Prehistoric Textile Fabrics Of The United States, Derived From Impressions On Pottery eBook

Prehistoric Textile Fabrics Of The United States, Derived From Impressions On Pottery by William Henry Holmes

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PREHISTORIC TEXTILE FABRICS OF THE UNITED STATES,

Derived from impressions on pottery.

By W. H. Holmes.

Introductory.

It is not my intention in this paper to make an exhaustive study of the art of weaving as practiced by the ancient peoples of this country. To do this would necessitate a very extended study of the materials used and of the methods of preparing them, as well as of the arts of spinning and weaving practiced by primitive peoples generally. This would be a very wide field, and one which I have no need of entering. I may state here, however, that the materials used by savages in weaving their simple fabrics consist generally of the fibre of bark, flax, hemp, nettles, and grasses, which is spun into thread of various sizes; or of splints of wood, twigs, roots, vines, porcupine quills, feathers, and a variety of animal tissues, either plaited or used in an untwisted state. The articles produced are mats, baskets, nets, bags, plain cloths, and entire garments, such as capes, hats, belts, and sandals.

It has been noticed by a few authors that twisted or plaited cords, as well as a considerable variety of woven fabrics, have been used by primitive tribes in the manufacture and ornamentation of pottery. Impressions of these made in the soft clay are frequently preserved on very ancient ware, the original fabrics having long since crumbled to dust. It is to these that I propose calling attention, their restoration having been successfully accomplished in many hundreds of cases by taking impressions in clay from the ancient pottery.

The perfect manner in which the fabric in all its details of plaiting, netting, and weaving can be brought out is a matter of astonishment; the cloth itself could hardly make all the particulars of its construction more manifest.

The examples presented in the accompanying plate will be very instructive, as the fragment of pottery is given on the left, with its rather obscure intaglio impressions, and the clay cast on the right with the cords of the fabric in high relief. The great body of illustrations have been made in pen directly from the clay impressions, and, although details are more distinctly shown than in the specimens themselves, I believe that nothing is presented that cannot with ease be seen in the originals. Alongside of these restorations I have placed illustrations of fabrics from other primitive sources.

There appears to be a pretty general impression that baskets of the ordinary rigid character have been extensively used by our ancient peoples in the manufacture of

pottery to build the vessel in or upon; but my investigations tend to show that such is not the case, and that nets or sacks of pliable materials have been almost exclusively employed. These have been applied to the surface of the vessel, sometimes covering the exterior entirely, and at others only the body or a part of the body. The interior surface is sometimes partially decorated in the same manner.

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The nets or other fabrics used have generally been removed before the vessel was burned or even dried. Professor Wyman, in speaking casually of the cord-marked pottery of Tennessee, says:

“It seems incredible that even an Indian would be so prodigal of time and labor as to make the necessary quantity of well-twisted cord or thread, and weave it into shape for the mere purpose of serving as a mold which must be destroyed in making a single copy.”

This remark is, however, based upon a false assumption. The fact that the net or fabric has generally been removed while the clay was still soft being susceptible of easy proof. I have observed in many cases that handles and ornaments have been added, and that impressed and incised designs have been made in the soft clay *after* the removal of the woven fabric; besides this there would be no need of the support of a net after the vessel had been fully finished and slightly hardened. Furthermore, I have no doubt that these *textilia* were employed as much for the purpose of enhancing the appearance of the vessel as for supporting it during the process of construction. I have observed, in relation to this point, that in a number of cases, notably the great salt vessels of Saline River, Illinois, the fabric has been applied after the vessel was finished. I arrive at this conclusion from having noticed that the loose threads of the net-like cover sag or festoon toward the rim as if applied to the inverted vessel, Fig. 82. If the net had been used to suspend the vessel while building, the threads would necessarily have hung in the opposite direction.

In support of the idea that ornament was a leading consideration in the employment of these coarse fabrics, we have the well-known fact that simple cord-markings, arranged to form patterns, have been employed by many peoples for embellishment alone. This was a common practice of the ancient inhabitants of Great Britain, as shown by Jewett. The accompanying cut (Fig. 60) is copied from his work.[1]

[Illustration: Fig. 60.—Ancient British vase with cord ornamentation.]

[Footnote 1: Jewett, Llewellynn: Grave mounds and their contents, p. 92.]

It is a remarkable fact that very few entire cord-marked vessels have been obtained in this country, although fragments of such are very plentiful.

