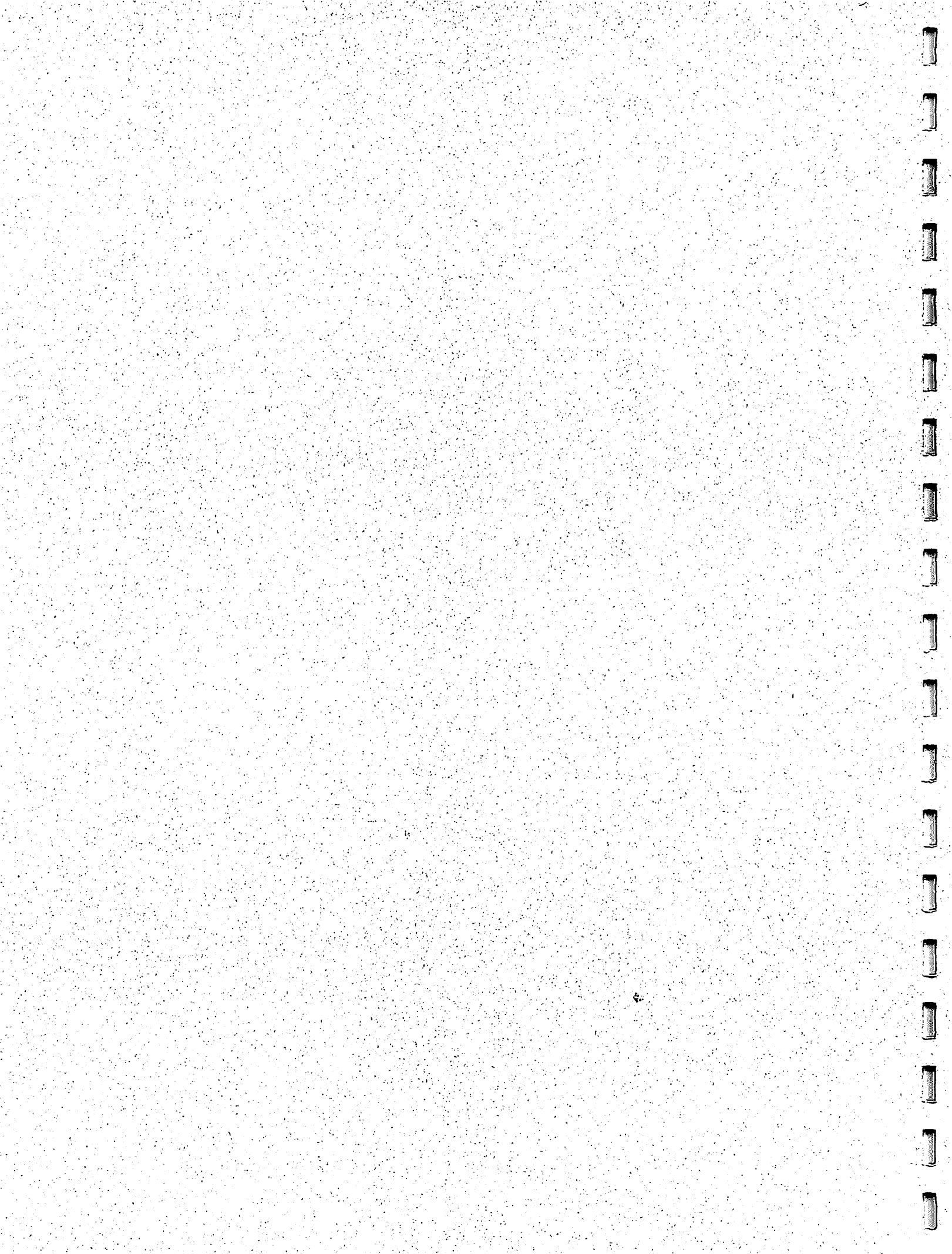


Mi'kmaq Textiles
Twining: Rush and Other Fibres
BkCp-1 Site
Pictou, Nova Scotia

by Joleen Gordon, Research Associate
Nova Scotia Museum
March, 1997





CURATORIAL REPORT NUMBER 82

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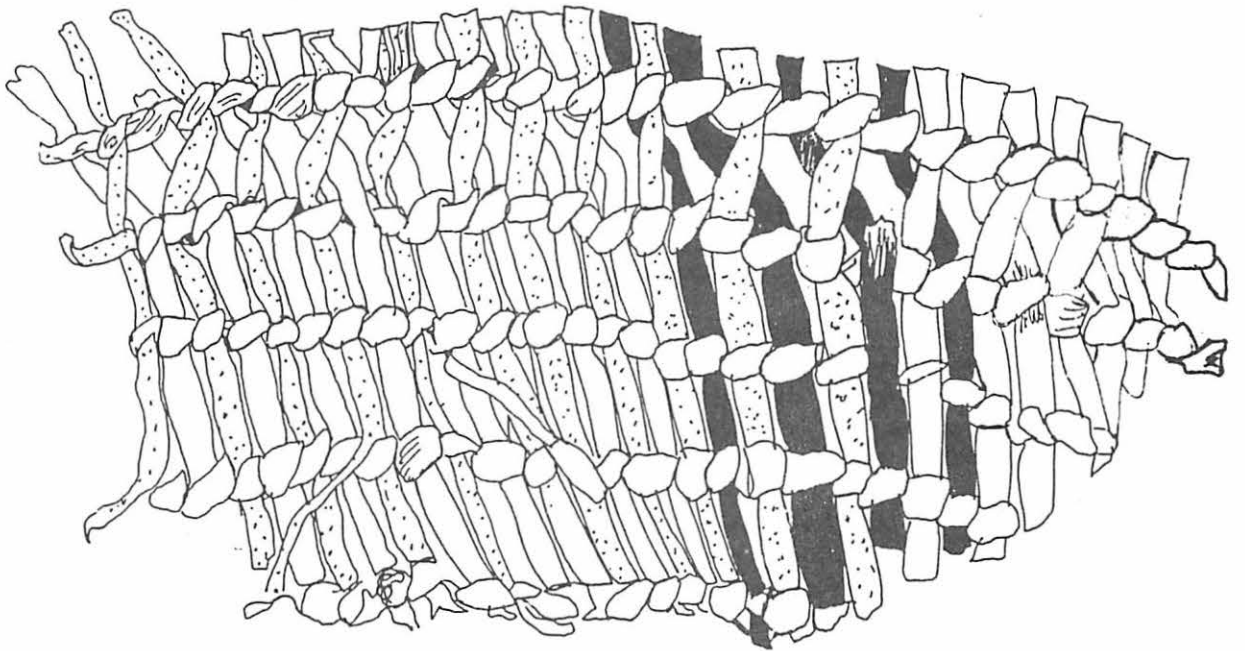
This report contains the preliminary results of an ongoing research program of the Museum. It may be cited in publications, but its manuscript status should be clearly indicated.

Dedicated to the memory
of
Joanne Segal Brandford
Basketweaver and Researcher
at the
Peabody Museum of Archaeology and Ethnology
Cambridge, Massachusetts

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INTRODUCTION



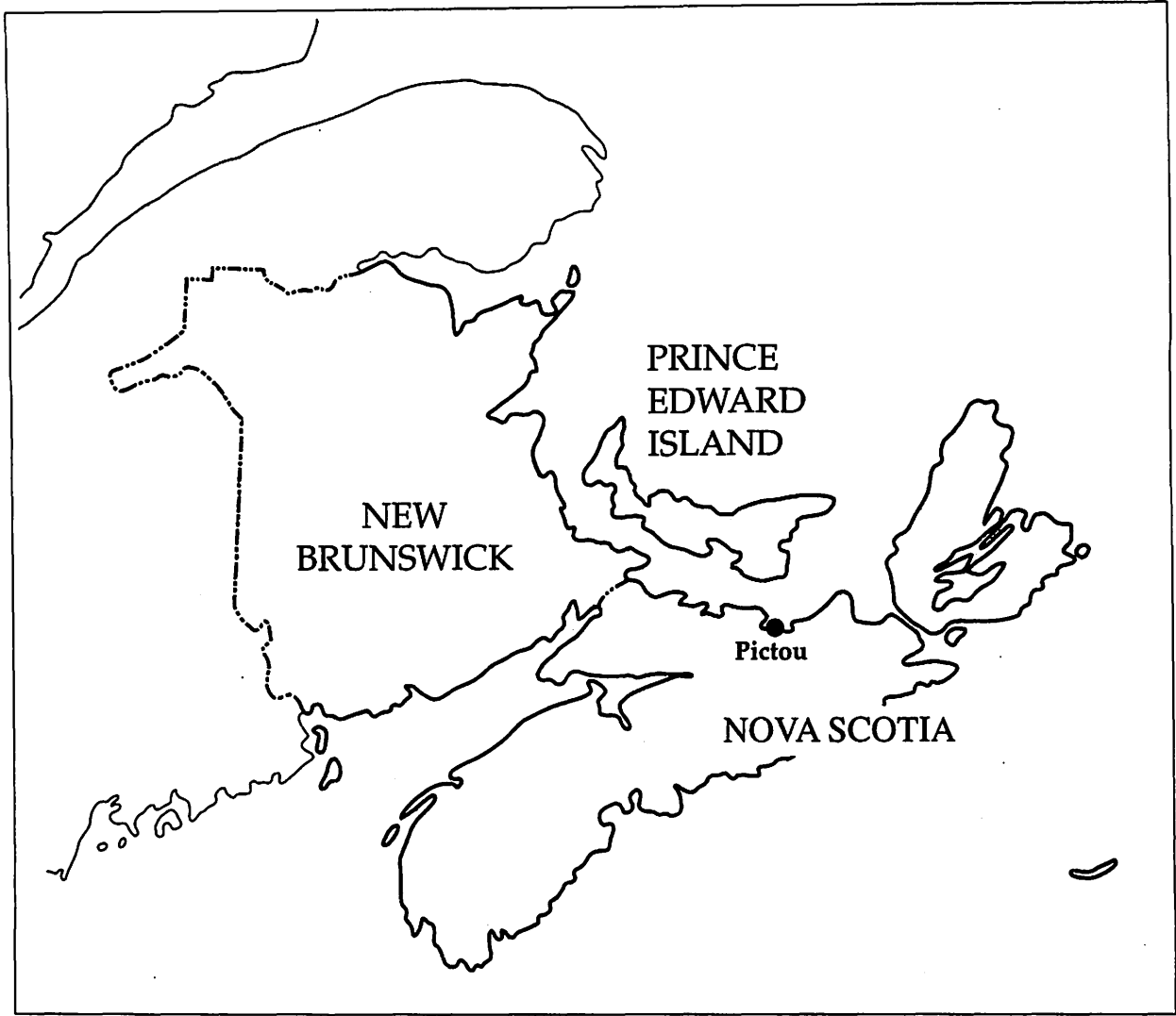


Figure 1 Map of the Maritime Provinces showing the location of Pictou, Nova Scotia. Nova Scotia Department of Education and Culture, Learning Resources and Technology.

INTRODUCTION

Archaeological site BkCp-1, near Pictou, Nova Scotia, has revealed a great deal of information about the textile skills of the Mi'kmaq people at the turn of the sixteenth century. Securely dated to 1570-1590 AD, the site was discovered by accident during 1955-1956 by Kenneth Hopps. (Figure 1) It consisted of two pits, the first containing the secondary burial of some of the bones of one man. The second pit, also a secondary burial, contained bone fragments of up to six adults (one a woman) and a young child. (Erickson, 198) Archaeological site-reports were written by Russell Harper. (1956; 1957)

Lavish offerings accompanied the human remains, including a large supply of copper cooking pots. The presence of copper in the burial pits acted as a biocide, preventing bacteria from breaking down much of the organic material in the site. (See Whitehead 1987a and 1993 for catalogues of the artifacts.)

Among the organic grave gifts were a rich assortment of textiles and cordage. The larger pieces were carefully preserved by the property owner. Unfortunately, much of the smaller fragments, "over three cubic yards of them", were reburied by Mr. Hopps, who explained he had no means of storing all the material. (Kenneth Hopps to Ruth Holmes Whitehead, personal communication, July 1984.) See Appendix One for a catalogue of all the twined fragments and Appendix Two for a listing of the cordage fragments he did preserve, which came to the Nova Scotia Museum in 1984.

Items recovered from the site include textile fragments constructed by twining, plaiting and sewing techniques, using a variety of plant materials. The majority of the fragments, however, are twined. In many cultures around the world, twining has been used for thousands of years, as people twisted long flexible grasses, rushes, reeds and pliable shoots of young plants around supports of similar or stronger materials to make the necessities of life: house-wall construction, boat frames, fish traps, mats and matting, bags and baskets, quivers, sheaths, raincapes, hats and footwear.

The knowledge of twining techniques and the use of rushes, reeds and grasses as a medium died out among the Mi'kmaq people in Nova Scotia soon after 1600 due to increasing importation of woven fabrics and other goods from Europe. There are no remaining complete artifacts. We have no oral or pictorial evidence of this craft, only a few historical references. Thus the light shed by the BkCp-1 textile fragments on both techniques and media

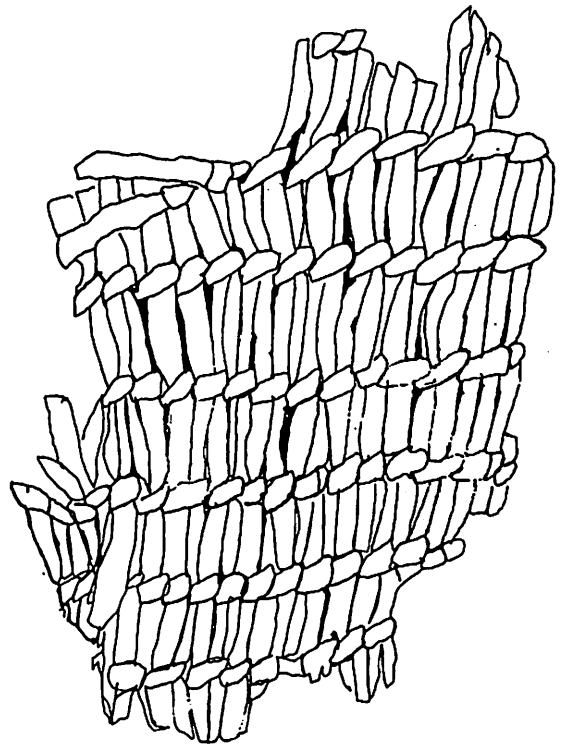
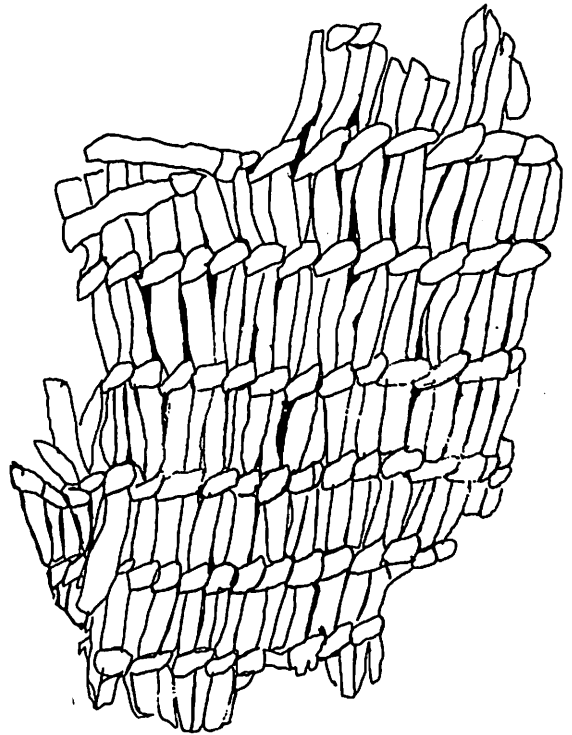
has been invaluable. Preliminary plant identification was done in 1986 by Mary Lou Florian, ethnobotanist with the Royal British Columbia Museum.

This report, the third in a trilogy examining the plant textiles found at the BkCp-1 site (Gordon, 1993b; Gordon, 1995) , examines the twined vegetable-fibre fragments and possible rush cordage. In order to place the Mi'kmaq work in its proper context, twined bags of aboriginal people from other parts of North America are discussed first, followed by a review of mat-making, using both twining and weaving techniques. (I feel the latter is important, for while there are no examples of what we believe to be matting in the BkCp-1 site, early written accounts allude to the Mi'kmaq use of mats.) The BkCp-1 twined fragments are then described, followed by an analysis of the step-by-step construction of a twined rush bag, based upon the evidence found in the fragments from the site.

It has been both a challenge and a pleasure to work with this collection.

Joleen Gordon
Dartmouth, N.S.

TWINING



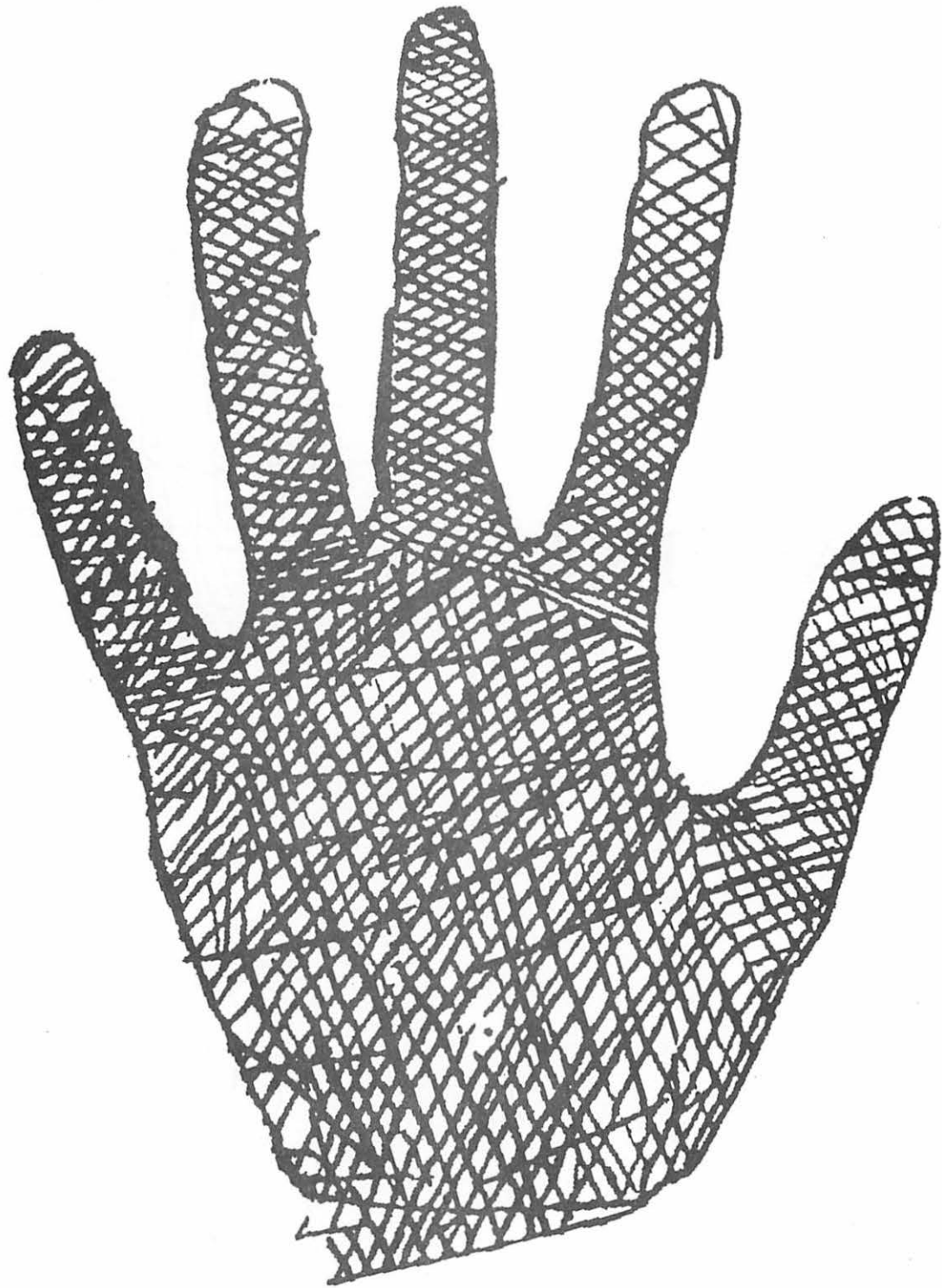


Figure 2 Petroglyph by an unknown Mi'kmaq artist. 9B41 Fairy Bay 2a (BcDh 13). Kejimikujik National Park, N.S.

THE TECHNIQUE

Otis Tufton Mason described twining as "the most elegant and intricate of all in the woven or plicated series." (1904/1972:231)

Twining, however, is quite different from weaving, or plain weave, although many writers equate the two, as evidenced by several quotes herein which I have left unchanged. The two techniques differ markedly in the active/passive relationship between warp and weft elements, as well as in the number of weft elements; twining having two or more, weaving only one.

Twining is used in basketry and in frame-weaving, where the warp and weft manipulation is controlled by the hands, and in true loom-weaving¹, where warp action is controlled by the heddles and the weft by the hands. In all three cases, the relationship between warp and weft is the same: two or more wefts encircle the warps. Twining is an extremely versatile technique. An almost endless variation of pattern can be achieved by varying the materials used, the overall direction of the weaving, the spacing of the rows, as well as the turn of the half-twist: either clockwise (an S-twist with a \ slant in the twist), or counter-clockwise (a Z-twist with a / slant in the twist). (Figure 3)

The multiple use of twining by off-loom basketweavers², by frame-loom and true-loom weavers, has led over time to a confusing terminology. In basketry, Mason defined twined work as a combination of warp rods, which may either be soft or rigid, together with paired weft elements; although at times three-strand and braid-twining wefts are used.

In passing from warp to warp these (weft) elements are twisted in half-turns on each other so as to form a two-strand or three-strand or braid and usually so deftly as to keep the smooth, glossy side of the weft outward. (1904/1972:231)

Along with the variation in the number of wefts being used, the relationship between the warp and weft elements can be manipulated and combined in a variety of ways. Mason defined the patterns. (1904/1972:231)

1. Plain twined weaving over single warps
2. Diagonal twined weaving, or twill, over two or more warps
3. Wrapped twined weaving in which one element remains rigid and the other is wrapped at the crossings

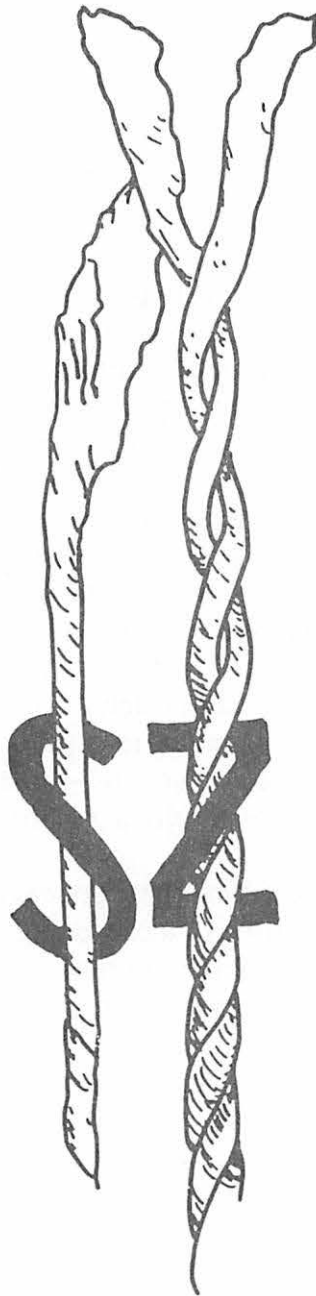


Figure 3 S and Z twists in a cord. Drawing by the author.

4. *Lattice twined weaving around vertical warps crossed by a horizontal element*
5. *Three-strand twined weaving and braiding in several styles*

J.M. Adovasio, in his definition of twining, clearly defined the active/passive roles of weft and warp.

Twining denotes a sub-class of basketweaves manufactured by passing moving horizontal elements, called wefts, around stationary vertical elements, called warps. In the twining process, the wefts are active while the warps are passive. (1977:15)

Irene Emery, writing her definitive work on fabric structures, agreed with Mason that the technique of twining was the same in both basketry and loom weaving. However, she focused on loom weaving, deliberately excluding an in-depth discussion of the technique in basketry. David Fraser sought to rectify that exclusion when he wrote *A Guide to Weft-Twining and Related Structures with Interacting Wefts*, in 1989. He proposed a broad definition of weft-twining to include the actions of twisting, interlacing and knotting.

Weft-twining and related structures with interacting wefts are fabric structures involving warps and wefts in which each weft row two or more wefts twist around, or otherwise interact with, each other, as they engage the warps. (1989:3)

Fraser developed a notation of categorizing weft-twining designed to apply to cloth, basketry, mats and assorted structures: to include information about the number of wefts in a weft row; the interaction between warps and wefts; the interaction within a weft row, among the wefts; the relationship between the weft rows; and the interaction among warps.

In addition to the twining pattern variations, different cultural groups have developed subtle directional differences (from the bottom up, or from the top down) on warps either bound together and freely suspended, or those held rigid in frame and heddle looms. For bag-making, soft fibres such as wool, cotton, rushes, grasses, and beaten or shredded cedar bark, are either tied together at one end and suspended with the weft beaten upwards, or held together by a row of twining, laid in the weaver's lap with the weft beaten downwards. In the making of mats, the soft, flexible warps are usually suspended from a line due to the sheer physical mass of the material, with the weft beaten upwards. Examples of mat-making on suspended warps are to be found across North America, from the woolen Chilkat blankets on the Northwest Coast to the soft flexible grass baskets in the northern Aleutian Islands, and the bast-fibre bags and wallets of the central Ojibway and Algonkians. In other cultures, soft flexible warps are held in a frame of some

sort where the weft is either beaten downward, towards the weaver, as seen in the Navaho wool rugs, or upward as in the Salish woolen blankets.

Some warps, such as tree trunks or shrubbery shoots, are rigid. Rather than being suspended or held in a frame, these warps are usually inserted either into the earth (for a fence or a fish weir) or into a previously woven structure (the bottom-weave of basket). The wefts in both cases are pushed in a downward direction. In Nova Scotia, rigid-warp twining is found in the withe basket by makers of European descent, while rigid-warp weaving is employed in the intertidal fish weirs of the Bay of Fundy. (Gordon, 1984; 1993a)

Twining presents different challenges when used for 3-dimensional objects, as compared to its use for 2-dimensional ones. In a bag or basket, the weaver twines in one continuous spiral from the bottom to the top of the container, never altering the direction of the twist. In twining a flat mat, however, the action of going back and forth across the warps with continuous weft threads presents challenges not only with the direction of the twining twist in successive rows, but also at the edges. Some mats are twined with discontinuous wefts, with the ends being tied or threaded away. Thus selvages are most important in analyzing twined matting.

Another factor to consider in analyzing the techniques used by a weaving community is whether the weaver was right- or left-handed. One usually makes the exact mirror image of the other: if a right-handed person twines from right to left, a leftie will twine left to right. In twining, both groups of people use the S and Z twists as it suits them, thus making analysis tricky.

In this study, we are concerned only with plain twining and its variations. In plain twining, the paired wefts are twisted around a set of warp elements to form a two-strand rope passing around each warp in a half-turn. These half-turns may vary in direction, either clockwise (in an S-twist) or counter-clockwise (in a Z-twist). The rows of weft-twining can be either close together or far apart. Another variation is that paired warps can be twined the full length of the fabric as the same pair, or split into alternating pairs, each half being caught with the adjacent warp, creating a series of triangular spaces and an overall diamond effect. Yet another variation is made by crossing the warps to create a lattice effect, in what has been termed hexagonal twining. All these variations are found in the twined textile fragments from the BkCp-1 site.

In conclusion, I would like to include the following definitions concerning weaving to clarify the historical accounts of the Mi'kmaq use of matting. In plain weave, "each weft unit passes alternately over and under successive warp units" reversing their positions in succeeding rows. In textiles where the warp and weft are either identical or approximately the same size, and equally spaced, it is a balanced plain weave. If the weft is heavier than the

warp, and/or more numerous, so that the weft compacts and completely covers the warp, the textile is a weft-faced plain weave, for example, tapestry. Conversely, if the warp is heavier and/or more numerous, the textile is a warp-faced plain weave as found in some of the Fox and Ottawa matting. (Emery, 1980:76-77)



Figure 4

THE VARIOUS MEDIA

The action of movement caused by twining demands certain qualities from the materials used with this technique³. To twine well, the medium should be flexible and rounded, not rigid and flat; long length is preferred. Plant materials used by the aboriginal peoples of North America for twining have included rushes, reeds, grasses, spun hemp and thread-like fibres, or cordage made from the soft inner barks of the cedar and basswood trees. The action of twisting during twining literally spins and toughens the material, resulting in surprisingly sturdy containers.

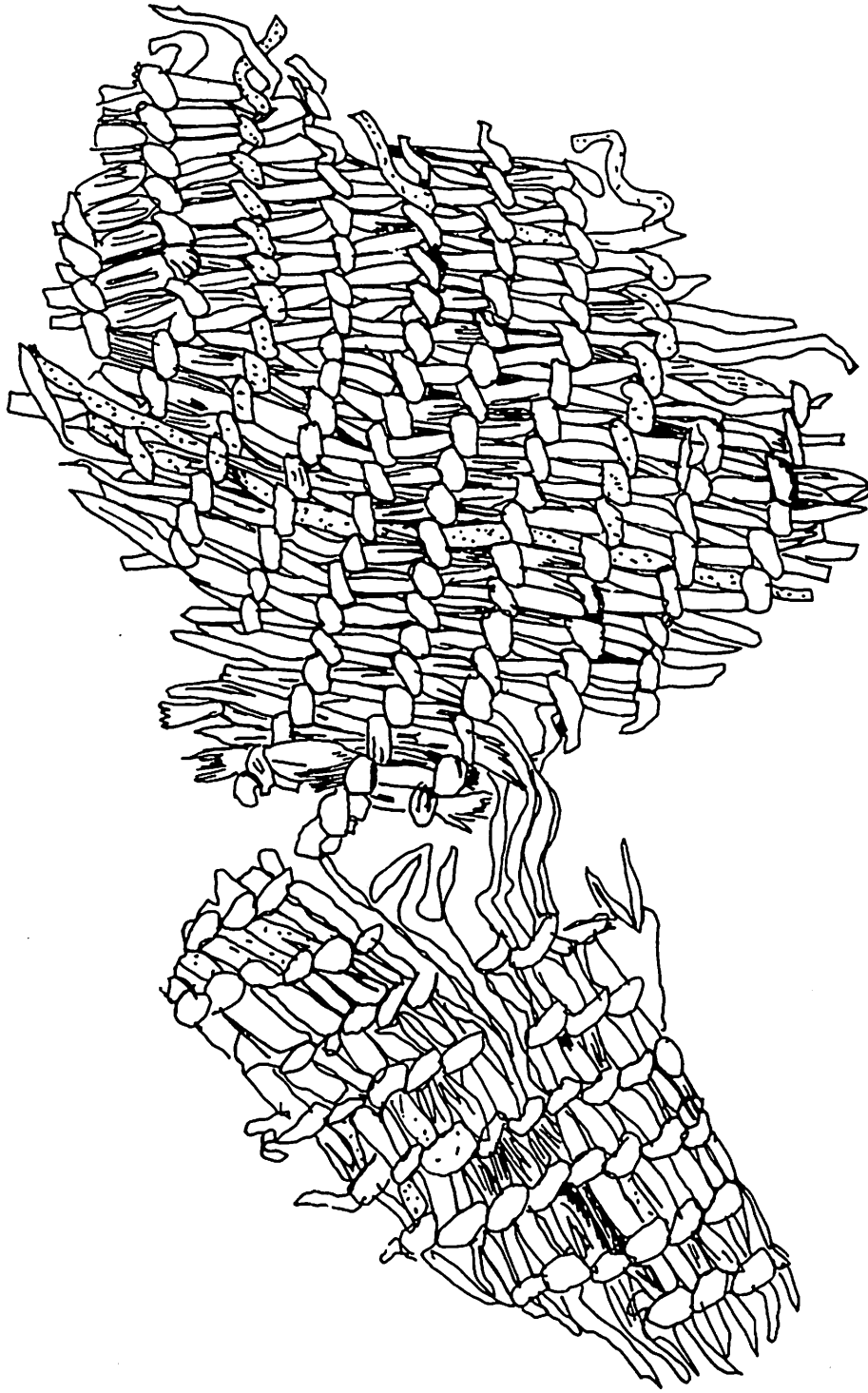
This study focuses on twining with rush and other related plants. Plants known as "rush" and "real rush" belong to the *Scirpus* genus, and are often known as "bullrushes". They have also been referred to as "reeds" and "tule" or "tule reeds". In Nova Scotia, there are several varieties of *Scirpus*. The taller species, *Scirpus validus* Vahl and *Scirpus acutus* Muhl., are so similar that they have been both classed as subspecies of *Scirpus lacustris* L. (Roland; 1969) They are found in shallow water around ponds and lakes, both in fresh water and in brackish water. In some shallow lakes, the plants form large areas of almost pure colonies, growing to a height of about two metres. The plants of the *Juncus* genus, also known as "reeds", are smaller and hollow. In this study, I will refer to *Scirpus* as rush and *Juncus* as reed⁴.

Rush was the material preferred for making mats by many aboriginal peoples across North America. The stalks were used for the warps of the mats. Because of the multitudinous pores in its stalk, rush possesses insulating and cushioning qualities not found in the thinner reeds. Several varieties of rush are found across North America. It is prolific; every summer brings a new harvest.

Basswood, or Linden, is an ornamental tree introduced to Nova Scotia. The inner bark or bast fibre is prepared in a manner similar to flax production, by retting, crushing and rolling the fibres into a cord used for weaving. Its possible appearance in the BkCp-1 fragments could be a testimony to the trade between this area and the peoples to the south where the tree is endemic.

Another possible medium for twining may have been sinew. Sinew was the primary source of thread used by many North American aboriginal groups before the coming of the Europeans⁵. Used in weaving and sewing, it was

obtained from the "back tendon" which stretched along the backbone of large animals such as deer and moose. Nicolas Denys reported that the Mi'kmaq made "a thread...from the tendon of a moose, found along the spine of the back. When this tendon is well beaten, it separates into threads, as fine as one wishes." (1672/1908:415) To my knowledge, sinew is no longer used by the Mi'kmaq. (See Whitehead, 1982:6, figure 3, for a photograph of moose-tendon thread.)



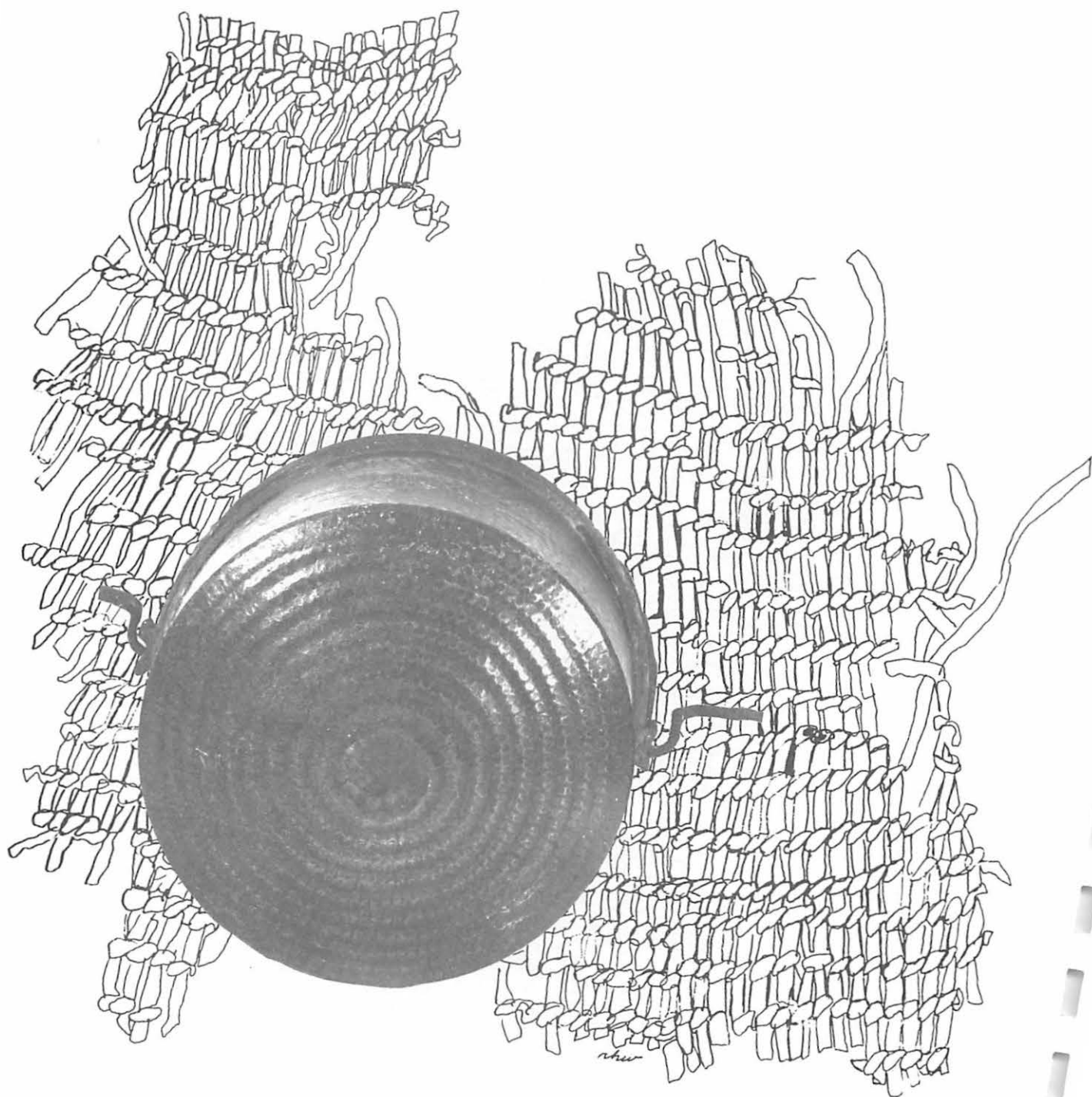


Figure 5 Copper pot, BkCp-1, NSM 84.22.

THE ARCHAEOLOGICAL CONTEXT

Archaeological sites provide a spotty but tantalizing picture of twining all over the world. A recent find in Eastern Europe has dated weaving and the technology for making cloth, nets and baskets to more than 25,000 years BP (Before Present), far older than anyone had previously believed. This evidence came from textile impressions on baked clay fragments, in what is now the Czech Republic. (Hall, 1995) In Chile, an eroding sand beach and a digging dog in Camarones Cove recently revealed 7000-year-old mummified bodies, the remains of people who were laid to rest on twined-reed mats. (Arriaza, 1995; 1996) These twined mats are the oldest known examples for the New World.

Very few twined fabrics have survived in archaeological sites. Because they were created with organic plant materials, they decomposed naturally with time. Thus we must look to special circumstances, or to other media, for most of our early evidence of the use of the technique and its variations. The special circumstances which preserve organic matter in archaeological sites include the presence of copper; the presence of alkaline soils such as shell middens; peat bogs, mudslides and volcanic eruptions; arid conditions; and ice.

Copper salts sterilize the soil, thus preserving the organic plant material. Although no dates were given, twined fabrics have been found fused to pieces of copper in pre-historic burial mounds from Davenport, Iowa (Holmes, 1884; Holmes, 1896), and from a site near Savannah, Georgia (Holmes, 1896), among others. "Our museums contain many examples of copper celts retaining on their surfaces portions of cloth so well preserved that the fibers retain much of their original strength as well as colour." (Holmes, 1896:36) Some of these fabrics are twined with extremely fine material. One example from Pike County, Ohio, has thirty-five to forty strands to the inch! It was preserved by being wrapped with a large number of copper beads. Holmes illustrated this closely-woven cloth together with four of the copper beads. (1896:36)

An abundance of copper beads among mortuary remains has preserved a spectacular array of textile and cordage fragments at the Boucher Site, dated between 2650-1900 BP, located in northeastern Vermont. (Petersen and Hamilton, 1984; Heckenberger, Petersen and Basa, 1990; Heckenberger et al, 1990)

A minimum of 23 individual woven objects have been identified from the analysis of 99 textile fragments preserved in the Boucher textile assemblage.

Twenty (87%) of these were twined textiles. These include four structural categories of twining: open simple twining, S-weft slant (16 forms); close simple twining, Z-weft slant (1 form); open simple and diagonal twining, S-weft slant (1 form); and close wrapped twining, Z-weft slant (2 forms). (Heckenberger et al, 1990:128)

As we shall see, some of these twining variations are also present in the BkCp-1 site at Pictou, Nova Scotia.

