with linea cloth spilling fibulae.



Plate 6. Lion situla as found with piece of linen behind ear.



Plate 7. Detail of lion situla.



Plate 8. Detail of ram situla with hemp behind horn.

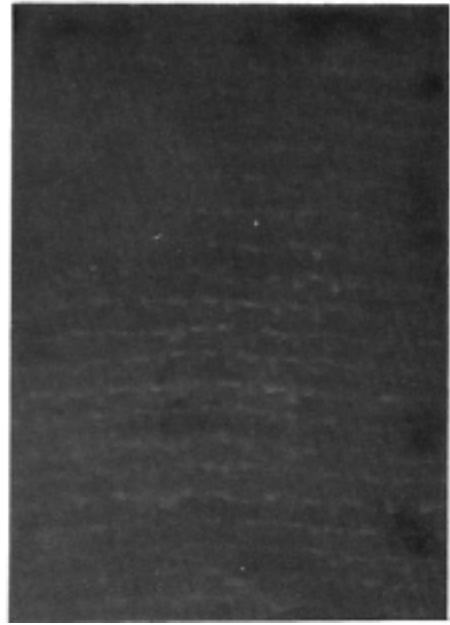
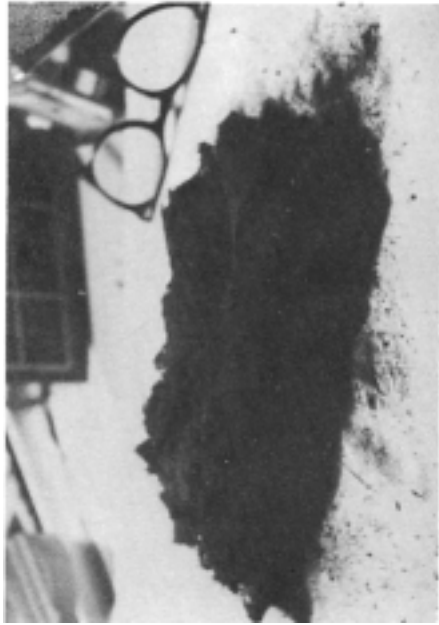
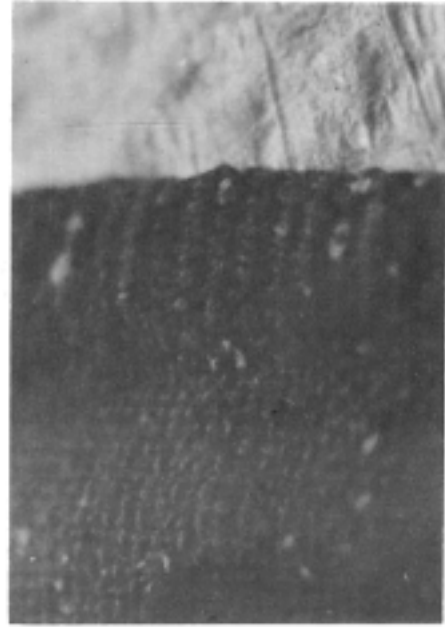
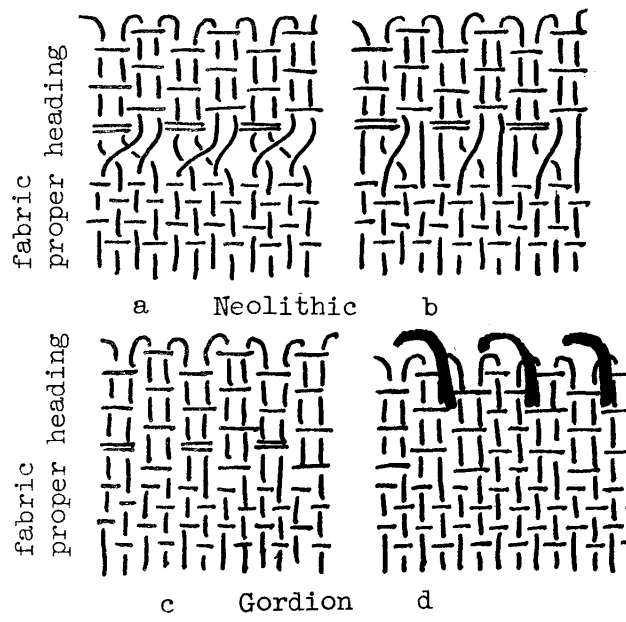


Plate 9. a (above left): charts of Neolithic (a,b) and Gordion (c,d) set-ups. b (above right): mohair fragment with heading. c (below left): charred mass of wool tabby with glasses for scale. d (below right): microphotograph of wool tabby.