In Fig. 61 we have an ancient vase from Pennsylvania. It presents a combination of net or basket markings and of separate cord-markings. The regularity of the impressions upon the globular body indicates almost unbroken contact with the interior surface of the woven vessel. The neck and rim have apparently received finishing touches by separately impressing cords or narrow bands of some woven fabric.

[Illustration: Fig. 61.—Ancient fabric marked vessel, Pennsylvania.]

Many examples show very irregular markings such as might have been made by rolling the plastic vessel irregularly upon a woven surface, or by molding it in an improvised sack made by tying up the margins of a piece of cloth.

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It is necessary to distinguish carefully the cord and fabric markings from the stamped designs so common in southern pottery, as well as from the incised designs, some of which imitate fabric markings very closely.

I shall present at once a selection from the numerous examples of the fabrics restored. For convenience of study I have arranged them in six groups, some miscellaneous examples being added in a seventh group. For comparison, a number of illustrations of both ancient and modern textiles are presented.

In regard to methods of manufacture but little need be said. The appliances used have been extremely simple, the work in a vast majority of cases having been done by hand. It is probable that in many instances a simple frame has been used, the threads of the web or warp being fixed at one end and those of the woof being carried through them by the fingers or by a simple needle or shuttle. A loom with a device for carrying the alternate threads of the warp back and forth may have been used, but that form of fabric in which the threads are twisted in pairs at each crossing of the woof could only have been made by hand.

The probable methods will be dwelt upon more in detail as the groups are presented. In verifying the various methods of fabrication I have been greatly assisted by Miss Kate C. Osgood, who has successfully reproduced, in cotton cord, all the varieties discovered, all the mechanism necessary being a number of pins set in a drawing board or frame, in the form of three sides of a rectangle, the warp being fixed at one end only and the woof passing back and forth between the lateral rows of pins, as shown in Fig. 74.

First group.

Fig. 62 illustrates a small fragment of an ordinary coffee sack which I take as a type of the first group. It is a loosely woven fabric of the simplest construction; the two sets of threads being interwoven at right angles to each other, alternate threads of one series passing over and under each of the opposing series as shown in the section, Fig. 63.

[Illustration: Fig. 62.—Type of Group one—portion of a coffee sack.]

[Illustration: Fig. 63.—Section.]

It is a remarkable fact that loosely woven examples of this kind of cloth are rarely, if ever, found among the impressions upon clay or in the fabrics themselves where preserved by the salts of copper or by charring. The reason of this probably is that the combination is such that when loosely woven the threads would not remain in place under tension, and the twisted and knotted varieties were consequently preferred.

It is possible that many of the very irregular impressions observed, in which it is so difficult to trace the combinations of the threads, are of distorted fabrics of this class.

This stuff may be woven by hand in a simple frame, or by any of the primitive forms of the loom.

In most cases, so far as the impressions upon pottery show, when this particular combination is employed, the warp is generally very heavy and the woof comparatively light. This gives a cloth differing greatly from the type in appearance; and when, as is usually the case, the woof threads are beaten down tightly, obscuring those of the web, the resemblance to the type is quite lost.

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Examples of this kind of weaving may be obtained from the fictile remains of nearly all the Atlantic States.

The specimen presented in Fig. 64 was obtained from a small fragment of ancient pottery from the State of New York.

[Illustration: Fig. 64.—Fabric impressed upon ancient pottery, New York.]

It is generally quite difficult to determine which set of threads is the warp and which the woof. In most cases I have preferred to call the more closely placed threads the woof, as they are readily beaten down by a baton, whereas it would be difficult to manipulate the warp threads if so closely placed. In the specimen illustrated, only the tightly woven threads of the woof appear. The impression is not sufficiently distinct to show the exact character of the thread, but there are indications that it has been twisted. The regularity and prominence of the ridges indicate a strong, tightly drawn warp.

Fig. 65 represents a form of this type of fabric very common in impressions upon the pottery of the Middle Atlantic States. This specimen was obtained from a small potsherd picked up near Washington, D.C. The woof or cross-threads are small and uniform in thickness, and pass alternately over and under the somewhat rigid fillets of the web. The apparent rigidity of these fillets may result from the tightening of the series when the fabric was applied to the plastic surface of the vessel.

[Illustration: Fig. 65.—From a fragment of ancient pottery, District of Columbia.]