Contact with a brass plate preserved three of the earliest twined textile fragments found in a contact-period grave in Manchester, Massachusetts. (Willoughby, 1935:247; Figure 6) Textile A, open-spaced with Z-twist twining over single warps, was a "fragment of a typical Algonkian flat bag of bast". The two other textiles, B and C, show much finer twining, again with a Z-twist. While both fragments show spaced rows of twining, in one the warps were twined singly, and for this reason Willoughby feels it might be the remains of a small bag. In the other fragment, the warps were twined in pairs, making "a much closer and warmer fabric". For this reason, Willoughby thought that it might represent the remains of a shoulder cape, and because of the fineness of the weave, he deduced that the material was "probably Indian hemp⁶ (*Apocynum cannabinum*) or bast of the linden, slippery elm, or some other tree⁷ having fine inner bark." (1935:248) As we shall see later, all these three variations of twining were found in the BkCp-1 site as well.

The right climatic conditions have also preserved fragments of early twining. The arid conditions of both the Lovelock Cave of Nevada and the Promontory Point Caves in the Great Salt Lake Region of the United States are perfect examples. Although researchers are unsure as to exactly which cultural groups are represented by the artifacts preserved here, it is believed that the Lovelock and Promontory Point cultures were contemporary, dating to around 2531 BP. Fabrics in the Lovelock Cave revealed many variations of counter-clockwise twining: plain, twill, three-strand, as well as overlay techniques, including both S and Z twists, with the latter being predominant. (Weltfish, 1930:489-494) The twined fragments from the Promontory Point Caves also give us a great deal of information⁸ about starts, finishes, edges and borders. (Steward, 1937:29-40)

Ice conditions have also preserved organic material. In 1991, a receding glacier in the Italian-Austrian Alps revealed the corpse of a Neolithic man, thought to be 5000 years old. Not only was his body in good condition, but his clothing, including a twined grass cape, and all his hunting gear, among which was a knife encased in a twined grass sheath, were remarkably well preserved. (Spindler, 1994)

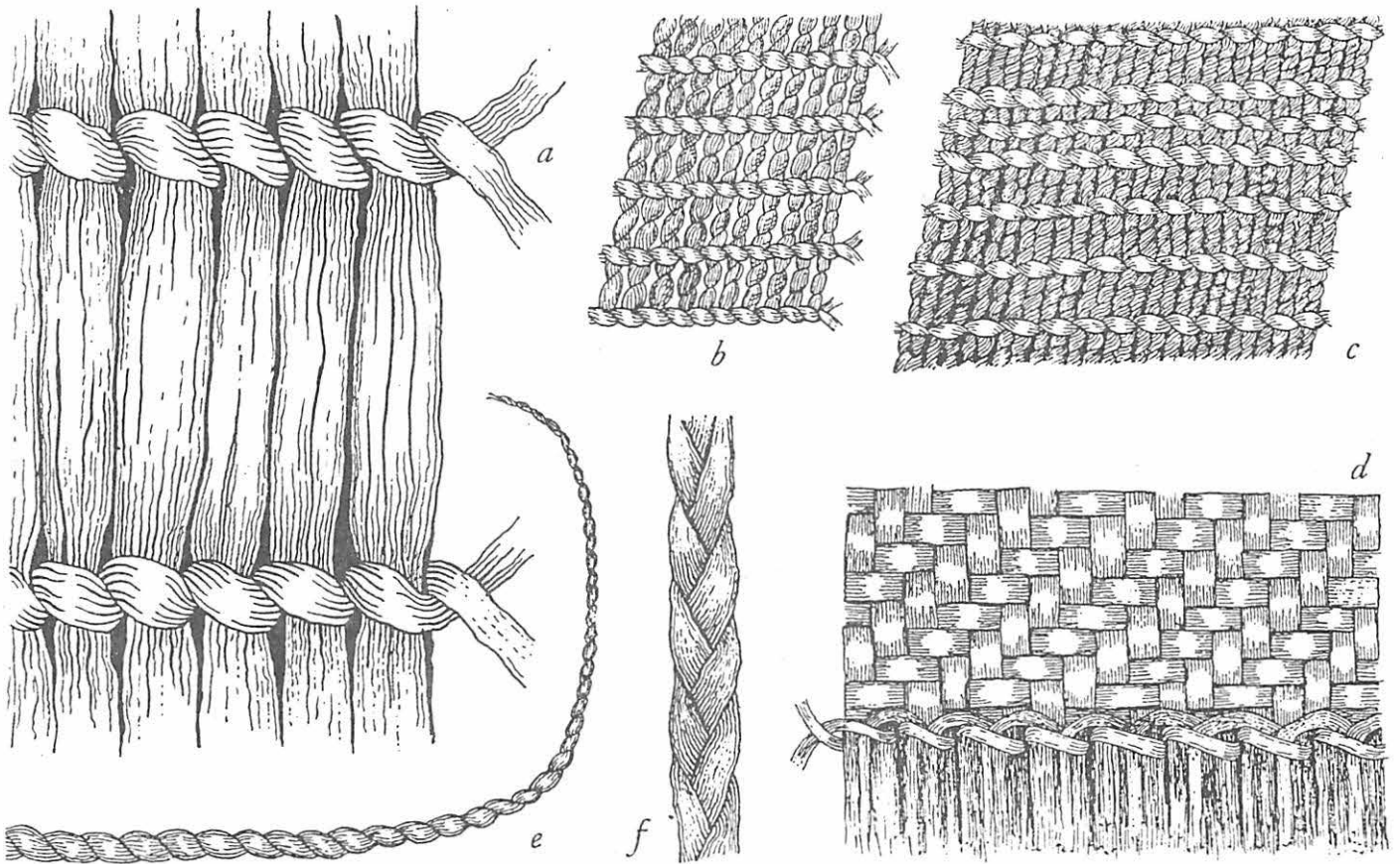


Figure 6 Early twined textile fragments found in an early contact-period grave in Manchester, Massachusetts. Textiles A, B and C are all twined with Z-twists with single and double warps, differing materials and differing spacing between warps and rows of weft twining. Willoughby surmised that A was a "bag of bast", B was a small bag and C represented the remains of a shoulder cape, probably of Indian hemp or inner tree bark fibre. From Charles Willoughby, *Antiquities of New England Indians*, 1935, Figure 133. The Peabody Museum of Archaeology and Ethnology, Cambridge, Massachusetts.

In looking to other media for information on early textiles, impressions have been found both in clay and, through acid-etching, on stone. Clay shards provide clear information on the use of twining among many aboriginal peoples of North America, even though there is some controversy as to whether these impressions represent basketry or fabric. (Holmes, 1884:405) Some researchers believe that in earlier times, pottery vessels were formed around basketwoven shapes, the organic materials being burned off during firing, leaving impressions in the fired clay. Other historians feel that the woven and twined impressions left in the shards were from basketry, cords or netting deliberately pressed in as ornamentation.

By making clay casts from pottery shards collected in the Mississippi Valley, William Holmes recovered multiple images of twining from the negative impressions left in the pottery shards. (Figure 7) The rows of twining stand out beautifully. The casts clearly show the tightness of the S-twists, the fineness of the material, the spaced rows; and the paired warps alternating with successive rows, creating the overall diamond pattern in the fabric. (These very same twining patterns are found in the BkCp-1 textile fragments from Pictou, Nova Scotia.) In his study, Holmes deduced that the materials used in these fabrics included "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." (1884:397) Examples of twining techniques are numerous, and extend over a wide area.

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. (Holmes, 1884:405)

James Petersen, in his search for a possible connection between ethnicity and such technological traditions as the direction of the S and Z twists in cordage and weft-twining, examined a wide range of aboriginal ceramics, and made casts of actual fibre artifacts from Maine, Vermont and New Hampshire spanning the Archaic and Contact time periods. (Petersen; in press) Pertinent to this discussion, several of his clay impressions showed open simple twining with a Z-twist in the weft. This manner of twining will be seen in the finer, more delicate, Pictou fragments twined with as yet unknown materials.

We have textile images preserved by other means as well, such as the earliest northeastern North American evidence⁹ of twined textiles, found in a Maritime-Archaic burial near Union, Maine, and dating to 4000 BP. Originally wrapped around the blades of six ground-slate bayonets, the fabric rotted in place, leaving impressions of the twining etched into the slate by the acids created as the fibre decayed. These patterns have been analyzed in an appendix of an overview report on the plant textiles found in the BkCp-1 site. (Whitehead, 1987a)

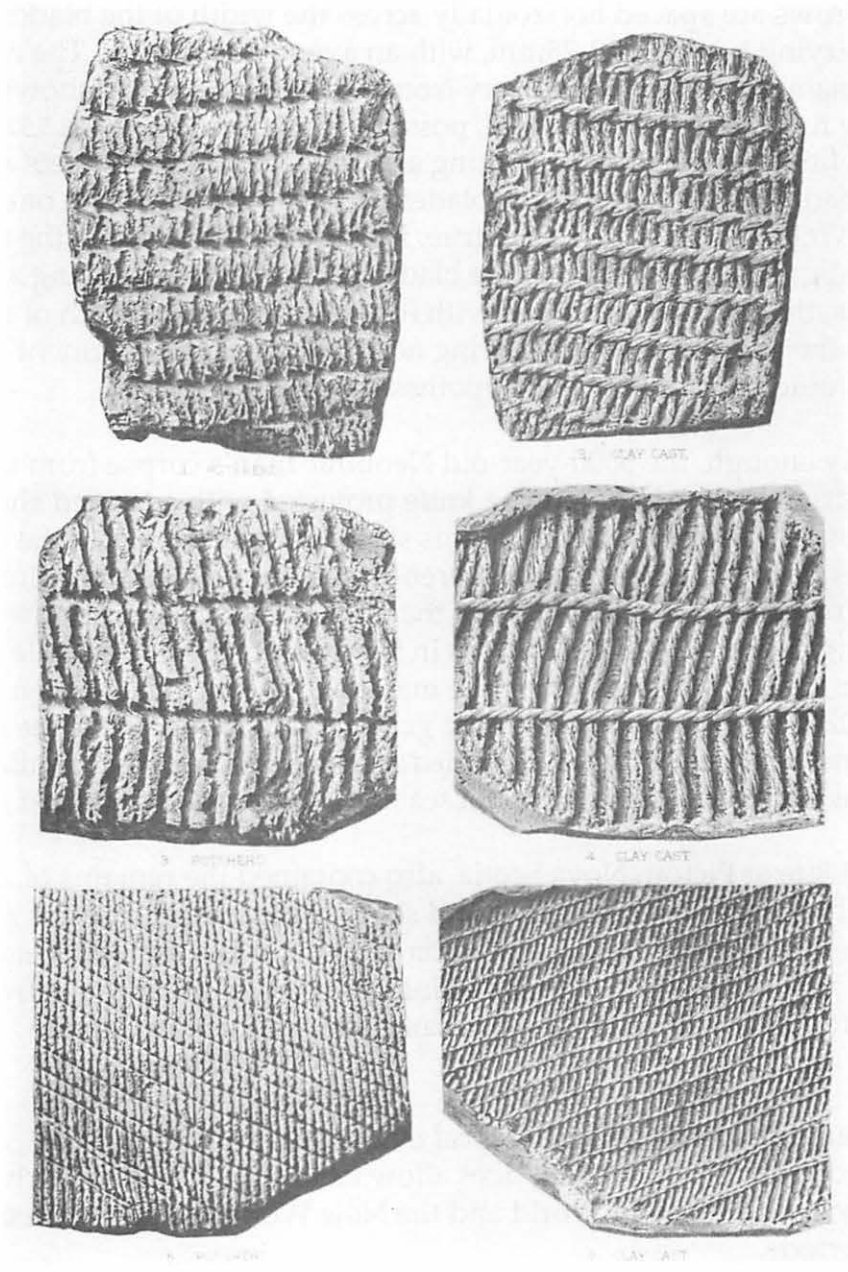


Figure 7 Pre-European clay shards from the Mississippi Valley, showing the twined patterns with both single and double warps and with both fine and thick materials. From W.H. Holmes, Third Annual Report of the Bureau of Ethnology, 1881-82, Plate 39.

Measuring the material, and allowing for possible shrinkage over time, Whitehead concluded that the twining was executed with rush, *Scirpus lacustris*. The warps run parallel down the length of the each blade, with the rows of weft-twining catching each warp singly in what appears to be a Z-twist. The rows are spaced horizontally across the width of the blades at intervals varying between 12-25mm, with an average of 15mm. The number of rows remaining on each blade vary from 6-8, with one blade showing a double row near the bayonet handle, possibly a border. (Figure 8; 28.5.326) Whitehead lined up the rows of twining across each of five bayonets and they matched, leading her to assume the blades had been covered with one piece of fabric. While this may have been true, it is also possible, given the fact that warps are aligned to the length of the blade and the rows of twining are at right-angles, that each was covered with its own protective sheath of rush twining. If the doubled row of weaving near the top of one fragment is a border, it would substantiate this hypothesis.

Interestingly enough, the 5000-year-old Neolithic man's corpse from the Italian-Austrian border had with it a knife protected with a twined sheath. (Spindler, 1994:101) The construction of this sheath is very similar to the etched impressions from Maine; the only difference is in the twist of the twining. The warps run parallel to the length of the blade, with the spaced rows of weft-twining catching the single warps in S-twists. There is a definite upper border near the knife handle where the material appears to have been folded in half creating two warps; the ends are gathered and bound near the knife tip. (This material has yet to be identified.) As we will see later, similar twining was found fused to two metal scabbard tips from the BkCp-1 site.

The BkCp-1 site at Pictou, Nova Scotia, also contained the remains of an armband. The birchbark interfacing and some of the leather exterior remain. Preserved as an impression in the mud on the leather is a textile. (Figure 9) The fineness of both the material and the twining are very similar to the fragments of twining found fused to fur from the same site, as illustrated in the accompanying drawings by Whitehead.

As I have said earlier, the archaeological evidence is scanty, and it is dependent on chance finds, but it does allow us to state that twining has a long history in both the Old World and the New World, in different cultures and time periods.

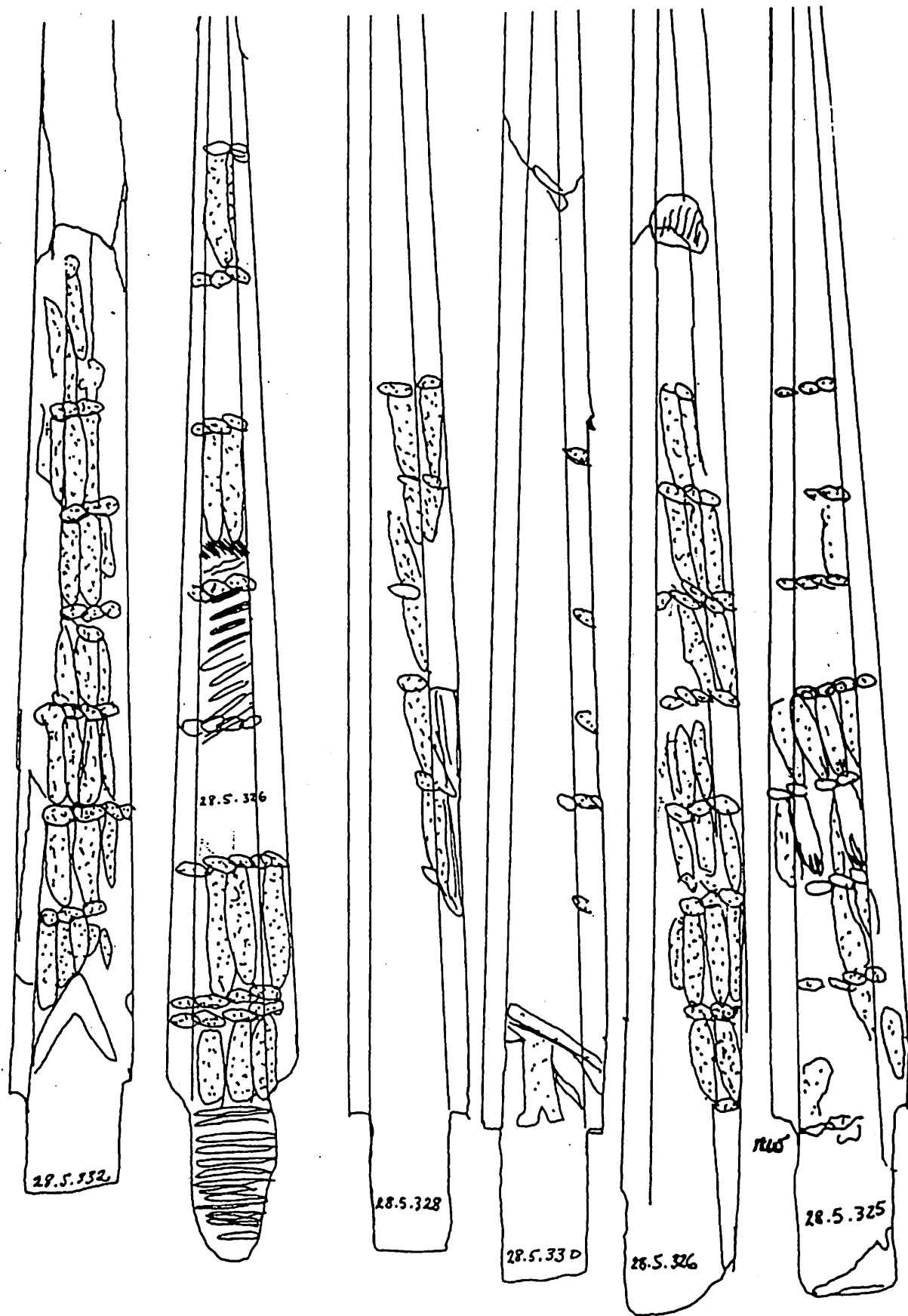


Figure 8 Rows of twining etched on the blades of ground-slate bayonets dating to 4000 BP from Union, Maine. Drawing by R.H. Whitehead, in *Plant Fibre Textiles from the Hopps Site: BkCp-1*, 1987a:75.



Figure 9 Twined impressions preserved in mud on leather, sewn to a birchbark armband. Note the sinew stitches, along the top and left side of the fragment, joining the leather and bark. NSM 73.180.433.



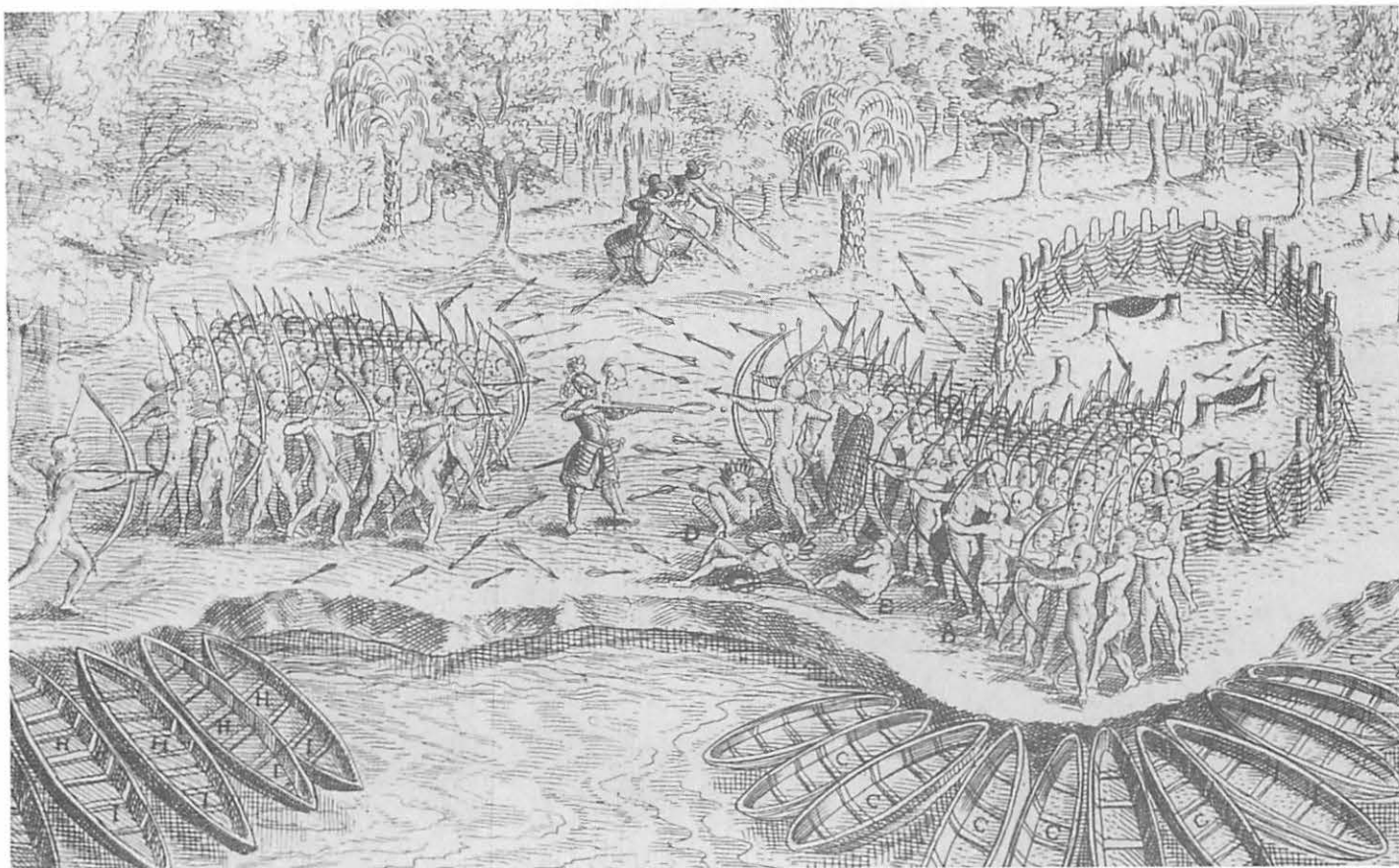


Figure 10 Twined enclosure made of upright posts and horizontal stick wefts. "Deffaitte des Yroquois au Lac de Champlain." From, Samuel de Champlain, Les Voyages du Sieur de Champlain. (Paris: Jean Berjon, 1613:232). Photo: National Archives of Canada, NMC C-5750.

THE HISTORICAL CONTEXT

When the first European explorers came to the eastern shores of what is now called North America, they found cultures already in place along the coast from Florida to the Arctic. As we have seen from the archaeological evidence, many of these cultures had developed techniques of processing a wide range of plant materials into threads and cords, along with several highly complex twining and weaving techniques. Gradually, these textiles were replaced by European cloth.

The historic and ethnographic evidence of twined fabrications from eastern North America, while scanty, not only show us that twining was known, but also allows us to ascertain some of the plant materials used, the design patterns employed and, in some cases, the objects created by twining.

One of the largest examples of twining was palisade fencing, made of vertical poles held together with rows of twined smaller sticks. In an illustration of a skirmish between the Iroquois and the Montagnais (witnessed and drawn by Samuel de Champlain) in what is now New York State, we see an Iroquoian circular enclosure made of upright tree posts, twined¹⁰ with smaller flexible branches. (Figure 10) Shields were also constructed by twining smaller flexible shoots around sturdier stock, as can be seen in Figure 10 as well. (As we have no surviving shields or palisades, we must be aware of possible artistic license, and take care in the interpretation of such illustrations.)

A third example of the versatility of twining are the burden straps¹¹ (also known as tumplines, pack-straps, and carrying straps) used by many aboriginal cultures for carrying heavy loads. (Figure 11) The ends of the straps were wrapped around the load, while the wide centre area of the strap stretched across the forehead or chest of the bearer. Carrie Lyford, an American anthropologist working in the 1940s, was able to record a great deal of information about these straps by talking to Ojibway/Chippewa elders.

Slippery elm fibers made burden straps of the best quality, being finer, stronger and more pliable than basswood fibers. Basswood fibers were good for very heavy straps. The fibers were prepared by boiling, stripping, rubbing and twisting into cords. (Lyford, 1945/1982:54)

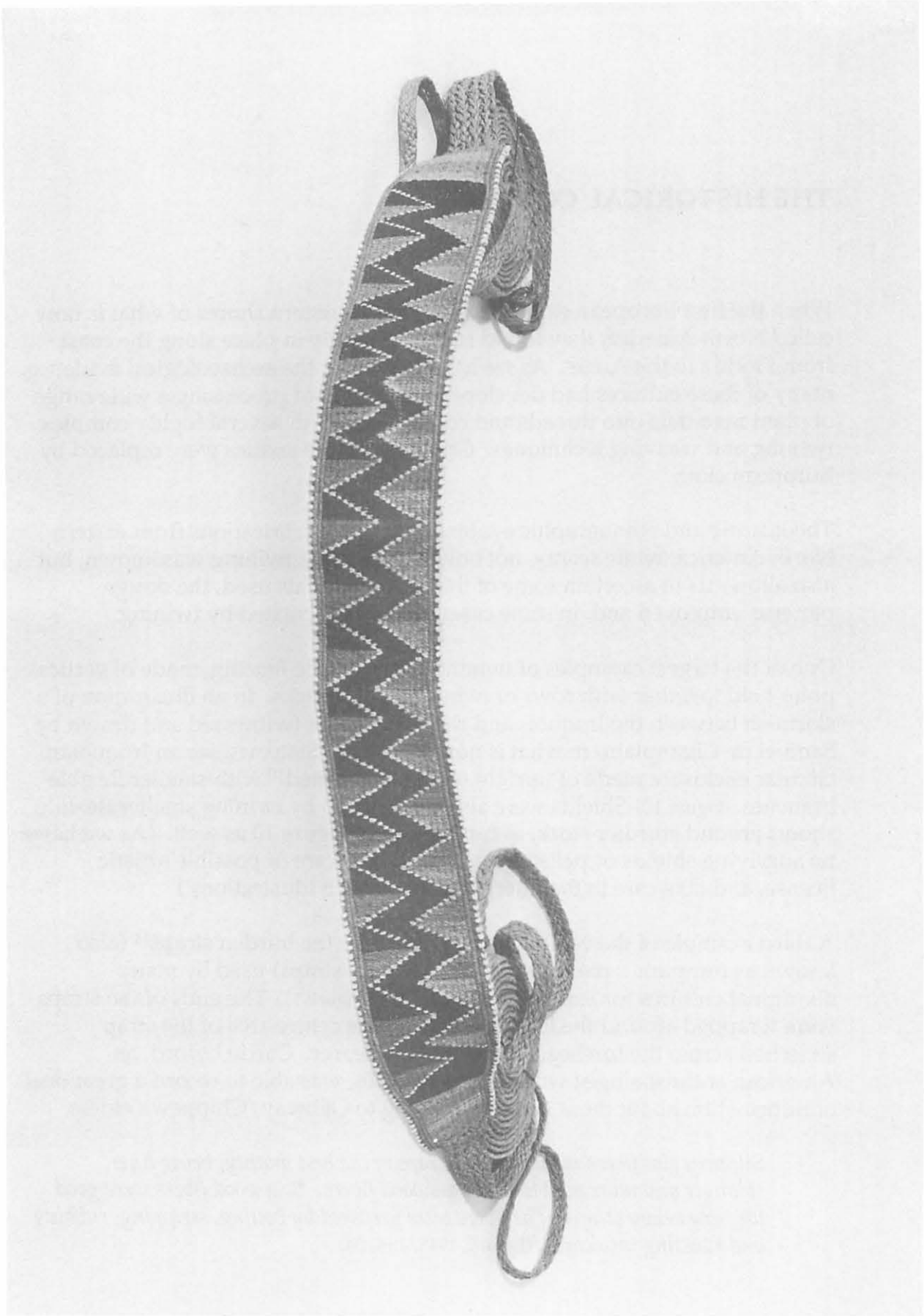


Figure 11 False-embroidered burdenstrap, Iroquois style, 18th century. Canadian Museum of Civilization, III-1-1230, Neg. 73-17442.

The cords were then either braided or twined into long, wide straps about two and a half inches wide and almost two feet long.

In making the belt a twined weave was used, two weft strands of fine fiber being twined over one another between the two coarser warp strands. The weaving was started in the middle of the belt which narrowed in width near the ends. The remaining length of the warp strands were then braided to form the tie-strings for the packs. On some straps the tying strips were reinforced by braiding strips of tanned deer hide with the fiber. The tie-strings usually extended about seven feet from each end of the belt. The finished strap was fifteen feet or more in length and three or four inches wide. (Lyford, 1945/1982:54)

These belts were often decorated with hairs of moose, buffalo, deer or elk, in combination with plant fibres, using false-embroidery techniques.

A fourth example of twined artifacts, bags and baskets made with rushes, reeds, grasses, hemp, nettle, basswood and bast fibre, tended to be soft, flexible and lightweight. The containers were suitable for storage and carrying less heavy objects; a basket twined of sticks was more suited for the heavier loads.

A 1585 drawing from North Carolina depicts a back basket made of vertical sticks, held together with a sturdy material, possibly roots or twigs, twined in widely spaced rows. (Figure 12) As most aboriginal basketweavers used softer rushes and grasses, it is one of the few images illustrating a heavy material in a twined basket. Once again, however, this may have been artistic license.

The early reports are enticing by their inclusion of artifacts, but they are frustrating by the information they lack. In 1613, Samuel de Champlain wrote of finding large grass bags used by the people along the coastline of New England for the storage of corn. Unfortunately, he made no mention of the technique used in their construction. The Pilgrims, landing on Cape Cod in 1620, reported opening an Indian cache to find a storage basket holding three or four bushels of shelled corn. Although they did not note the material or technique used in its construction, they did report that it was "handsomely and cunningly made" and described it as being round with a narrow opening at the top. They also discovered many other baskets in a mat-covered lodge, "baskets of sundry sorts, bigger and lesser, finer and some coarser; some were cunningly wrought with black and white in pretty works." (Willoughby, 1905:88)

Quivers of rushes, some of which were coloured, were also made by the people of New England in the early 1600s. "Their quivers were a full yard long, and made of long dried Rushes wrought about two handfuls broad above, and one handful beneath with prettie works and compartments, Diamant [sic] wise of red and other colours." (Pring, 1603/1906:348;) These

Figure 12 An aboriginal backpack twined of sturdy sticks from coastal North Carolina, 1585. Detail of an engraving after a lost drawing of John White. From W.H. Holmes, Thirteenth Annual Report of the Bureau of Ethnology, 1891-92. 1896: Plate Ia

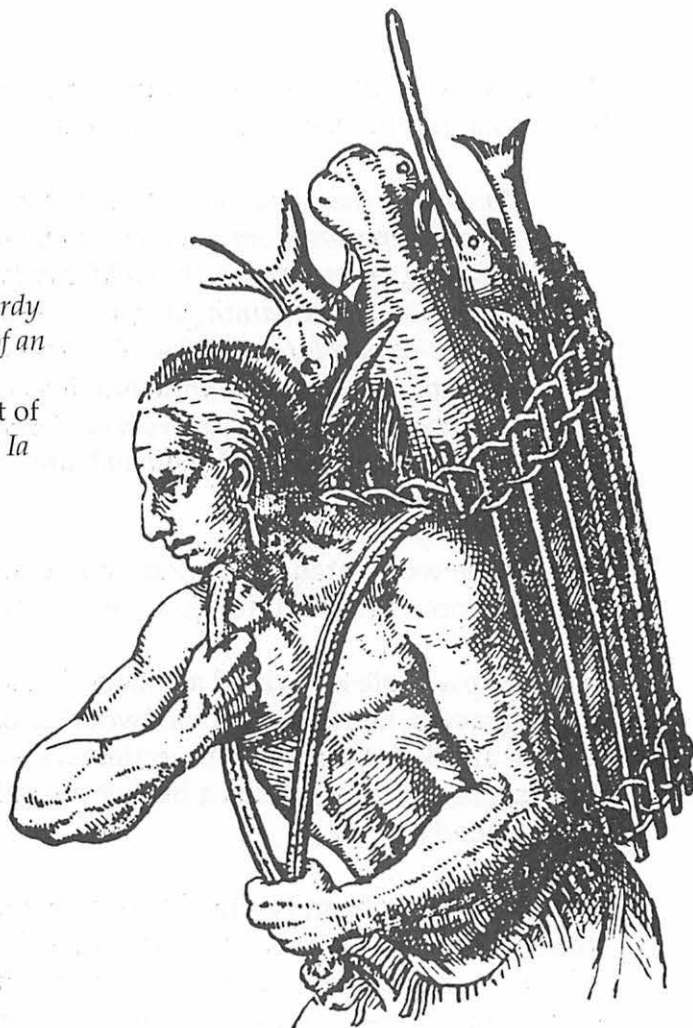


Figure 13 Detail from a 1615 watercolour showing the native use of a shoulder bag, made with a triangular geometric pattern similar to later Iroquois and Huron twined bags. Autograph album of Michael Van Meer (Ms La III 283, Folio 254V). University of Edinburgh Library, Scotland

containers may have been twined, but from the description of the diamond designs in the fabric, they could have been plain-woven for reasons given at the end of the matting discussion below.

Two early-seventeenth-century images show the native use of twined basketry in Virginia. A 1615 watercolour depicts a man carrying a shoulder bag with a geometric pattern similar to later Iroquois and Huron twined bags. (Figure 13) A second watercolour, "Drey Americaner" by Francis L. Michel, is dated 1702. In it, one of the three people shown is carrying a bag or basket, again with a geometric pattern using what the author called "a kind of root". (Figure 14) A third drawing from Virginia, dated 1705, shows the method of making (possibly twining) these soft fibre bags and baskets, by suspending the warps upside down from a tree branch. (Figure 15)

The rush basketry of the Massachusetts Indians was described in detail in 1792 by Daniel Gookin, including their size, materials, and delicate imagery, but excluding the method of manufacture.

Several sorts of baskets were made, both great and small. Some will hold four bushels or more, and so downward to a point, some are made of rushes, some of bents (coarse grass), others of maize husks, others of a kind of silk grass, others of a kind of wild hemp, and some of the barks of trees, many of them very neat and artificial with portraitures of birds, beasts, fishes and flowers upon them in colors. (Willoughby, 1935:250)

In addition to the archaeological and written evidence of twined bag and basketmaking from the Northeast, there are some fine examples in museum collections of twined seventeenth- and eighteenth-century baskets from the New England area, plus one from the Great Lakes. I would like to review them in turn.

A twined basket was given to the Connecticut Historical Society in 1842 with the following citation:

Yohicake Basket, a bag or basket as termed by the Mohegans. Received from Cynthia, now 60 or 70 and daughter of Lucy Tocamwap, the first member of the Mohegan church. By tradition of her own family Cynthia believes the basket to be near 200 years old. It has at any rate seen service. July 4, 1842. (Willoughby, 1935:254)

If the basket were 200 years old in 1842, the date of its manufacture would be close to 1642, making it our oldest complete example of twining from this area of North America. (Figure 16) Willoughby believed the basket to have been made of Indian hemp, *Apocynum cannabinum*.

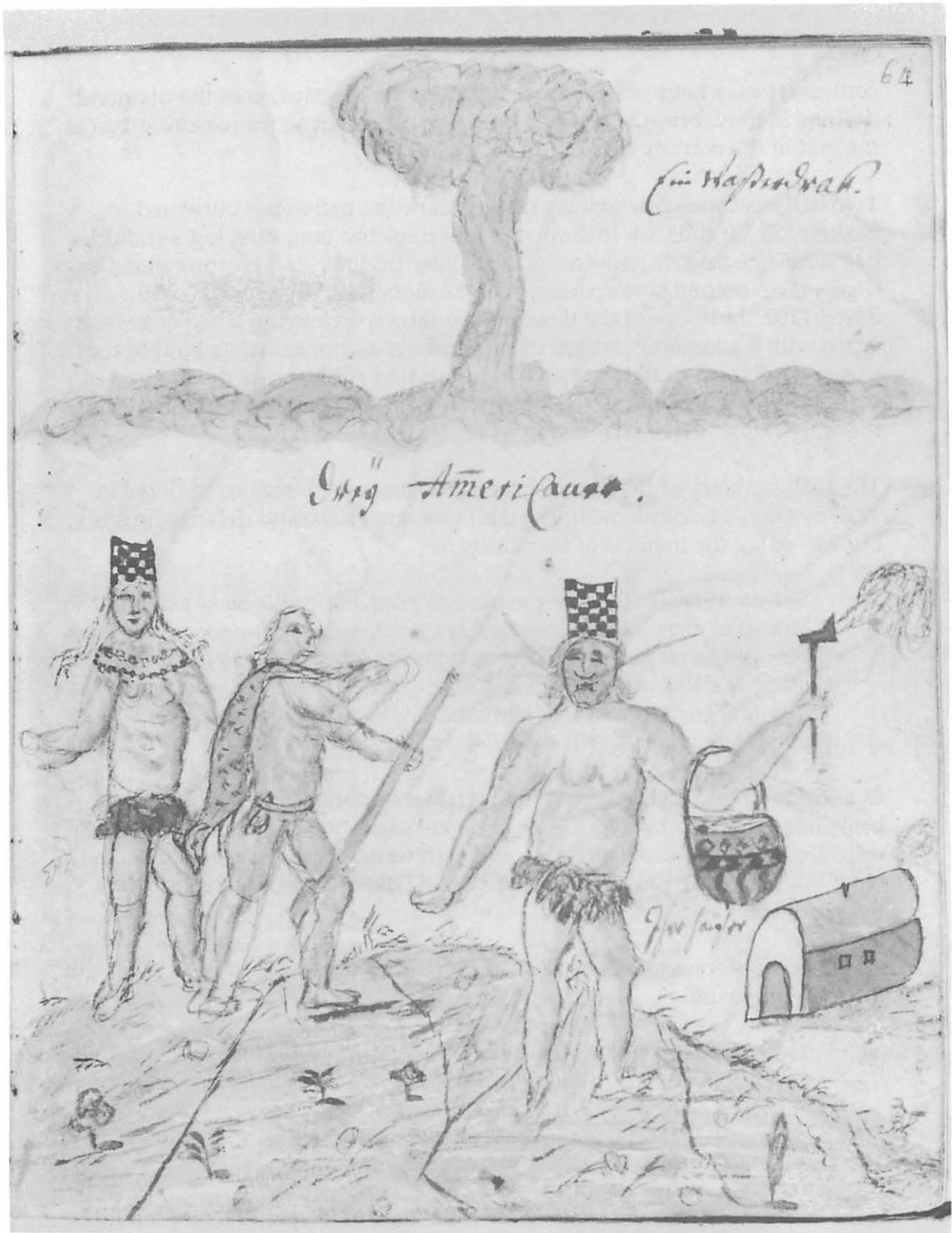
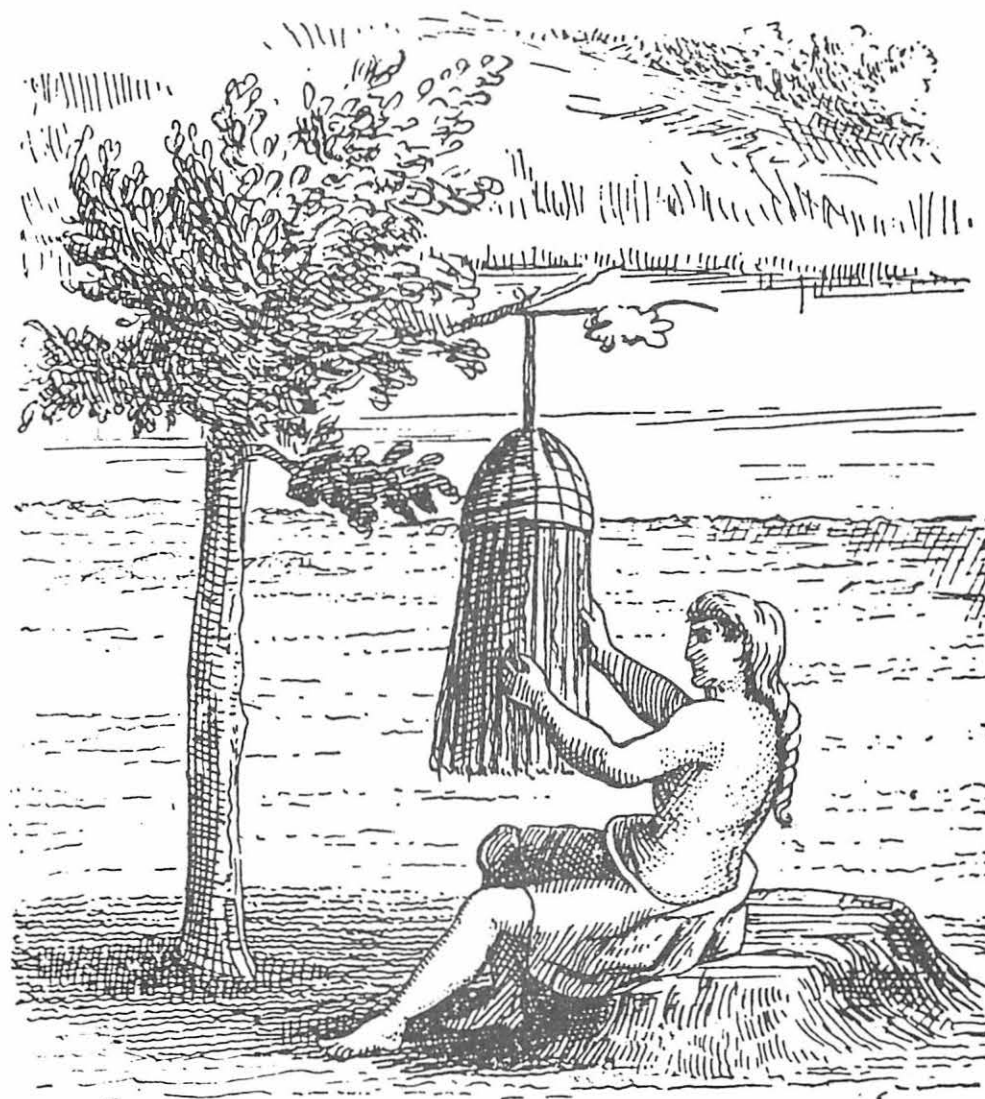


Figure 14 A 1702 watercolour, "Kurzer Bericht über die Americanische Reiss" by Franz Ludwig Michel, showing three Virginia natives, one carrying a geometrically patterned bag made of "a kind of root".
Burgerbibliothek, Bern, Switzerland, Mss.h.h.X.152.



b

Figure 15 An early eighteenth-century drawing from what is now Virginia, dated 1705, of a person making a geometrically-patterned bag by suspending the warp from a tree branch. First published in Robert Beverley, The History and Present State of Virginia, London, 1705:Table 5. From W.H. Holmes, Thirteenth Annual Report of the Bureau of Ethnology, 1891-92. 1896: Plate Ib.