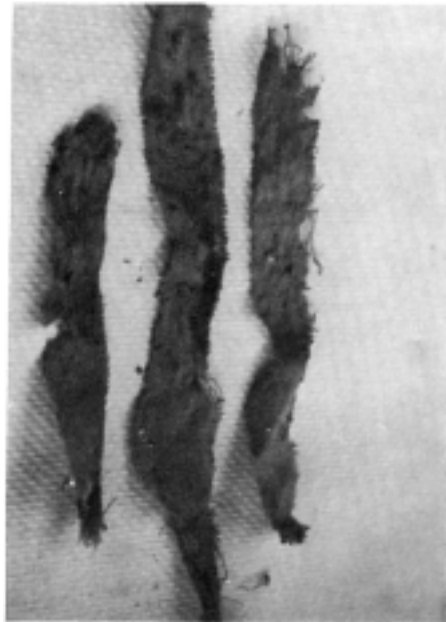
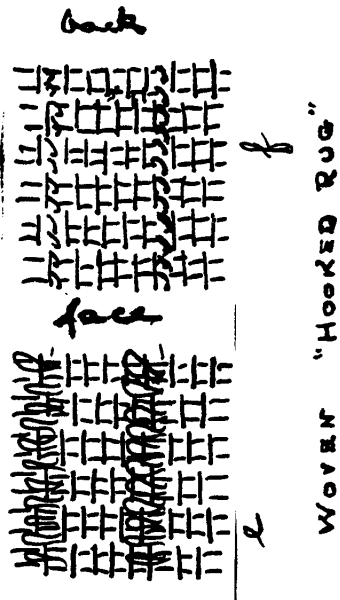
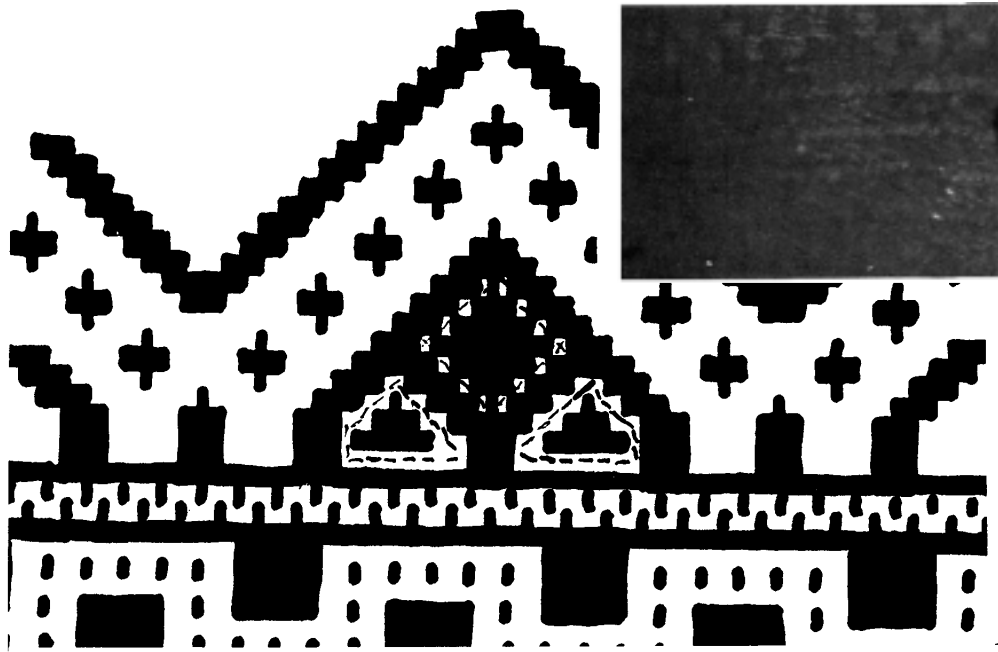


Plate 10. a (above left): drawing of weft float pattern. b (above right): weft float pattern with sumak border. c (below left): chart of "hooked rug." d (below right): linen tapes, 0.25m and 0.20m wide.