I present in Fig. 66 the only example of the impression of a woven fabric found by the writer in two summers' work among the remains of the ancient Cliff-Dwellers. It was obtained from the banks of the San Juan River, in southeastern Utah. It is probably the imprint of the interior surface of a more or less rigid basket, such as are to be seen among many of the modern tribes of the Southwest. The character of the warp cannot be determined, as the woof, which has been of moderately heavy rushes or other untwisted, vegetable fillets, entirely hides it.

[Illustration: Fig. 66.—From a fragment of ancient Cliff-house pottery.]

The caves of Kentucky have furnished specimens of ancient weaving of much interest. One of these, a small fragment of a mat apparently made from the fiber of bark, or a fibrous rush, is illustrated in Fig. 67.

[Illustration: Fig. 67.—Fabric from a cave in Kentucky.]

This simple combination of the web and woof has been employed by all ancient weavers who have left us examples of their work. The specimen given in Fig. 68 is the work of the ancient Lake-Dwellers of Switzerland. It is a mat plaited or woven of strips of bast, and was found at Robenhausen, having been preserved in a charred state.[2] Keller gives another example of a similar fabric of much finer texture in Fig. 8, Pl. CXXXVI.

[Illustration: Fig. 68.—Fabric from Swiss Lake-Dwellings.]

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[Footnote 2: Keller: Lake-Dwellers. Fig. 2, Pl. CXXXIV.]

An illustration of this form of fabric is given by Foster,[3] and reproduced in Fig. 69.

[Illustration: Fig. 69.—Cloth from a mound, Ohio.]

[Footnote 3: Foster: Prehistoric Times.]

In the same place this author presents another form of cloth shown in my Fig. 70. In Fig. 71 we have a section of this fabric. These cloths, with a number of other specimens, were taken from a mound on the west side of the Great Miama River, Butler County, Ohio. The fabric in both samples appears to be composed of some material allied to hemp. As his remarks on these specimens, as well as on the general subject, are quite interesting, I quote them somewhat at length.

“The separation between the fibre and the wood appears to have been as thorough and effectual as at this day by the process of rotting and hackling. The thread, though coarse, is uniform in size, and regularly spun. Two modes of weaving are recognized: In one, by the alternate intersection of the warp and woof, and in the other, the weft is wound once around the warp, a process which could not be accomplished except by hand. In the illustration the interstices have been enlarged to show the method of weaving, but in the original the texture was about the same as that in coarse sail-cloth. In some of the Butler County specimens there is evidently a fringed border.”

[Illustration: Fig. 70.—Cloth from a mound, Ohio.]

[Illustration: Fig. 71.—Section.]

In regard to the second specimen described, I would remark that it is a very unusual form, no such combination of the parts having come to my notice either in the ancient fabrics themselves or in the impressions on pottery. In a very closely woven cloth it might be possible to employ such a combination, each thread of the web being turned once around each thread of the woof as shown in Fig. 71; but certainly it would work in a very unsatisfactory manner in open fabrics. I would suggest that this example may possibly belong to my second group, which, upon the surface, would have a similar appearance. The combination of this form is shown in the section, Fig. 73.

Second group.

It is not impossible, as previously stated, that open fabrics of the plain type were avoided for the reason that the threads would not remain in place if subjected to tension. A very ingenious method of fixing the threads of open work, without resorting to the device of knotting has been extensively employed in the manufacture of ancient textiles. The simplest form of cloth in which this combination is used is shown in Fig.

72. This example, which was obtained from a small fragment of pottery found in Polk County, Tennessee, may be taken as a type.

[Illustration: Fig. 72.—From ancient pottery, Tennessee.]

[Illustration: Fig. 73.—Section.]

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Two series of threads are interwoven at right angles, the warp series being arranged in pairs and the woof singly. At each intersection the pairs of warp threads are twisted half around upon themselves, inclosing the woof threads and holding them quite firmly, so that the open mesh is well preserved even when much strained. Fabrics of this character have been employed by the ancient potters of a very extended region, including nearly all the Atlantic States. There are also many varieties of this form, of fabric resulting from differences in the size and spacing of the threads. These differences are well brought out in the series of illustrations that follow.

In regard to the manufacture of this particular fabric, I am unable to arrive at any very definite conclusion. As demonstrated by Miss Osgood, it may be knitted by hand, the threads of the warp being fixed at one end and the woof at both by wrapping about pegs set in a drawing board or frame, as shown in the diagram, Fig. 74.