Figure 16 "Yohicake woven bag", a Mohegan twined basket made of Indian Hemp, Apocynum cannabinum, probably dating from the mid-17th century. The Connecticut Historical Society, Hartford, 1842-44-1/A-56.



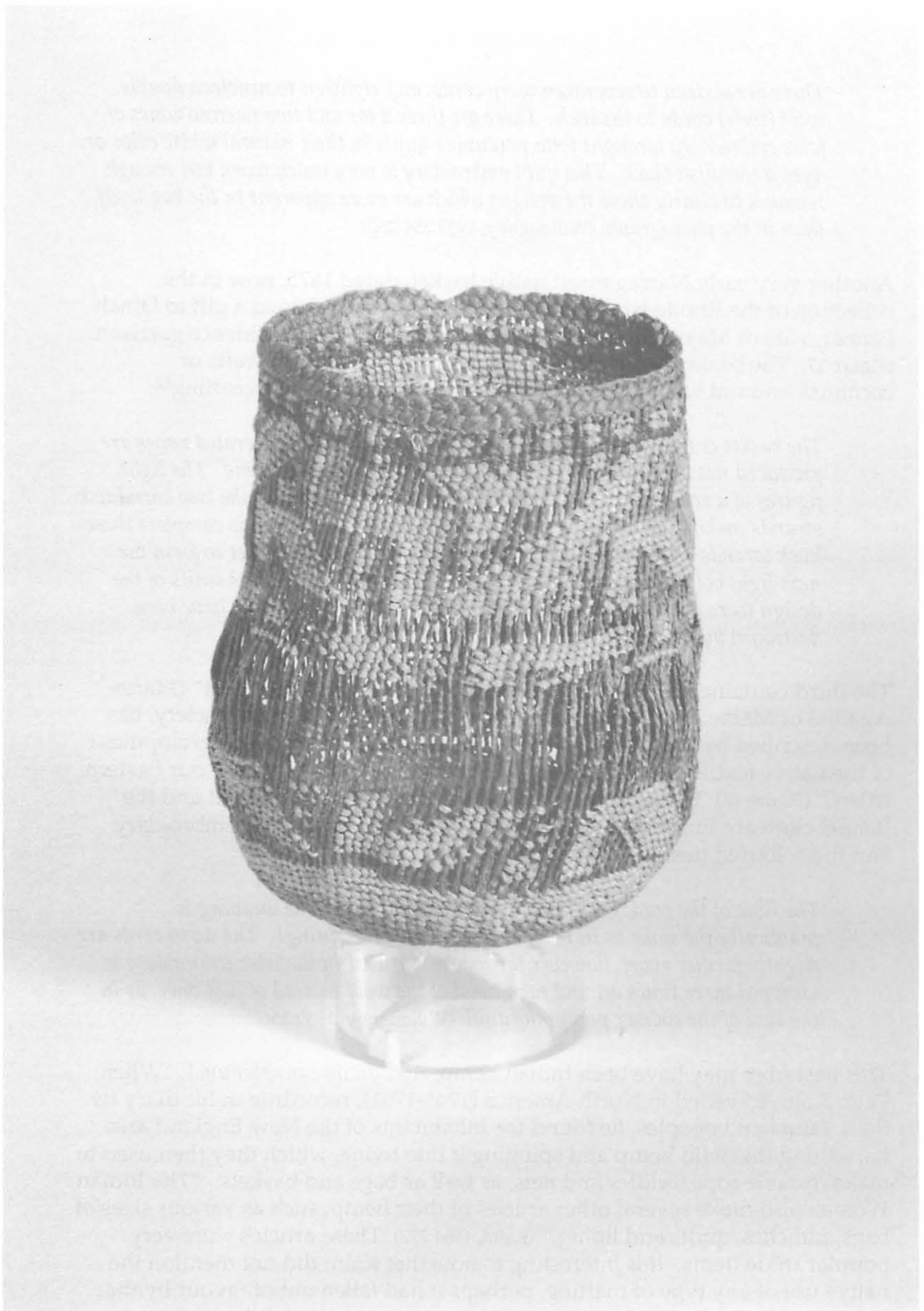


Figure 17 Algonkian Basket from Narragansett dating around 1675, anonymous artist. Rhode Island Historical Society, Providence, RHi X3 2660.

There are sixteen to seventeen warp cords, and eighteen to nineteen double woof [weft] cords to the inch. There are three wide and two narrow zones of false embroidery wrought with porcupine quills in their natural white color or dyed a purplish black. This quill embroidery is very much worn but enough remains to clearly show the designs which are more apparent in the bag itself than in the photograph. (Willoughby, 1935:254-255)

Another very early Narragansett native basket, dated 1675, now in the collection of the Rhode Island Historical Society, was made as a gift to Dinah Fenner, wife of Major Thomas Fenner, then living in the Providence garrison. (Figure 17) The basket, which has basswood-bark warps with wefts of cornhusk and red wool unravelled from a blanket, is most interesting¹².

The basket is twine-woven and the designs in each of the decorated zones are produced not by false embroidery, but by twined weaving alone. The light figures of a zone are formed by twining in the usual manner the two corn husk strands making up the woof cord. When a unit of the design is complete these husk strands are carried forward on the inner side of the basket to form the next light coloured unit...The wool strands making up the dark units of the design were doubtless manipulated in like manner, but as they have been destroyed by insects we cannot be sure. (Willoughby, 1935:254)

The third container, a "Twofold Pocketbook" made by "Mollocket" (Marie-Agathe) of Maine, now in the collection of the Maine Historical Society, has been described by Willoughby as "an illustration of the highest development of the native textile industry which has been found among any of our Eastern tribes." (Figure 18) The silver hasp bears the date 1778, and while it and the flannel cloth are European, the style of twining, the moosehair embroidery and the coloured designs are native.

The fibre of the cordage is apparently very fine bast. The weaving is practically the same as in the last bag described (twining). The warp cords are slightly farther apart, however the moosehair used in the false embroidery is wrapped three times around each twist of the woof instead of just once, as in the case of the coarser porcupine quill. (Willoughby, 1935:256)

This bast fibre may have been Indian hemp, *Apocynum cannabinum* L. When Peter Kalm travelled in North America (1748-1751), recording in his diary its flora, fauna and peoples, he found the inhabitants of the New England area harvesting this wild hemp and spinning it into twine, which they then used to make durable rope, bridles and nets, as well as bags and baskets. "The Indian Women also make several other articles of their hemp, such as various sizes of bags, punches, quilts and lining." (Kalm, 1964:277) These articles were very popular trade items. It is interesting to note that Kalm did not mention the native use of any type of matting; perhaps it had fallen out of favour by that time.

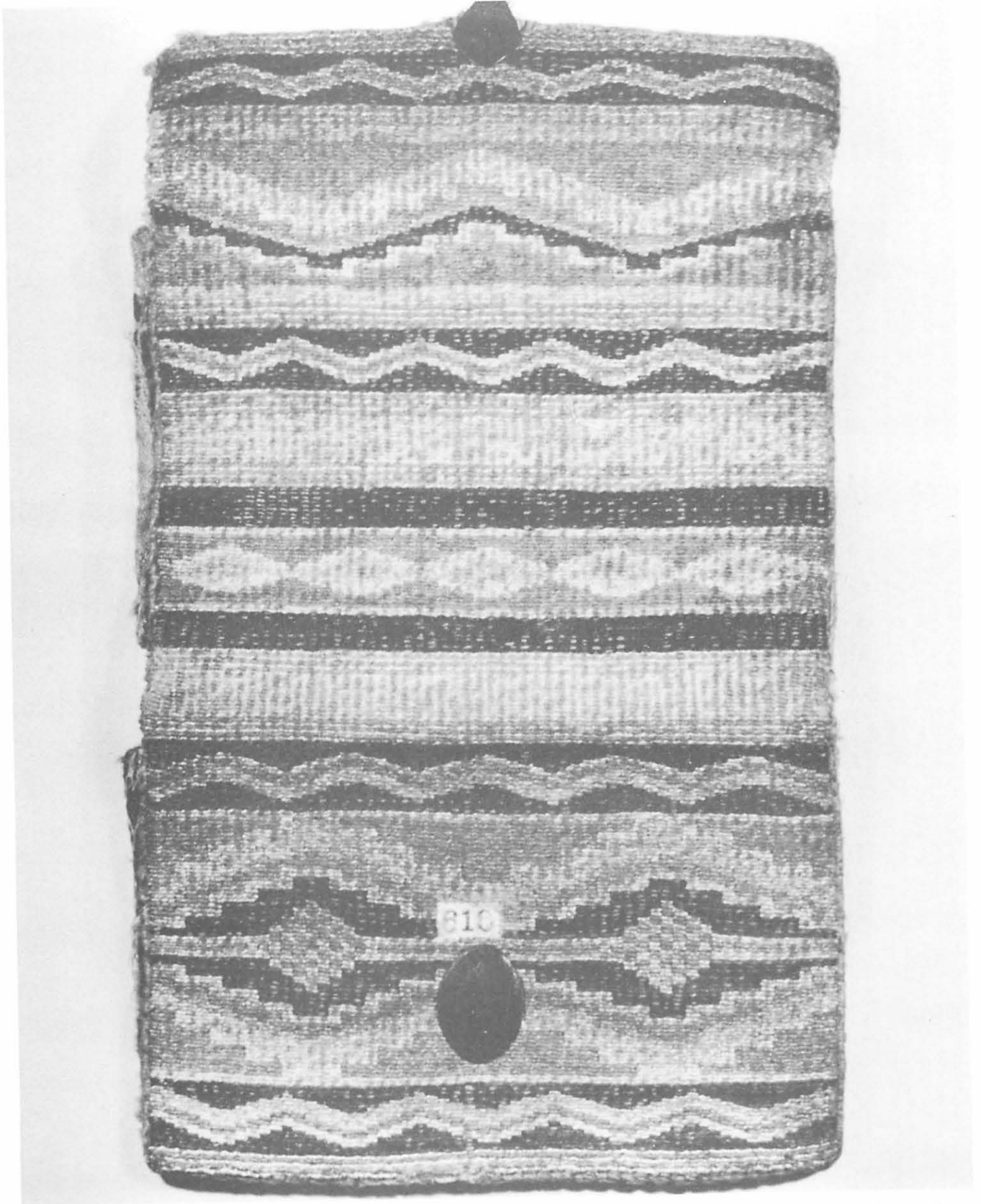


Figure 18 Twofold pocketbook made by "Mollocket" (Marie Agathe), an Abenaki woman, about 1785. Length (unfolded) 15cm. Maine Historical Society, Portland.



Figure 19 Back-basket twined of beach grass by Basha Accouch at Gay Head, Martha's Vineyard, Massachusetts, around 1800. The Peabody Museum of Archaeology and Ethnology, Cambridge, 23-79-10/K156.

In the nineteenth century, twined grass baskets became a popular tourist trade item. The collection of the Peabody Museum of Archaeology and Ethnology in Cambridge, Massachusetts, has a beach-grass back basket¹³, "*wap'hán a...*the only known survivor of a once flourishing twined grass basket tradition in New England." (Brandford, 1984:12) It was made by Bashie Accouch of the Gay Head Indians of Martha's Vineyard around 1800. The warps of grass were weft-twined in pairs, using Z-twists, and alternately splitting the pairs between the evenly spaced rows to create a visually pleasing diamond effect. The bag may have been twined upside down (from bottom to top), with the warp ends being braided together to form a neat edge around the opening of the bag. A 3-strand braided carrying strap runs from the bottom, up one side, and affixes to the top edge. (Figure 19)

From the Great Lakes region comes an early eighteenth-century twined vegetable-fibre bag, made with horizontal panels of porcupine-quill false embroidery; now housed in the Archiv der Staatlichen Schlösser und Gärten Wörlitz, Oranienbaum, Luisium, in Germany. (Figures 20 and 21) According to Ruth Phillips, this bag is unique in two ways. The designs are executed with porcupine-quills, rather than moosehair, and the motifs are unusual. (Ruth Phillips, personal communication, November 1995)

The motifs do not resemble those executed on the small number of related baskets from the Northeast. The closest designs are those found in Cree loom-woven quillwork and on painted bags that probably come from the northern Great Lakes. This would put the probable provenance of the bag among the Ojibwa of northern Ontario. (Phillips, 1988:68)

Twined containers executed with traditional methods and decorative patterns continued to be made throughout the eighteenth century and into the nineteenth century by the Algonkian, Iroquois and Ojibwa peoples. (Brasser, 1975:7; King, 1982:27-28; Phillips, 1987:58) They were flat rectangular pouches¹⁴, made in various sizes and used for storing a variety of objects. (Figures 22-23)

By the twentieth century, anthropologists working in the field were writing accounts of native cultures and taking photographs. (Figure 24) The most detailed report of the making of a soft, twined baglike container¹⁵ was written by Carrie Lyford, who worked with the Ojibwa/Chippewa in the early 1940s. Their bags were made of basswood fibre.

To make the basswood fiber, strips of untwisted fiber about one-eighth of an inch or more in width which were to serve as warp were hung over a suspended rod so that they were equally long on both sides of the rod. Before being put on the rod a pair of weft threads of twisted basswood fiber running at right angles to the warp was carried across the untwisted warp threads on top of the rod. One weft passed behind, and the other in front of a warp or group of warps and given a half twist between each, all the way across the rod.



Figure 20 Twined basket from the Great Lakes area, 18th century, possibly Ojibwa. Height 22cm; circumference 42-54cm. Archiv der Staatlichen Schlösser und Gärten Wörlitz, Oranienbaum, Luisium. Photo: Marie-Luise Werwick, 1996.

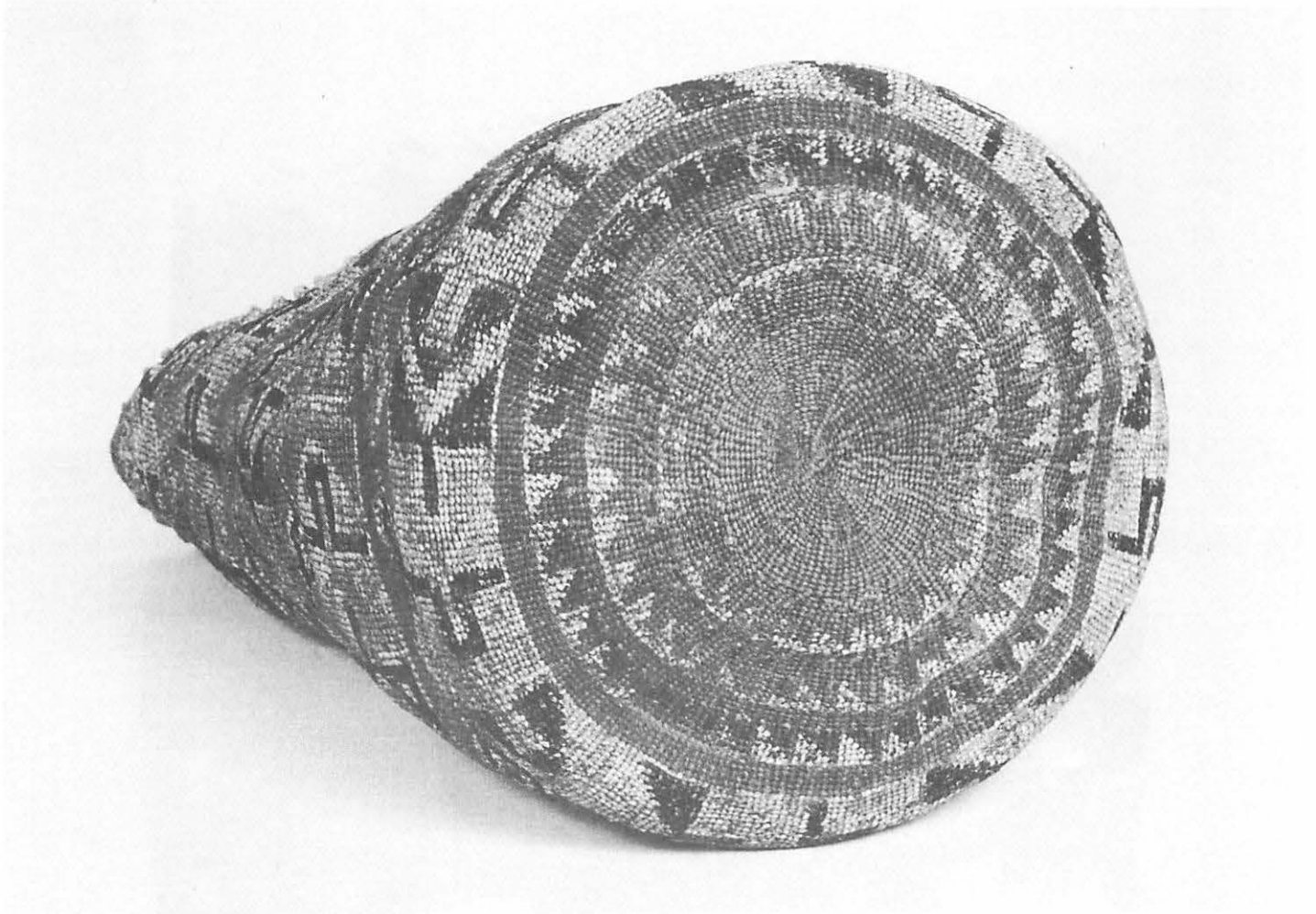


Figure 21 Detail of bottom start of basket in previous figure. Archiv der Staatlichen Schlösser und Gärten Wörlitz, Oranienbaum, Luisium. Photo: Marie-Luise Werwick, 1996.

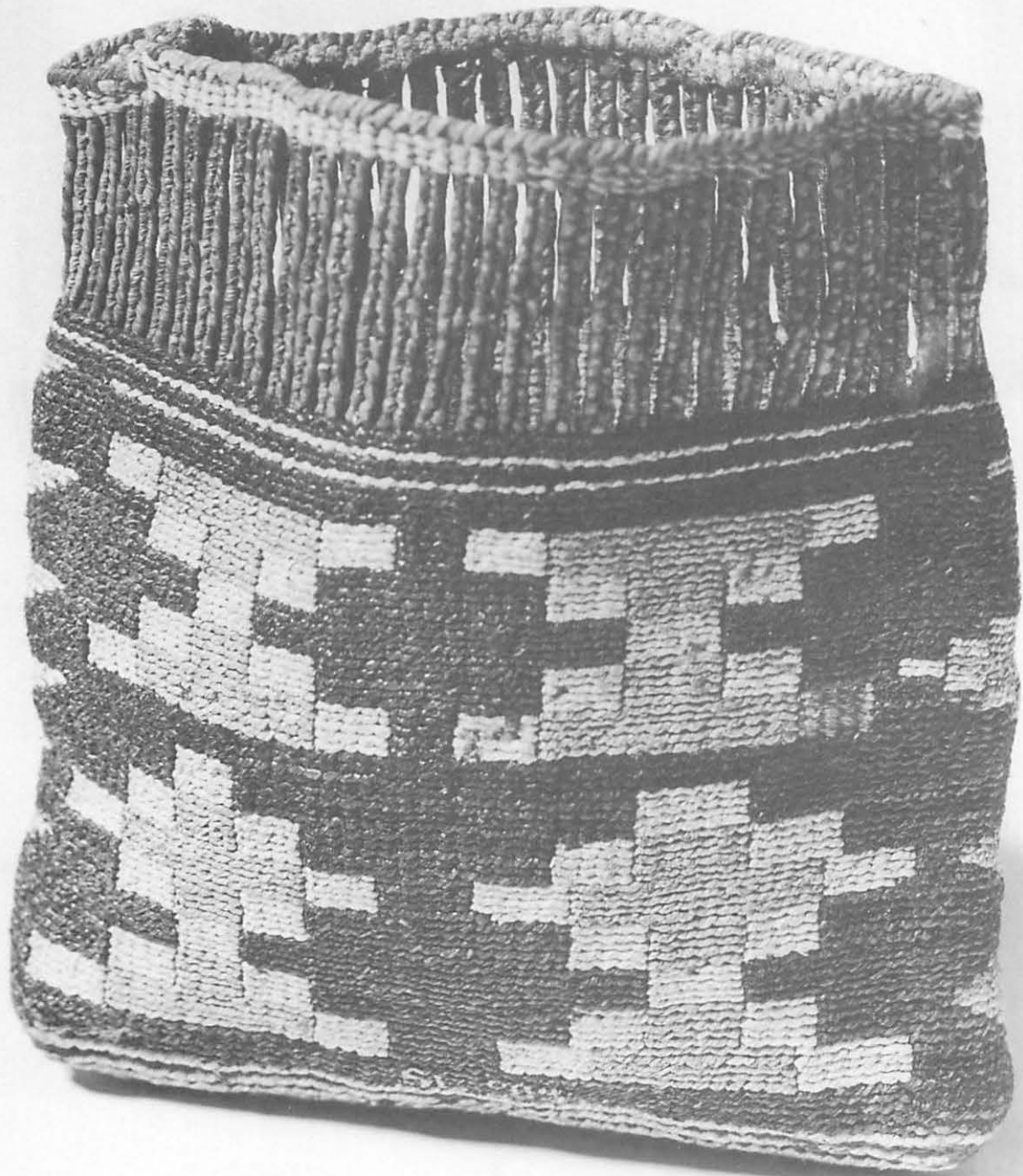


Figure 22 A Huron twined pouch, decorated in false embroidery, circa 1720. Size 13x13cm. The wrapping of the warps in a figure-eight pattern is very similar to the moosehair wrapping seen in Figure 32. British Museum, London, SL-203.

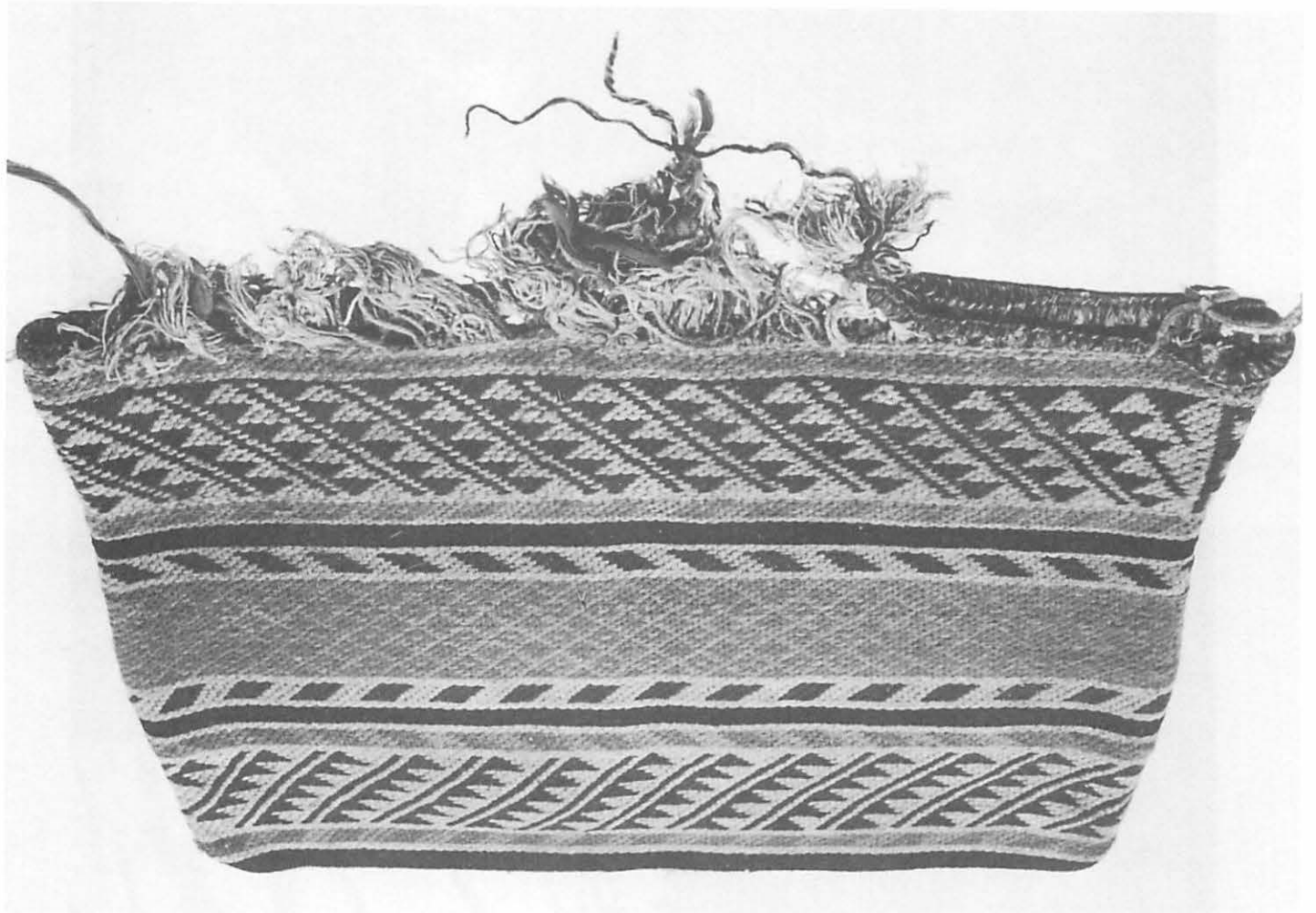


Figure 23 A Southwestern Ojibway twined bag circa 1860. Canadian Museum of Civilization, III-G-647, Neg.73-17446.



Figure 24 Woman from Penobscot, Maine, twining a basswood-fibre hunting bag. No date, probably early twentieth century. Note the position of the weaver and her work: the warps were joined together at the bottom of the bag, folded up, and now lie on her lap away from her; the wefts lay to the right (she is probably right-handed), and beaten downwards towards her; and inside the bag is a wooden form around which the bag is being shaped. University of Pennsylvania Museum, Philadelphia, S4-139107.

Another pair of wefts was then carried across the warps at a distance of about one inch below the rod, over and under each warp or group of warps, with a half turn between each, in the same way that they had been carried across the rod. The second pair of wefts passes all the way around the warps on both sides of the rod. Additional rows of weft threads are woven into the warp at regular intervals. The portion of the bag that rested on the rod formed the bottom of the finished bag so that no bottom seam was necessary, since the weft threads were carried continuously around the warp on both sides of the bag.

Open work weaves were secured in the basswood bags (a) by pairing the warps and working out vertical zigzag patterns and (b) by crossing the warps at a sharp angle to secure a lattice effect with hexagonal interstices.

The ends of the warp strips as they hung from the rod were usually left long enough so that they could be brought together for a finish at the top when the bag was removed from the rod. Groups of from 3 to 5 warp strands were twisted into a heavier strand for a short distance, then gathered into a continuous coil or a tight braid that was carried around the top to provide a firm finish to the bag. On other bags a strip of basswood two or more inches deep, woven in the same technique as that used in the body of the bag, was sewed firmly across the top of the bag giving it some added strength.

The design on the basswood bag is the same on both sides. It is usually a vertical stripe or panel secured by the arrangement of the colors used in the warp. (Lyford, 1943/1953:78-81)

Both Lyford and Gene Weltfish worked with the Iroquois people, who used cornhusks, the soft pliable outer leaves of the corncob, for twining. The Seneca Iroquois cut the husks into narrow strips and twined them into bags and shoes. (Lyford 1945/1982:64, figures 59 and 60) Weltfish stated that "only the Iroquois" in eastern North America used cornhusk twining in making their airtight salt bottles and tobacco baskets. (1930:481) Weltfish gave a detailed description of the twining of these containers, even though it focuses on the slant of the twist, which as we have seen earlier, appears to have been a matter of personal preference.

These baskets, as seen from above, have a clockwise spiral at the mouth and are apparently worked on the convex surface. There is some possibility that these baskets were hung mouth downward in making, in which case they were woven toward the right of the worker. Some specimens have stitches leaning upward, while others have stitches leaning downward, indicating that there is probably no conventional standard as to the twist of the stitch. The use of both twists may mean that different workers or families use only one or the other twist; but this is not at all necessary, since as in the case of the Quamichan baskets, an individual worker may use both twists. As no detailed records of

the manufacture of these Iroquoian baskets are available, technical analysis cannot be conclusive on these points. (1930:481)

Margaret Wheat recorded the folkways of the Northern Paiute of Nevada in the early twentieth century. These men and women twined rush baskets remarkably similar in construction to the fragments of those found in Pictou.

The bags had no set form of construction. The mesh was fine or coarse depending on the kind of food being gathered. The tule-bag was intended to be used only once. Men often made larger bags, a bushel or more in size to bring home their catch of fish or ducks. (1967:84-85)

Wheat's contact, Wuzzie, described the making of the bag she used to gather duck eggs. Several lengths of rush, or "tule-reed", were single-twined along their mid-lines for the desired width of the basket, the free ends were then folded up for the sides, and twined in one continuous spiral to the desired depth of the container. The bag was not completed beyond this point, the free ends of rush being gathered together for carrying. At other times, a handle was made by 3-strand braiding several of the free ends across the mouth of the basket and tying them on the opposite side. Wuzzie also said some people wrapped the remaining free ends along the rim into one continuous bundle with one of the rushes.

It is quite possible that the thicker rush fragments found at Pictou were twined in this manner and for the same purposes as the Paiute; a quickly made container of readily available materials needed to carry food such as eggs, clams, fish, ducks or other small meat source. By varying the distance both between the warps and the rows of twining, the same type of bag could carry objects as small as blueberries or as large and awkward as ducks. However, freshly used rush has a tendency to crack and split open as seen in the photographs illustrating Wheat's work. As described in the next section, rush is usually gathered in the summer and then rewetted for working later in the fall or winter. Properly dried, rush becomes soft and pliable like chamois cloth. As Wheat reported, the Paiute bags were made for a one-time use.

A fifth example of twined artifacts among the aboriginal peoples may be found in some forms of matting. Mats were made of a variety of plant materials, using differing techniques¹⁶ (twining, plain weave or plaiting, diagonal plaiting, or twilling—with or without transposed warp patterning), and for a variety of purposes. In his literature review of the early 1600 textiles of the Northeast, Wendell Hadlock reported on the material and the purpose, but rarely on the technique of manufacture; the original observers were not weavers.

As mentioned earlier, when the Pilgrims landed on Cape Cod in 1620, they found "Sundry bundles of Flags and Sedge, Bulrushes and other stuffe to

make Mats" gathered nearby the homes of the native people. (Hadlock, 1947:59) Mats were used in their home construction; being tied to a pole framework in layers, with the newer and possibly more finely made mats on the inside. "The houses were double matted, for as they were matted without, so were they within, with newer and finer matts." (1947:55)

Matting made from plant material continued to be used for house construction into the mid-seventeenth century. Although neither the plant nor the manufacture technique was documented, their ability to insulate was noted; the mats must have been thick with the rows very closely woven or twined.

[Their homes] were covered with close-wrought mats of their own weaving, which deny entrance to any drops of raine, though it come both fierce and long, neither can the piercing North wind find a crannie, through which he can conveigh his cooling breath, they be warmer than English houses. (Wood, 1634; in Hadlock, 1947:58)

Mats "made of reeds" were not only used for their homes, but also for sleeping. (Morton, 1637/1967:135) Although Morton gave a detailed description of making of the sewn-cattail matting, he unfortunately gave no description for making the reed/rush mat. (See Gordon, 1995, for a reconstruction of Mi'kmaq sewn-cattail matting.)

There appears to be a difference between the sleeping mats used by various aboriginal groups. Champlain described a sleeping mat used by the Massachusetts natives on beds made with "a number of saplings laid one against the other, where on they place a reed mat, in the Spanish style (which is a kind of thick mattress two or three fingers in depth) and upon this they sleep." (Champlain, 1613; in Hadlock, 1947:56) Another mat, called a "Matannauke or Mattannaukanash", was described as a "fine sort of mats to sleep on". (Williams, 1643 in Hadlock, 1947:55) These two different descriptions were most likely due to their construction, the first being a mattress of such depth it may have been similar to the multi-layered, sewn-cattail matting (Gordon, 1995); whereas the second description sounds like a mat made of finer material either twined or plain woven such as the mat rolled up for a pillow in the drawing by de la Pottherie. (Figure 25)

Along with their everyday use in Northeastern aboriginal culture, mats served important functions in several ceremonies. Both Chrestien LeClercq, writing about the seventeenth-century Mi'kmaq, and others writing more generally, note that mats were used in burials for both wrapping the body and covering the grave. About the same time, the Pilgrims in New England uncovered a number of graves, with mats which apparently had been used "as a protection to the grave from the elements". (Hadlock, 1947:57) Later in 1671-2, Father Charles Albanel met some "Mistassirinini" Indians on the

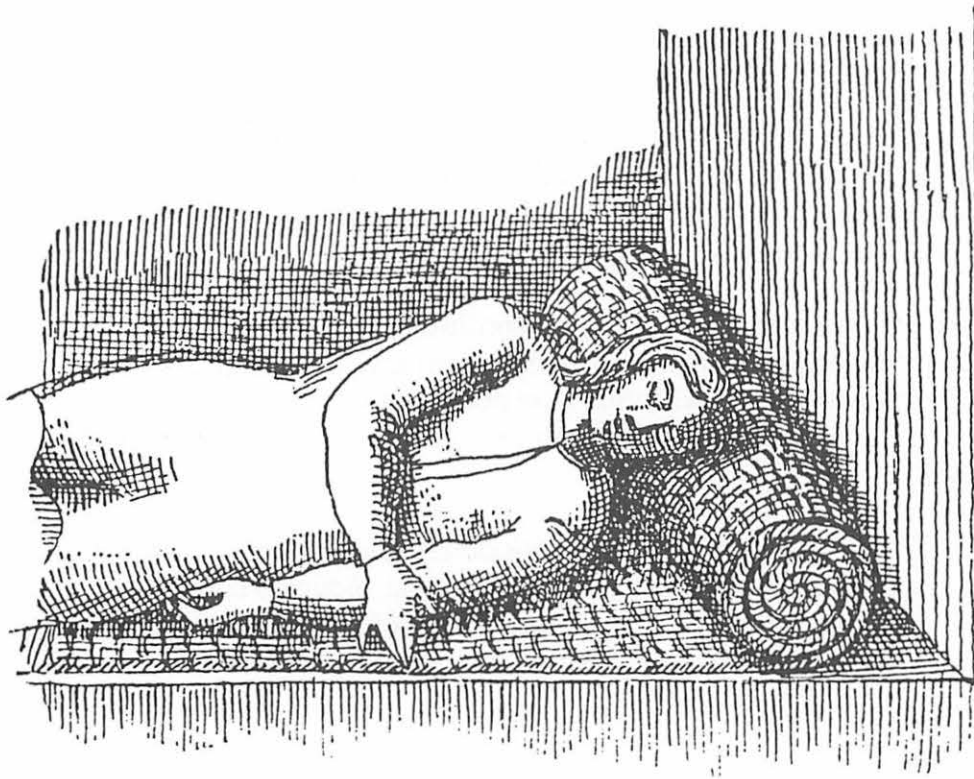


Figure 25 Matting rolled up for a pillow, detail of a drawing by de la Pottherie. From W.H. Holmes, Thirteenth Annual Report of the Bureau of Ethnology, 1891-92, Figure 3.

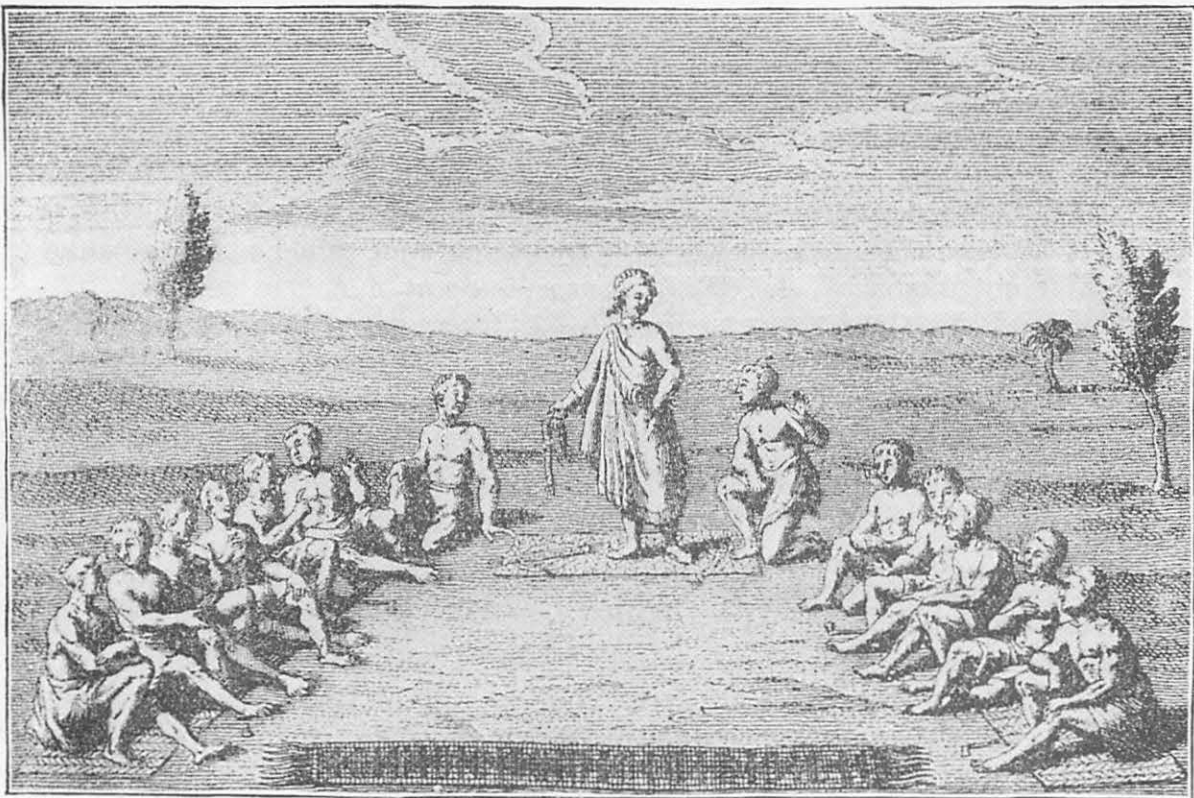


Figure 26 Matting used in ceremonial meeting. Drawing after Lafitau, from W.H. Holmes, Thirteenth Annual Report of the Bureau of Ethnology, 1891-92, Figure 2.

Saguenay River en route to Hudson's Bay. He was offered a mat with the following citation, the tone of which reveals the high regard of matting in that region: "As your friend, ally and kinsman, I give you that mat to cover the graves of your dead who were slain by the Iroquois". (1947:57)

Although he gives no specific dates, Hadlock reports brief references in the *Jesuit Relations* to mats, as having ceremonial significance to the people of the St. Lawrence and Great Lakes regions. In welcoming ceremonies, mats were offered to newcomers as gestures of greeting and hospitality. (1947:57) Rolled up, mats were easily carried to meetings where they were spread around fires for council meetings. (Figure 26)

Early Europeans in the New World noted that intricate and colourful patterns were incorporated in some of these bags and baskets and mats. The Algonkians made a mat "wrought as tapestries are in France". (1947:58) People living in the Narragansett area of Rhode Island in 1643 lined their homes with "embroidered" mats known as "Munnotaubana or Hangings" made by local women. (1947:55) Mat making was a seasonal activity.