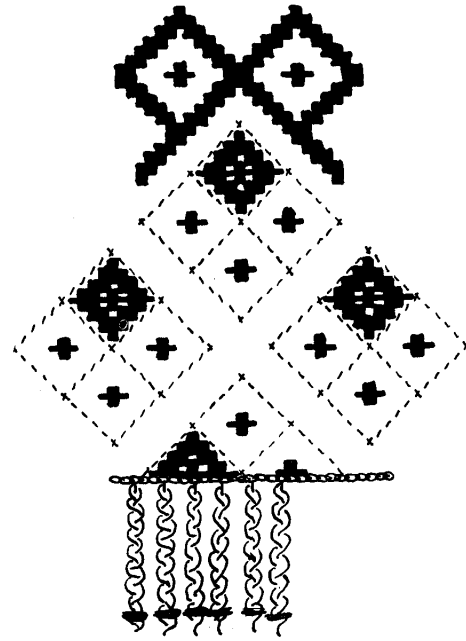
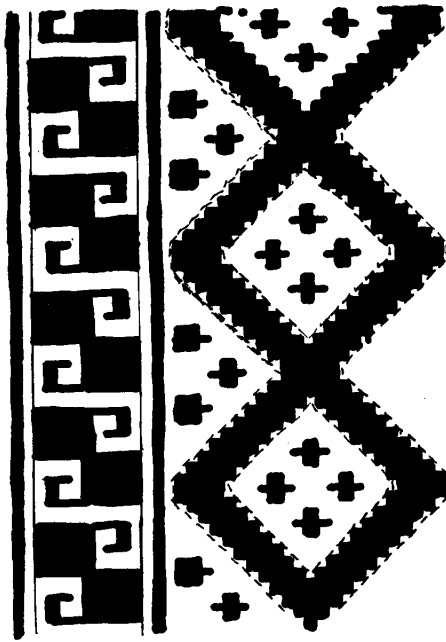


Plate 11. a (above left): "S" pattern border, crooked. b (above right): slit tapestry, braided fringe. c (below left): drawing of "S" pattern border above, as it was woven. d (below right): drawing of slit tapestry pattern above.

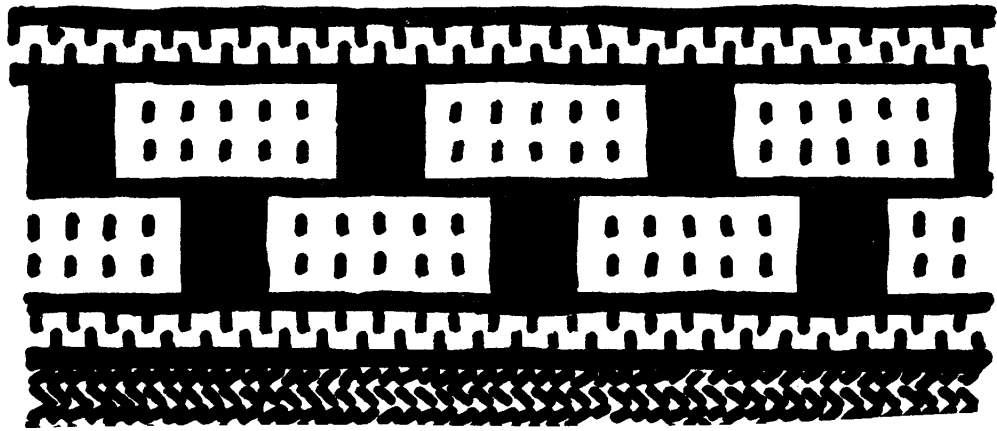


Plate 12. a (above): floated weft border, sumak edge. b (below): floated weft border, slit tapestry above.