[Illustration: Fig. 74.—Diagram showing the method of weaving Form 2.]

The combination is extremely difficult to produce by mechanical means, and must have been beyond the reach of any primitive loom. I have prepared a diagram, Fig. 75, which, shows very clearly the arrangement of threads, and illustrates a possible method of supporting the warp while the woof is carried across. As each thread of the woof is laid in place, the threads of the warp can be thrown to the opposite support, a turn or half twist being made at each exchange. The work could be done equally well by beginning at the top and working downward. For the sake of clearness I have drawn but one pair of the warp threads.

[Illustration: Fig. 75.—Theoretic device for working the twist.]

Fig. 76 illustrates a characteristic example of this class obtained from a fragment of pottery from the great mound at Sevierville, Tenn.

[Illustration: Fig. 76.—From fragment of mound pottery, Tennessee.]

The impression is quite perfect. The cords are somewhat uneven, and seem to have been only moderately well twisted. They were probably made of some vegetable fiber. It will be observed that the threads of the woof are placed at regular intervals, while those of the web are irregularly placed. It is interesting to notice that in one case the warp has not been doubled, the single thread having, as a consequence, exactly the same relation to the opposing series as corresponding threads in the first form of fabric presented. The impression, of which this is only a part, indicates that the cloth was considerably distorted when applied to the soft clay. The slipping of one of the woof threads is well shown in the upper part of the figure.

The fabric shown in Fig. 77 has been impressed upon an earthen vessel from Macon, Ga. It has been very well and neatly formed, and all the details of fiber, twist, and combination can be made out.

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[Illustration: Fig. 77.—From ancient pottery, Georgia.]

The example given in Fig. 78 differs from the preceding in the spacing and pairing of the warp cords. It was obtained from a fragment of ancient pottery recently collected at Reel Foot Lake, Tennessee.

[Illustration: Fig. 78.—From ancient pottery, Tennessee.]

Fig. 79 represents another interesting specimen from the pottery of the same locality. The border is woven somewhat differently from the body of the fabric, two threads of the woof being included in each loop of the warp.

[Illustration: Fig. 79.—From ancient pottery, Tennessee.]

Fig. 80 is from the pottery of the same locality. The threads are much more closely woven than those already given.

[Illustration: Fig. 80.—From ancient pottery, Tennessee.]

The next example, Fig. 81, impressed upon a fragment of clay from Arkansas, has been made of coarse, well-twisted cords. An ornamental border has been produced by looping the cords of the woof, which seem to have been five in number, each one passing over four others before recrossing the warp.

[Illustration: Fig. 81.—From a piece of clay, Arkansas.]

In no locality are so many fine impressions of textiles upon clay vessels found as in the ancient salt-making districts of the Mississippi Valley. The huge bowl or tub-like vessels used by the primitive salt-makers have very generally been modeled in coarse nets, or otherwise have had many varieties of netting impressed upon them for ornament.

In the accompanying plate (XXXIX) two fine examples of these impressions are given. They are somewhat more clearly defined than the majority of those from which the other illustrations are made.

Fig. 82 illustrates a specimen in which every detail is perfectly preserved. Only a small portion of the original is shown in the cut. The cords are heavy and well twisted, but the spacing is somewhat irregular. I observe one interesting fact in regard to this impression. The fabric has apparently been applied to the inverted vessel, as the loose cords of the woof which run parallel with the rim droop or hang in festoons between the cords of the warp as shown in the illustration, which is here placed, as drawn from the inverted fragment. The inference to be drawn from this fact is that the fabric was applied to the exterior of the vessel, after it was completed and inverted, for the purpose of enhancing its beauty. When we recollect, however, that these vessels were probably built for service only, with thick walls and rude finish, we are at a loss to see why so

much pains should have been taken in their embellishment. It seems highly probable that, generally, the inspiring idea was one of utility, and that the fabric served in some way as a support to the pliable clay, or that the network of shallow impressions was supposed to act after the manner of a *degraissant* to neutralize the tendency to fracture.

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[Illustration: Fig. 82.—From fragment of a large salt vessel, Saline River, Illinois.]

Another example from the same locality is shown in Fig. 83. This is similar to that shown in the lower figure of Plate XXXIX. It is very neatly woven of evenly spun and well-twisted thread. The double series is widely spaced as shown in the drawing.