In summer they gather...Hemp and Rushes, with dyeing stuffe of which they make curious baskets with intermixed colours and protractures of antique imagerie; these baskets be all of sizes from a quart to a quarter. (Willoughby, 1935:250)

While analyzing the patterning techniques and comparing the rush mats to tapestry, we must be aware that the term "tapestry" has been used in the literature to denote a variety of construction techniques ranging from true tapestry-weaving to embroidery.

Tapestry is generally described as a weft-faced plain weave in which areas of colour are woven with a single weft over and under single warps, back and forth, completely covering the warp. The patterns seen by the early explorers may indeed have been executed "as the tapestries are in France", or they may have been done with entirely different techniques but depicted scenes similar to the French tapestries.

From the pictorial evidence, the warp elements in some of the native rush mats were not only coloured, but they may also have been selected for thickness. Figures 27 and 28 illustrate mat-making on suspended warps. Pattern was created by manipulating both the coloured and the thicker warps, moving them either to the left or right in plain weave, twining or "diagonal plaiting", described by Nora Rogers. (1983:12) Careful examination of Figure 27 will reveal both the obvious coloured warp patterning and the more subtle raised relief patterning. Such intricately patterned mats were executed by the Fox people of Iowa (Figure 29), the Menomini of the Great Lakes area (Figure 30), as well as the Ottawa people living in Michigan. (Illustrated in Phillips, 1987:68)



Figure 27 Woman weaving rush mat. No location given. The mat appears to have been woven in a warp-faced plain weave with the patterning of warp movement possibly executed in diagonal plaiting. Photo: Diamond Jenness, 1937. Canadian Museum of Civilization, 81365.

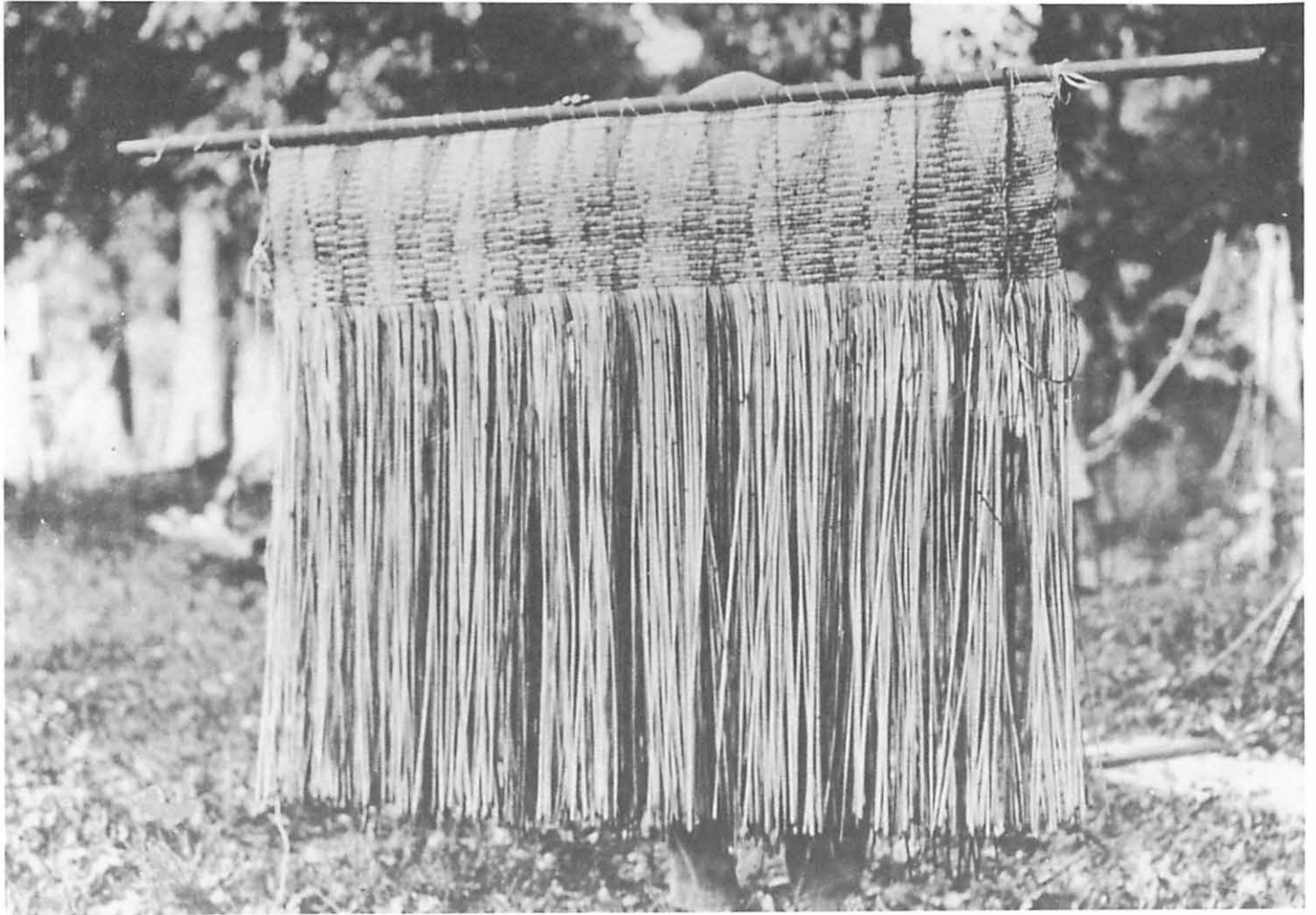


Figure 28 Rush mat in a suspended warp loom, Tamo, Iowa, 1923. The mat appears to have been woven in a warp-faced plain weave with the patterning of warp movement executed in diagonal plaiting. Photo: Huron H. Smith. Milwaukee Public Museum, 111024.



Figure 29 Completed rush mats with their Fox makers, Charles Keosatok and his wife, of Tama, Iowa, 1923. Note the raw materials in the background. Photo: Huron H. Smith. Milwaukee Public Museum, 46756.

Coloured rushes were probably dyed prior to weaving. John Josselyn reported that the people of New England in the seventeenth century were making "baskets, bags and mats woven with Sparke (?), bark of the Line-tree [Basswood, also called Lime], and Rushes of several kindes, dyed as before, some blacke, blew, red, yellow...." (1865:295) He includes no dye sources. It is also possible that the colouring could have been done by painting on the completed mat. New England native wigwams¹⁷ were described as being hung with mats "painted with several colors". (1865:307) However, careful consideration must be taken in the literal or figurative interpretation of this quote.

As we have no descriptions of exactly how these early rush mats were made, we must rely on later ones. The Menomoni women of the Great Lakes region at the turn of the twentieth century were still weaving mats of rushes which were used on the floors.

Leaves for mat-making are prepared by first cutting them when green, then steeping them in boiling water, and laying them in the sun to bleach. Some leaves are then dyed, to produce the final work various designs in colored stripes. The colors are chiefly dull green, red, and brown. The frame employed in making mats consists of two upright poles about 10 feet high and 6 to 8 feet apart (plate 20). Another pole is then tied transversely as high as the face of the worker. Along the crosspiece is then stretched a stout cord of basswood fiber, to which the leaves are attached by plaiting, thus making the latter pendent, one against the other, for as great a length as it is desired to make the mat. A long thread, also of basswood fiber, with a diameter of nearly three-sixteenths of an inch, is then attached to the left side of the row of leaves and run across toward the right by passing it in and out alternately over and between the leaves in succession. At intervals of every 4 or 6 inches a loop is made, to prevent the woof from slipping down, the loop being pulled out when another space of 4 or 6 inches is woven and stretched taut. The worker is occasionally obliged to spray water on the leaves, to make them pliable and to prevent breaking. When the right side is reached, the woof is secured to a heavier warp cord, which had been previously attached to the vertical pole. The colored leaves have already been placed at proper points, in the first instance, to give the desired stripes when finally woven. The lower edge is finished by cutting the leaves of equal length and plaiting them from left to right, when the last leaves are turned under and tied. (Hoffman, 1896: 259)

From this description, the mat was plain-woven, or plaited, with the single weft of basswood fibre going over and under each rush warp in turn across the row. Succeeding rows alternated the position of the warps to create an over-one, under-one weave pattern. The most meticulous directions for weaving a rush mat were given by Karen Petersen (1963) in her work with the Chippewa.

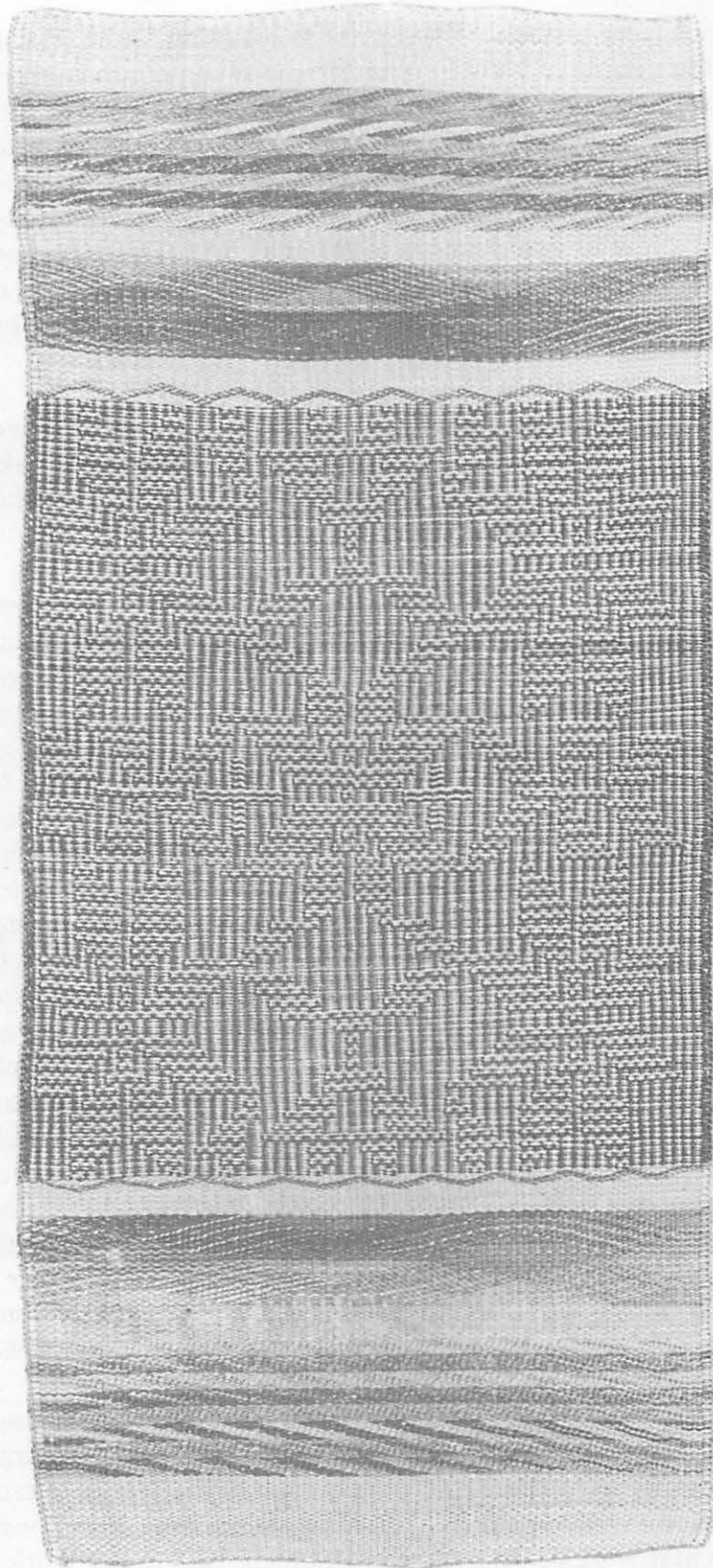
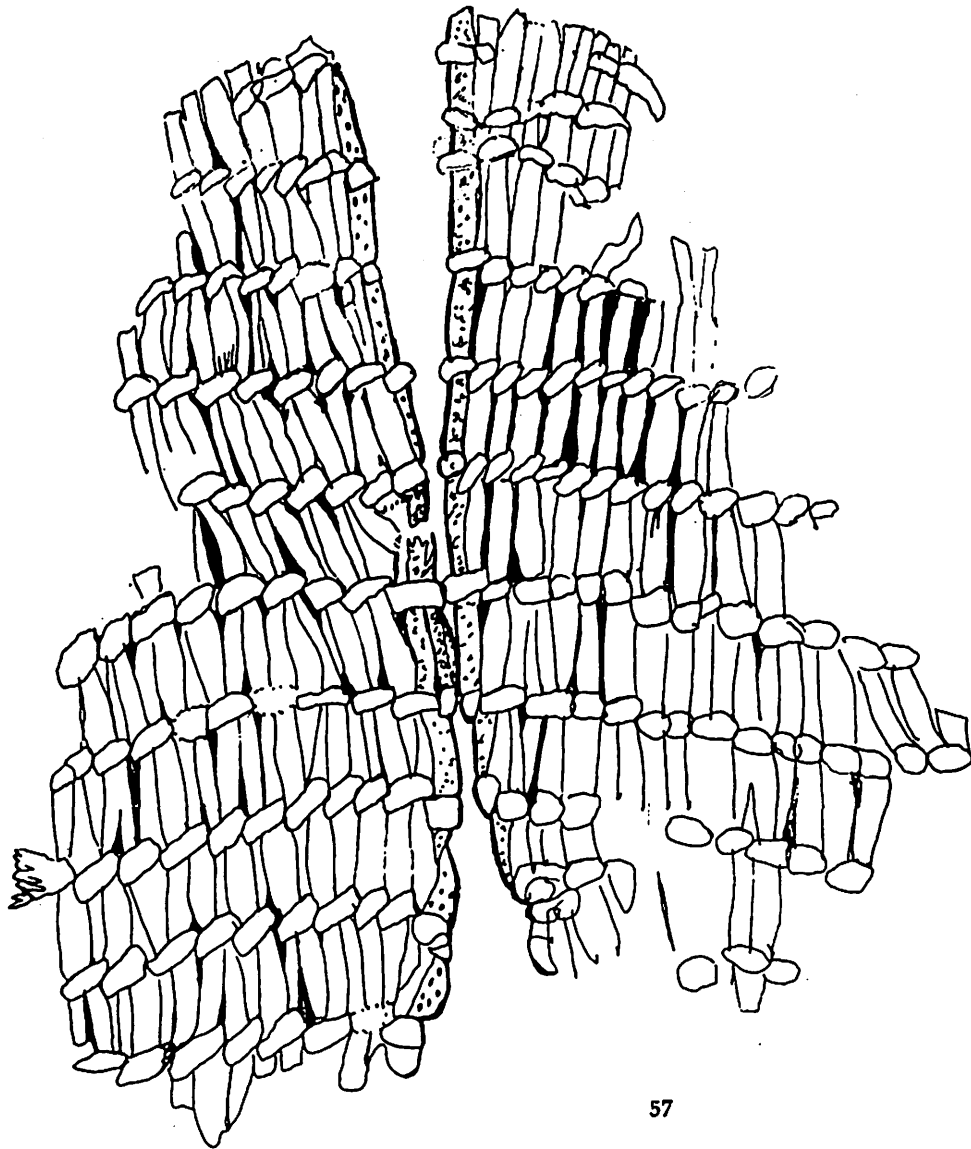


Figure 30 Menomini rush mat, 95" x 43", with "...color bands of twined patterns on each end...plain weave 'op art' patterns in black and natural in the center panel" (Rogers, 1983:9) Denver Art Museum, Denver, Colorado, 1939-440.

As we will see in the next chapter, the Mi'kmaq people also made patterned rush mats which impressed the European newcomers and reminded them of their geometrically symmetrical patterned knot gardens in Europe.

MI'KMAQ TWINING



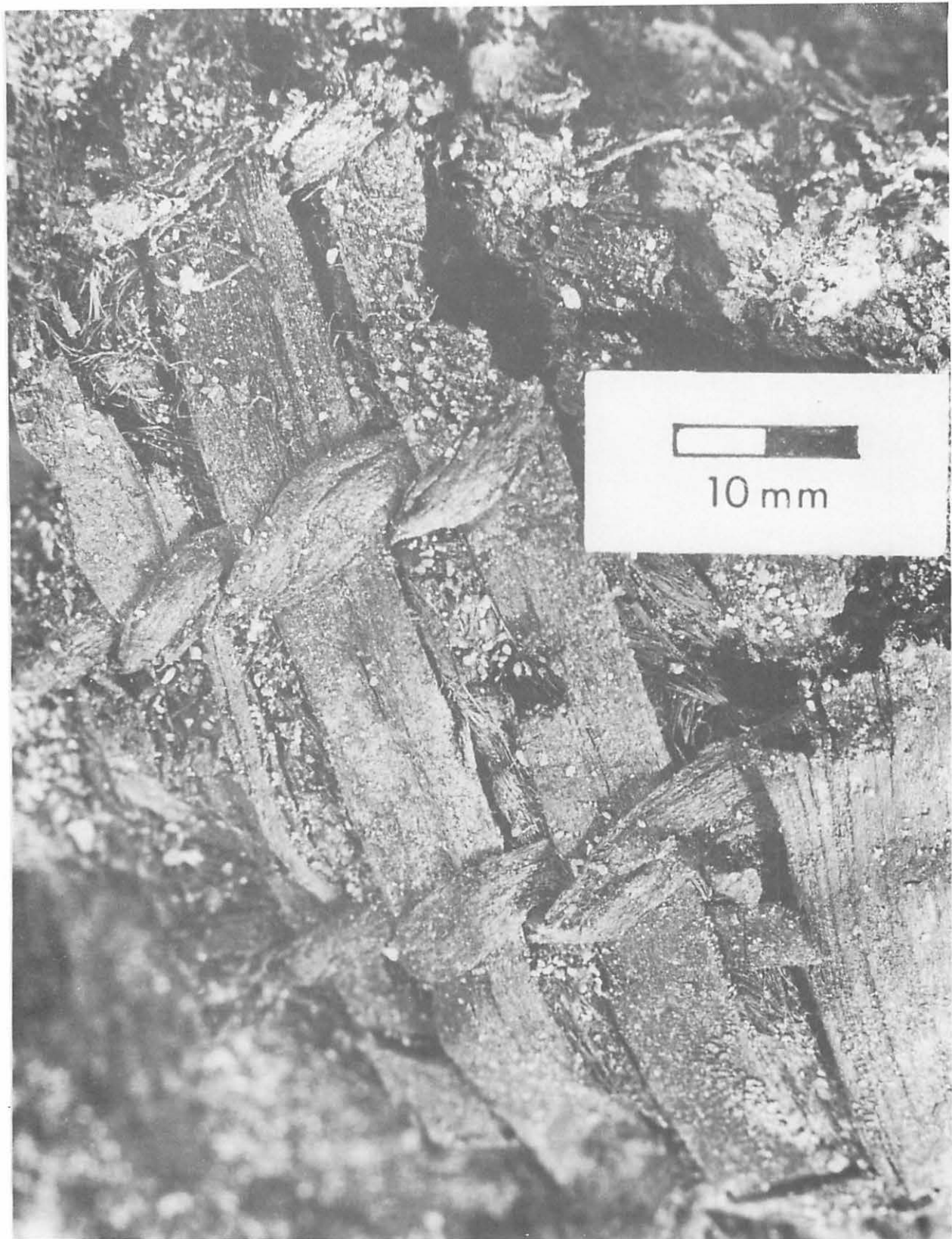


Figure 31 Twined fragment from the Augustine Mound site (CfDI-2), Red Bank, New Brunswick, dated to 2500-2700 BP. The materials are probably wide leaves of cattail twined with smaller lengths of rush. Photo: Albert Ferguson, New Brunswick Department of Municipalities, Culture and Housing, Fredericton.

ARCHAEOLOGICAL EVIDENCE

CfDI-2: Augustine Mound, New Brunswick

The earliest archaeological site in the Maritime Region to have thus far revealed textiles is the Augustine Mound (CfDI-2) site, near Red Bank, along the shores of the Miramichi River in New Brunswick. It is dated to 2,500 BP. (Turnbull, 1976) The organic material at this site has been preserved by the presence of hundreds of copper beads.

The textiles of the Augustine Mound will be discussed in a future publication. (Gordon, Whitehead, in preparation) I would like, however, to introduce two remarkably different pieces of twining found in this collection. In one, part of a bag found encasing several hundred copper beads crimped over leather thongs, lengths of possible cattail leaves (*Typha latifolia*) were twined with another smaller and rounder material, most likely rush (*Scirpus lacustris*). (Figure 31)

The second and exceedingly more remarkable textile¹⁸ was created on a warp of possible vegetable fibre or moose sinew wrapped with what have been positively identified as moose hairs. (Whitehead, 1980:53) A group of five or six hairs are wrapped back and forth across pairs of adjacent warps, leaving the next pair of warps free. (Whitehead, 1980:figure 4) This is followed by a row of two-strand plain twining, possibly with moose sinew. In the next row, the wrapped/open paired warps are alternated, followed again by a row of twining. The overall pattern is that of a grid. (Figure 32)

BkCp-1: Pictou, Nova Scotia

The second site which included textiles is the Pictou (BkCp-1) site, dated to the end of the sixteenth century, and located along the Northumberland shoreline in Nova Scotia. The organic material at Pictou has been preserved by the presence of copper in the form of large copper cooking kettles. Such pots, a possible total of 22, some intact, others fragmented—one with a rim diameter of 27 inches—were found at the Pictou site. (Whitehead, 1987b:33)

Pit One at the BkCp-1 site was discovered by Kenneth J. Hopps in the autumn of 1955, while digging a drain in the backyard of his home at Lowdens Beach. The following year, he uncovered Pit Two, an adjacent grave. J. Russell Harper of the New Brunswick Museum was contacted to view the material,

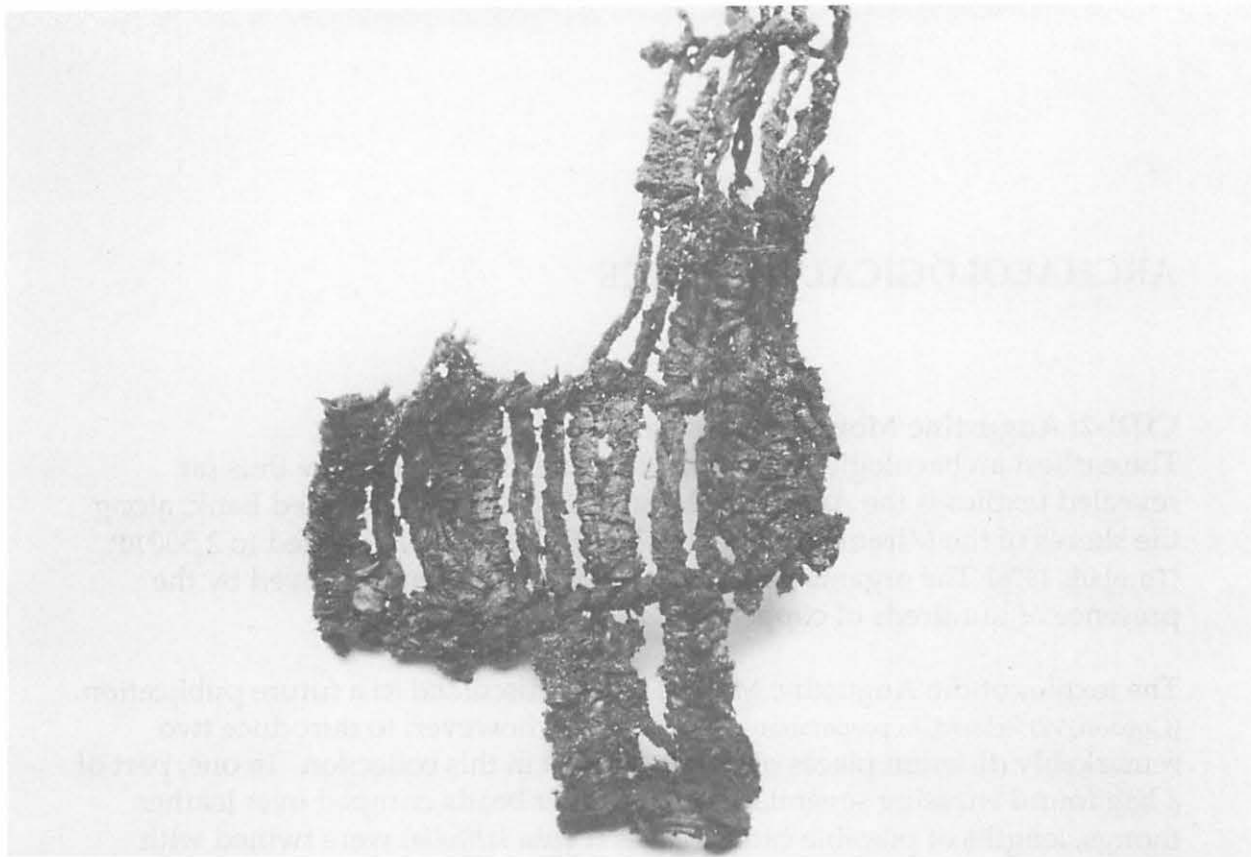


Figure 32 Fragment of wrapping and twining, Augustine Mound site (CfDl-2), Red Bank, New Brunswick, dated to 2500-2700 BP. The paired warps are wrapped with bundles of moose hairs, alternating with rows of plain twining.
 Photo: Rod Stears, New Brunswick Department of Municipalities, Culture and Housing, Fredericton.

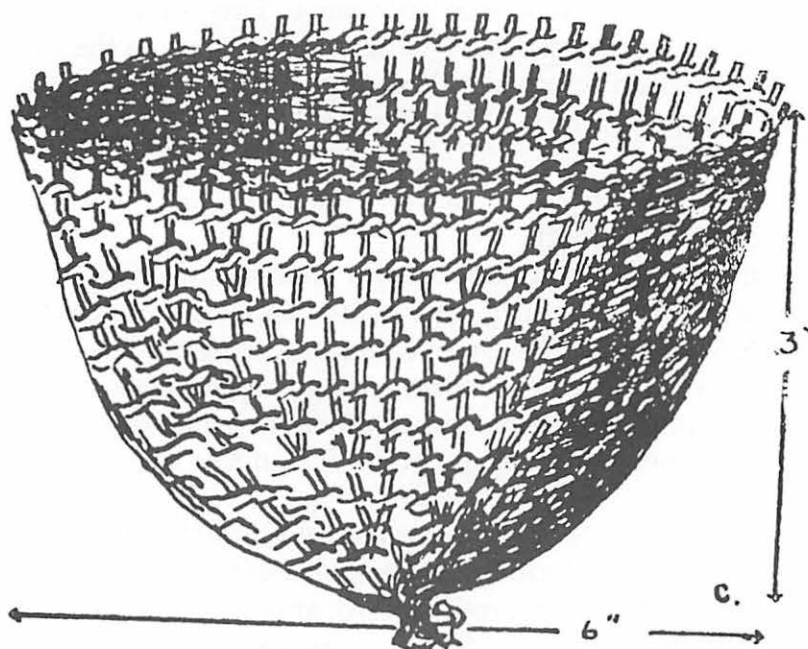


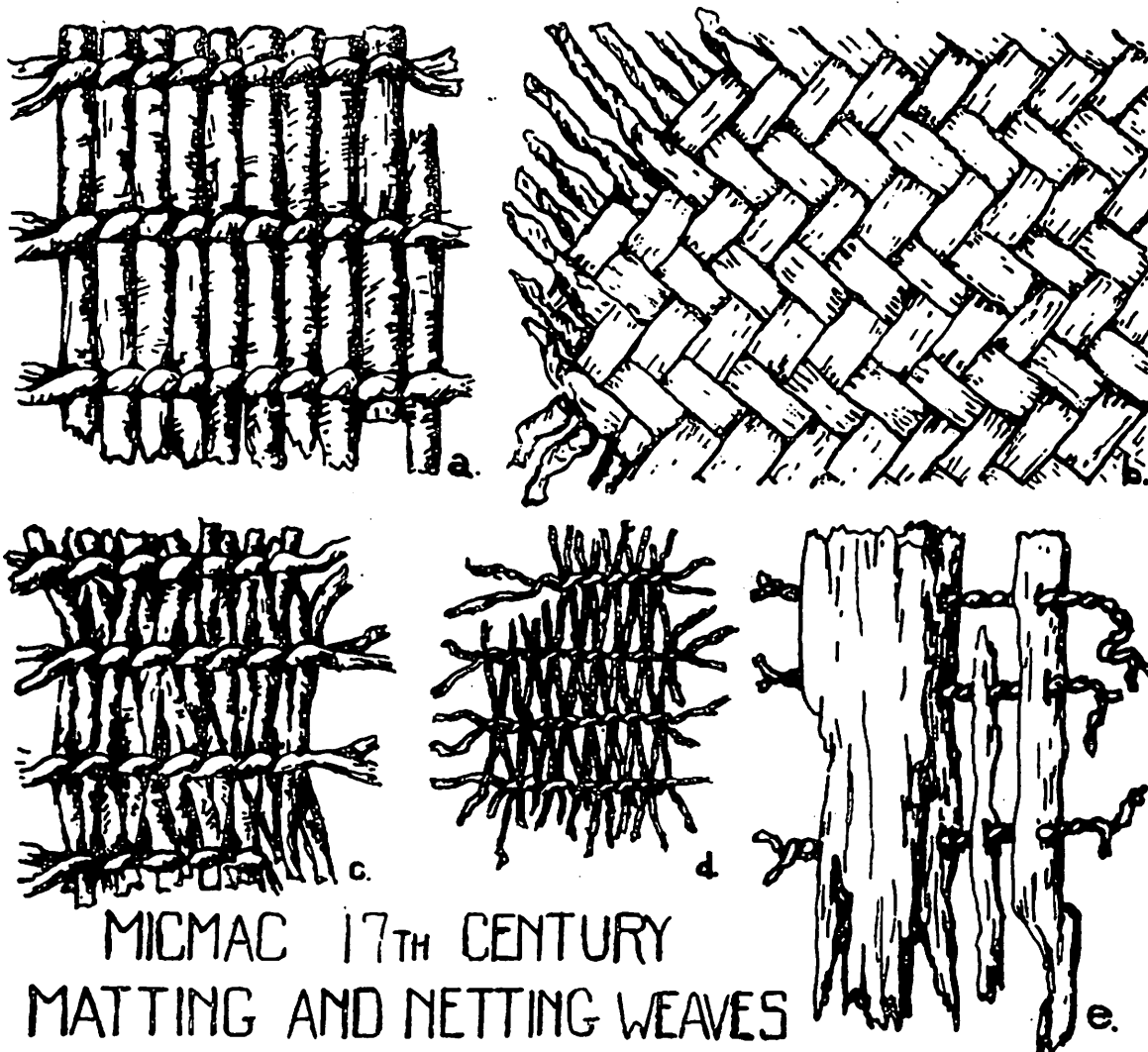
Figure 33 A small hemispherical grass basket found at the Pictou site BkCp-1. From Harper, Portland Point, Crossroads of New Brunswick History, 1956, Figure 7.

and he described the site in two publications. (Harper, 1956;1957) Hopps had the latter publication typed and offset-printed for sale in the small museum which he built to house the find. He had previously given various recovered items away, some of which, directly and indirectly, have come to the Nova Scotia Museum over the years. In 1984, Hopps gave the remaining collection to the Nova Scotia Museum. (Whitehead, 1987a) The 1984 acquisitions, the largest collections, were accessioned as 84.22.1-856. (See Appendix One for a complete catalogue of the twining under discussion.)

Harper was impressed with the number of recovered fragments using "bulrushes", bast fibres and grasses; some he believed were from matting, others from bags or baskets. Grave Pit One revealed "fragments of carefully woven rush matting" lying underneath flattened kettles. All the kettles in this section were crushed "either by deliberate flattening under heavy pressure (jumped on?) or by axe holes cut in them; they were 'killed' to release the spirit of the kettle at the time of burial." (Harper, 1956:41) It is fortunate for this study that these kettles were flattened; they made a wider surface of copper to which the organic twined material adhered, and was thus preserved.

Working in Burial Pit Two, Harper found that a basket was the first object to have been placed in the grave, possibly giving it some significance of importance. "A bulrush basket in the southwest sector was the first object placed in the grave; the grave floor then covered deliberately with a single thickness of copper sheeting obtained from opening up these kettles." (Harper, 1957:4) This was one of many bags or baskets of grass, rush and unknown material which, unfortunately, are no longer in the collection. The only remaining bag or basket is a small, split cedar-bark bag. (Whitehead, 1987a:41,67; Gordon, 1993b) Harper, however, gave a detailed description including a drawing of a hemispherical basket, diameter 6" and depth 3"; made with what he thought was "coarse sedge grass", and collected from Grave Pit Two. (Figure 33)

The first two stems of fibrous grass went from rim to rim right across the bottom of the basket; they thus formed the four warp threads or spines of the basket. To these stems six additional warp threads or stems were bound at the bottom so that the first circle of weft-twining at the bottom of the basket was carried around ten warp threads or spines. As further circles of weft-twining encircled the basket, more warp threads were added by binding the lower end of each in the same loop as a warp thread which already existed, but on the next round of weft-twining, it was bound separately. The proper flare to the sides was thus obtained. A total of thirteen rows of weft threads completed the basket but with the last two rows on the rim being very close together to give a firm finish. (Harper, 1957:16)



MICMAC 17TH CENTURY
MATTING AND NETTING WEAVES

Figure 34 Mi'kmaq textiles of the seventeenth century as drawn by Russell Harper. Fragments A and C are from Pictou, while D is from Portland Point. Harper pointed out that C and D appear to use the same method of twining, although the materials appear to differ. B is twill-woven cedar work from Red Bank; E is a fragment of sewn-cattail matting from Pictou. From Harper, "Two Seventeenth-century Copper-kettle Burials", 1957, Figure 21.

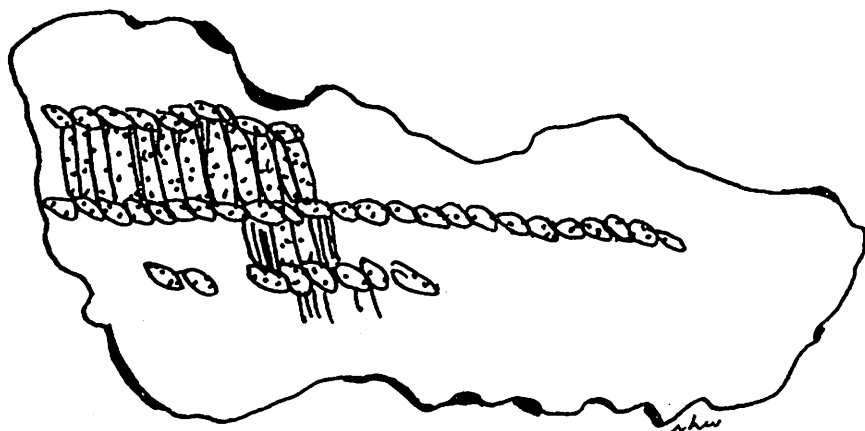


Figure 35 Textile fragment, 88 x 35mm, (NSM 72.51.4b) from the Northport BLCx-1 site. Drawing: R.H. Whitehead in Plant Fibre Textiles from the Hopps Site: BkCp-1, 1987a:70.

Harper also included drawings of the variations of twining found at Pictou and compared them to one found at Portland Point, New Brunswick, discussed below. (Figure 34)

The Pictou site contained two methods of twining, the first with single-strand warps, and the second with alternately paired warps. The latter was the same method of twining used in the Portland Point fragment. He was quite right in his assessment of the work; it is "remarkable for the evenness and the regularity of workmanship." (Harper, 1957:49)

BICx-1: Northport, Nova Scotia

The third Maritime site to contain textiles, Northport (BICx-1), like Pictou, dates to the end of the sixteenth century and is located along the Northumberland shoreline of Nova Scotia. By comparison, textiles were sparse. The single Northport fragment (NSM 72.51.4b) is small, 88 x 35mm, and fused to a lump of black organic matter measuring 115 x 55mm., both in poor condition. (Figure 35) In the textile, three successive regularly-spaced rows of Z-twist weft-twining encircle single warps, each row being a different length.

The first course shows approximately 12 twists around 12 warps, then a 10mm interval; the second course has 25 surviving twists around approximately 7 surviving warps; then a 6-7mm interval; the third course shows approximately 9 twists, with a gap in the line. (Whitehead, 1987a:70)

Whitehead felt that the material used here was probably reed, *Juncus effusus* L., due to its small size, 2-4mm in diameter. She concluded that the fragment "may once have been part of a bag", as the twining is similar to the bag-like fragments found at the Pictou site of approximately the same time period. (Whitehead, 1993:43) This site is the primary burial of a young adult female, and a finely twined bag might have been an appropriate grave good.

Portland Point, New Brunswick

The fourth Maritime site in which textiles have been found is Portland Point, at the mouth of the St. John River in New Brunswick. It is dated circa 1645, prior to the destruction of Fort la Tour. The single Portland Point fragment "may be part of a bag of grass or bast nettle (?) fibres. These fibres are so charred by age as to prevent an exact definition." (Harper, 1956:49) Whitehead felt the material was more likely to be Indian Hemp (*Apocynum cannabinum*), or an American nettle species (*Labitae*), as bast nettle (*Galeopsis tetrahit* L.) is not native to North America. (1980:53) Harper included a drawing of the fabric structure, but unfortunately not a measure of scale. (Figure 34d) Four evenly spaced rows of weft-twining with S-twists encircle pairs of warps which alternate in each successive row creating an overall diamond effect.



Figure 36

HISTORICAL EVIDENCE

The three early contact-period sites date to about the same time as our first recorded European observations of Mi'kmaq life, allowing us an opportunity to compare their written descriptions with the actual textiles. Marc Lescarbot, travelling with Samuel de Champlain in 1606 along the coast of what is now Maine, noted that the people brought "fish and grapes within baskets made of rushes for to exchange with some of our wares." (Lescarbot, 1609/1928:107) Although he made no mention of the size of the basket or the appearance of the weave, we can assume, from the predominance of rush twining in the archaeological evidence from about the same time period in Acadie, that they were twined. The open, spaced rows of twining seen in the Pictou site would have made a fabric suitable for holding fish and grapes.

Lescarbot gave us more pertinent fabric-structure information, in the following passage on Mi'kmaq use of matting.

Touching their smaller exercises: when the winter doth approach, they prepare that which is necessary to oppose themselves against this rigorous adversary, and make mats of rushes, wherewith they garnish their cabins, and others to sit upon, and all very artificially, yea, also colouring their rushes; they make partitions in their works, like to them that our gardeners do make in their garden knots, with such measure and proportion as nothing is found amiss therein. (1609/1928:252-253)

From this wonderfully detailed description, we can see that at the time of European contact, the Mi'kmaq people were making rush matting using dyed rushes, in intricate geometric patterns like the patterned knot gardens¹⁹ which were popular in Europe in Lescarbot's time. However, we do not know if they were twined, plain-woven or diagonally plaited. The techniques differ remarkably, as stated earlier.

There is no evidence in the Mi'kmaq record of their having used a loom. I think it might be safely assumed, however, given the evidence in the historical record of their complicated patterned rush matting, that they probably used looms similar to the ones shown in Figures 27 and 28. Mary Elizabeth King called this the suspended-cord frame loom, in the horizontal form, which "consists of two stakes, with a cord tied between them". (1979:127) This type of loom²⁰ would have allowed the weaver more control over the

free-hanging warps by suspending them, rather than having them tangle on the ground.

Lescarbot's information about the Mi'kmaq patterned matting complements other European observations of aboriginal cultures farther south along the coastline of North America from the same time period; as well as the later documentations of the Menomini and Ojibway cultures further inland, as discussed above.

Other early observers in Acadie (now the Maritime Provinces of Nova Scotia, New Brunswick and Prince Edward Island) were the Jesuit missionaries, who wrote extensive letters back to France describing, among other things, the manners and customs of the native peoples. Father Pierre Biard served in Port Royal from 1611 to 1613. He observed the women making their wigwams of a framework of poles set in the ground around a central fireplace.

Upon these poles they throw some skins, matting or bark. At the foot of the poles, under the skins, they put their baggage. All the space around the fire is strewn with leaves of the fir tree, so that they will not feel the dampness of the ground, over these leaves are often thrown some mats, or seal skins as soft as velvet. Upon this they stretch themselves around the fire with their heads resting on their baggage. (Biard, JR III, 1897:77)

In the summertime, Father Biard reported that the shape and size of their houses changed, but they still used mats, "...for then they are broad and long, that they might have more air, then they nearly always cover them with bark, or mats made of tender reeds, finer and more delicate than ours made of straw, and so skilfully woven, that when they are hung up the water runs along their surface without penetrating them." (1897:77)

These mats might have been like the sewn-cattail mats which were used in other aboriginal cultures for shedding rain from their homes. (Gordon, 1995) However, from the description of the material as being fine and comparable to straw, I feel that these mats were probably made of rush. The surface of a closely woven or twined rush mat would easily repel the rain.