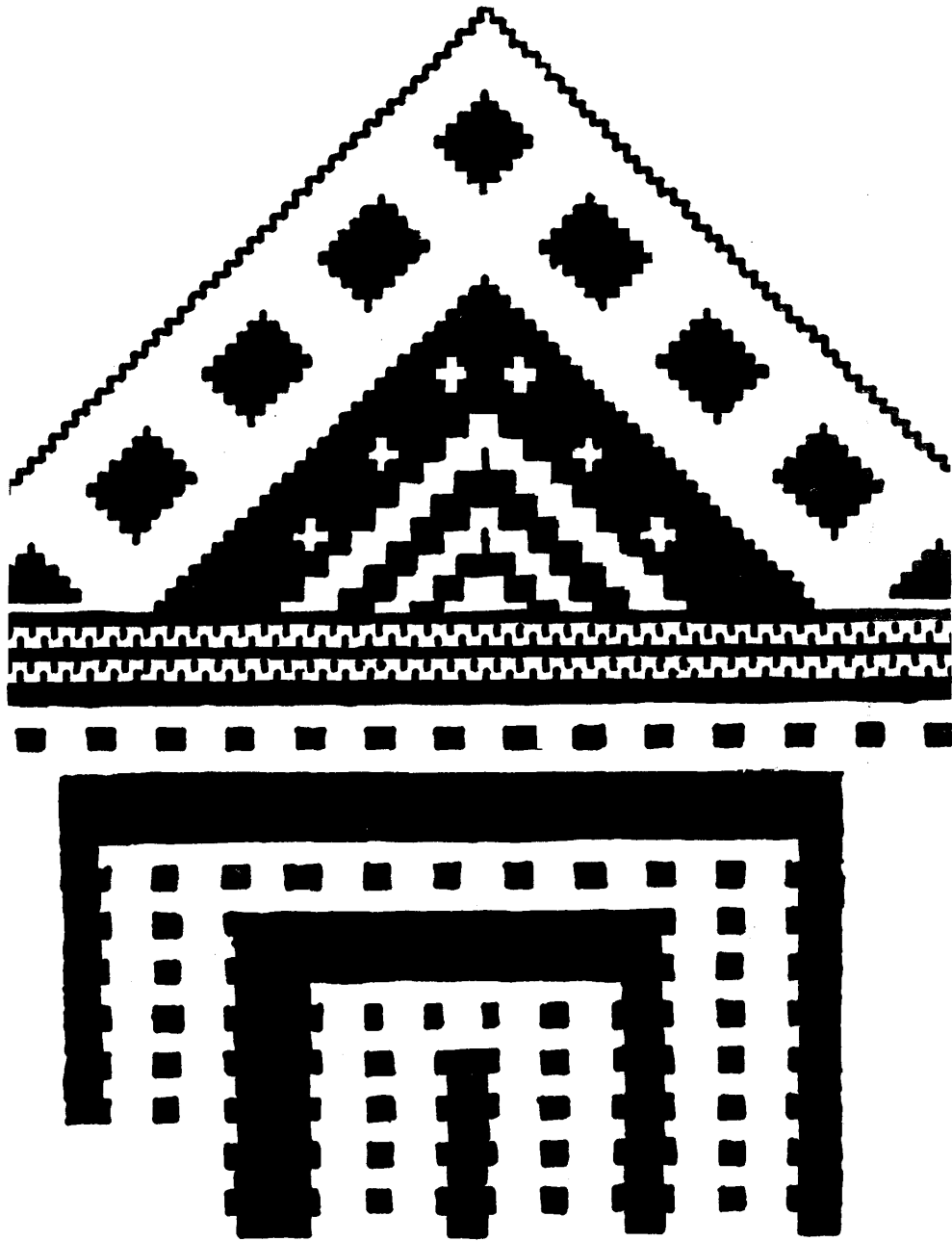


Plate 13. Slit tapestry pattern.

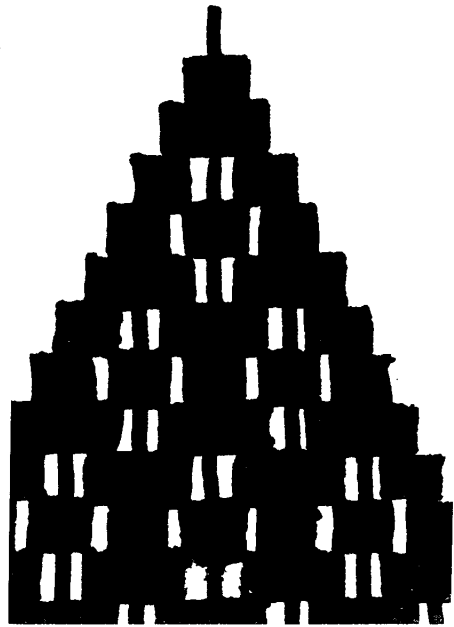


Plate 14. a (above): drawing, slit tapestry pattern; light is wool, dark is mohair. b (below left): slit tapestry triangle in plain tapestry ground. c (below right): drawing of b.