[Illustration: Fig. 83.—From a salt vessel, Saline River, Illinois.]

The very interesting specimen illustrated in Fig. 84 was obtained from a small fragment of pottery found in Fort Ripley County, Missouri. The combination of the two series of threads or strands clearly indicates the type of fabric under consideration, the twisted cords of the warp being placed very far apart. The remarkable feature of this example is the character of the woof, which seems to be a broad braid formed by plaiting three strands of untwisted fiber, probably bast. All the details are shown in the most satisfactory manner in the clay cast.

[Illustration: Fig. 84.—From ancient pottery, Missouri.]

The open character of the web in this specimen assists very much, in explaining the structure of tightly-woven examples such as that shown in Fig. 85, in which the cross cords are so closely placed that the broad bands of the opposing series are completely hidden.

[Illustration: Fig. 85.—From ancient pottery, Tennessee.]

I have made the drawing to show fillets of fiber appearing at the ends. These do not appear in the impression. It is highly probable, however, that these fillets are plaited bands, as in the preceding example. They are wide and flat, giving somewhat the effect of basket-work of splints or of rushes. This specimen was obtained in Carter County, Tennessee.

We have a few pieces of this variety of fabric which have been preserved by contact with the salts of copper. Professor Farquharson describes an example from a mound on the banks of the Mississippi River, near the city of Davenport. It had been wrapped about a copper implement resembling a celt, and was at the time of its recovery in a very perfect state of preservation. In describing this cloth Mr. Farquharson says that

> “the warp is composed of four cords, that is, of *two double and twisted* cords, and the woof of *one* such doubled and twisted cord which passes between the two parts of the warp; the latter being twisted at each change, allowing the cords to be brought close together so as to cover the woof almost entirely.”

His illustration is somewhat erroneous, the artist not having had quite a clear understanding of the combination of threads. This cloth has a general resemblance to

ordinary coffee-sacking. In Fig. 86 I give an illustration of this fabric derived from the opposite side of the celt.

[Illustration: Fig. 86.—Fabric from a copper celt, Iowa.]

Although I am not quite positive, it is my opinion, after having examined the specimen carefully, that the body of the cloth belongs to my first group and that the border only is of the second group. My section and drawing give a clear idea of the construction of this fabric. A finely-preserved bit of cloth belonging to the group under consideration was recently found fixed to the surface of a copper image from one of the Etowah mounds in Georgia.

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This form of weaving is very common among the productions of the modern tribes of Western America. A very good example is shown in Fig. 87, which represents the border of a cape like garment made by the Clyoquot Indians, of Vancouver's Island. It is woven, apparently, of the fiber of bark, both web and woof showing considerable diversity in the size of the cords. The border has been strengthened by sewing in a broad, thin fillet of rawhide.

[Illustration: Fig. 87.—Modern work, Vancouver's Island.]

The beautiful mats of the northwest coast peoples, from California to Ounalaska, are often woven in this manner, the materials being bast, grass, or rushes.

The Lake Dwellers of Switzerland seem to have made a great many varieties of cloth of this type. I have reproduced four examples from the great work of Dr. Keller. Fig. 88 is copied from his Fig. 1, Plate CXXXV. It exhibits some variations from the type, double strips of bast being bound by a woof consisting of alternate strips of bast and cords. It is from Robenhausen.

[Illustration: Fig. 88.—Fabric from the Lake Dwellings, Switzerland.]

In Figs. 89 and 90 we have typical examples from the same locality. The woof series seems to consist of untwisted strands of bast or flax.

[Illustration: Figs. 89 and 90.—Fabrics from the Lake Dwellings, Switzerland.]

Third group.

A third form of fabric is distinguished from the last by marked peculiarities in the combinations of the threads. The threads of the warp are arranged in pairs as in the last form described, but are twisted in such a way as to inclose two of the opposing series instead of one, each succeeding pair of warp threads taking up alternate pairs of the woof threads, as shown in the section, Fig. 91. This is a very interesting variety, and apparently one that would possess coherence and elasticity of a very high order.

[Illustration: Fig. 91.—Section.]

In Fig. 92 a simple scheme of plaiting or weaving this material is suggested. It will be seen to differ from the last chiefly in the way in which the woof is taken up by the warp.

[Illustration: Fig. 92.—Theoretical device for weaving third group.]