Biard's description of the making and use of matting among the Mi'kmaq people was the last in the historical record. Nicolas Denys (1672/1908) and other writers of the time—Chrestien LeClercq (1691/1968) and le Sieur de Diereville (1708/1933)—did not mention matting, either in the aboriginal homes or in burial ceremonies. When Patrick Campbell came through this area in 1791 "to ascertain whether Canada afforded opportunity for successful settlement by Highland immigrants", he made no mention of seeing matting in native bark wigwams. (1791/1937) However, when Wilson Wallis visited Burnt Church, New Brunswick, in the summers of 1911-12 as part of his

anthropological study of the Mi'kmaq, he was told of people erecting two or three birchbark wigwams each summer, with mat coverings making an appearance.

...but sometimes they are first covered with flag or swamp grass, se'suusk, woven into a mat, e'laama'sit²¹. It forms an inside lining which helps to keep out the rain and the wind. These mats were three to four feet in length, and about two and a half feet in width —practically the same width as the bark placed over them. (Wallis and Wallis, 1955:58)

Unfortunately, he did not give a more complete description of how the mat was made, probably because he had only heard about them.

Unlike the mats, reference to the making of bags and baskets continued to be found in the historical record well into the mid-seventeenth century. Nicolas Denys, living in Acadia 1635-1681, saw "bags of flattened rushes, which they plaited one within another". (1672/1908:423) From this description it is difficult to determine exactly how these bags were made. Denys may have been referring to the action of fingerweaving the rushes in either twining or braiding. In any event, these bags were included in their belongings on their seasonal moves. "...then the women and girls must carry the wigwam, their dishes, their bags, their skins, their robes, and everything they can take, for the men and boys carry nothing." (Denys, 1672/1908:405)

Finally in the historical record there is a rather curious reference to the use of rushes in the making of a Mi'kmaq hat, by Henry Wansey, an English cloth manufacturer who made a tour of Canada and the United States in 1798, with an eye to cloth production. Crossing the Atlantic, he stopped in Halifax and noticed a "Micmac Indian woman: The dress of the young woman was remarkable, a cap made of rushes in the form of a sugar loaf, a blue serge petticoat, very short, a flannel cloke of a yellow ground embossed with red flowers, her hair was plaited into a long pigtail down her back." (Wansey, 1778; in de Marly, 1990:152) This style of hat became popular in the 1660s but survived in many rural communities throughout the 18th century. As this is the only reference of a rush Mi'kmaq hat of which I am aware, it may have been a one-time experiment to duplicate a fashionable style with a readily available material.

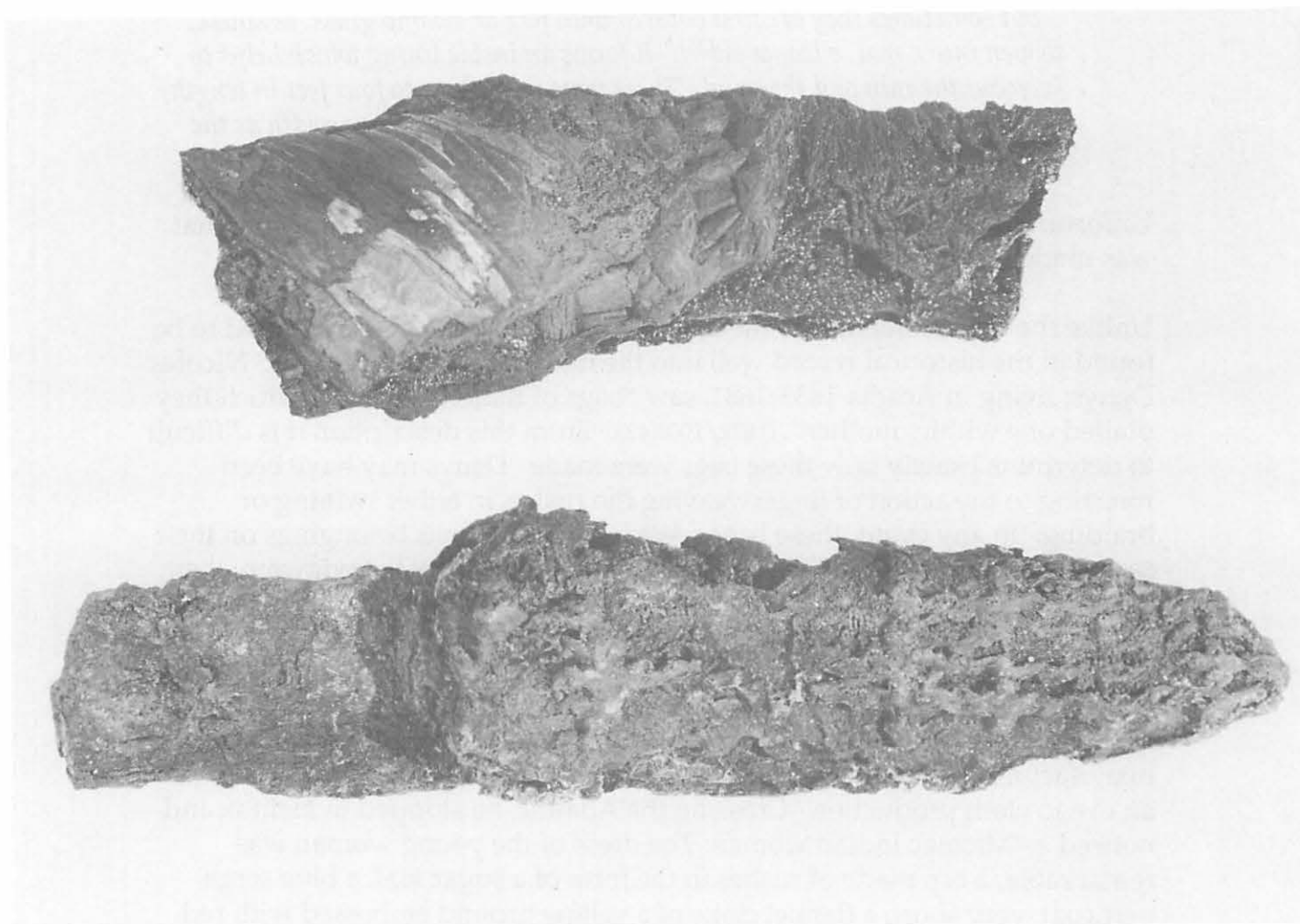


Figure 37 Two metal dagger-sheath tips from the Pictou site, each bonded by corrosion to a textile fragment. The upper dagger tip (NSM 84.22.094b), has a fragment (NSM 84.22.094c) with a possible border. The lower dagger tip (NSM 84.22.520a) has a fragment (NSM 84.22.520c) showing evenly spaced rows of twining on 2-ply single warps.

TWINED FRAGMENTS FROM SITE BkCp-1

Returning to the subject of this paper, let us now examine the twined textile fragments from the Pictou site (BkCp-1) in the Nova Scotia Museum Collection. They include a cedar bark bag, a number of fragments laminated to two corroded metal tips of dagger sheaths, and several loose fragments, made of a variety of materials including rush, basswood, and other unknown media.

The cedar bark bag has been described by several authors, including my extensive report in 1993. For some reason, Harper did not mention the sheath tips with their twining, but Whitehead included them in her Collections Inventory. (1993:127) One tip (84.22.094b) has a twined remnant, possibly rush, reminiscent of a border. The other tip (84.22.520) bears a remnant with rows of twining on 2-ply single warps. (Figure 37) See Appendix One for more details. It is possible that these twined remains represent carrying bags similar to the one found with the Neolithic man, and those from Maine discussed earlier.

The largest number of twined fragments were executed with what we believe to be rush (*Scirpus lacustris*), although this has yet to be verified. The diameter of the rush is very fine compared to that which can be gathered today. It may be that rushes were smaller in diameter at the end of the sixteenth century, or that these fragments represent remains of special bags twined of carefully selected material, rather than possible quickly-made everyday containers made with the more abundant thicker rush. Another group of fragments, 84.22.560 (Figure 38), 84.22.562 and 84.22.568, appear to have been twined with the soft, inner-bast fibre of the Basswood tree, *Tilia americana* L., as identified by Mary Lou Florian. Other BkCp-1 fragments have been twined with finer, as yet unidentified, material. It is difficult to determine the exact material without further microscopic analysis, but reed, *Juncus*, (Figure 39) and possible sinew (Figure 40) may have been used.

As there are no complete specimens remaining in the collection, information about their original form must be pieced together. In all the fragments, the rows of twining are spaced far apart; none are close together. The textiles thus created are thin and open, rather than being dense and thick, had the rows of twining been closer together. For this reason, these fragments may represent the remains of bags and baskets for carrying lightweight loads, or clothing such as a cape or skirt²² like the cedar-bast fragment C in Figure 6,

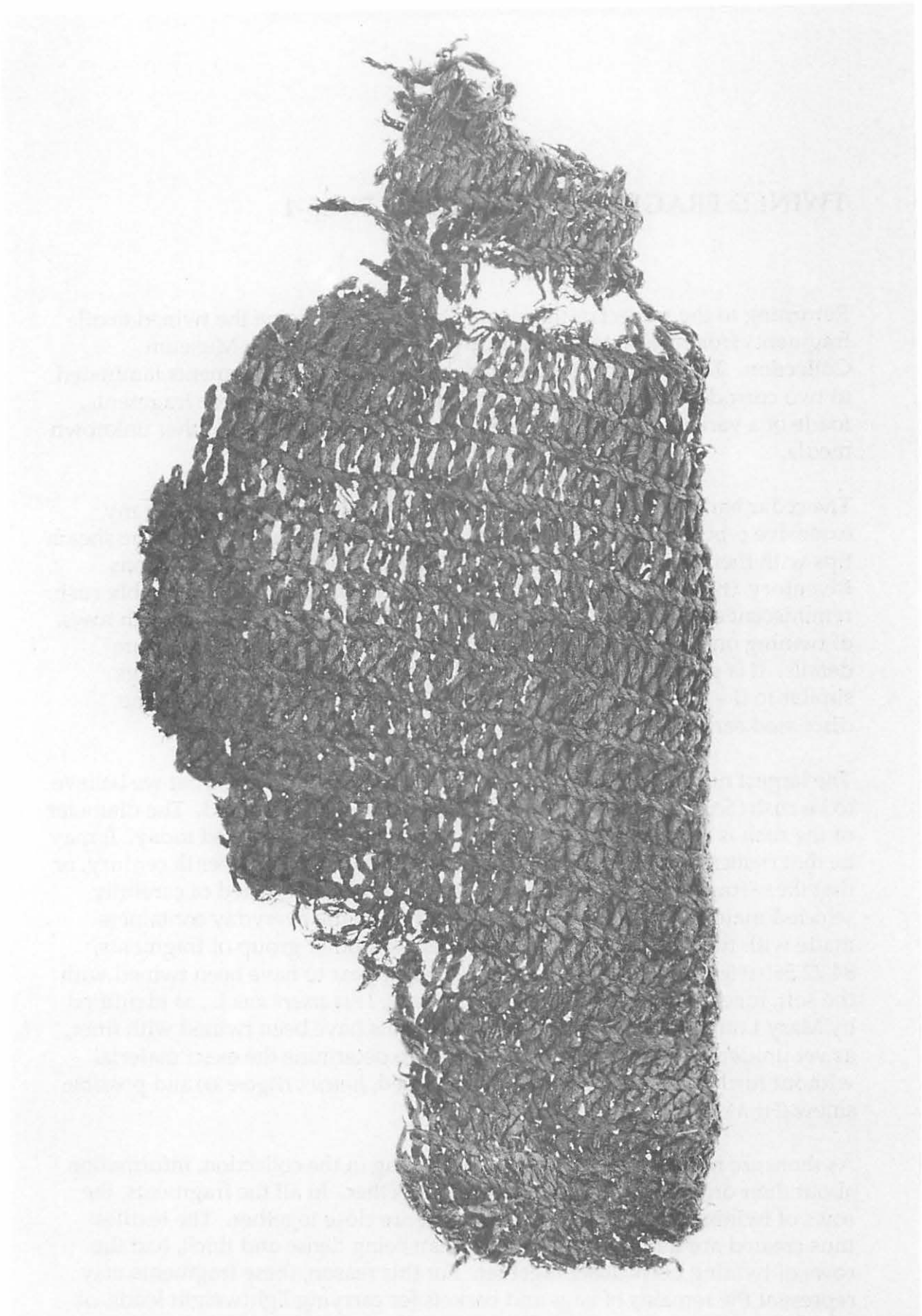


Figure 38 Twined fragment of soft textile made with the inner-tree bark fibre from Basswood Tilia americana. Note the Z-twists in both the warp and weft elements. NSM 84.22.560.

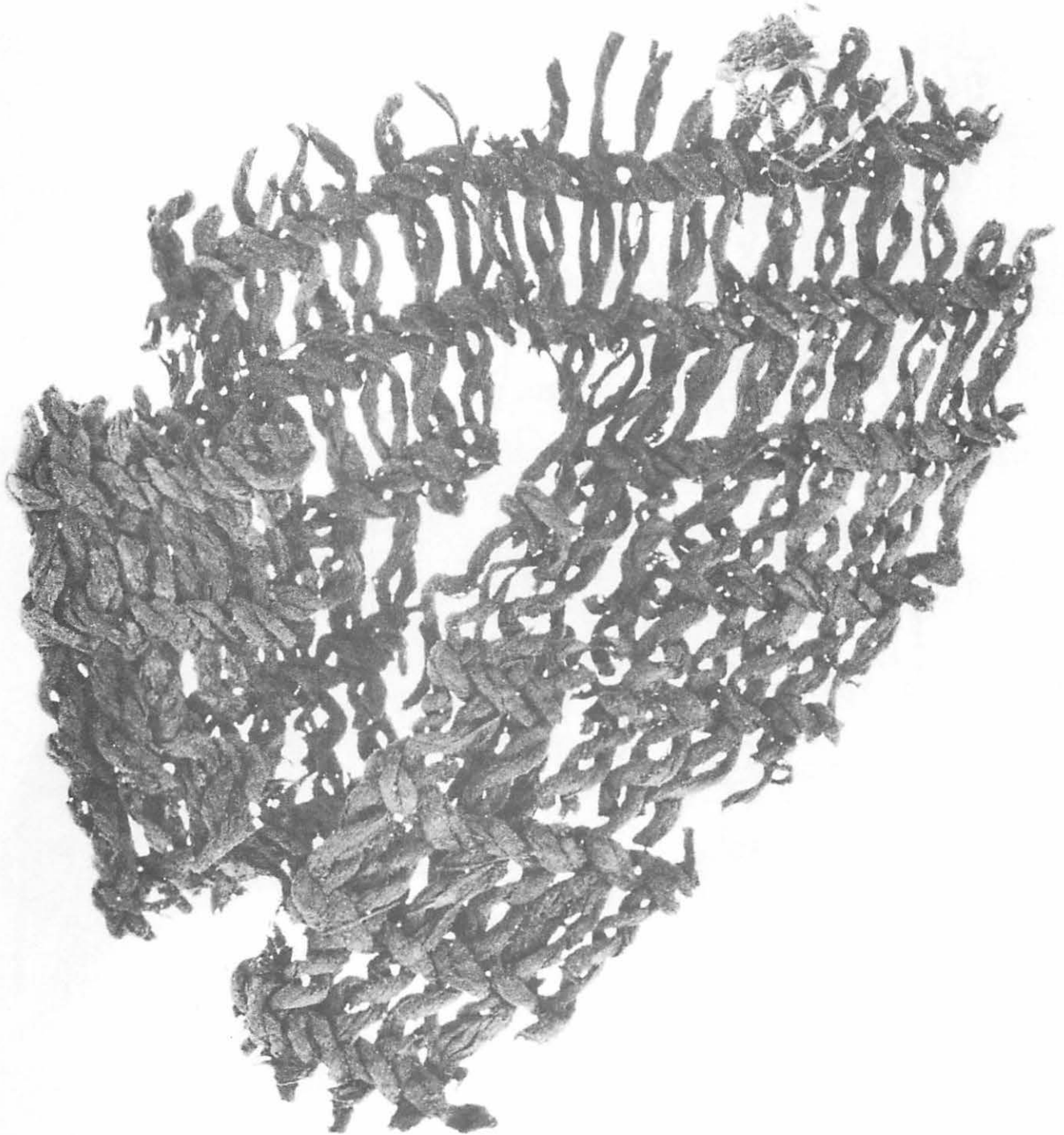


Figure 39 Twined fragment, possibly reed, from Site BkCp-1. Note the Z-twists in the twined wefts as well as in the 2-ply vertical warps. NSM 84.22.567.

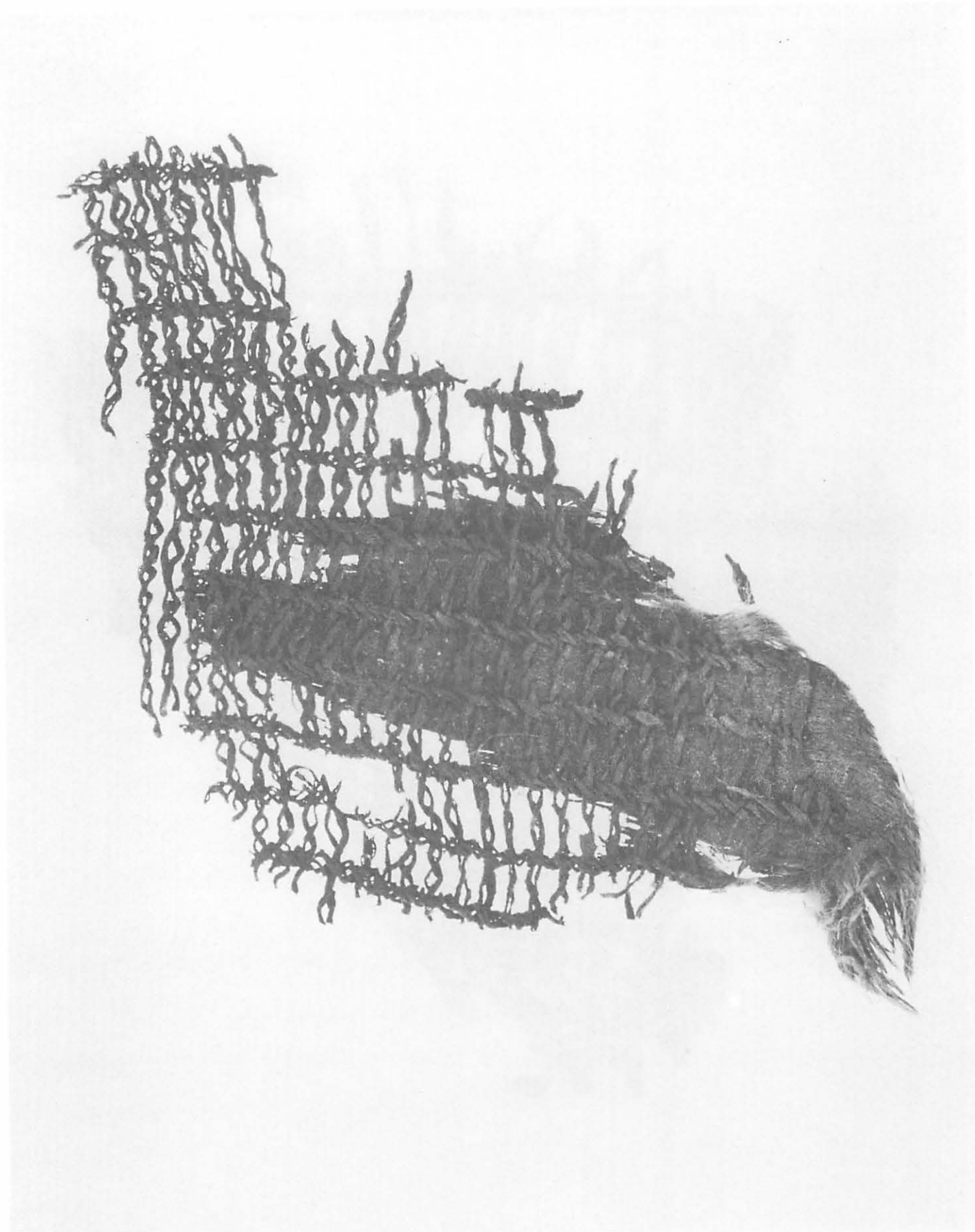


Figure 40 Twined fragment of textile, possibly of sinew, from BkCp-1. Again, as with the two previous fragments, note the Z-twists in both the vertical warps and the horizontal wefts. This piece has been fused to a piece of fur. NSM 84.22.573a.

rather than matting to be used as cushioning on floors and canoes. That the Mi'kmaq did make some very intricately patterned rush matting at this time period is documented in the historical record.

Examining the twined-rush fragments more closely, one shows the bottom and sides of what looks to be a bag or container. (Figure 41) It is not difficult to imagine the rushes being sorted to diameter and length, then folded in half, with the folded areas being twined together in pairs to create the bottom of the bag; the free ends becoming the side-support pieces. Another fragment appears to be a bottom corner-edge of a bag. (Figure 42) It appears that additional rushes were added by twining one folded rush at a time into the weave, slipping the folded rush in between two existing rushes, and twisting the new and old together near the fold, thereby making a rounded curve to the bottom of the bag and increasing the number of side pieces. Once the desired number of rushes had been added to both the sides, the full complement was twined for the desired depth of the container. New rush wefts were added from time to time, as seen in Figure 43, by twisting a new butt end in with the tapering tip, and then twining them together.

In the twining, variations include plain twining over single warps with spaced rows (Figures 44 and 45), and paired warps with the warps alternating pairs between rows, creating a diamond pattern. (Figure 41) This was not always rigidly carried out, as can be seen in Figure 45, where there is a mixture of both single and doubled warps.

In some of the fragments, near what might be the top edge of a container, the spaced warps are crossed, creating a hexagonal effect. In one fragment (NSM 84.22.578), one row of twining above the crosses holds the crossed warps in place (Figure 46), while in another fragment (NSM 84.22.576a), there are two rows of weft twining holding the crosses in place (Figure 47). The ends of the rushes appear to have been cut off creating what must have been a rather unstable edging. There are no fragments showing an interlaced border.

All the twined fragments show the same spaced rows, but there are two curious differences. While all the rush fragments show weft-twining around both single and doubled unspun warps, all of the unknown finer material fragments exhibit weft-twining only around single warps, all of which are 2-ply (S-spun, Z-twist). The second, more significant difference, is that while all the rush twined fragments have an S-twist, the fragments executed with the unknown finer materials are twined with a Z-twist.

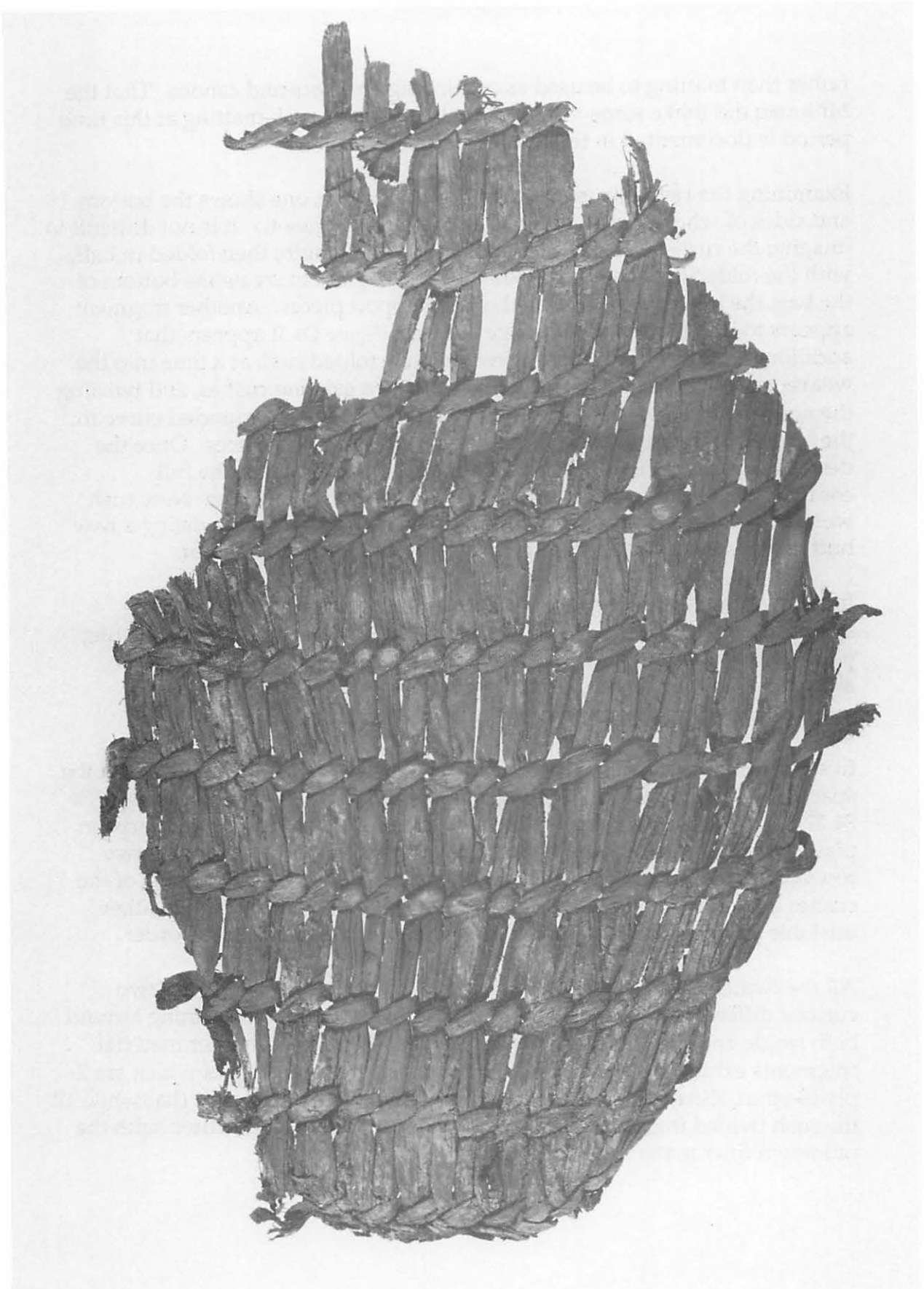


Figure 41 A fragment of rush twining showing the outline of what might have been a bag. The row on the bottom might represent the bottom-edge of a bag in which the rushes were twisted together in pairs (S-twist), and then folded up, the two ends forming the two sides of the container. NSM 84.22.574a.

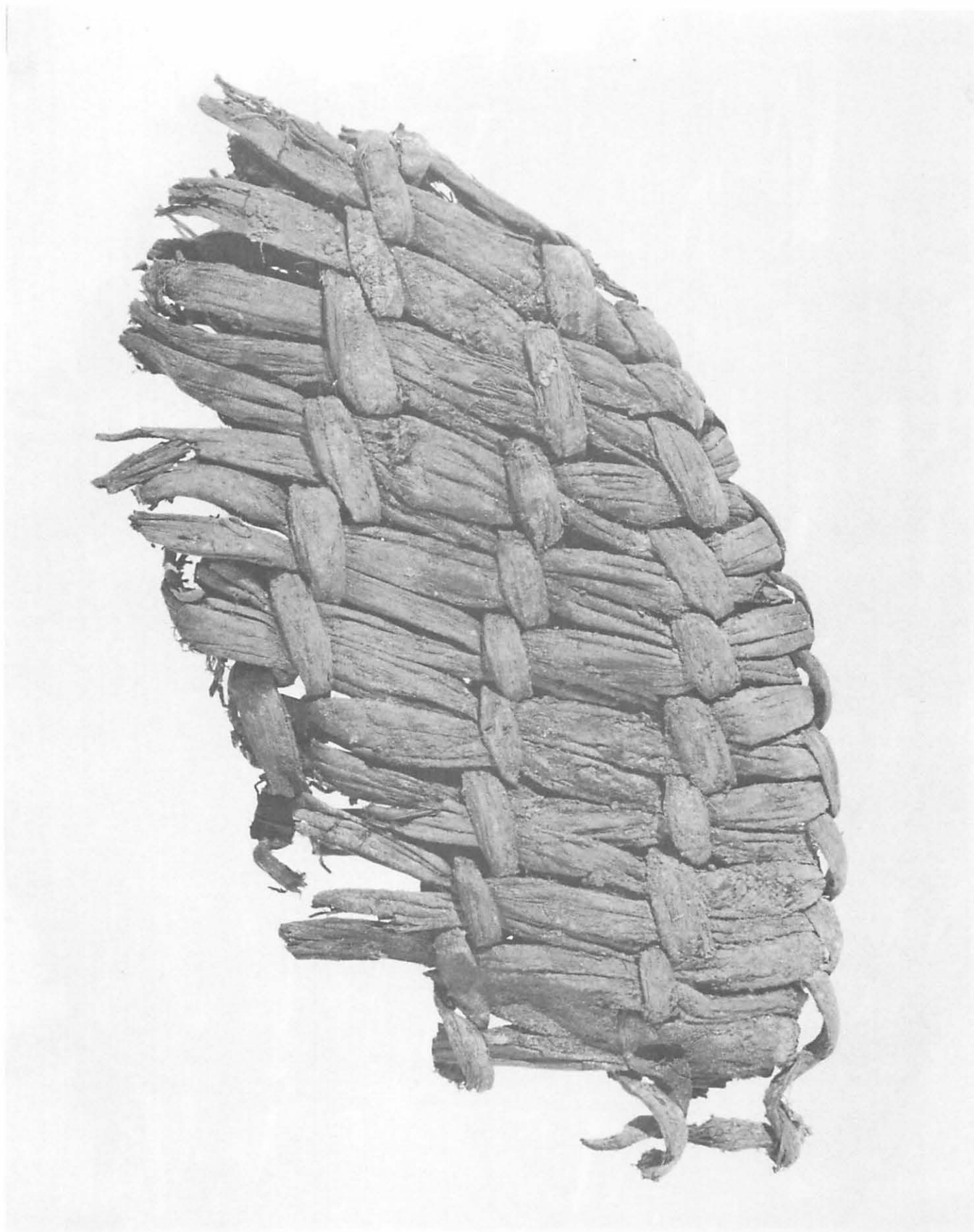


Figure 42 A close-up image of another fragment showing a possible bottom-edge of a bag formed with paired rushes (S-twist); with a corner edge showing the addition of folded rushes, creating a rounded corner. NSM 84.22.574c.

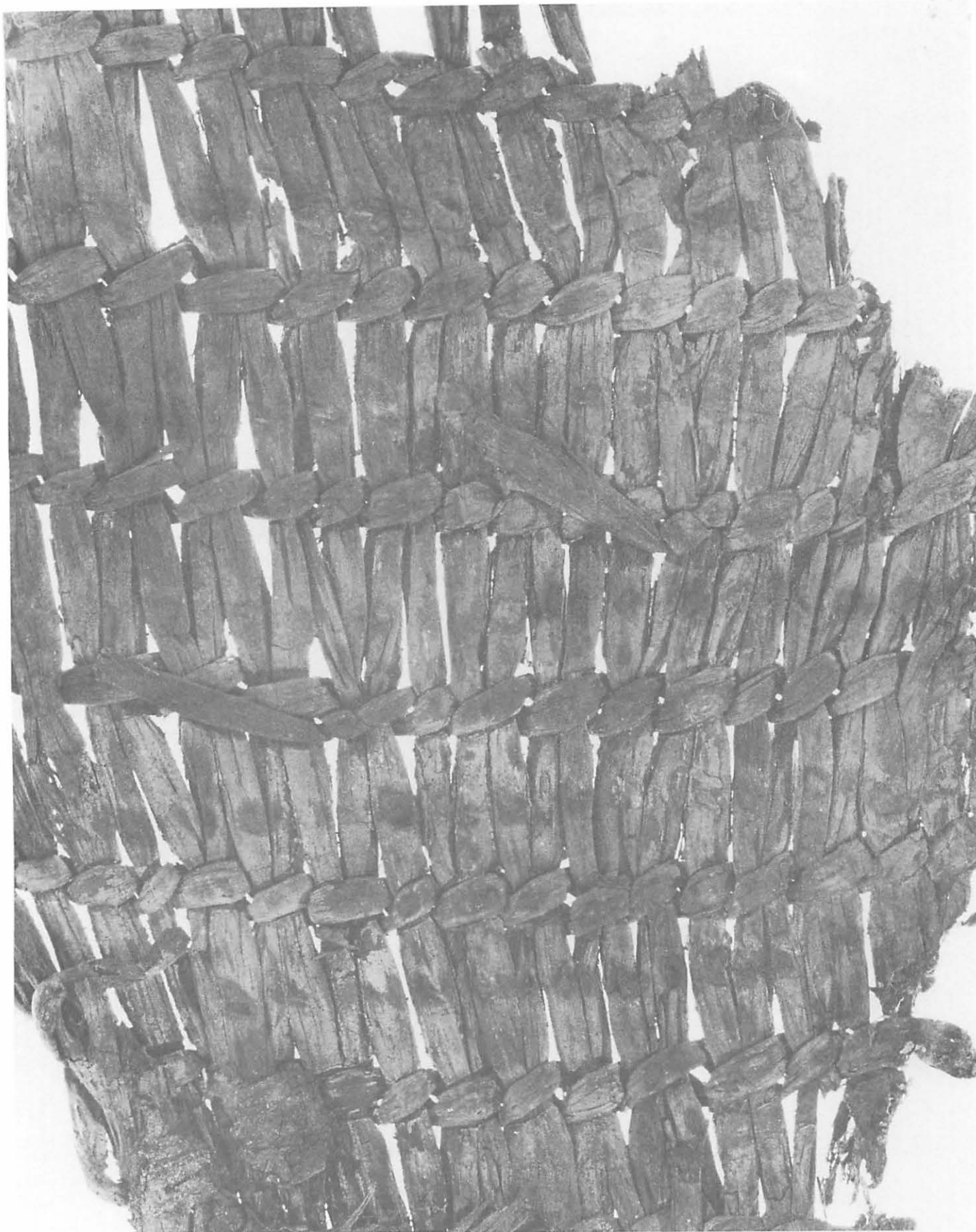


Figure 43 New rushes were added to the fabric by twisting the new with the old and laying the end at the back of the work. This is the reverse side of the fragment in Figure 41. NSM 84.22.574a.

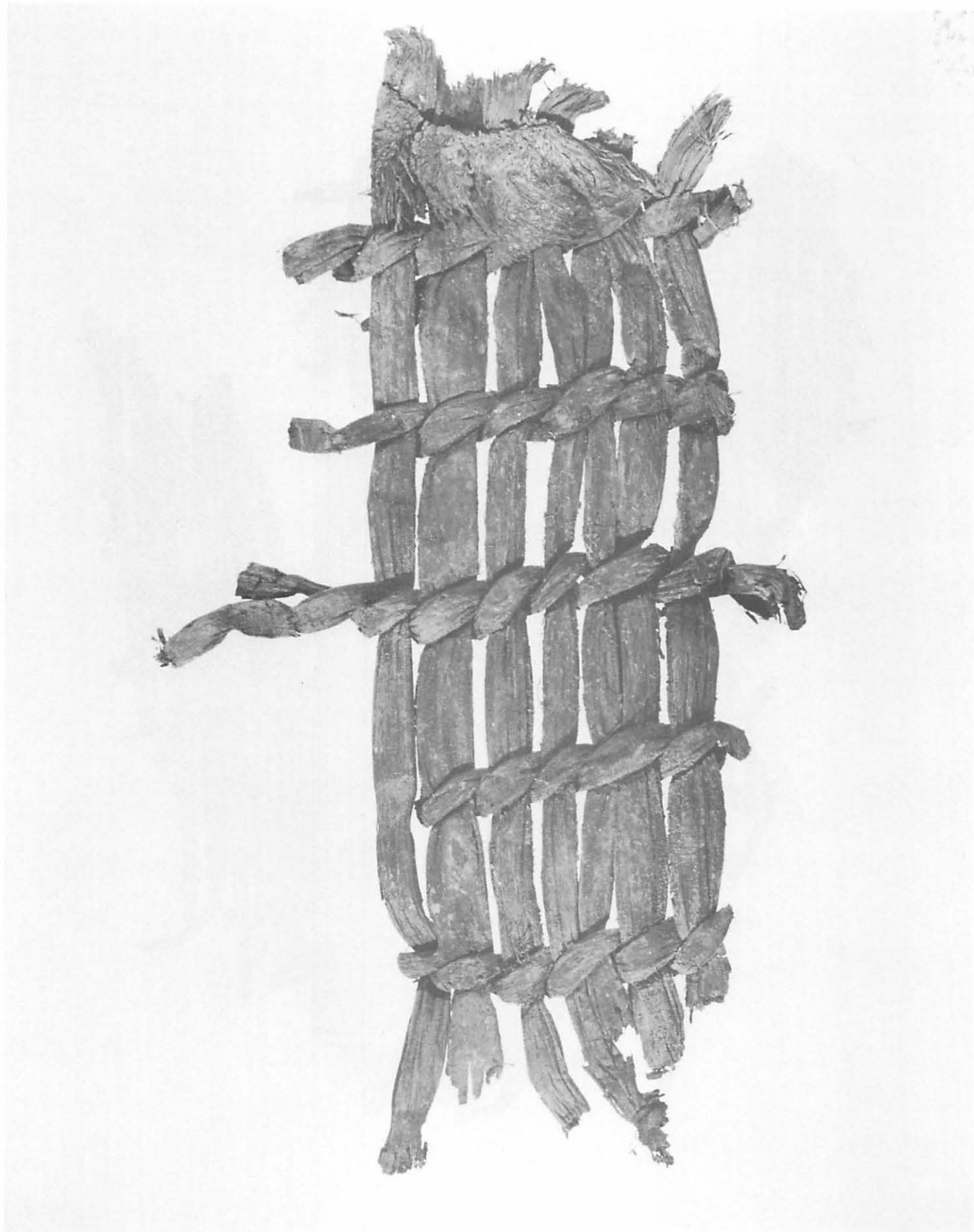
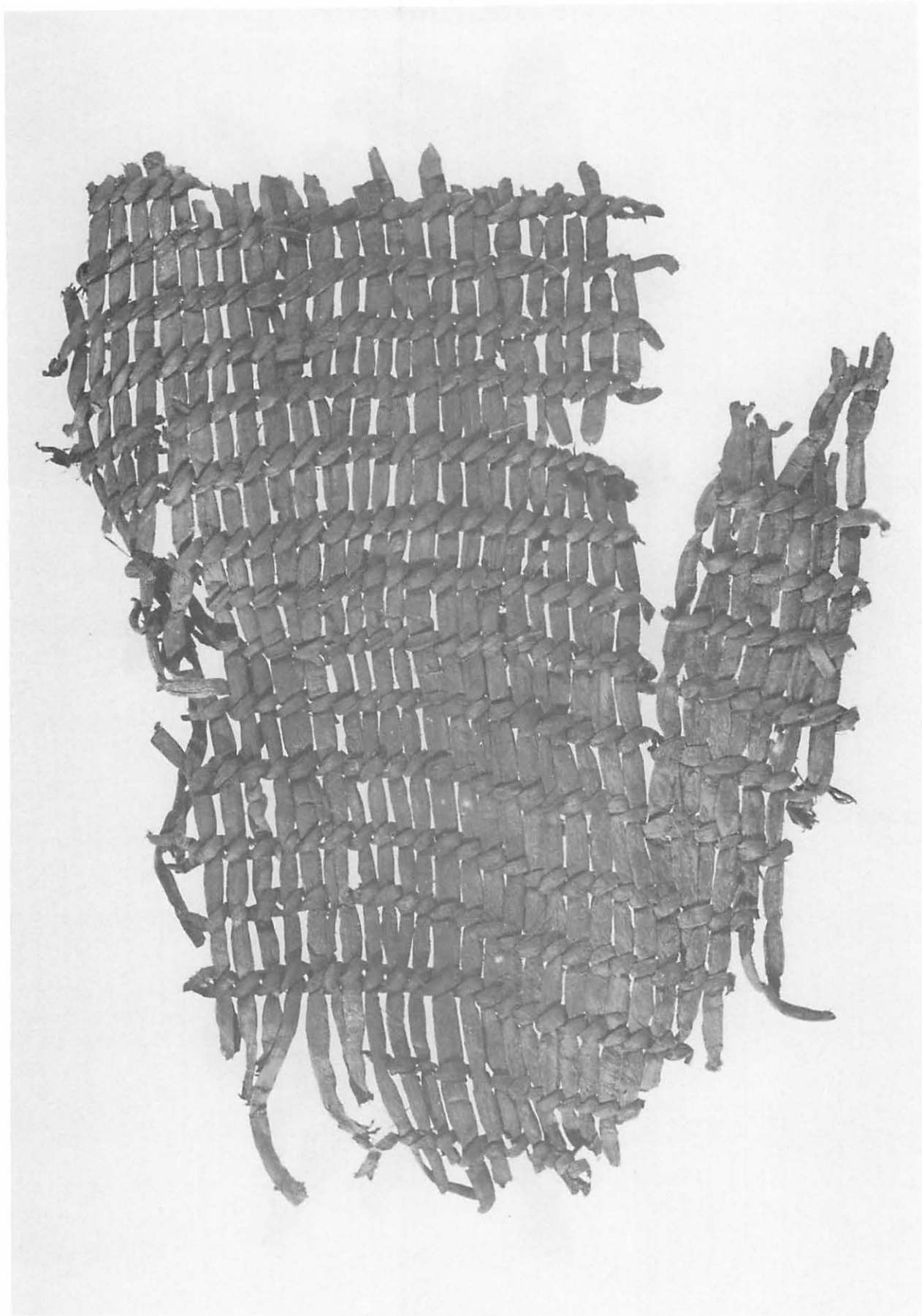


Figure 44 Plain twining with an S-twist over single warps in evenly spaced rows. NSM 84.22.582.