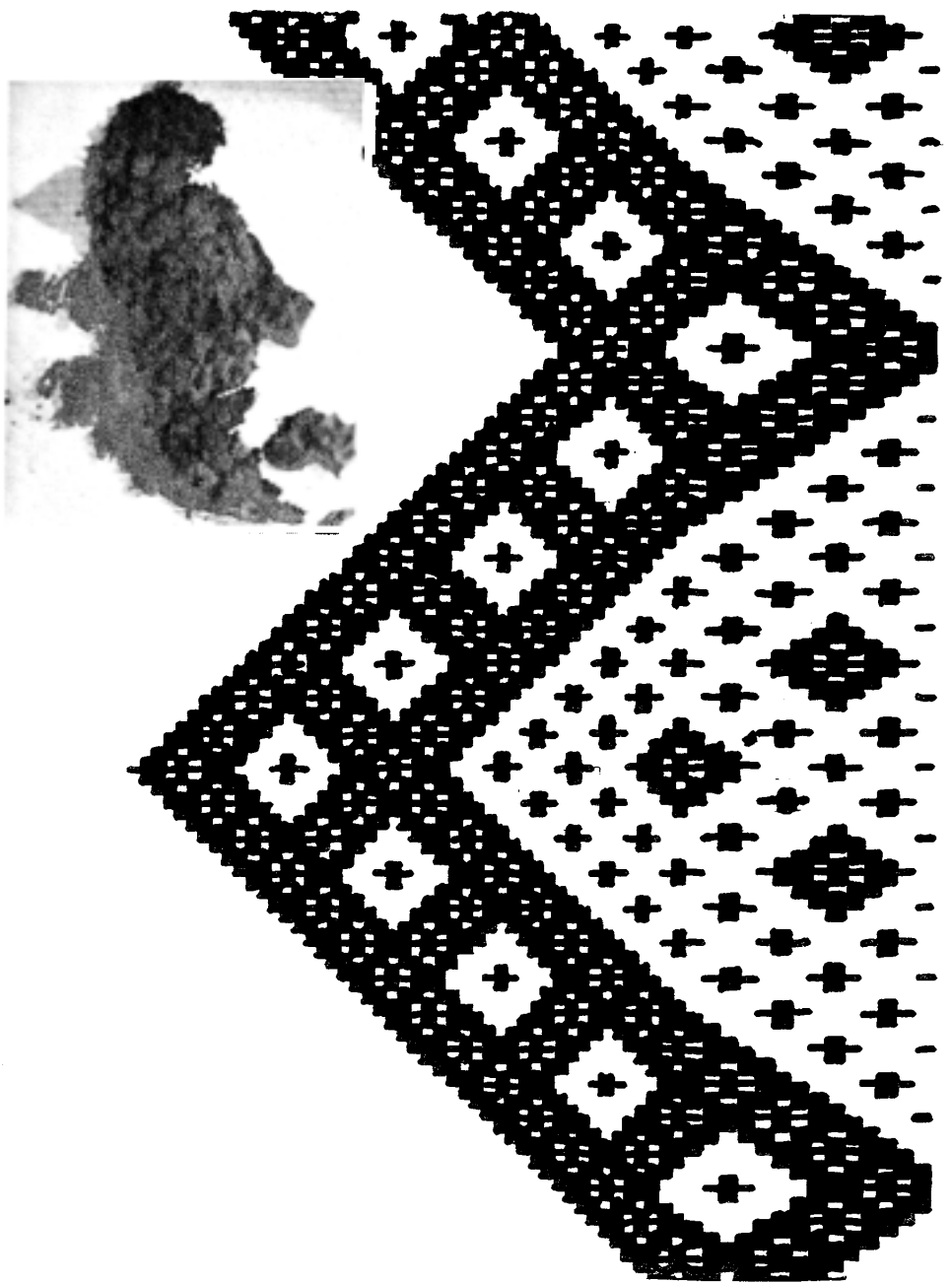


Plate 15. Slit tapestry; the pattern lengthens at the bottom.