The ancient pottery of the Mississippi Valley furnishes many examples of this fabric. It is made of twisted cords and threads of sizes similar to those of the other work

described, varying from the weight of ordinary spool cotton to that of heavy twine. The mesh is generally quite open.

In Fig. 93 we have a very well preserved example from Reelfoot Lake, Tennessee. It was obtained from a large fragment of coarse pottery. Other pieces are nearly twice as coarse, while some are much finer.

[Illustration: Fig. 93.—From the ancient pottery of Tennessee.]

Figs. 94 and 95 are finer specimens from the same locality.

[Illustration: Fig. 94. Fig. 95.
From the ancient pottery of Tennessee.]

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We have also good examples from Saline River, Illinois. They are obtained from fragments of the gigantic salt vessels so plentiful in that locality.

The upper figure of Plate XXXIX illustrates one of these specimens. Other examples hare been obtained from Roane County, Tennessee.

A piece of charred cloth from a mound in Butler County, Ohio, has been woven in this manner. Foster has described examples of the two preceding forms from the same locality. The material used is a vegetable fiber obtained from the bark of trees or from some fibrous weed. This specimen is now in the National Museum.

An interesting variety of this form is given in Fig. 96. It is from a small piece of pottery exhumed from a mound on Fain's Island, Jefferson County, Tennessee. The threads of the woof are quite close together, those of the web far apart.

[Illustration: Fig. 96.—From ancient pottery, Tennessee.]

A very fine example of this variety of fabric was obtained by Dr. Tarrow from an ancient cemetery near Dos Pueblos, Cal. It is illustrated in Fig. 2, Plate XIV, vol. VII, of Surveys West of the 100th Meridian.[4] In describing it, Professor Putnam says that the fiber is probably obtained from a species of *yucca*. He says that

> "the woof is made of two strands, crossing the warp in such a manner that the strands alternate in passing, over and under it, and at the same time inclosing two alternate strands, of the latter, making a letter X figure of the warp, united at the center of the X by the double strands of the woof."

It should be noticed that the series of cords called the woof by Professor Putnam are designated as warp in my own descriptions. The illustration shows a fabric identical with that given in the upper figure of Plate XXXIX, and the description quoted describes perfectly the type of fabric under consideration.

[Footnote 4: Putnam, F. W., in Vol. VII of Surveys West of the 100th Meridian, page 244.]

This method of weaving is still practiced by some of the western tribes, as may be seen by a visit to the national collection.

A somewhat complicated arrangement of the threads may be seen in the fabric shown in Fig. 97. It is clearly only a variation of the combination just described. The manner in which the threads pass over, under, and across each other can be more easily understood by reference to the figure than by any description. It comes from one of the Northwest coast tribes.

[Illustration: Fig. 97.—Modern fabric, Northwest coast.]

Fourth group.

A fourth form of fabric, illustrated in Fig. 98, is of very rare occurrence on our fictile remains.

[Illustration: Fig. 98.—Diagonal fabric, ancient pottery of Tennessee.]

It is a very neatly woven diagonal from the ancient pottery of Polk County, Tennessee. Two series of cords have been interwoven at right angles to each other, but so arranged as to produce a diagonal pattern. One series of the cords is fine and well twisted, the other coarser and very slightly twisted.

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The remarkable sample of matting shown in Fig. 99 is from a small piece of pottery from Alabama. It has been worked in the diagonal style, but is somewhat different from the last example. It has probably been made of rushes or heavy blades of grass.

[Illustration: Fig. 99.—From the ancient pottery of Alabama.]

The texture shown in Fig. 100 is from a rather indistinct impression upon a small fragment of pottery from Iowa. One series of the strands seems to have been quite rigid, while the other has been pliable, and appear in the impression only where they have crossed the rigid series. The dotted lines indicate their probable course on the under side of the cross threads.

[Illustration: Fig. 100.—From ancient pottery, Iowa.]

This form of fabric is very common in modern work.

Fifth group.

In Fig. 101 I present a variety of ancient fabric which has not to my knowledge been found upon ceramic products. This specimen shows the method of plaiting sandals practiced by the ancient inhabitants of Kentucky. Numbers of these very interesting relics have been obtained from the great caves of that State. They are beautifully woven, and well shaped to the foot.

[Illustration: Fig. 101.—Plaiting of a sandal, Kentucky cave.]