*Figure 45 Plain twining with an S-twist over single warps, with the occasional doubling of the warps, in evenly spaced rows.
NSM 84.22.576b.*

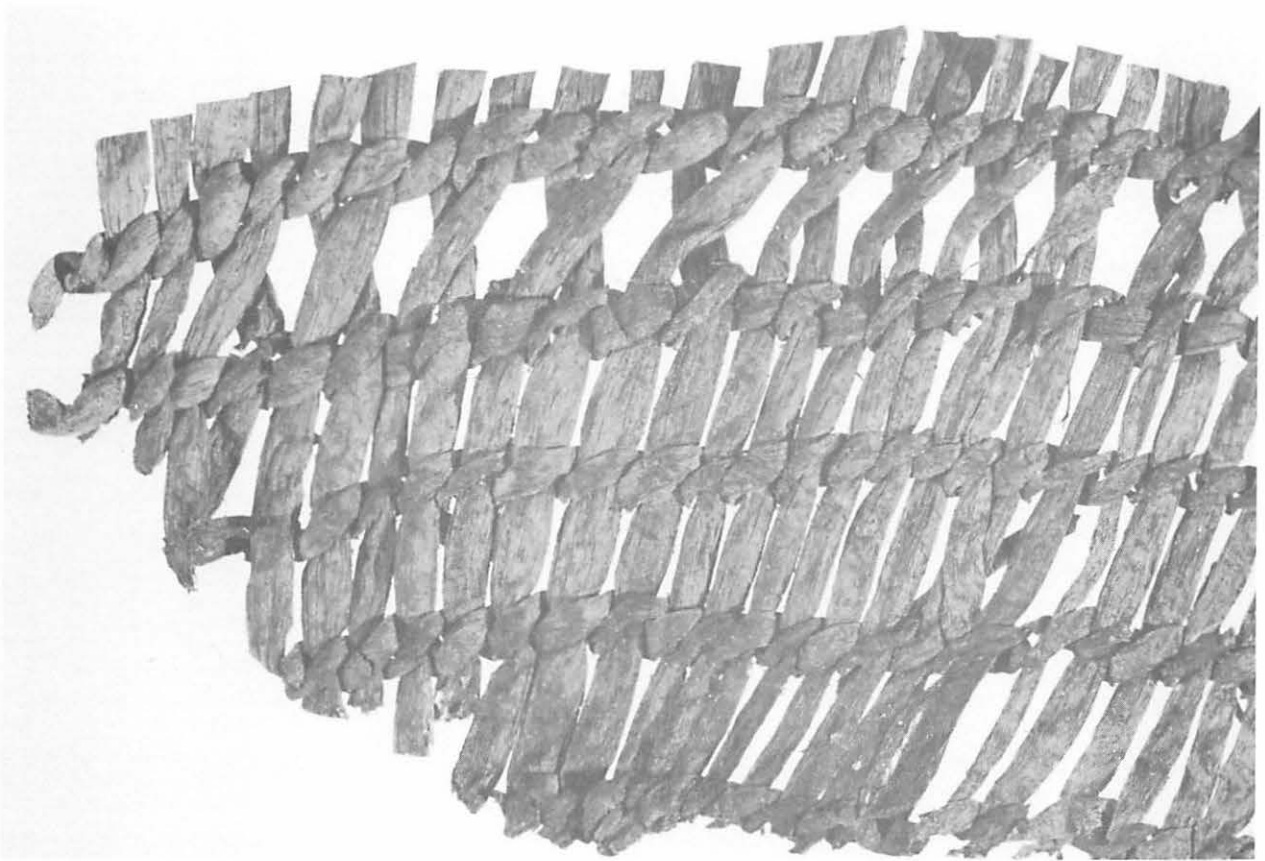


Figure 46 Twined rush fragment showing the crossing of the warps, with one row of weft twining above to hold the crosses in place. NSM 84.22.578.

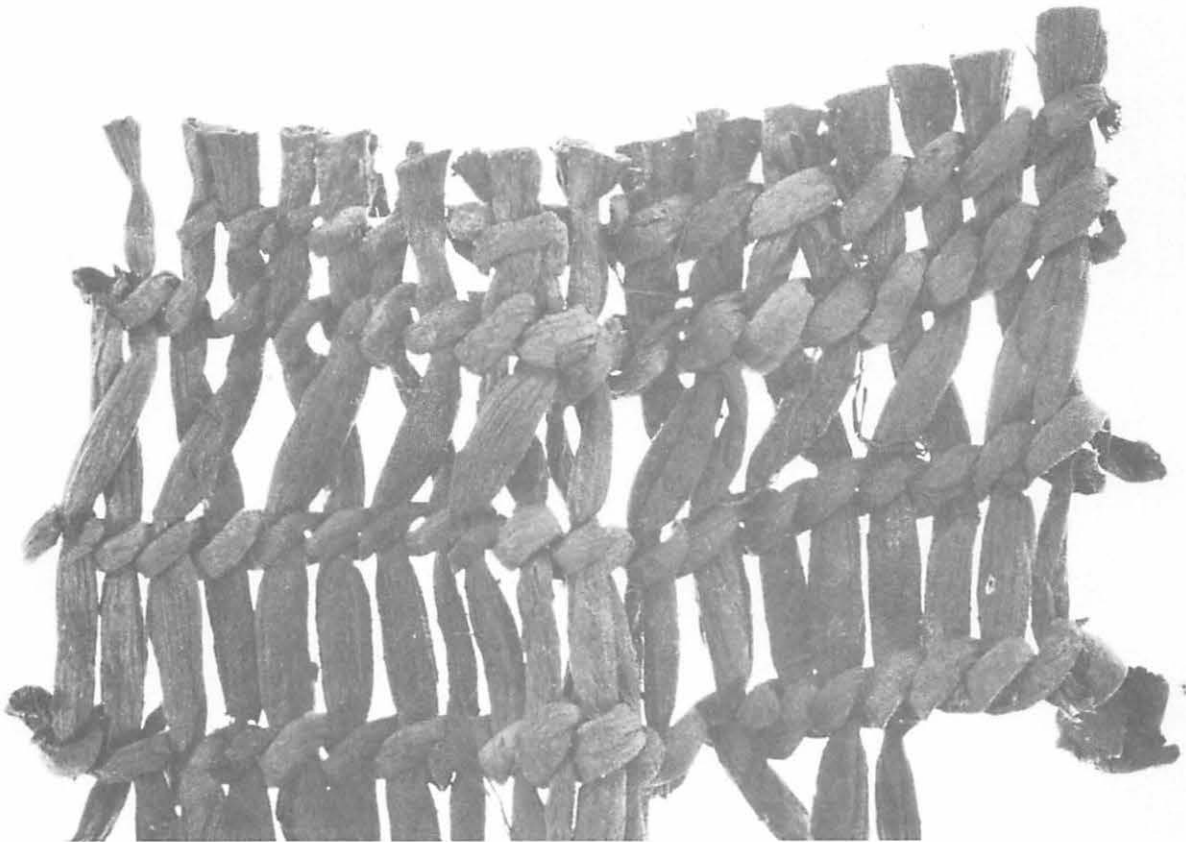


Figure 47 Twined rush fragment showing the crossed warp rushes with two rows of weft twining above to hold the crosses in place. NSM 84.22.576a.

**MODERN
RECONSTRUCTION
OF A
MI'KMAQ TWINED
RUSH BAG**

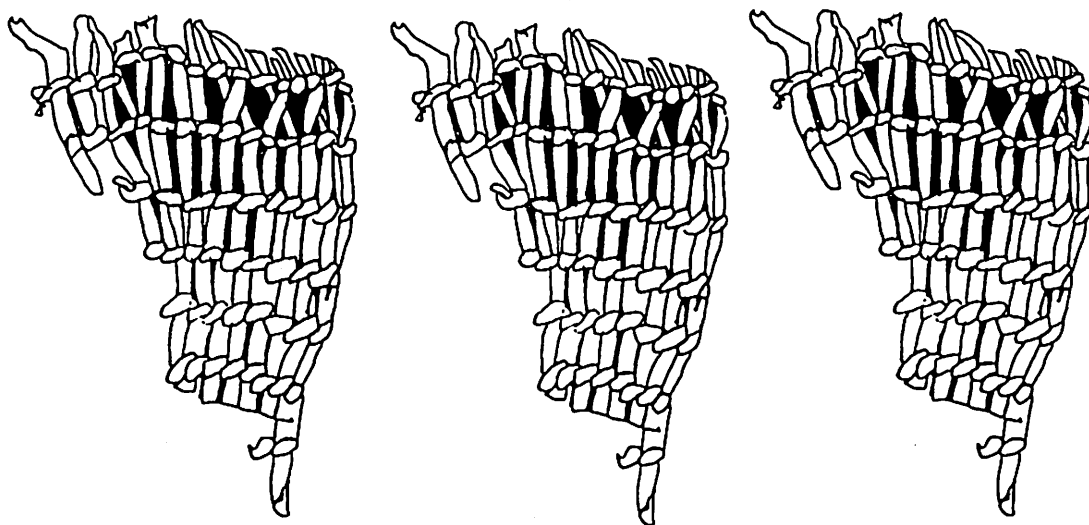




Figure 48 Rush habitat. Photo: Joleen Gordon.

GATHERING AND PREPARATION OF MATERIALS

The time to gather rush²³ is when the plant has grown to its full height, just before the tips start to turn brown. In Nova Scotia, this is in mid-summer during the last two weeks of July and the first two weeks of August. The exact time may vary according to the weather; extreme dry weather will cause the plants to mature early, while a wet summer will prolong the season. Rush gathered at the right time produces a soft, chamois-like material, while rush gathered later in the season will be stiff and tough and less suitable for working.

Rushes grow both in fresh water (in slow-moving rivers and beside lake shores) and in brackish waters. (Figure 48) It has been my experience, working with rushes from both locations, that the freshwater rushes tend to be softer and more supple than those collected from areas where the salt and fresh water mix.

One method of gathering is to cut the plants at the base of the stalk with a long knife. Another method is to pull from the root, whereupon the stalk will pop loose from the root socket. This latter method depends on the maturity of the plant; the base of the stalk will not pull free of the root until the plant is mature. Using this latter method insures you are working with mature rushes, but I feel it damages the root system and so I prefer to cut.

Once gathered, the rushes must be dried. This is done either in full sun, bleaching the stalks; or in shade, thus preserving the green colour of the material. One method of drying is to lay them on the grass, turning every day, and taking them in at night to prevent moulding in the evening dew. The best method I have found is first to sort the rush to length, then to tie fist-sized bunches at their tips and/or seed heads, and then to hang them in a shed away from the sun, rain and evening mist. To my knowledge, the British do not bleach the rushes by boiling as described for the Chippewa. (Petersen, 1963) In preparation for working, the rushes must be softened or "mellowed". Following a method used by British rush basketmakers, the rushes and an old blanket are spread separately on the grass and sprinkled with water from a watering can. (Do not soak them.) Then, the rushes are tightly rolled together in the blanket and stored for the night. When using the rush, take from the bundle only those pieces with which you are working. Keep the rest covered with the damp blanket; they dry out quickly when exposed to the air.

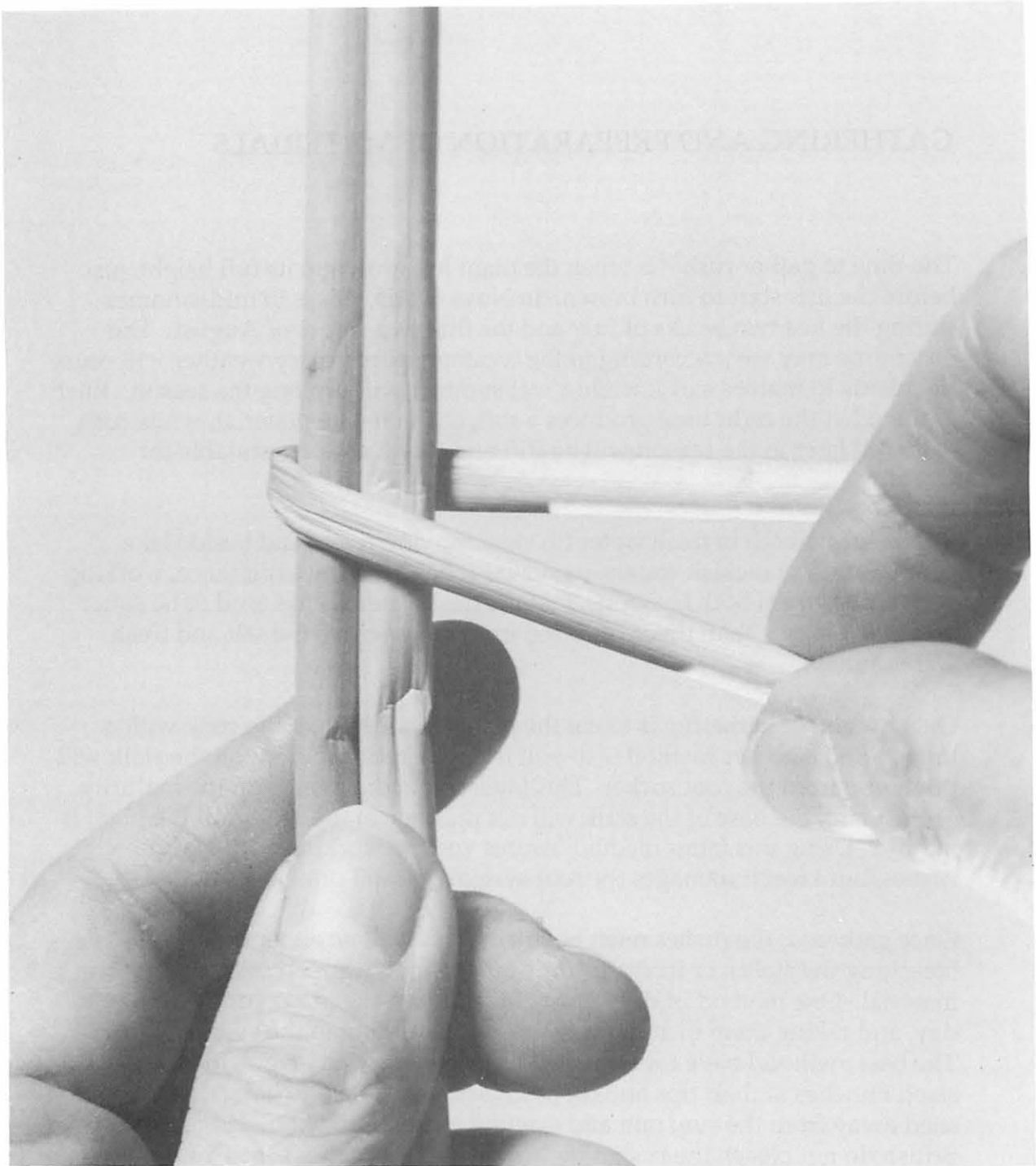


Figure 49 Fold the weft rush in half around one or two warp rushes.

STEP-BY-STEP TWINED BAG

The collection contains no complete bag. The following instructions are based on my observations of the fragments; on written accounts of other aboriginal containers, primarily the Paiute ones; and on my own experience with rush twining and weaving. I will give two sets of instructions simultaneously: one for a single-warp bag with a crossed-warp pattern near the top and a rim of cut rushes similar to the remains of one seen in Figure 46; and another for a paired-warp bag, with alternate pairing, as seen in Figure 41.

To give a general description, the bag is twined from the bottom to the top. The rushes are secured along their mid-line with a row of twining on what will be the bottom-edge of the bag. The free ends of the rushes are then folded up for the side-stakes of the bag and the twining continued to the desired depth of the bag, adding in more side-stakes near both bottom corners to make the bag more rounded. The opening of the bag is finished off by cutting the untwined rushes.

First sort the rushes to length and to size. Select a number of rushes of equal length and similar diameter; these will be the "warps", or stakes, of the container. Align them so that their butts, or the lowermost thicker ends, are together and their tips, or the uppermost thinner ends, are at the other end of the pile. Set aside those rushes which are much longer and possibly thinner, but certainly not thicker than the first group; these rushes will be the "wefts".

To make the bottom row of twining for both the single-warp bag and the paired-warp bag, first select either a single "warp" rush or a pair of "warp" rushes, reversing the position of each one so that they are aligned opposite, butt to tip; this will spread out the thickness/thinness of the material evenly around the container.

Fold one of the weft rushes in half around either a single or a pair of warp rushes. (Figure 49) Twist the weft rush in a clockwise S-twist and add another single or a pair of warp rushes. (Figure 50) Continue in this way, adding either singles or pairs of rushes for the desired length of the bottom of the bag. (Figure 51)

To begin one side of the bag, twine across the rushes on one side of the centre-bottom line of twining. In the single-warp bag, twine each rush individually. To create the diamond pattern in the paired-warp bag, one rush in the first

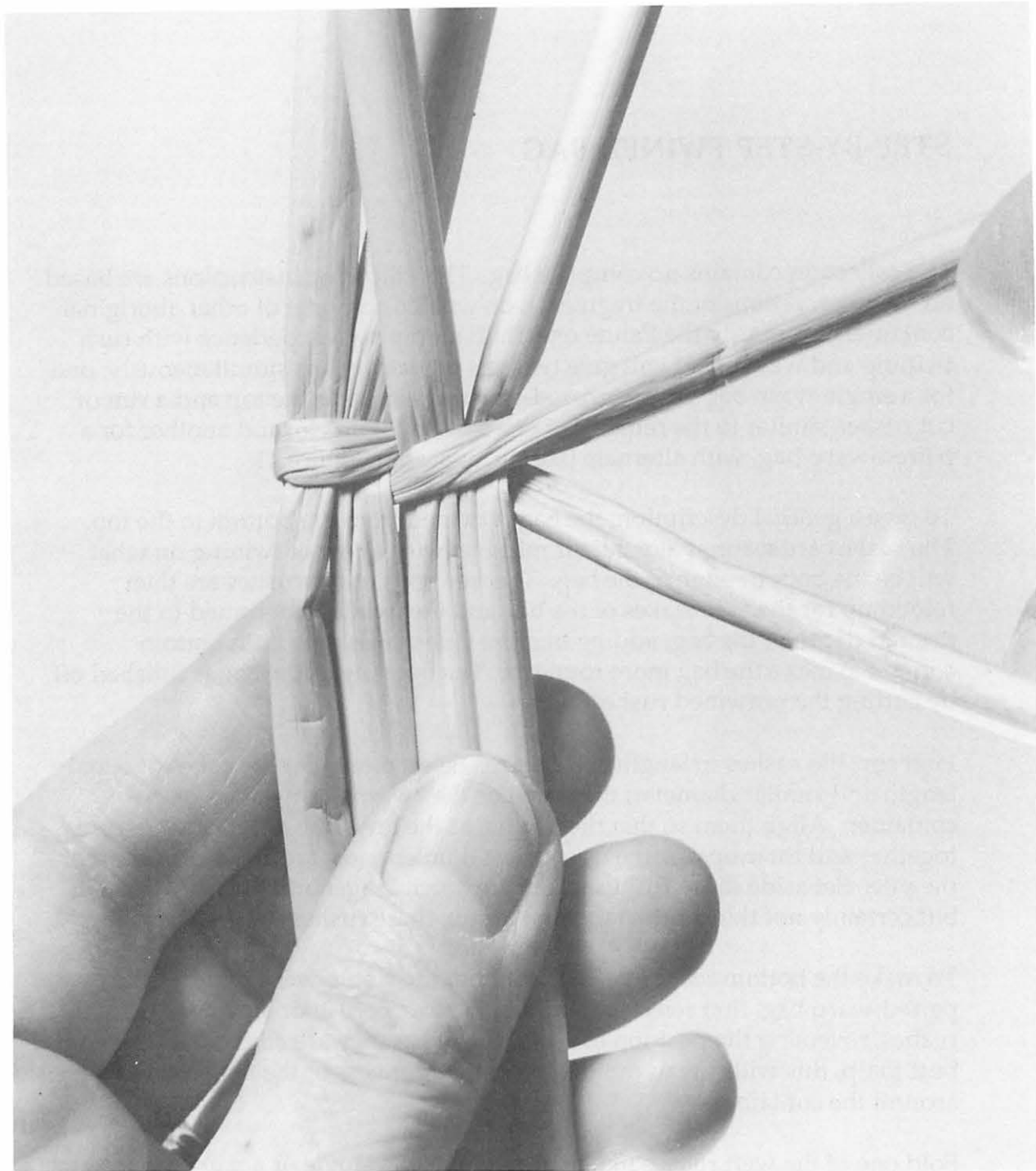


Figure 50 Twist the wefts with an S-twist and add either one or two more warp rushes in the next twist.

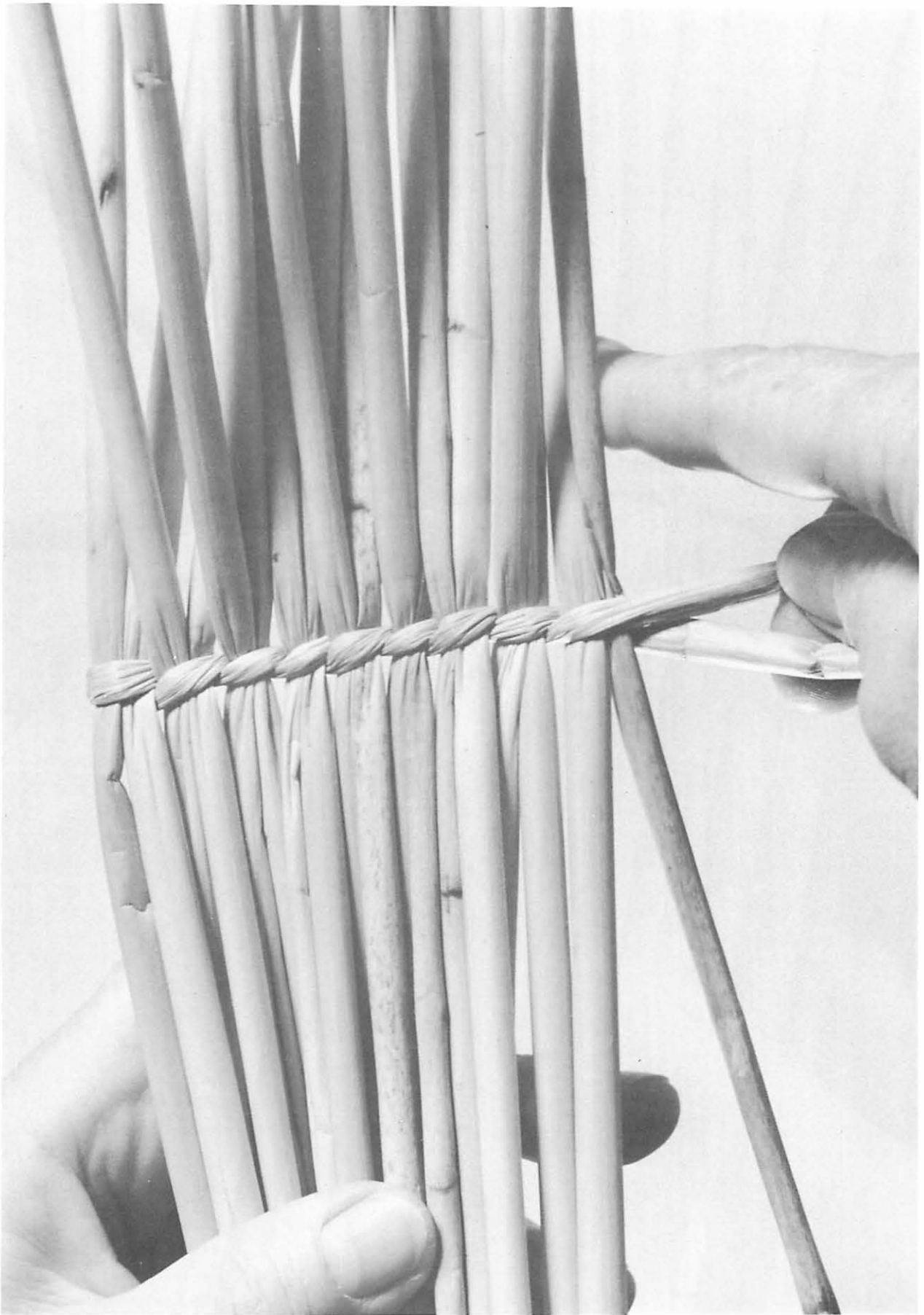


Figure 51 Continue adding single or paired warp rushes for the desired length of the bottom of the bag.

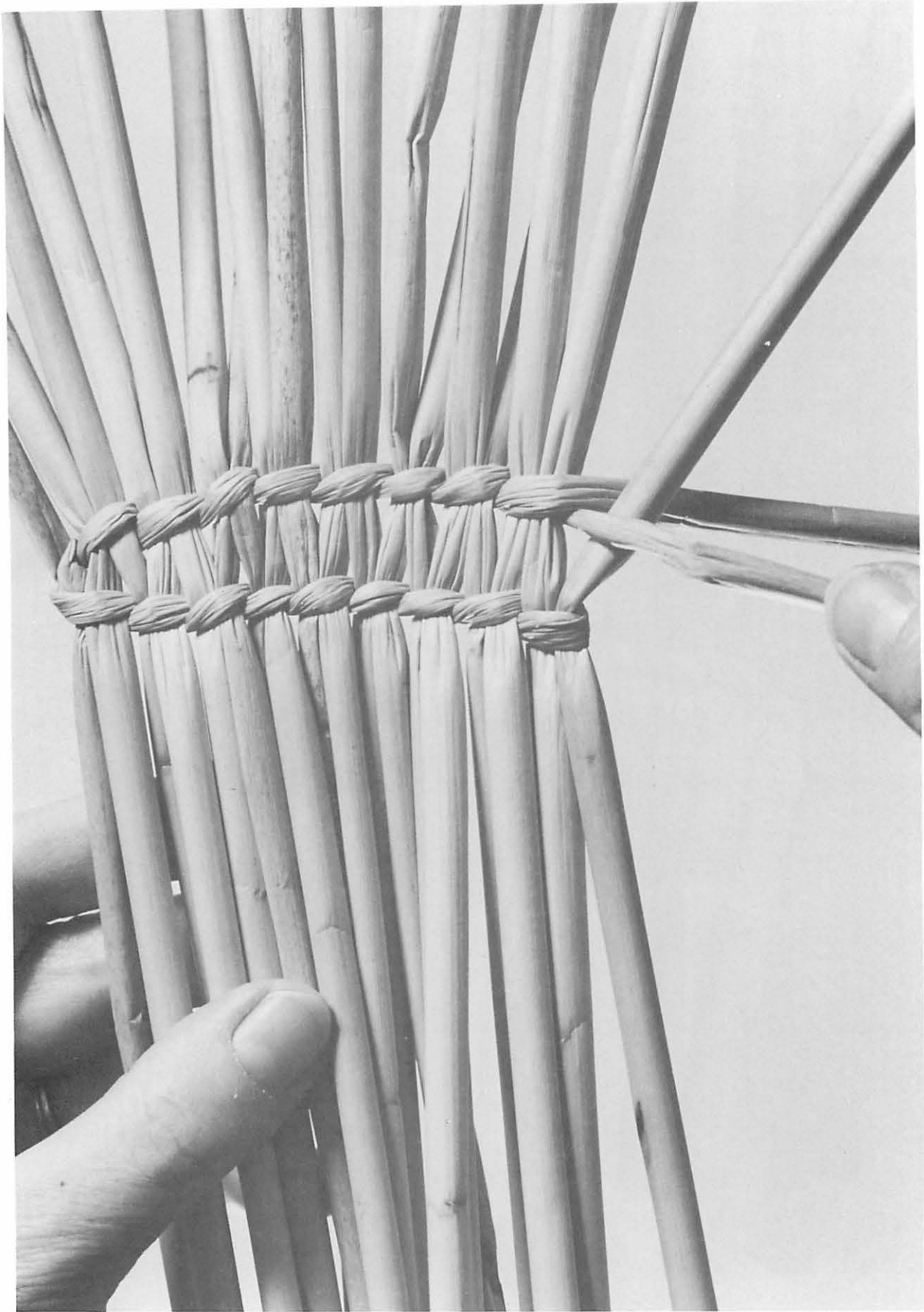


Figure 52 One side of the bag created by twisting the weft rushes around either single or paired side-warp rushes.

pair of warps must be twined as a single, the rest in pairs, selecting one rush from each of the pairs in the previous centre-bottom line of twining. (Figure 52) At the end of this row, the number of warps in both bags is increased by two with the introduction of a folded length of rush. (Figure 53) Twine across this addition, keeping the pattern of either single or paired warps until the other end of the centre-line of bottom twining is reached (a full circle). Add another folded rush to balance the first addition and increase the number of warps (Figure 54), thereby creating a fullness to the bottom corner of the bag. (Figure 55) Fold on the centre-line of the bottom so that the free rushes become the warps for the sides of the container. When a length of rush is completely twined, add a new one by overlapping it with the old one. (Figure 56) In twining paired rushes in the diamond pattern, there are times when a rush must be twined singly to keep the pairs alternating in each row. (Figure 57)

Continue adding folded rushes on each side of the bag until you have the desired shape. Continue twining on that number of rushes for the desired depth of the bag. Try to make the twining as even as possible by pulling on both wefts with the same strength, and by making the twist of the twining as firmly and as close to the warp/s as possible. Because of the position of the hands, the twining of a right-handed person will shift to the left. Correct this by pulling the two wefts together to the right with a sharp tug every once and awhile.

To add a decorative element to the twining near the top of the single-warp bag, cross the rush warps as seen in the fragments and twine one or two rows above the crosses to hold them in place. (Figures 46 and 47) The crosses were not be done with the paired warps. To finish²⁴ off the opening of the bag, the warps are cut. (Figure 58)

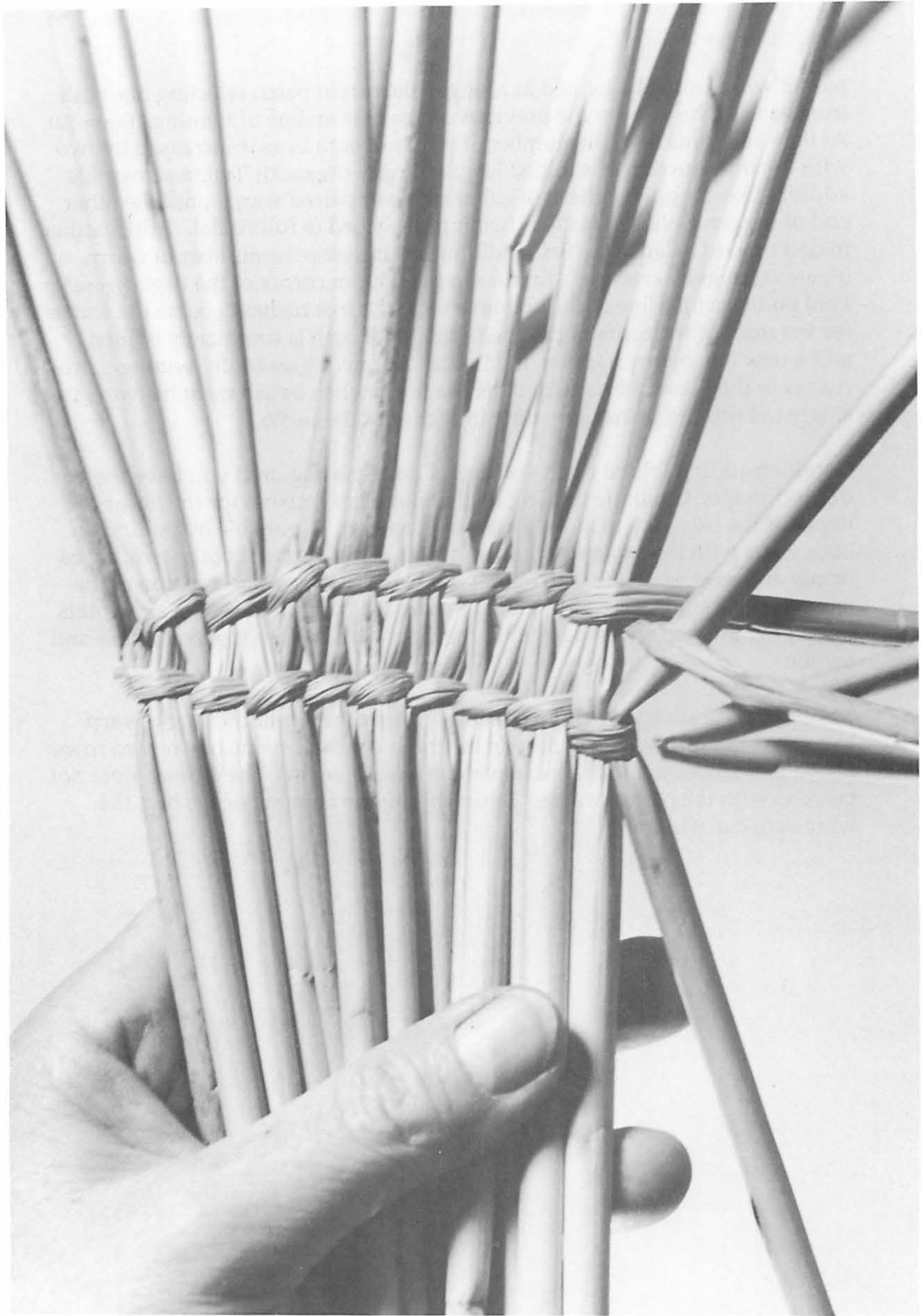


Figure 53 Add a new rush to the warp by folding it in half, and twine each end with the rush on either side.

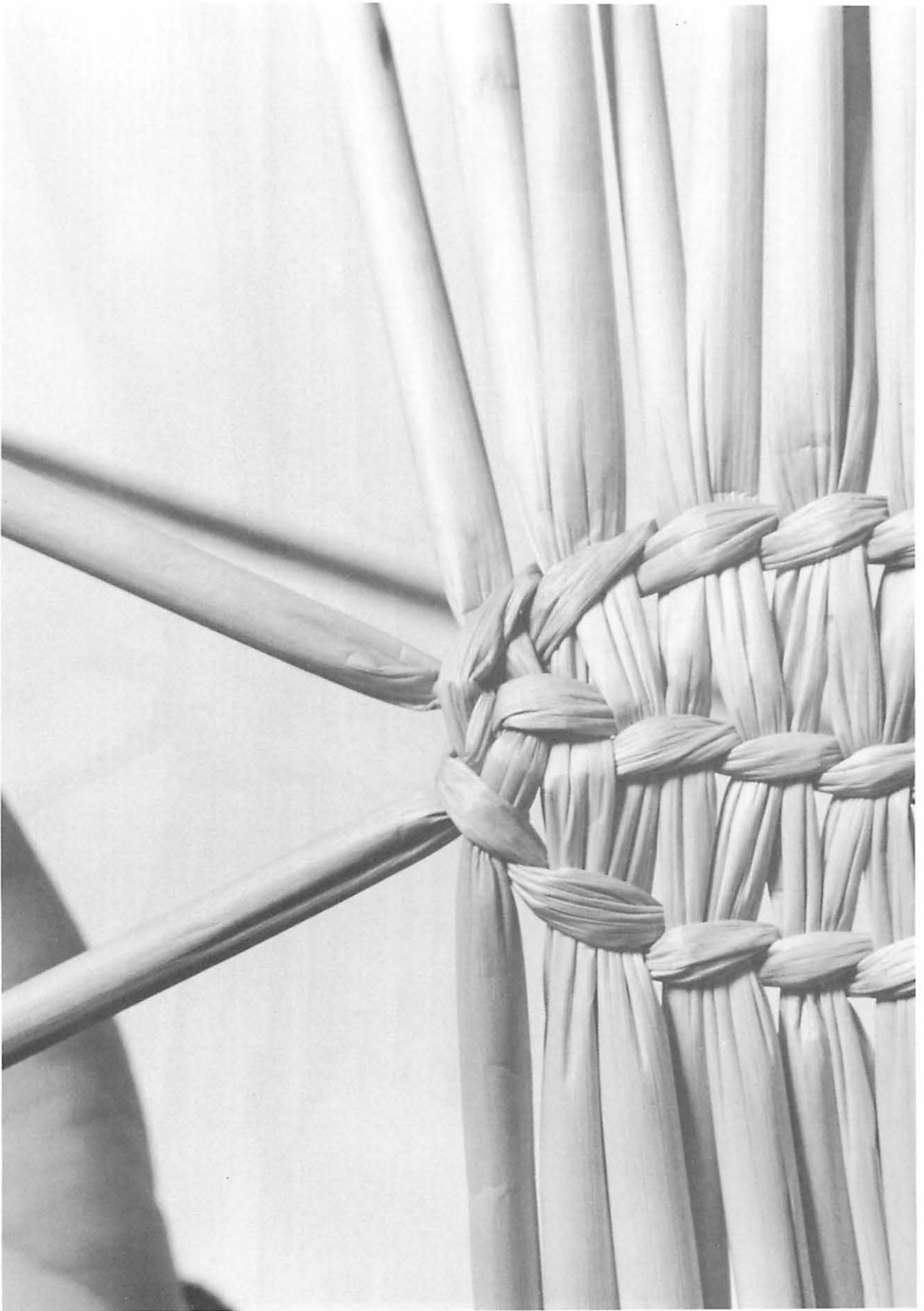


Figure 54 Close-up showing the addition of a folded rush on one end.

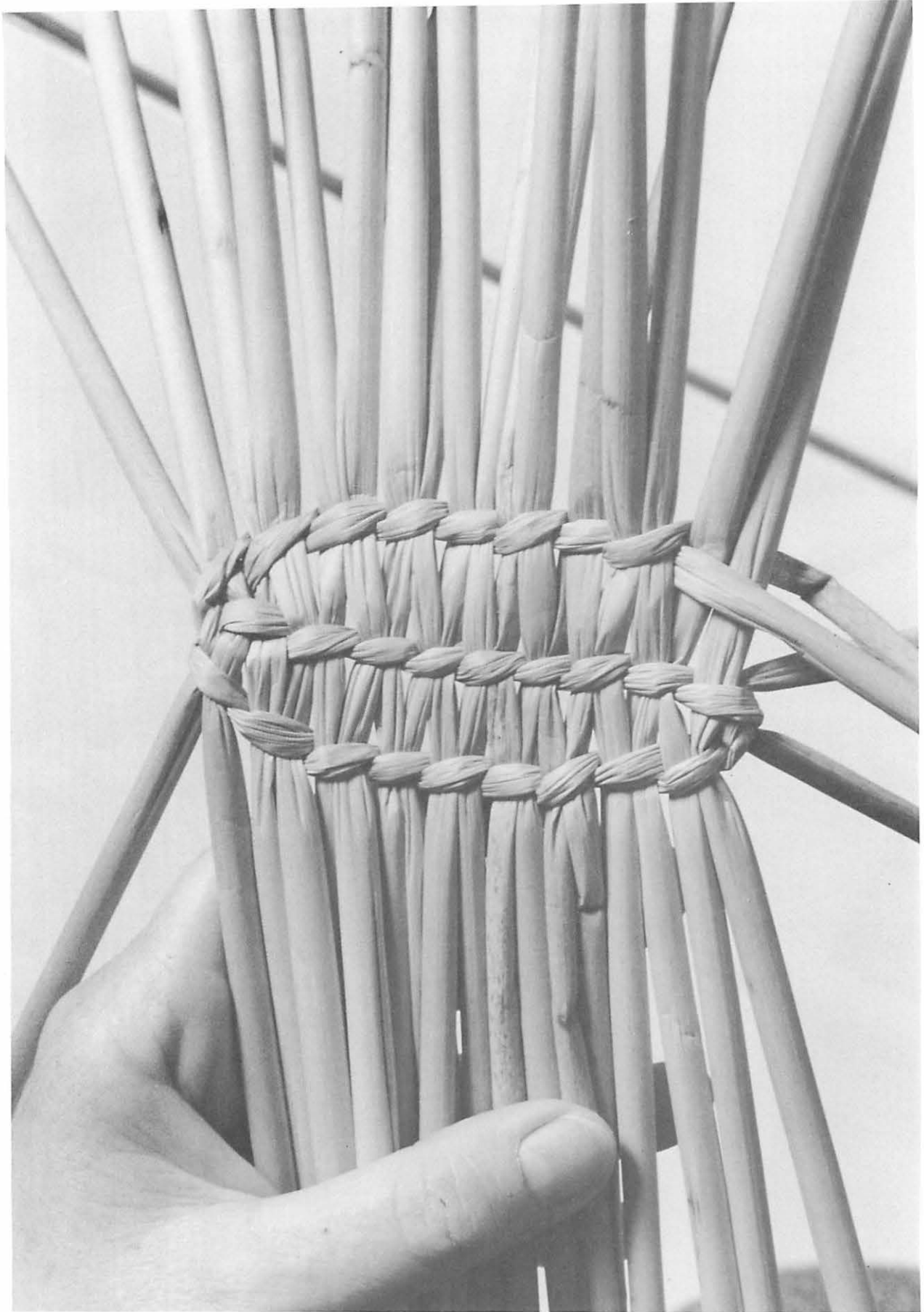


Figure 55 First row of twining on both sides of the bag, complete with the addition of a folded rush on either end.