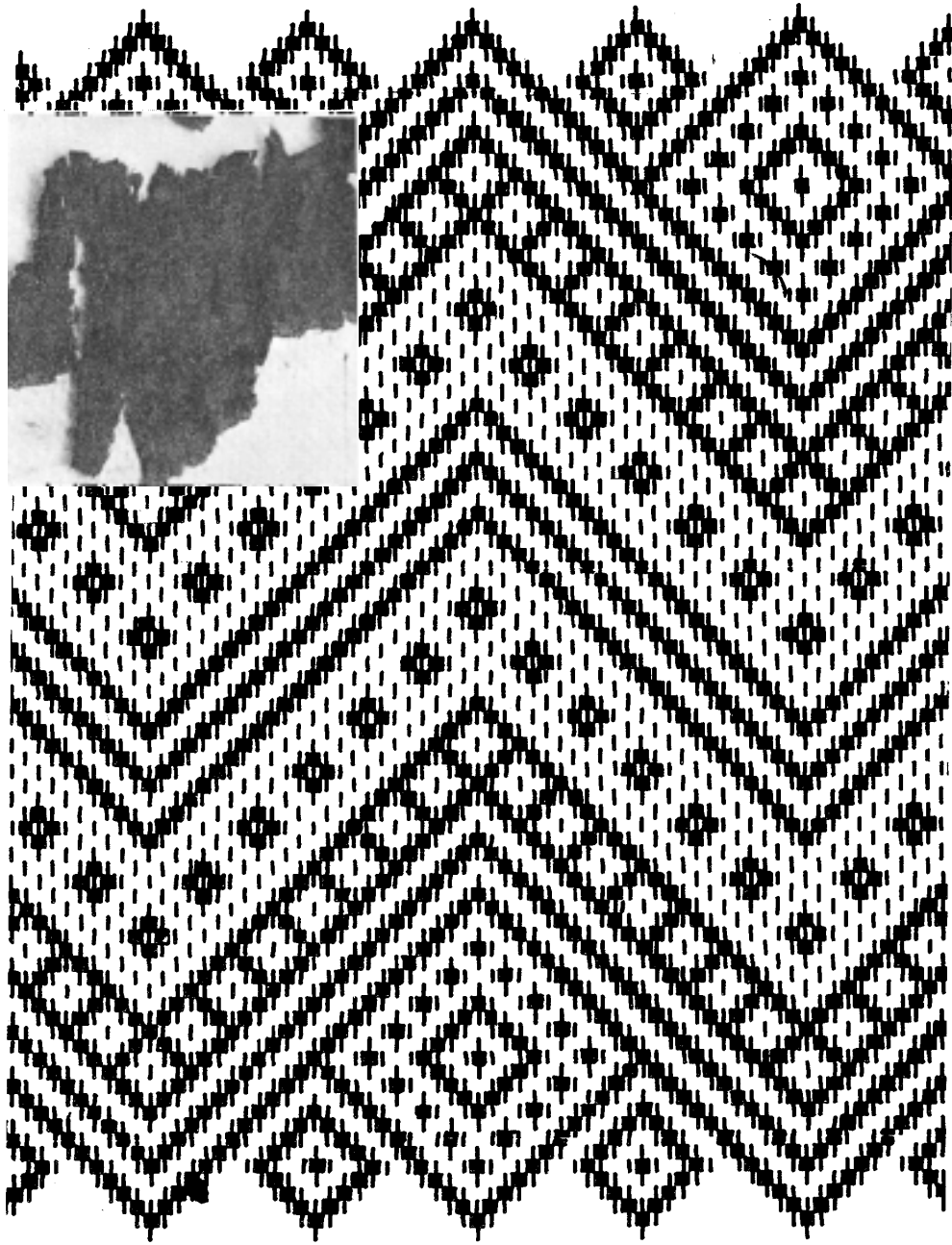


Plate 16. Slit tapestry with sumak border.