The fiber has the appearance of bast and is plaited in untwisted strands, after the manner shown in the illustration. Professor Putman describes a number of cast-off sandals from Salt Cave, Kentucky, as “neatly made of finely braided and twisted leaves of rushes."[5]

[Footnote 5: Putnam, F. W. Eighth Annual Report of the Peabody Museum, p. 49.]

Fig. 102 illustrates a somewhat similar method of plaiting practiced by the Lake Dwellers of Switzerland, from one of Keller’s figures.[6]

[Illustration: Fig. 102.—Braiding done by the Lake-Dwellers.]

[Footnote 6: Keller, Dr. F. Lake Dwellers. Fig. 3; Pl. CXXXVI.]

Sixth group.

The art of making nets of spun and twisted cords seems to have been practiced by many of the ancient peoples of America. Beautiful examples have been found in the

huacas of the Incas and in the tombs of the Aztecs. They were used by the prehistoric tribes of California and the ancient inhabitants of Alaska. Nets were in use by the Indians of Florida and Virginia at the time of the discovery, and the ancient pottery of the Atlantic States has preserved impressions of a number of varieties. It is possible that some of these impressions may be from European nets, but we have plentiful historical proof that nets of hemp were in use by the natives, and as all of this pottery is very old it is probable that the impressions upon the fragments are from nets of native manufacture.

Wyman states that nets or net impressions have not been found among the antiquities of Tennessee. I have found, however, that the pottery of Carolina, Virginia, and Maryland furnish examples of netting in great numbers. In many cases the meshes have been distorted by stretching and overlapping so that the fabric cannot be examined in detail; in other cases the impressions have been so deep that casts cannot be taken, and in a majority of cases the fragments are so decayed that no details of the cords and their combinations can be made out.

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In Fig. 103 we have a thoroughly satisfactory restoration from a small fragment of pottery picked up in the District of Columbia. It is shown a little larger than natural size in the drawing. The impression is so perfect that the twist of the cord and the form of the knot may be seen with ease. Most of the examples from this locality are of much finer cord and have a less open mesh than the specimen illustrated. It is a noteworthy fact that in one of these specimens an incised pattern has been added to the surface of the soft clay after the removal of the net.

Recent collections from the mounds of Western North Carolina have brought to light many examples of net-marked pottery. Generally the impressions are quite obscure, but enough can be seen in the cast to show clearly the character of the fabric. The restoration given in Fig. 104 represents an average mesh, others being finer and others coarser. Another specimen from the same collection is shown in Fig. 105. The impression is not very distinct, bat there is an apparent doubling of the cords, indicating a very unusual combination. It is possible that this may have come from the imperfect imprinting, but I can detect no indications of a shifting of the net upon the soft clay.

[Illustration: Fig. 103.—From ancient pottery, District of Columbia.]

[Illustration: Fig. 104.—Net from the pottery of North Carolina.]

[Illustration: Fig. 105.—Net from the pottery of North Carolina.]

Many interesting examples could be given, both from the ancient and modern work of the inhabitants of the Pacific coast, but for the present I shall content myself by presenting a single example from the Lake Dwellings of Switzerland (Fig. 106):

[Illustration: Fig. 106.—Net from the Swiss Lake Dwellings. Keller, plate, CXXX.]

Miscellaneous forms.

The forms of fabrics used by the ancient tribes of the Middle and Northern Atlantic States in the manufacture and ornamentation of their pottery have differed materially from those used in the South and West. As a rule the fragments are smaller and the impressions less perfectly preserved. The fabrics have been more complicated and less carefully applied to the vessel. In many cases the impressions seem to have been made from disconnected bands, belts, or strips of cloth. Single cords, or cords arranged in groups by rolling on sticks, or by other contrivances, have been extensively employed. Baskets have doubtless been used, some of which have been woven, but others have apparently been of bark or skin, with stitched designs of thread or quills. Some of the impressions suggest the use of woven vessels or fabrics filled up with clay

or resin, so that the prominences only are imprinted, or otherwise cloths may have been used in which raised figures were worked.

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Fig. 107 is obtained from a fragment of pottery from New Jersey. The impressions are extremely puzzling, but are such as I imagine might be made by the use of a basket, the meshes of which had been filled up with clay or resin so that only the more prominent ridges or series of thongs remain uncovered to give impressions upon the clay. But the threads or thongs indicate a pliable net rather than a basket, and the appearance of the horizontal threads at the ends of the series of raised stitches suggests that possibly the material may have been bark or smooth cloth with a heavy pattern stitched into it.