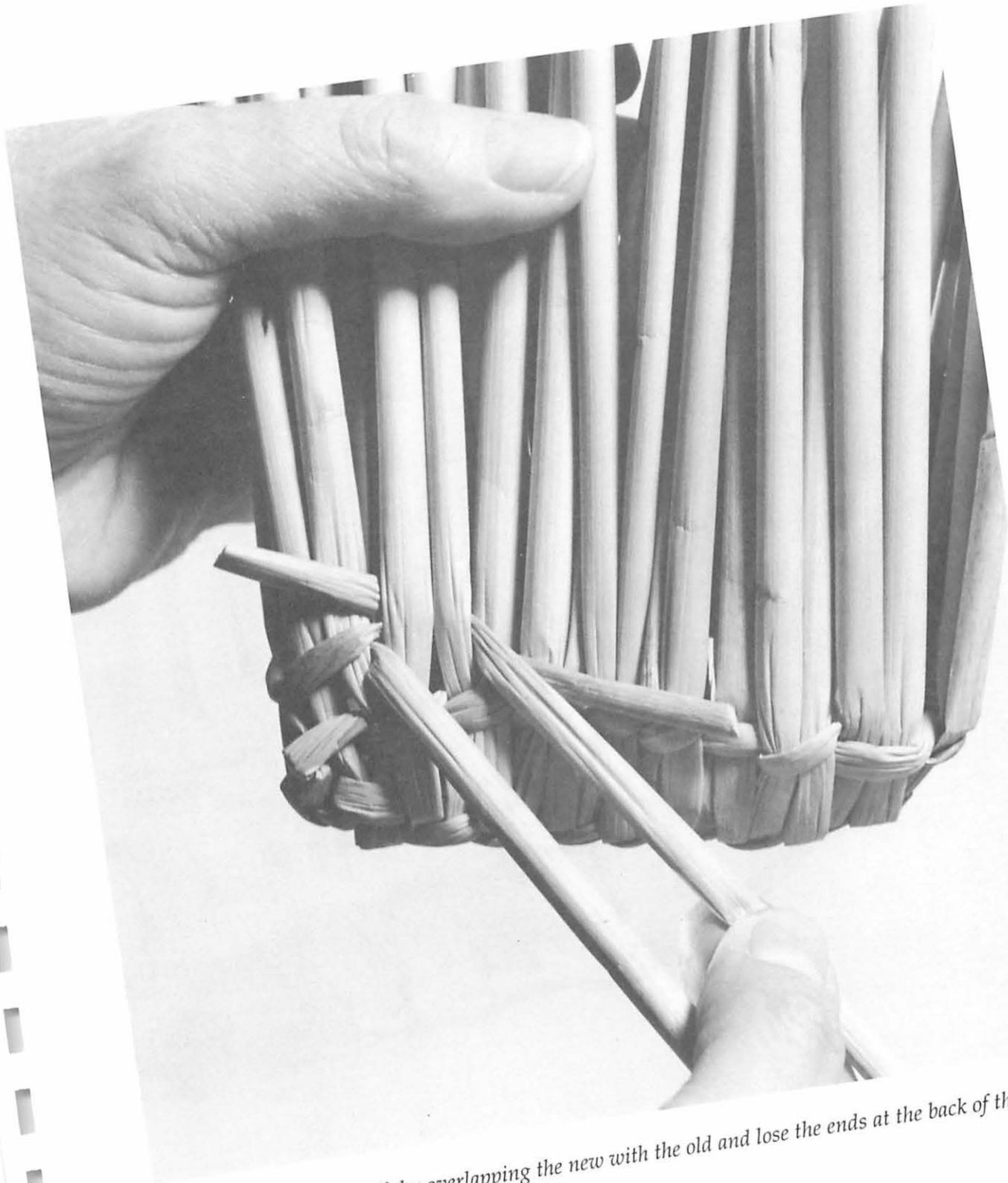


Figure 56 Add a new weft by overlapping the new with the old and lose the ends at the back of the work.

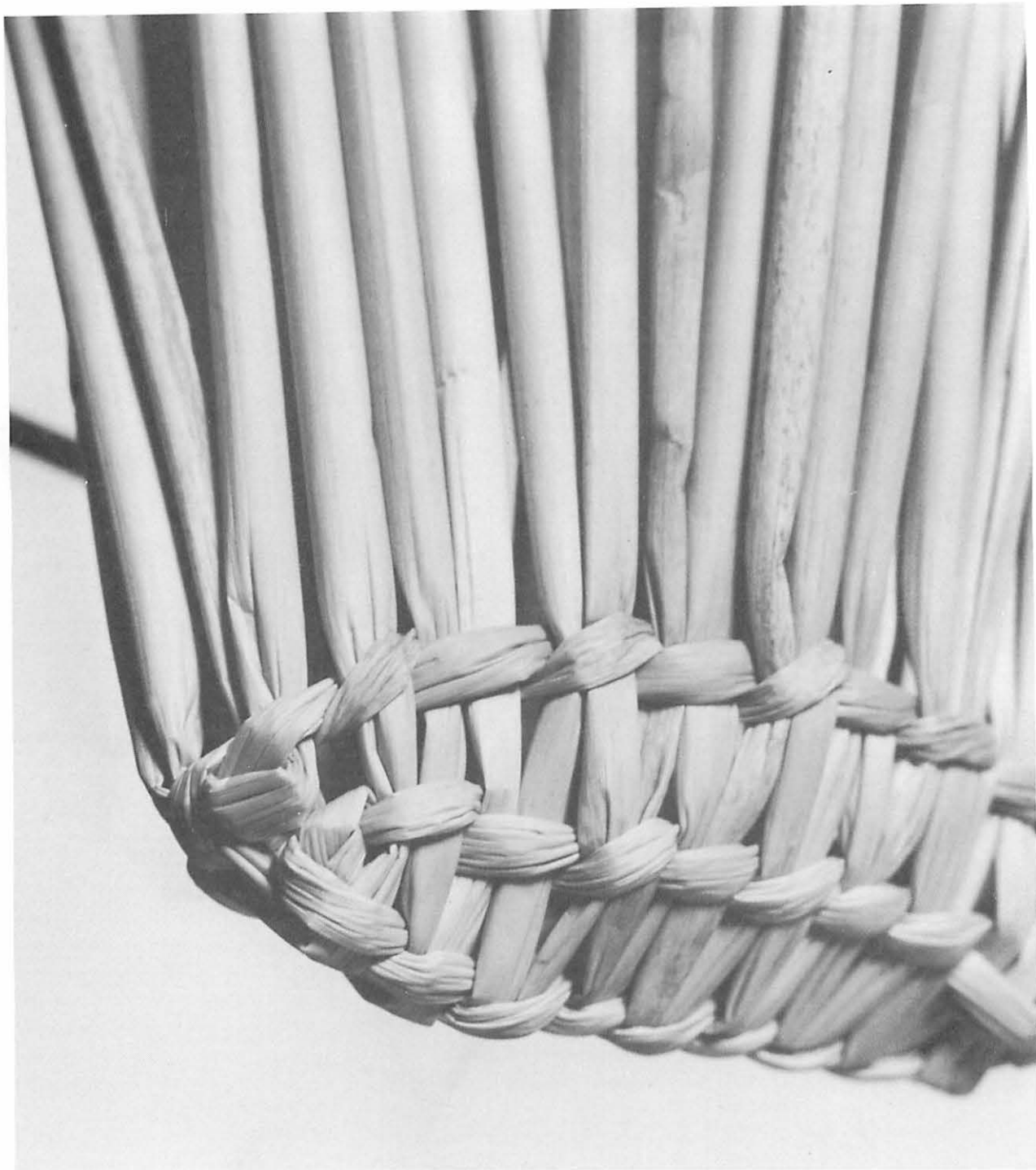


Figure 57 In twining the diamond pattern, the paired rushes in each row alternate back and forth in successive rows with the occasional warp-rush twined singly.

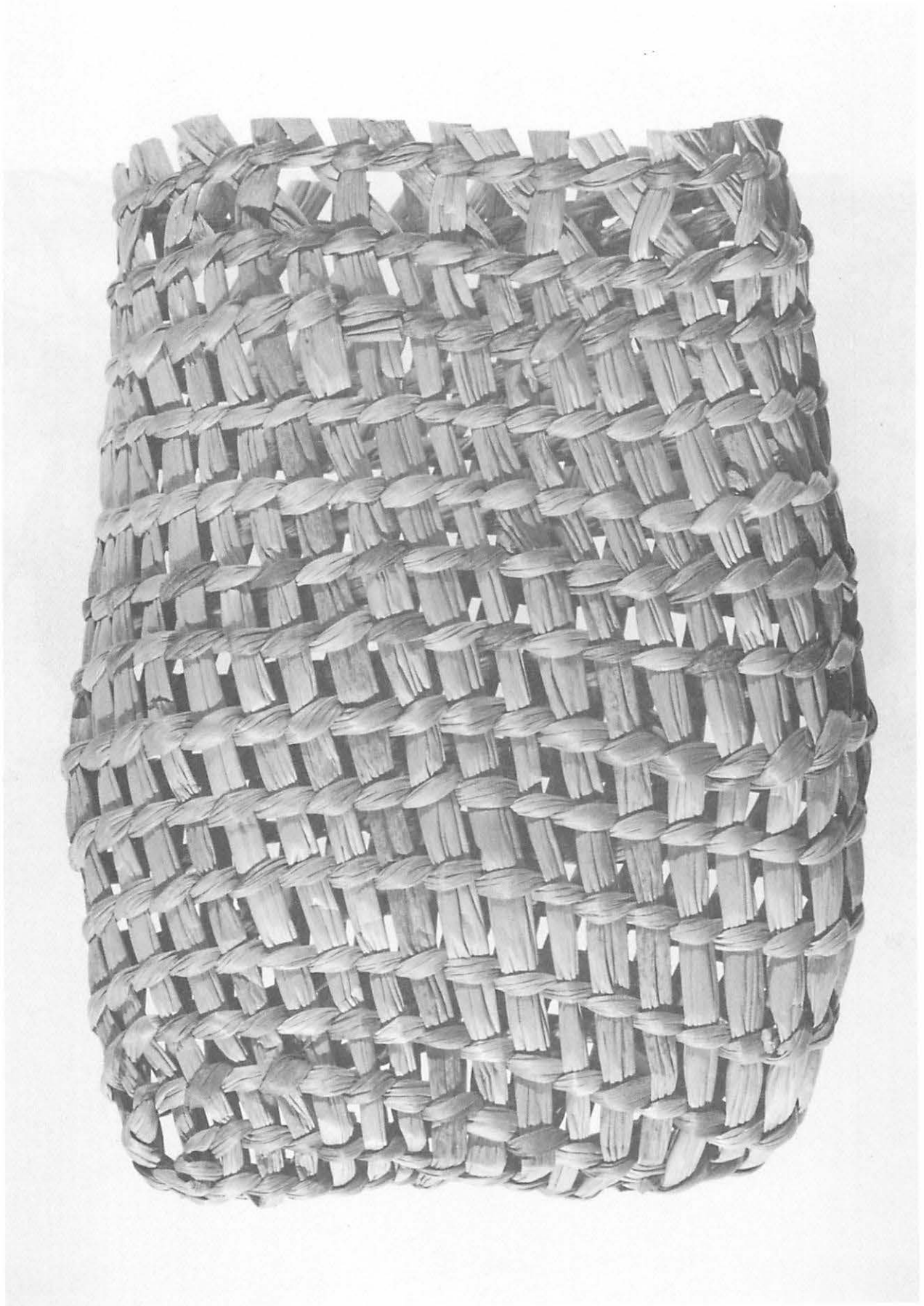


Figure 58 The finished bag.



Figure 59

CONCLUSIONS

The Pictou site has revealed an incredible amount of information about the fabric-making skills of the Mi'kmaq people at the time of European settlement. Most of these textile skills disappeared soon after the turn of the sixteenth century.

This report examines those fragments executed with the twining technique and its many variations. Most of the fragments appear to have been twined with the rush *Scirpus*, some with the reed *Juncus*, some with Basswood fibre, *Tilia americana*, and others with much finer plant or animal material, as yet unidentified. The fragments attest to the knowledge of the Mi'kmaq people—gathering and processing of a number of plant and possible animal fibres suitable for twining; twining on both single and paired unspun rush warps; using both single warps and plyed warps (2-ply; S-spun, Z-twist); using both S- and Z-twists in weft-twining; shaping a container with additional warps; and using decorative techniques of warp movement by crossing single warps in hexagonal patterns, and by alternating paired warps in diamond patterns.

Although no complete examples survive, the fact that all of the fragments are twined with spaced rows would seem to indicate that they are the remains of bags and baskets, or clothing, rather than of matting, in which the rows would have been closer together. The thicker rush containers may have been made for carrying food found in the field, newly laid eggs, or a freshly caught fish. The finer reed and unknown-fibre fragments took a great deal more time to produce. The fineness of both the materials and the evenness of the weave are incredible. We are left to wonder about the form of the original artifact and the purpose for which it was made.

ENDNOTES

1. Several authors have reviewed the literature relating to basketmaking and cloth weaving in North America: Gene Weltfish (1930), Charles Amsden (1932), Horace Miner (1936), Clark Wissler (1957), Sarah Turnbaugh (1976), Mary Elizabeth King (1979), Cheryl Samuel (1982) and others.
2. Twined basketry is discussed in many publications on native North American basketry by several authors including George Wharton James (1909/1972), Frank K. Porter (1990), and Sarah Peabody Turnbaugh and William A. Turnbaugh (1986); the latter has many beautiful colour photographs.
3. Elizabeth J.W. Barber has given an excellent historical review of the gathering and processing of plants for spinning and weaving. (Barber, 1991)
4. Each plant has two names: a common name, usually a singular word spelled in lower case letters, and a Latin name, always double, with the first being the genus name beginning with a capital letter, followed by the species name in lower case letters. The Latin name is always either underlined, bolded or italicized, and includes the name of the botanist who first described the plant in regular print. While one plant has only one Latin name which is used universally, whatever the spoken language, the same plant may have several common names in many languages. To add to this confusion, not only may some plants have the same common name, but also their accepted usage changes with time.
5. The Tlingit continue to gather sinew from the mountain goat and caribou.
Once the sinew was taken from the animal, it was thoroughly washed in cool water and hung on a fish rack until nearly dry. It was then taken down and smoothed with the thumbnail. It was easy then to split into tiny strands by holding between the thumb and first finger of each hand and pulling it apart. In preparation for spinning, the woman would draw thin pieces of split sinew through her mouth to moisten them. (Samuel, 1982:64-65)
The Dene people also use sinew thread for sewing garments. *"A moose or caribou back tendon was scraped clean, dried and split into fine strands. The seamstress moistened the sinew, then twisted it by rolling it along her leg. To sew a seam, she pierced a hole through the skin of both garment pieces using a sharp awl made from a bird or animal bone, she pushed the sinew thread through."* (Thompson, 1994:13)
Sinew cannot be a tendon which joins muscle to bone, but rather a ligament joining bone to bone. The medical term for this tissue is the nuchal ligament. (Dr. Ian MacKay, Dartmouth Veterinary Hospital, personal communication, January 1996)
According to Mike Martin, a Mi'kmaq hunter and trapper, this tissue is neither tendon nor ligament but the covering, or sheathing, of the musculature running along the back of the animal. (Mike Martin to Ruth Holmes Whitehead, personal communication, July 1979)
6. Possible Indian-hemp cord was found twined on a split twig foundation in another Northeastern archaeological site. Ted Brassler, in his review of the literature concerning the origins of splint basketry in North America, cited William A. Ritchie's account of finding this

fragment of twining "presumably from a basket", of the Castle Creek people of New York State, sometime between 1200 and 1400 AD. (Ritchie, 1965:193,289; in Brassler, 1975:5)

7. An archaeological twined fragment of unknown material was found near Lake Cochituate, Wayland, Massachusetts. For a more detailed discussion, see Tonya Largy and James B. Petersen, "An Aboriginal Basketry Fragment from Lake Cochituate, Wayland, Massachusetts", *Bulletin of the Massachusetts Archaeological Society*, 1987.

8. Fragments of quillwork were recovered from the deepest deposits of Lovelock Cave, Nevada; material recovered from the same level was carbon-dated to +531 BC. (Turner, 1953:71)

Julian Steward includes some wonderful line drawings of the twining techniques and construction details found in the Promontory Point Cave textiles. (Steward, 1937:29-40)

Focussing on the American southwest, Kate Peck Kent (1983) gives detailed information on prehistoric textiles from that area, including the preparation of natural fibres, dye sources, and the methods of fabric construction.

9. Northeastern North America is defined according to Trigger (1978:1) as that part of the continent stretching from Virginia and North Carolina in the South, to the boreal forest of Ontario and Québec in the North, and from the western grasslands of the Prairies, to the Atlantic Ocean coastline in the East.

10. The use of the twining technique in this visual image may be artistic license. In the reconstruction of a Huron palisade at the Keffer Site, 1500 AD, in what is now the Toronto suburb of Vaughan, the Museum of Archaeology (an affiliate of the University of Western Ontario) chose to weave the posts.

Based on archaeological and ethnographic data, it is known that a palisade was built by inserting into the ground wooden poles or tree saplings that were 5 to 20 centimetres in diameter and 3 to 4 metres in height. Some believe the poles were placed side by side to form a solid defensive wall, while others believe the poles were spaced 20 to 50 centimetres apart and interwoven horizontally with twigs and small branches, to form a solid wall. Our reconstruction adopted the latter method. (Robert Pearce, Senior Archaeologist, to Joyce Chown, personal communication, November 1995)

The postcard produced by the museum shows that the weaving is plain-weave, or "wicker" in basketry, rather than twining. Given the size and spacing of the poles, this structure would be easier to wicker-weave, rather than to twine. This technique would also use less material, although the resulting fabric would not be as strong. For more information on this site, see Finlayson et al, 1987.

11. Burden straps were reported by William Orchard (1929), Carrie A. Lyford (1945/1982), and by Alanson B. Skinner (1910).

12. In 1984, I received a letter from Joanne Segal Brandford, fellow basketmaker and then researcher at the Peabody Museum of Archaeology and Ethnology, concerning this basket, along with museum catalogue information plus her detailed notes of the bag construction. Given the importance of Joanne's museum work and the fact that, to my knowledge, her notes have not been published, I would like to include them here.

Rhode Island Historical Society, Providence, Rhode Island. Miss Field's statement:

This little basket was given by a squaw, a native of the forrest to Dinah Fenner, wife of Major Thomas Fenner, who fought in Churche's Wars, then living in the garrison in Providence, now Cranston R.I. The squaw went into the garrison, Mrs. Fenner gave her some milk to drink, she went out by the side of the river, peeled the inner bark from the Wickup tree (Basswood or linden tree), went down under the tree, drew the shreds out of her blanket, mingled them with the bark, wrought this little basket, took it to the garrison and presented it to Mrs. Fenner. Mrs. Fenner gave it to her daughter Freelove, wife of Samuel Westcoat. Mrs. Westcoat gave it to her granddaughter Wait Field,

wife of William Field, at Fields Point. Mrs. Field gave it to her daughter Sarah. Sarah left it with her sister Elinor, who now presents it to the Historical Society of Rhode Island. Field's Point, September 1842.

A note added sometime later: "Professor Willoughby has made a careful examination of this basket and has discovered that the horizontal weft is made of cornhusk."

Joanne Segal Brandford's analytical notes:

Analysis of base: a starting "knot" of over/under interlacement of tripled strands; 3.0mm x 0.5cm square. Plain spaced twining begins with these elements; 2 of them serving as warps, and the other elements combined to make paired wefts. This makes a base of a diameter 5.2cm. The spaced twining continues for four rounds, as warps rapidly expand to the 5.2cm diameter. New warps elements are inserted by adding broad loops (of paired?) elements to the inside face; this all happens in the first 3.0cm. The remaining open twine expansion has no additional warps. Dense part of the base is in two parts: the first part (large) twines over paired warps for 8 rounds. New warp elements are inserted at the beginning of this area, but instead of broad insertion (with accompanying float) these are narrow, right next to each other: these additions seem to be the final ones. Number of warps is determined at this point seems to remain steady—136 warps. Difference between the "largest" and the "small" element areas seems to be 1.5mm size weft element ("small") and 2.0mm size element ("large") and numbers of warps clasped, large wefts clasp 2 warps (3/cm), small wefts clasp one warp (6/cm). No time for rest of basket/looks like wrapped twining, using one "cornhusk" weft and one wool (either red or blue). Where not required for the design, the wool is carried at the back, the wrapping twiner holding it. This wool still remains intact inside. But in front almost all the wool is now missing.

These notes, along with her drawings, are stored in my research file in the Library of the Nova Scotia Museum.

13. This beach grass basket, catalogued "wap'hán a", is the only known survivor of a once flourishing twined-grass basket tradition in New England. It was made by Basha Accouch, a Gay Head Indian woman, around 1800. A straightforward utilitarian piece, the basket's primarily visual appeal comes from the glossy plump grass stems that are shown to advantage in the open weave. In the twined structure, each weft row enclosed re-grouped warp bundles, creating a zigzag mesh. The carry strap is a simple braid, that appears now to be much shorter than it was originally. (Joanne Segal Brandford, 1984)

14. Ruth Phillips includes an illustration of an early-nineteenth-century Ottawa-type twined bag, made of nettletalk fibre with wool yarn design, from the collection of the Peabody Museum of Salem, Massachusetts. She surmised that "The underwater-panther motifs indicate that this bag held sacred medicines." (1988:58)

15. Similar bags were also made by several groups in the Great Lakes region as reported by Lyford (1953:77-81), and Whiteford (1977:52-63).

16. With regard to the specific construction techniques used in making the matting, the literature is misleading. According to Karen Petersen, "Lyford twice cites the use of twining for rush mats (1953, pp. 69 and 90) but her statements are unsupported in either her text or her bibliography. If the Chippewa indeed used twining, these are their most complicated mats, comparable to the twined yarn wallets among their bags." However, Petersen does allow for the unexpected, "It seems reasonable that a few skillful weavers may have transferred the twining complex from bag to matmaking." (1963:233) I agree with Petersen in that it was more likely the mats were plain-woven (plaited) rather than twined, due to the problems mentioned earlier of maintaining the direction of the twist when twining back and forth with continuous wefts on a flat surface, and threading away the discontinuous wefts.

17. The full description by John Josselyn of the use of matting in the bark wigwam is most interesting:

Their houses, which they call wigwams, are built with poles pitcht into the ground of a round form for most part, sometimes square. They bind down the tops of their poles, leaving a hole for smoak to go out at, the rest they cover with the bark of trees and line the inside of their wigwams with mats made of rushes painted with several colors. One good post they set up in the middle that reaches to the hole in the top, with a staff across before it; at a convenient height, they knock in a pin upon which they hang their kettle. Beneath that they set up a broad stone for a back which keepth the post from burning. Round by the walls they spread their mats and skins where the men sleep whilst the women dress their victuals. They have commonly two doors, one opening to the south, the other to the north, and, according as the wind sets, they close up one door with bark and hang a deers skin or the like before the other. Towns they have none, being always removing from one place to another for conveniency of food, sometimes to those places where one sort of fish is most plentiful, other whiles where others are. I have seen half a hundred of their wigwams in a piece of ground and they show prettily; within a day or two or a week they have been all dispersed. (1674/1865:126)

18. Examples of this twined gridded pattern have been discovered in three sites across North America—Michigan, New Brunswick, Vermont; all date from 2,500-2,600 BP. (King, 1968; Turnbull, 1976; Heckenberger, Petersen and Basa, 1990) The same technique, with variants in the gridding, appears in Lovelock Cave, Nevada, dated to 2,500 BP. (Whitehead 1982:1) Whitehead has found surviving seventeenth-century examples from the Gulf of St. Lawrence area; in both cases, porcupine quills were the wrapping material. (1987c: 36, figure E109)

19. *Medieval gardeners invented the knot garden, with beds planted or otherwise designed in ornamental, knotlike patterns. It remained popular in many countries until well into the 17th century. Knot gardens were almost always square. Often each knot in the garden was of a different design, perhaps a simple geometric pattern, perhaps an intricate figure of heraldic origin, the designs worked out in low-growing herbs or clipped box. (Wilkinson and Henderson, 1985:20)*

20. Mat-making on suspended looms can be seen in the following illustrations: "Ojibbawa [sic] Wigwams, Rainy Lake", a watercolour by Frederick Arthur Verner, 1919, 52.7x73.7cm. Verner, a Canadian artist inspired by Paul Kane, preserved the life and environment of the native peoples at a time when there were rapid changes in their lifestyle and a decline in their population due to the westward settlement of the white man. This image captures a woman creating diamond patterns in a mat suspended from a horizontal pole supported by two vertical forked sticks. (*Sotheby's Catalogue*, October 1992)

Another image of a suspended loom may be found in Hoffman's "The Menomini Indians" (1896: Plate 20). Two women are working on a mat, with ten vertical stripes, suspended from a horizontal pole. To keep the vertical edges even, they have been tied at regular intervals to the vertical uprights of the loom.

The same image of a Chippewa suspended loom is seen in both Mason (1904/1972: Plate 122) and in Amsden (1932: Plate 3b). The half-woven mat, with its intricate geometric pattern, is held by the horizontal bar only; there are no ties to the vertical poles. Mason included the story of its manufacture.

...a mat plaited by a Chippewa squaw, about 50 years old, at Grand Marias, Minnesota. It is of cedar bast made in strips a quarter of an inch wide, and it is in three colours—one the natural tinge of the material and the other two dyed. A small rod or stiff cord of bark is suspended by means of eight loops from a pole resting on two forked sticks. This is to give free motion to the woman's hands. Over this the warp strings are suspended freely...For a few rows the weaving is simple checkerwork of the plainest kind, and then begins a series of twilled patterns, over two and under two. But even this simplest technique so lends itself to charming effects of light and shade that there is no monotonous square inch on the surface. Another band of plain weaving is followed by zigzag and angular work, inclosing lines and squares, giving birth to a very pleasing effect. Some of the oldest pictures preserved in the early chronicles of the Algonkian Indians, to whom the Chippewa belong, show them weaving in exactly the same fashion.

The mat described above was made for Capt. R.D. Gaillard, U.S.A., in a single day, the work beginning at 9 o'clock in the morning and the finished product being delivered 2 miles away at 4 o'clock in the afternoon. It is 6 feet 5 inches long and 4 feet 5 inches wide. (Mason, 1904/1972:374-375)

21. Wilson did not speak Mi'kmaq, and used his own orthography to write Mi'kmaq words, such as his "se'suusk" and "e'laama'sit." His recording of what he heard was often so incorrect as to make it undecipherable by Mi'kmaq speakers. (Bernie Francis to Ruth Whitehead, personal communication, February 1991)

22. An image by Du Pratz (in a plate facing page 310, volume 11 of his *Histoire de la Louisiane* and reprinted in Figure 7 of Holmes, 1896), shows a Louisiana woman and a girl wearing "former costumes" consisting of fibre-woven skirts wrapped around their bodies. Hilary Stewart gives a wonderful written description, complete with line illustrations, of the twined cedar bark skirts, blankets, capes and hats, as well as matting, in her book *Cedar, Tree of Life to the Northwest Coast Indians*. (1984:141-148)

23. As the use of rush among the Mi'kmaq people has completely disappeared, I must rely on information from other sources, primarily British, where rushes are still twined and woven. I refer the reader to Whitbourn (1969) and Elton Barratt (1986).

24. For those of you wishing to make a sturdier border, I suggest using the pattern (a 3-rod border) found in my book *With the Baskets, Traps and Brooms*. (1984) To make a 2-ply rush cordage handle, loop a single piece of rush through the top rows of weaving of the bag. Twist each rush with several S-twists for about 1-2cm. Ply the two twisted strands together in a Z-twist. If a length of rush runs out, add a new one by overlapping the old with the new. To complete the handle cord, thread each rush around the top few rows of weaving on the other side of the bag, one from the front and the other from the back, twist the two ends together, knot if necessary, and loose the ends in the weaving. See Figures 70 and 71 for reproductions of rush bags with both single and paired warps, the 3-rod border, and cordage handle.

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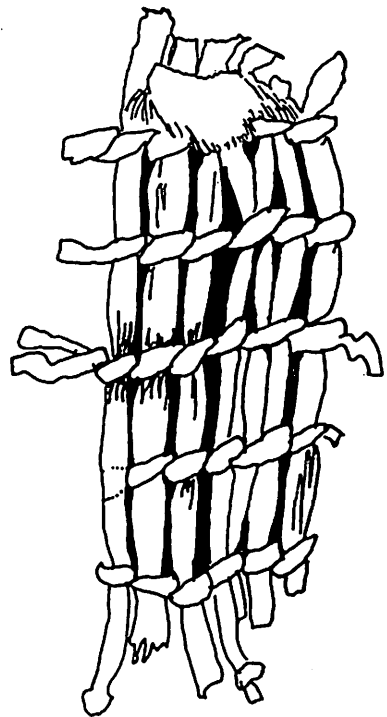
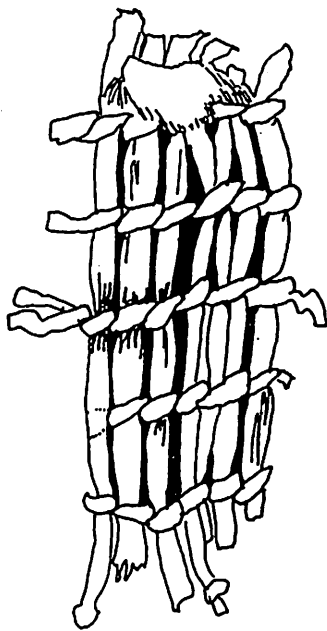




Figure 60

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Figure 61

ACKNOWLEDGEMENTS

I thank Dr. Ruth Holmes Whitehead of the Nova Scotia Museum for her continued guidance and her editing skills; Ronald E. Merrick and Roger Lloyd, Department of Education and Culture, Learning Resources and Technology, for their skilled photography of both the friable artifacts and my reproduction work; and Scott Robson for his love of Macintoshes and his computer-translation support. I would like to express my sincere thanks to Chris Turnbull, Provincial Archaeologist for the Province of New Brunswick, for allowing me to study the textiles in the Augustine Mound Collection; Mary Lou Florian of the Royal British Columbia Museum for her time spent on the plant analysis in 1986; Kay Johnson and Olivia Elton Barratt of the British Basketmakers' Association for showing me how to collect, prepare, weave and twine with rush; Suzanne Lewis of Dartmouth for giving me the information about the Mi'kmaq rush hat; Joyce Chown of Dartmouth for sharing her information about the Huron palisade, her weaving editing skills and her enthusiasm for all things plicated; Dr. Ian MacKay for his medical information relating to the use of the word "tendon"; and my husband Don and daughters Heather and Sarah for reading my manuscript. I would like to express my heartfelt appreciation to Karen Daniels Petersen of St. Paul, Minnesota, for her encouragement of my work. I feel that I have followed in her footsteps adding this work to the intriguing textile accomplishments of the native peoples of North America.

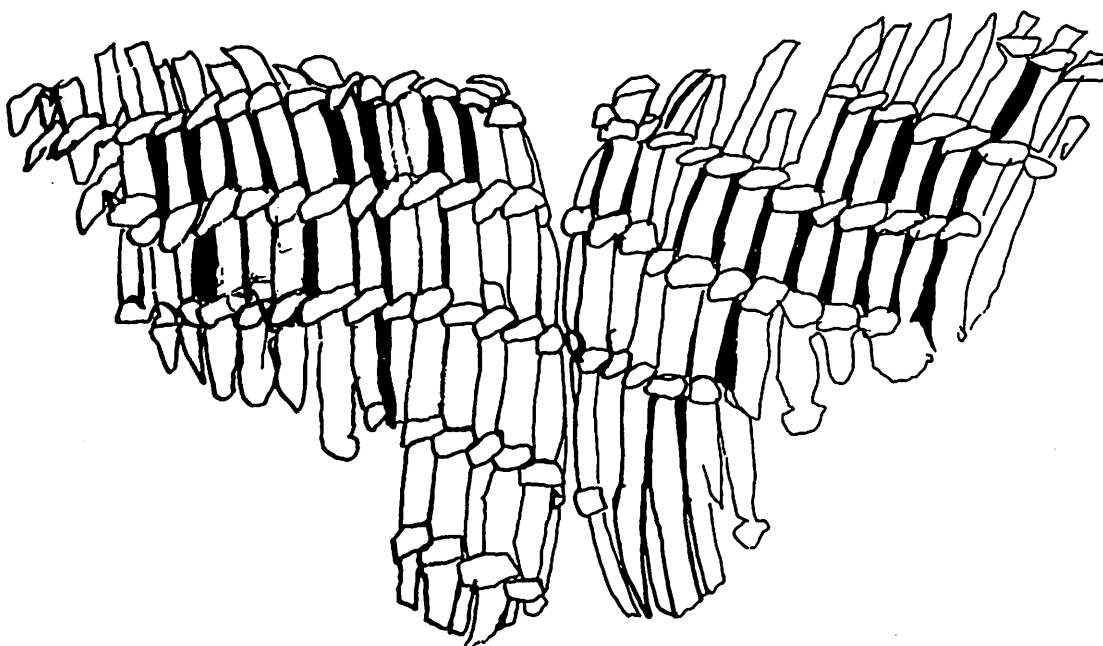
I acknowledge the several historical societies and public institutions which have either sent me copies or permission to use their historical photographs: Archiv der Staatlichen Schlösser und Gärten Wörlitz, Oranienbaum, Luisium; British Museum; Burgerbibliothek, Bern, Switzerland; Canadian Museum of Civilization; Connecticut Historical Society; Denver Art Museum; Maine Historical Society in Portland; Milwaukee Public Museum; New Brunswick Department of Municipalities, Culture and Housing; The Peabody Museum of Archaeology and Ethnology; Rhode Island Historical Society; United States Bureau of the Interior, Washington; and the University of Edinburgh Library. Thank you for sharing your collections. The fine library collections in Nova Scotia were of valuable assistance to me in this research: Dalhousie University Library, St. Mary's University Library, the Nova Scotia Legislative Library, the Nova Scotia College of Art and Design Library and our own Nova Scotia Museum Library. I also thank the Board of Governors and the staff of the Nova Scotia Museum for their continued support of my work.

To the Mi'kmaq people, my deepest respect for their work in textiles over the centuries.

Joleen Gordon

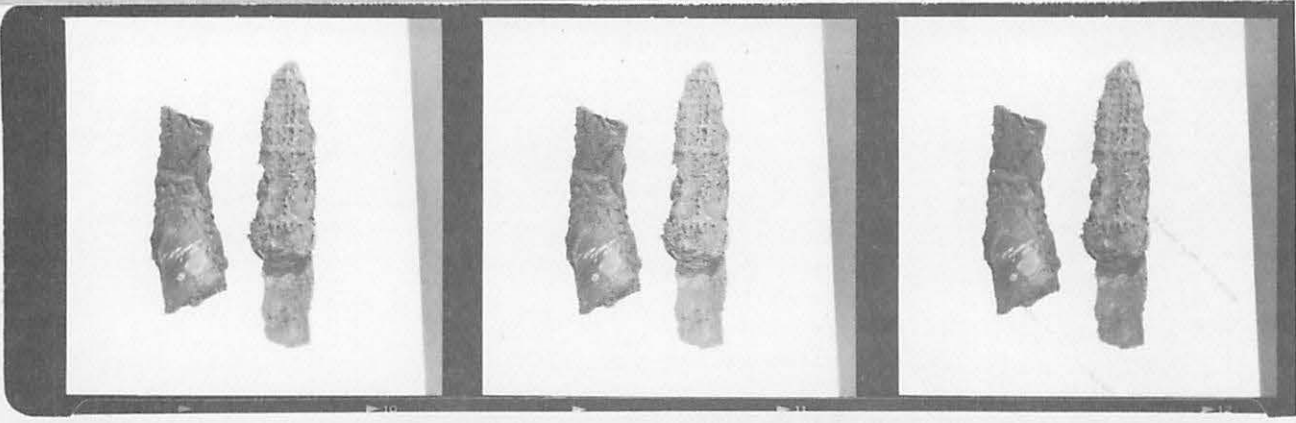
APPENDIX ONE

Catalogue of Twined Fragments from Site BkCp-1



12/93

DATE



NE6. No: N- 20, 088



TECHNICAL DATA

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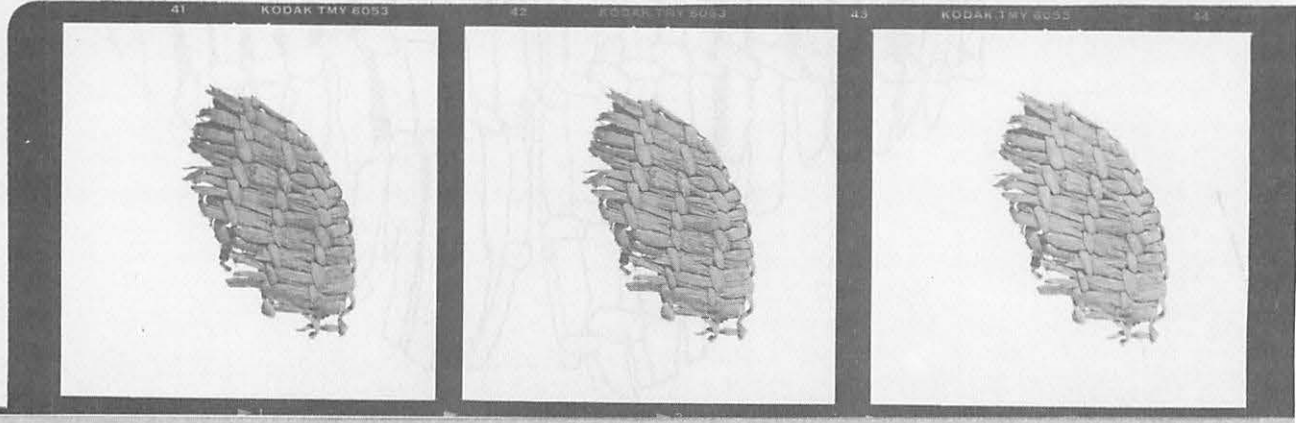
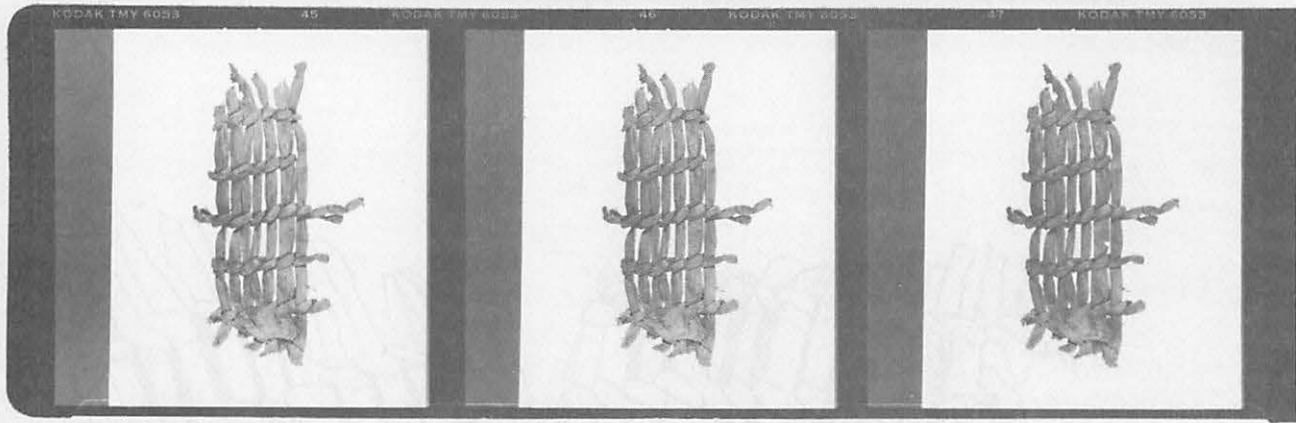


Figure 62 Contact sheet, artifact photography, BkCp-1.