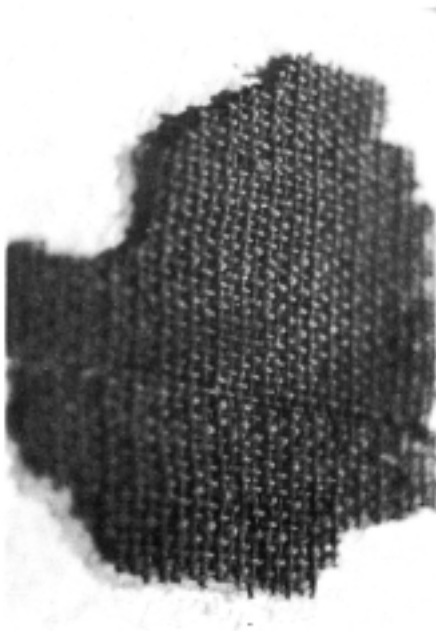
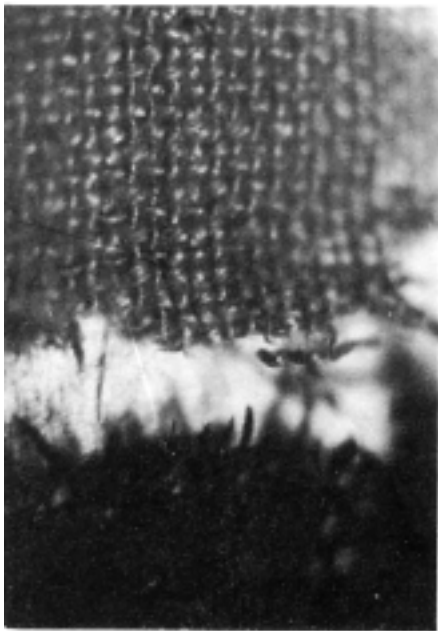
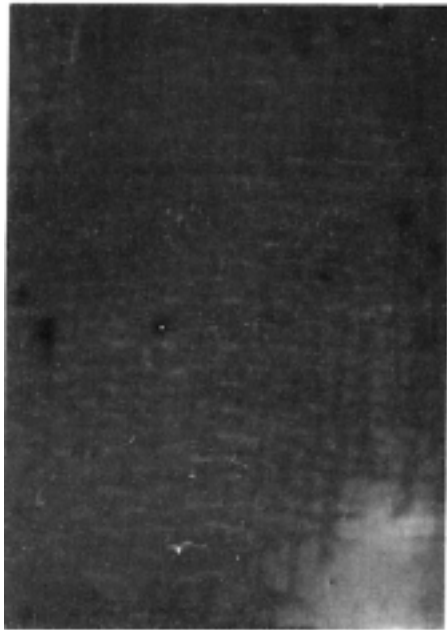


Plate 17. a (above left): wool tabby. b (above right): hemp tabby. c (below left): linen tabby.
d (below right): mohair tabby.

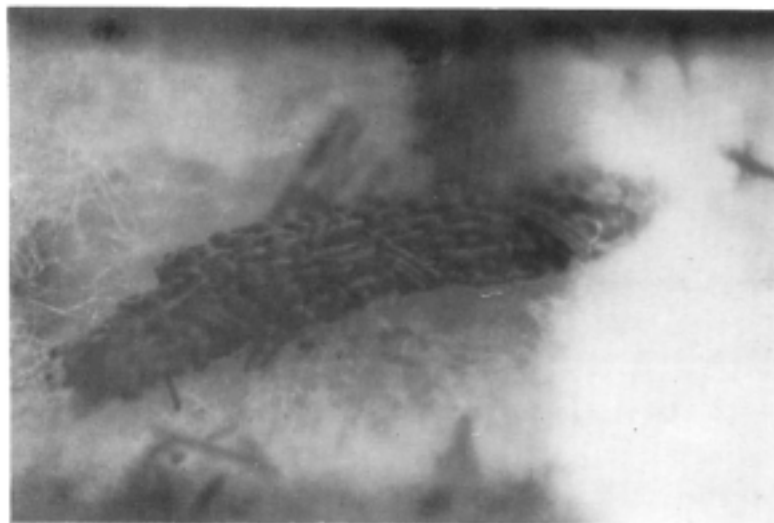


Plate 18. a (above): rolled and whipped edge from mohair fabric. b (below): four layers of mohair basted together with paired yarns.

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