[Illustration: Fig. 107.—From the ancient pottery of New Jersey.]

Very similar to the above is the example given in Fig. 108, also derived from the pottery of New Jersey.

[Illustration: Fig. 108.—From the ancient pottery of New Jersey.]

Fig. 109 illustrates an impression upon another fragment from the same state. This impression may have been made by a piece of birch bark or fine fabric with a pattern sewed into it with cords or quills.

[Illustration: Fig. 109.—From the ancient pottery of New Jersey.]

Fig. 110 illustrates an impression upon a large, well-made vase, with scalloped rim, from Easton, Pa. The character of the fabric is difficult to make out, the impression suggesting bead-work. That it is from a fabric, however, is evident from the fact that there is system and uniformity in the arrangement of markings, the indentations alternating as in the impressions of fabrics of the simplest type. Yet there is an appearance of patchwork in the impression that suggests separate applications of the material.

[Illustration: Fig. 110.—From the ancient pottery of Pennsylvania.]

In Figs. 111 and 112 we have what appear to be impressions of bands or belts. The first shown consists of six parallel cords, coarse and well twisted, with a border of short cord indentations placed at regular intervals. This is a very usual form in all parts of the country, from the Mandan towns of the Missouri to Florida. It is possible that the cords may in this case have been separately impressed, but the example given in Fig. 112 is undoubtedly from, a woven band or belt, the middle portion of which seems to have been a closely-woven cloth, with a sort of pattern produced by series of raised or knotted threads. The borders consist of single longitudinal cord impressions with an edging of short cord indentations placed at right angles to the belt.

[Illustration: Fig. 111.—From the ancient pottery of Ohio.]

[Illustration: Fig. 112.—From the ancient pottery of New Jersey.]

Similar to the last is the very effective decorative design impressed upon a large fragment of pottery from Alabama, shown in Fig. 113. The peculiarity of this example is the use of plaited instead of twisted cords. The work is neatly done and very effective. It seems to me almost certain that single cords have been used. They have been so imprinted as to form a zone, filled with groups of lines placed at various angles. An ornamental border of short lines has been added, as in the examples previously given.

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[Illustration: Fig. 113.—From the ancient pottery of Alabama.]

Two other examples of cord ornamentation, which may be duplicated from the pottery of almost any of the Atlantic States, are presented in Figs. 114 and 115, the first from a fragment of pottery from Charles County, Maryland, and the other from the pottery of Alabama.

[Illustration: Fig. 114.—Cord-markings from ancient pottery of Maryland.]

[Illustration: Fig. 115.—Cord-markings from ancient pottery of Alabama.]

It will readily be seen that it is extremely difficult to draw a line between an ornamentation produced by the use of single or grouped cords and that made by the use of fabrics.

It is not less difficult to say just how much of this use of cords and fabrics is to be attributed to manufacture simply and how much to ornament.

Although the restorations here presented certainly throw considerable light upon the textile fabrics of the ancient inhabitants of the Atlantic States, it cannot be affirmed that anything like a complete idea of their fabrics has been gained. Impressions upon pottery represent a class of work utilized in the fictile arts. We cannot say what other fabrics were produced and used for other purposes.

However this may be, attention should be called to the fact that the work described, though varied and ingenious, exhibits no characters in execution or design not wholly consonant with the art of a stone-age people. There is nothing superior to or specifically different from the work of our modern Indians.

The origin of the use of fabrics and of separate cords in the ornamentation of pottery is very obscure. Baskets and nets were doubtless in use by many tribes throughout their pottery making period. The shaping of earthen vessels in or upon baskets either of plain bark or of woven splints or of fiber must frequently have occurred. The peculiar impressions left upon the clay probably came in time to be regarded as ornamental, and were applied for purposes of embellishment alone. Decorative art has thus been enriched by many elements of beauty. These now survive in incised, stamped, and painted designs. The forms as well as the ornamentation of clay vessels very naturally preserve traces of the former intimacy of the two arts.

Since the stereotyping of these pages I have come upon a short paper by George E. Sellers (Popular Science Monthly, Vol. XI, p. 573), in which is given what I believe to be a correct view of the use of nets in the manufacture of the large salt vessels referred to

on pages 398 and 409. The use of interior conical moulds of indurated clay makes clear the reasons for the reversed festooning of the cords to which I called attention.

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