APPENDIX ONE

Catalogue of Twined Fragments from Site BkCp-1

ALL INFORMATION IS PRESENTED IN THE FOLLOWING FORMAT:

Nova Scotia Museum accession number

Area of twining

Distance between the rows of twining

Diameter of warps (diameter of each ply); direction of twist/ply

Diameter of wefts (diameter of each ply); direction of twist/ply

Material

Comments

Photograph: Nova Scotia Museum negative number

84.22.94c

Area of twining 50x20mm

Distance between rows 5-6mm

Diameter of warps 2-4mm, unplied; paired?

Diameter of wefts 4mm, unplied; S-twist

Material rounded, looks like rush

Material fused to dagger scabbard-tip. (NSM 84.22.94a) The warps possibly twined in pairs; 5 rows of twining visible.

Photo: Nova Scotia Museum N-20,088

84.22.520c

Area of twining 60x20mm

Distance between rows 7-8mm

Diameter of warps 2, unplied; single

Diameter of wefts 2mm, unplied; S-twist

Fine material, outer surface appears smooth with a pitch centre, suggesting rush.

Sample very compressed, making analysis difficult; fused to metal dagger scabbard-tip. (NSM 84.22.520a)

Photo: Nova Scotia Museum N-20,088

84.22.574a

Area of twining 195x120mm

Distance between rows 15-20mm

Diameter of warps 4-6mm, unplied; singles and paired Diameter of wefts 4-6mm, unplied; S-twist

Material appears to be rush

Outline of fragment looks like bag profile, bottom edge; reverse side shows addition of wefts.

Photo: Nova Scotia Museum N-20,090

Photo: Nova Scotia Museum N-21,793

84.22.574b

Area of twining 130x85mm

Distance between rows 1.5-2.0mm

Diameter of warps 3-5mm; paired

Diameter of wefts 3-4mm; S-twist

Material appears to be rush.

84.22.574c

Area of twining 75x60mm

Distance between rows 1.5cm

Diameter of warps 4-5mm

Diameter of wefts 4-5mm; S-twist

Material appears to be thick rush

Possible bottom corner of bag

Photo: Nova Scotia Museum N-20,088

84.22.575

Area of twining 130x60mm

Distance between rows 1.2-1.5cm

Diameter of warps 3-4mm; singles

Diameter of wefts 2-4mm; S-twist

Material appears to be rush.

84.22.576a

Area of twining 220x80mm

Distance between rows 10-13mm

Diameter of warps 2-4mm; singles

Diameter of wefts 2-4mm; S-twist

Material appears to be rush

Crossed-warp pattern in upper edge, with 1 row of twining above

Photo: Nova Scotia Museum N-21,793

84.22.576b

Area of twining 130x108mm

Distance between rows 10-12mm

Diameter of warps 2-4mm; singles

Diameter of wefts 2-4mm; S-twist

Material appears to be rush

Outline of fragment looks like bag profile

Photo: Nova Scotia Museum N-20,090

84.22.577

Area of twining 100x110mm
Distance between rows 8-10mm
Diameter of warps 2-4mm; singles
Diameter of wefts 2-3mm; S-twist
Material appears to be rush
Cut edge

84.22.578

Area of twining 110x55mm
Distance between rows 10mm
Diameter of warps 2-4mm; singles
Diameter of wefts 2-4mm; S-twist
Material appears to be thin rush
Warps crossed in next to last row; edges cut.
Photo: Nova Scotia Museum N-20,090

84.22.579

Area of twining 60x60mm
Distance between rows 7-8mm
Diameter of warps 3-4mm; paired
Diameter of wefts 3-4mm; S-twists
Material appears to be rush
Cut edge

84.22.580

Area of twining 160x100mm
Distance between rows 8-10mm
Diameter of warps 2-4mm; paired
Diameter of wefts 2-3mm; S-twist
Material appears to be rush

84.22.581

Area of twining 80x80mm
Distance between rows 16-18mm
Diameter of warps 3-6mm; singles
Diameter of wefts 2-3mm; S-twist
Material appears to be rush

84.22.582a

Area of twining 120x70mm
Distance between rows 20mm
Diameter of warps 4-6mm; singles
Diameter of wefts 4-6mm; S-twist
Material appears to be thick rush

Twining executed in regularly spaced rows of single warps, with the exception of two rows where two rushes were paired.

Photo: Nova Scotia Museum N-20,088

84.22.583

Area of twining 85x75mm
Distance between rows 14-15mm
Diameter of warps 3-4mm; singles
Diameter of wefts 2-4mm; S-twist
Material appears to be rush
Cut edge

84.22.849

Area of twining 30x35mm
Distance between rows 10mm
Diameter of warps 3-4mm; singles
Diameter of wefts 2-3mm; S-twist
Material appears to be rush

84.22.850

Areas of twining 15x55mm; 40x70mm; 25x55mm
Distance between rows 10-18mm
Diameter of warps 3-4mm; singles
Diameter of wefts 3-4mm; S-twist
Material appears to be rush
Three pieces

84.22.851

Area of twining 30x55mm
Distance between rows 10mm
Diameter of warps 3-4mm; singles
Diameter of wefts 2-3mm; S-twist
Material appears to be rush

84.22.852

Possibly bits of rush weavers

84.22.853

Area of twining 60x30mm
Distance between rows 14-15mm
Diameter of warps 5-7mm
Diameter of wefts 5-6mm; S-twist
Material appears to be rush
Squashed, hard to tell if warps are twined in singles or paired

84.22.854a

Area of twining 120x50mm
Distance between rows 15mm
Diameter of warps 3-6mm; paired
Diameter of wefts 3-4mm; S-twist
Material appears to be rush

84.22.555

Area of twining 40x60mm
Distance between rows 10-12mm
Diameter of warps 3-4mm; singles
Diameter of wefts 2-3mm; S-twist
Material appears to be rush
Cut edge

84.22.560

Area of twining 165x80mm
Distance between rows 5-6mm
Diameter of 2-ply warps 3mm (each ply 1.5mm); S-twist/Z-ply
Diameter of weft 2mm (each S-twist cord 1mm); Z-twist
Material unknown; multi-fibred (Basswood?)
Twist is tighter in weft than warp, warps twined in singles
Photo: Nova Scotia Museum N-21,794

84.22.561

Area of twining 45x50mm
Distance between rows 5-6mm
Diameter of 2-ply warps 2mm (each ply 1mm); S-twist/Z-ply
Diameter of weft 1.5mm (each S-twist cord less 1mm); Z-twist
Material unknown; multi-fibred (grass?)
Overlapping areas of twining difficult to analyze, twist is tighter in weft than warps, warps twined in singles

84.22.562a

Area of twining 150x50mm
Distance between rows 6-7mm
Diameter of 2-ply warps 2mm (each ply 1mm); S-twist/Z-ply
Diameter of weft 1.5mm (each S-twist cord 1mm); Z-twist
Material unknown; multifibred, (Basswood?)
Twined with single warps

84.22.567

Area of twining 40x40mm
Distance between rows 5mm
Diameter of 2-ply warps 2mm (each ply 1mm); S-twist/Z-ply
Diameter of weft 2mm (each S-twist cord 1mm); Z-twist

Material unknown; multifibred (reed?)
Twined with single warps, possible cut-edge
Photo: Nova Scotia Museum N-21,794

84.22.568

Area of twining 8x30mm
Distance between rows 5mm
Diameter of 2-ply warps 2mm (each ply 1mm); S-twist/Z-ply
Diameter of weft 1.5mm (each S-twist cord less 1mm); Z-twist
Material unknown; multifibred (Basswood?)
Twined with single warps
Photo: Nova Scotia Museum N-21,794

84.22.573a

Area of twining 70x70mm
Distance between rows 5mm
Diameter of 2-ply warps 2mm (each ply 1mm); S-twist/Z-ply
Diameter of weft 1.5mm (each S-twist cord less 1mm); Z-twist
Material unknown; multifibred (sinew?)
Twist tighter in weft than warp, warps twined in singles; fused to fur

84.22.573b

Area of twining 30x80mm
Distance between rows 5-7mm
Diameter of 2-ply warps 1.5mm (each ply less 1mm); S-twist/Z-ply
Diameter of weft 1.5mm (each S-twist cord less 1mm); Z-twist
Material unknown; multifibred (grass?)
Twist tighter in weft than warps, warps twined in singles; fused to fur

84.22.573c

Area of twining 40x80mm
Distance between rows 5mm
Diameter of 2-ply warps 1.5mm (each ply less 1mm); S-twist/Z-ply
Diameter of weft 1.5mm (each S-twist cord less 1mm); Z-twist
Material unknown; multifibred (grass?)
Twist tighter in weft than warp, warps twined in singles; fused to fur

84.22.573d

Area of twining 90x30mm
Distance between rows 5-6mm
Diameter of 2-ply warps 1.5mm (each ply less 1mm); S-twist/Z-ply
Diameter of weft 1.5mm (each S-twist cord less 1mm); Z-twist
Material unknown; multifibred (grass?)
Tightly twined, fused to fur

84.22.573e

Area of twining 30x50mm

Distance between rows 5-6mm

Diameter of 2-ply warps 1.5mm (each ply less 1mm); S-twist/Z-ply

Diameter of weft 1mm (each S-twist cord less 1mm); Z-twist

Material unknown; multifibred (grass?)

Warps twined in singles; fused to fur

84.22.573f

Area of twining 110x120mm

Distance between rows 5-6mm

Diameter of 2-ply warps 1.5mm (each ply less 1mm); S-twist/Z-ply

Diameter of weft 1.5mm (each S-twist cord less 1mm); Z-twist

Material unknown; multifibred (grass?)

Fragment folded along one side; twist tighter in weft than warp, warps twined in singles

Photo: Nova Scotia Museum N-21,794

84.22.573g

Area of twining 30x50mm

Distance between rows 5mm

Diameter of 2-ply warps 2mm (each ply 1mm); S-twist/Z-ply

Diameter of weft 1.5mm (each S-twist cord less 1mm); Z-twist

Material unknown; multifibred (grass?)

Twist tighter in weft than warp, warps twined in singles; fused to fur

APPENDIX TWO

Cordage Making and Catalogue of Cordage from Site BkCp-1

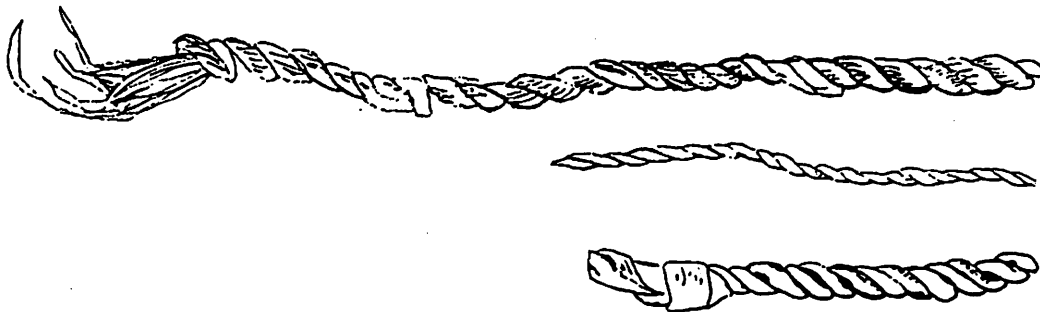




Figure 63 A fish smoking-rack, showing the use of cordage.

APPENDIX TWO

Cordage Making and Catalogue of Cordage from Site BkCp-1

The BkCp-1 material includes 77 lengths of cordage fragments. They range in length from 12-290mm, with a diameter ranging from 1.0-50mm. All are S-spun in a Z-twist 2-ply cord. (Figure 64) Although they have not been tested, some appear to have been made from a plant material similar to small, rounded rush, others appear to have been made from a fine, thin grass, or friable bast material. Lengths of similar cordage were used as stitching material in making the sewn-cattail matting. (Gordon, 1995) There is no evidence, archaeological, historic or ethnographic, linking such cordage with bags and baskets. However, the cordage is of the same sort (2-ply; S-spun, Z-twist) and about the same diameter as the cordage of unknown materials used for both the warp and weft in the finer twined fabrics found at this same site. These cord may be the remains of longer lengths made in preparation for twining. Although they are small in diameter, it is also possible that this kind of cord may have been used as a carrying strap for containers.

Also in the collection is a small 1x5cm sample of a 7-strand braid, possibly made of rushes in an over-one, under-one, over-one pattern. (Figure 65) This braided cord, being thick, would have made a serviceable handle or burden strap for carrying lightweight loads. (Gordon, 1993b; Appendix Two) Again, there is no evidence linking this piece of braid to the bags, therefore its use as a handle is speculative.

To make two-strand (2-ply) rush cordage, loop a single piece of rush over a hook. (Figure 66) Hold each piece of rush with the thumb and forefinger of each hand. Twist each rush in a clockwise direction (left to right); an S-twist. (Figure 67) The direction of the twist is in the same direction as the centre-line of the letter S (\). When 1-2cm of each rush has been twisted, twist the two twisted strands together with an opposite twist, counter-clockwise (right to left); a Z-twist. (Figure 68) The direction of the twist follows the centre-line of the letter Z (/). This process is repeated for the desired length of the cord. To add a new length of rush to the cord, lay a new rush over the old one close to the twist of the ply, and continue twisting the new rush leaving the old one behind. (Figure 69)

As mentioned in my earlier report (Gordon, 1993b), there is another method of making 2-ply cordage. The two strands are laid across the maker's thigh and

are rolled in unison forwards and backwards. The forward roll creates the S-twist in each strand, while the backward roll plies them together in a Z-twist. This method of cordage making continues today in some aboriginal cultures, using a variety of plant materials such as grasses, rushes, reeds, strips of soft inner bark, and thin, ribbon-like pieces of wood.

To repeat, the lengths of BkCp-1 cordage were found separate from the twined fragments; none were attached as possible handles. However, to add a 2-ply cordage handle to a rush bag, presumably the material was looped around the upper rows of twining as explained in Endnote 24, with the final results shown in Figures 70 and 71.

To make the braided cord shown in Figure 65, bind the ends of seven pieces of rush together with another length of rush. Fan them out, dividing the ends into two groups, one of three rushes, and the other of four. Keeping them in order, bend the outer rush in the group of four, over-one, under-one, over-one to lie alongside the inside-edge of the other group of three. Always working the group of four, this pattern is repeated for the length of the braid. When a rush is almost completely woven, the end of a new rush is overlapped with the old one for a few steps. Bind off. To use as a handle, the braided cord may be either directly tied to the bag, or looped around a few rows of twining and lashed to itself.

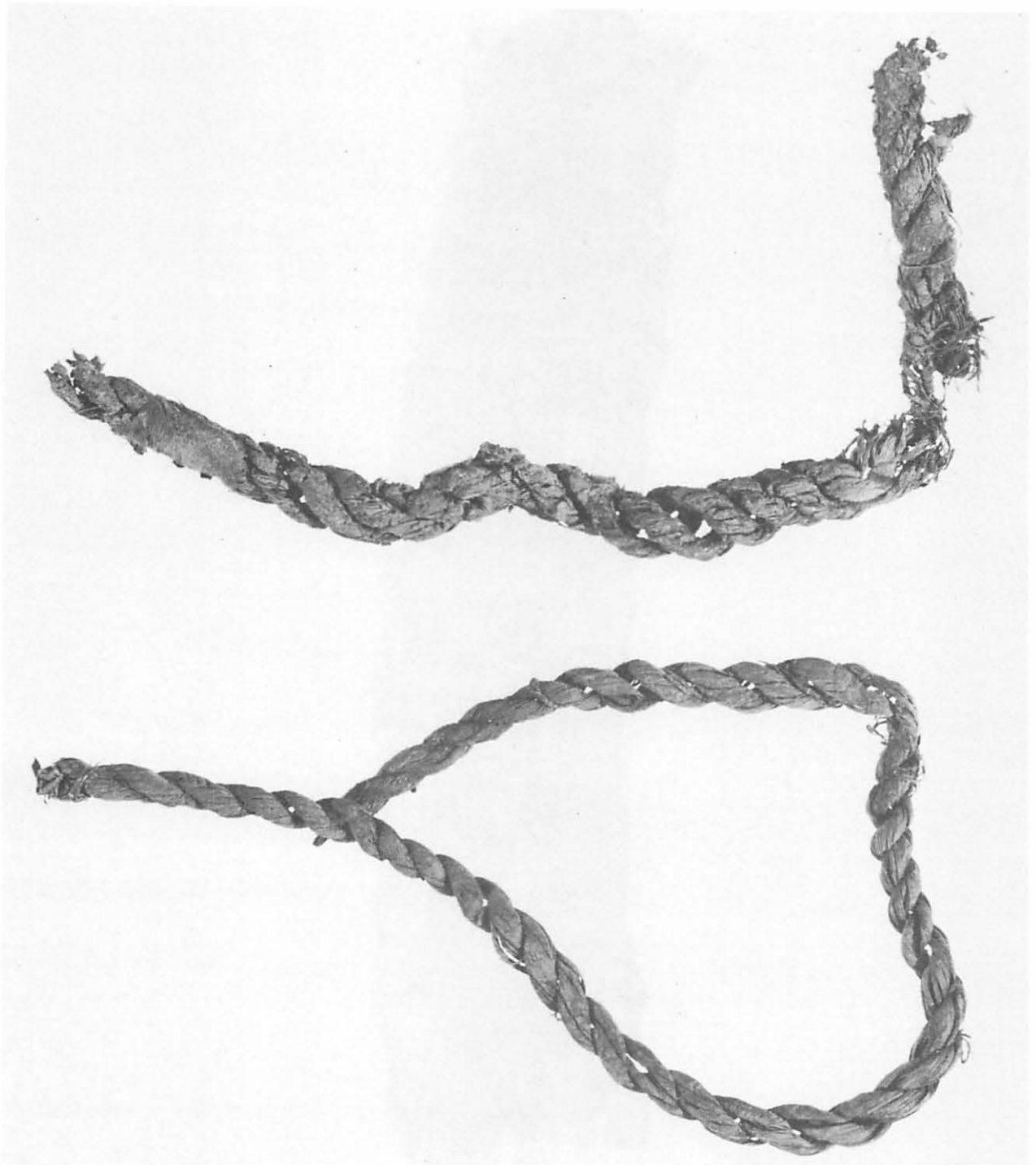


Figure 64 Two-ply cordage spun with an S-twist and plyed with a Z-twist. NSM 84.22.559 (top); NSM 84.22.556 (bottom).



Figure 65 Length of 7-strand braid possibly made of rush. This may have been used as a handle. NSM 84.22.554.

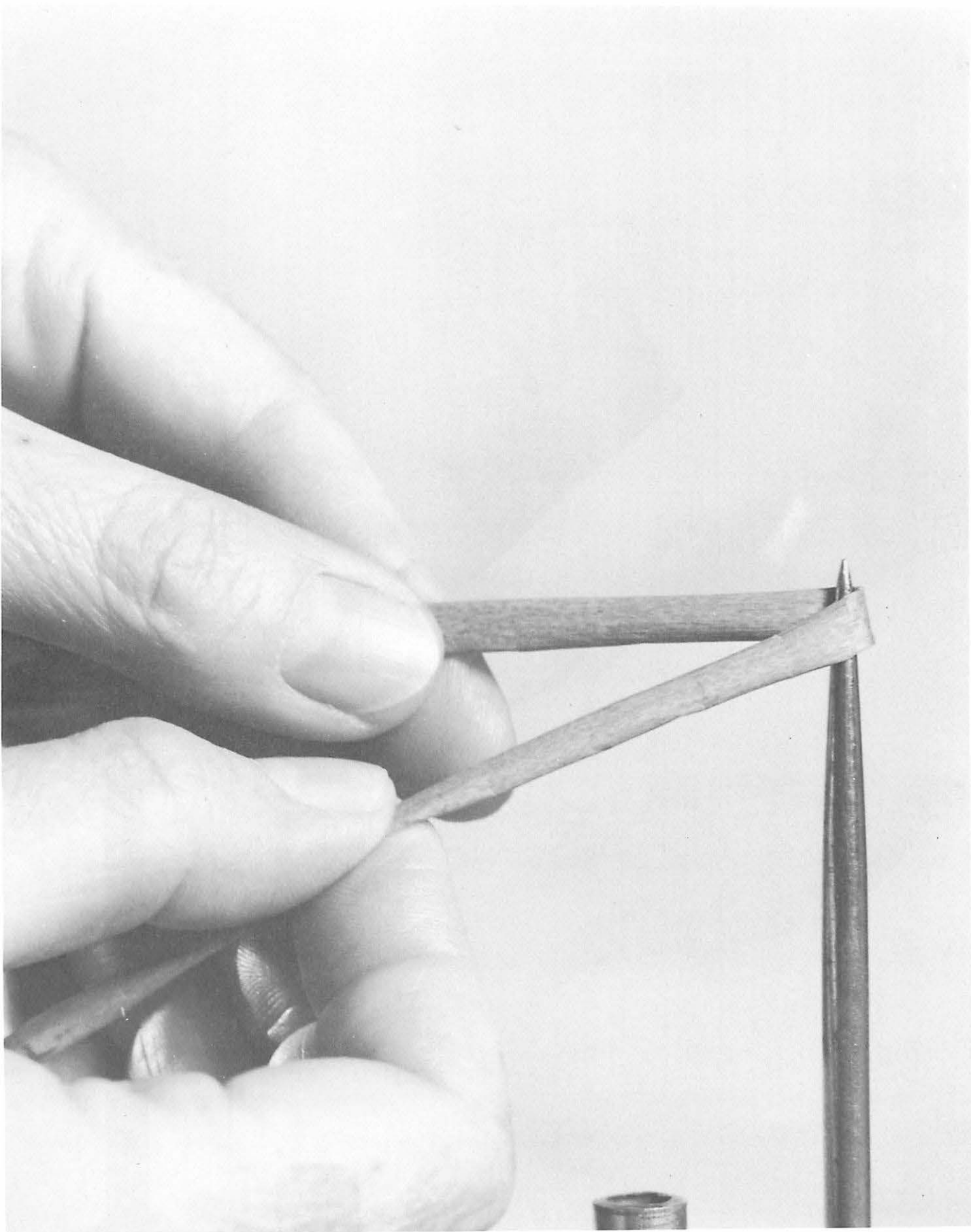


Figure 66 Loop a single piece of rush over a hook.

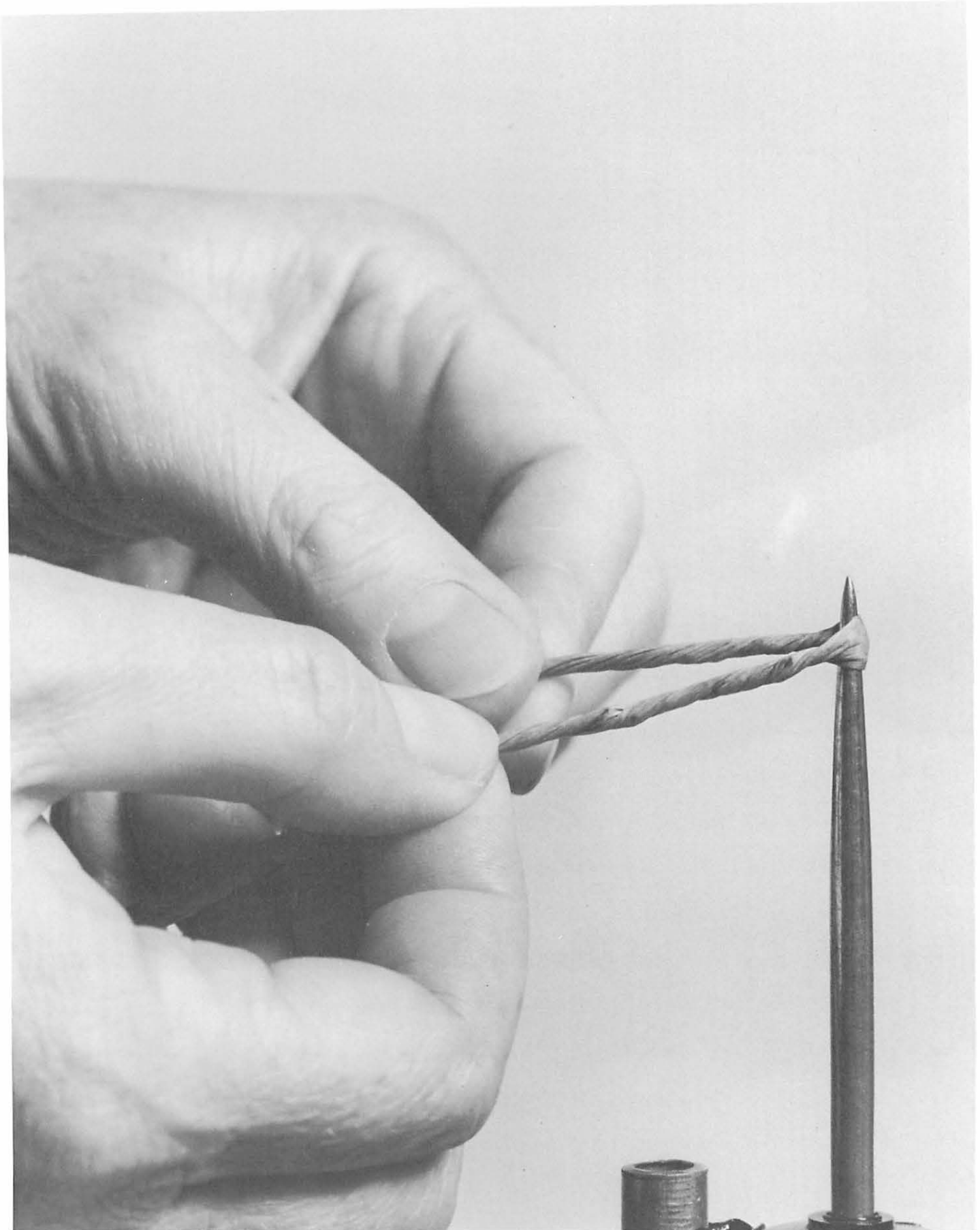


Figure 67 Twist each rush with S-twists for 1-2cm.

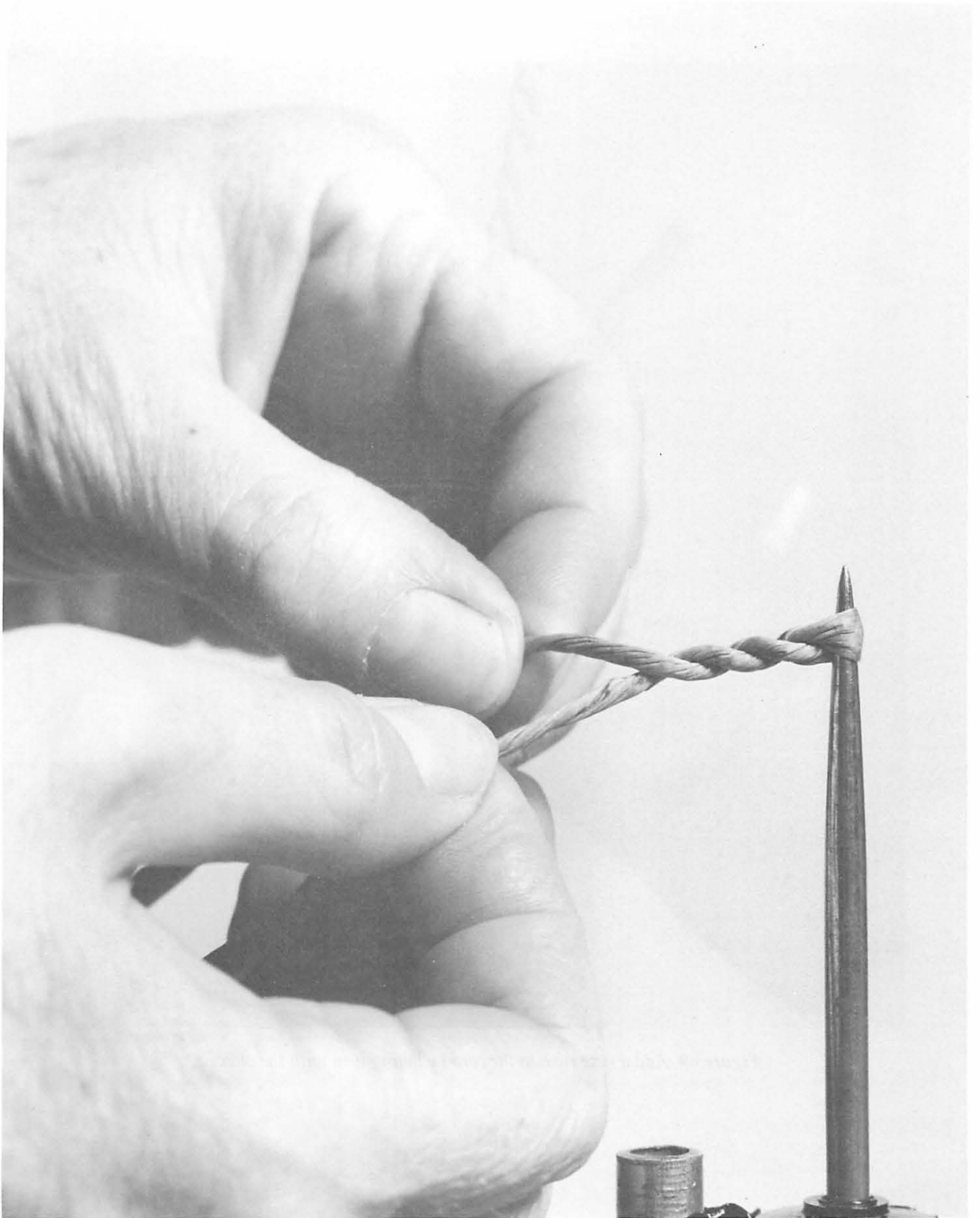


Figure 68 Ply the two S-twisted strands in a Z-twist.

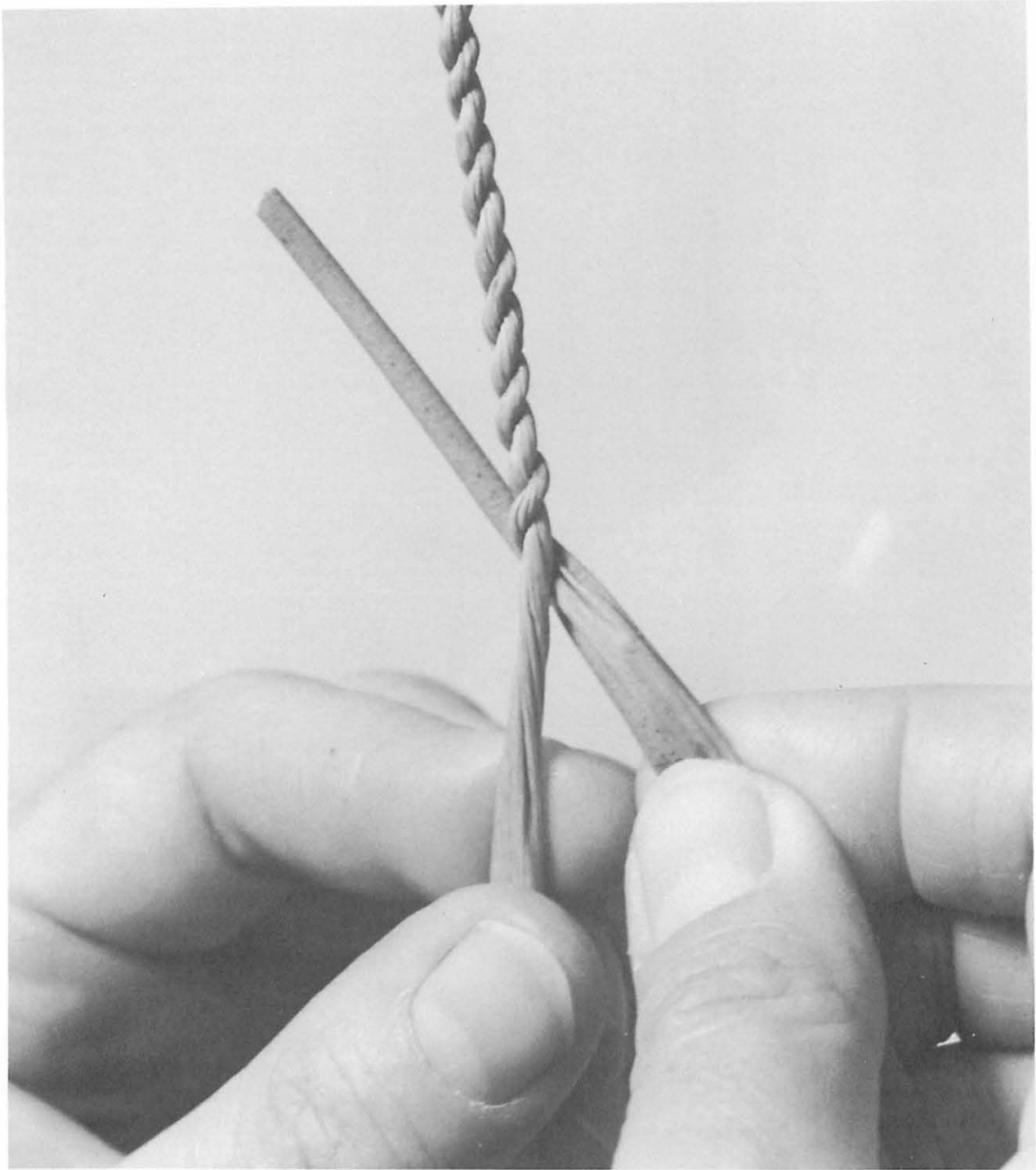


Figure 69 Add a new rush to the cord by laying it in with the old one.



Figure 70 Reproduction of a small rush bag twined over single warp rushes with a 3-rod border and a 2-ply rush cordage handle.



Figure 71 Reproduction of a small rush bag twined over paired warp rushes with a 3-rod border and a 2-ply rush cordage handle.

Catalogue of 2-ply Cordage from Site BkCp-1

All information is presented in the following format:

Nova Scotia Museum accession number

Length

Diameter

Direction of single-ply twist / 2-ply twist

Number of twists per cm

Helix angle

Remarks

Photo negative number

[Number of twists per cm and helix angle indicate the tightness of the twist. This manner of describing cordage follows Emery. (1980:10) The "Remarks" category includes information on any knots, additions or splices.]

accession number	length	dia.	twist	twists per cm	helix	remarks	negative number
84.22.556	163mm	2.7mm	S/Z	3	60°		N-20,088
84.22.557	290mm	3.0mm	S/Z	4	60°		
84.22.558	125mm	2.5mm	S/Z	3	60°		
84.22.559	100mm	4.0mm	S/Z	4	60°		N-20,088
84.22.563a	103mm	3.0mm	S/Z	3	70°		
84.22.584	38mm	3.0mm	S/Z	3	70°		
84.22.585	138mm	4.0mm	S/Z	3	60°		
84.22.586	65mm	2.0mm	S/Z	4	70°		
84.22.587	60mm	5.0mm	S/Z	4	60°		
84.22.588	214mm	3.0mm	S/Z	3	60°		
84.22.589	126mm	3.0mm	S/Z	3	60°		
84.22.590	41mm	5.0mm	S/Z	3	50°		
84.22.591	102mm	2.0mm	S/Z	3	70°		
84.22.592	172mm	3.0mm	S/Z	2	60°		
84.22.593	82mm	3.0mm	S/Z	4	60°		
84.22.594	99mm	3.0mm	S/Z	2	70°		
84.22.595	157mm	3.0mm	S/Z	2	60°		
84.22.596	161mm	2.0mm	S/Z	3	60°	1 addition	
84.22.597a	25mm	3.0mm	S/Z	4	70°		
84.22.597b	94mm	2.0mm	S/Z	4	60°		
84.22.597c	49mm	2.0mm	S/Z	3	60°		
84.22.598	218mm	2.0mm	S/Z	4	70°		
84.22.599	72mm	2.0mm	S/Z	4	60°		
84.22.600	169mm	2.0mm	S/Z	3	60°		

accession number	length	dia.	twist	twists per cm	helix	remarks	negative number
84.22.601	59mm	4.0mm	S/Z	3	60°		
84.22.602	59mm	2.0mm	S/Z	3	70°		
84.22.603	71mm	3.0mm	S/Z	5	40°		
84.22.604	94mm	4.0mm	S/Z	3	70°		
84.22.605	81mm	3.0mm	S/Z	3	60°	2 bound cords	N-19,436
84.22.606	132mm	3.0mm	S/Z	3	60°		
84.22.607	144mm	4.0mm	S/Z	3	60°	2 additions	
84.22.608	112mm	4.0mm	S/Z	3	60°		N-19,436
84.22.609	48mm	4.0mm	S/Z	3	70°		
84.22.610	85mm	3.0mm	S/Z	4	50°		
84.22.611	134mm	2.0mm	S/Z	3	70°		
84.22.612	118mm	3.0mm	S/Z	3	70°		
84.22.613	142mm	4.0mm	S/Z	3	50°		
84.22.614	59mm	2.0mm	S/Z	5	50°		
84.22.615	167mm	3.0mm	S/Z	3	50°		
84.22.616	83mm	3.0mm	S/Z	5	60°		
84.22.617	88mm	4.0mm	S/Z	3	70°		
84.22.618	126mm	3.0mm	S/Z	3	70°		
84.22.619	78mm	4.0mm	S/Z	2	60°		
84.22.620	80mm	3.0mm	S/Z	4	40°		
84.22.621	131mm	2.0mm	S/Z	3	60°		
84.22.622	125mm	2.0mm	S/Z	2	70°	knot	
84.22.623	116mm	3.0mm	S/Z	2	70°		
84.22.624	93mm	3.0mm	S/Z	4	40°		
84.22.625	181mm	4.0mm	S/Z	4	50°		
84.22.626	98mm	2.0mm	S/Z	3	60°		
84.22.627	41mm	2.0mm	S/Z	4	50°		
84.22.628	82mm	2.0mm	S/Z	3	60°		
84.22.629	106mm	3.0mm	S/Z	4	60°		
84.22.630	102mm	2.0mm	S/Z	6	50°		
84.22.631	64mm	5.0mm	S/Z	3	70o		
84.22.632	53mm	3.0mm	S/Z	3	50o		
84.22.633	133mm	3.0mm	S/Z	4	60o		
84.22.634	92mm	2.0mm	S/Z	3	70o		
84.22.635	116mm	3.0mm	S/Z	3	70o		
84.22.636	37mm	3.0mm	S/Z	3	50°		
84.22.637	82mm	2.0mm	S/Z	3	70°		
84.22.638	67mm	3.0mm	S/Z	3	60°		
84.22.639	108mm	2.0mm	S/Z	3	70°		
84.22.640	81mm	2.0mm	S/Z	3	70°		
84.22.641	86mm	4.0mm	S/Z	4	70°		
84.22.642	39mm	2.0mm	S/Z	3	70°		

accession number	length	dia.	twist	twists per cm	helix	remarks	negative number
84.22.643	131mm	2.0mm	S/Z	4	60°		
84.22.644	68mm	1.0mm	S/Z	5	60°		
84.22.645a	29mm	2.0mm	S/Z	4	60°		
84.22.645b	12mm	2.0mm	S/Z	4	60°		
84.22.646a	88mm	2.0mm	S/Z	4	70°		
84.22.647	67mm	2.0mm	S/Z	5	40°		
84.22.648	126mm	3.0mm	S/Z	5	60°		N-19,436
84.22.659	48mm	4.0mm	S/Z	4	60°		
84.22.668	53mm	2.0mm	S/Z	2	70°		
84.22.669	84mm	2.0mm	S/Z	3	70°		
84.22.670	134mm	2.0mm	S/Z	3	70°	2 additions	



Figure 72

Layout and design by R.H. Whitehead and Joleen Gordon, 1996.

All line drawings of textiles are by R.H. Whitehead, unless otherwise indicated.

The uncaptioned photographs all show reconstructions of Mi'kmaq life about 1400 AD, and were taken on the set of *Mi'kmaq*, a television series on the fifteenth-century Mi'kmaq, co-produced by the Nova Scotia Department of Education, and CBC Halifax, 1980-1981; at the request of the Micmac Association for Cultural Studies. The photographer was Linda Wood, Education Media Services.