

Nova Scotia



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Mi'kmaq

Textiles:

Sewn-

Cattail Matting

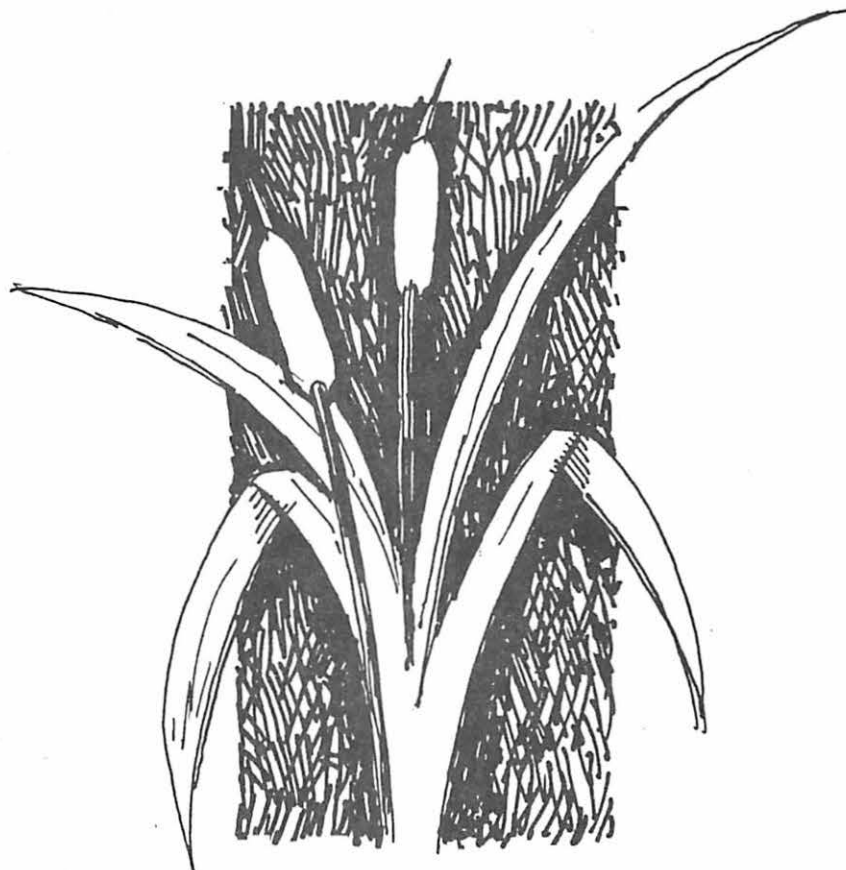
BkCp-1 site

Pictou

Nova Scotia

Nova Scotia Museum  
Museum Services Division  
1747 Summer Street  
Halifax, Nova Scotia, Canada  
B3H 3A6

By Joleen Gordon,  
Research Associate, Nova Scotia Museum  
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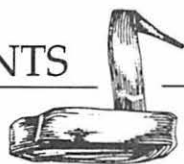
**Nova Scotia Museum Curatorial Reports**

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## INTRODUCTION

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Cattails are familiar plants all across North America. Found growing in wet ditches and marshlands, this indigenous plant is easily recognized by its brown sausage-shaped seed head. There are two varieties of cattails, the tall *Typha latifolia* and the smaller *Typha angustifolia*. While both occur in Nova Scotia, the taller plant is more common. Cattails are often called "bulrushes", which is also the common name of the real rush *Scirpus lacustris*. See Appendix One for a more complete discussion of plant terminology.

In times past, the aboriginal people of North America relied on their environment for their survival: plants and animals provided their food, their housing, and their clothing. One example of their resourcefulness was their use of the long, wide cattail leaves to make matting. Hundreds of leaves were bound together alternating the thick and thin ends of each leaf so that they hung vertically like a curtain. The leaves were then sewn with plant cordage at horizontal intervals down their length, and on either side of the mat, trapping an insulating pocket of air between the two layers of stitching. These mats were used for a variety of purposes—insulation from the cold winter ground, padding while kneeling in canoes, and protection from the weather as rain-repelling, wind-breaking and light-filtering walls in their summer homes.

Sewing cordage for these mats was made by twisting and plying plant fibers such as grasses, reeds or rushes. Edging cord was made by braiding cattail leaves. Needles were the only tools required to make these mats, although some western aboriginal people also used mat creasers.

Otis T. Mason defined this method of sewn-mat construction as a "pierced warp—a form of weaving in cat-tail and other soft materials when the weft strings pass through the warp. The warp stems are strung on the weft strings." (1904/1972:195)

Sewn matting has been documented for the Menomini and Winnebago in New England, for the Algonquian tribes of the Great Lakes region, for the Ojibwa/Chippewa, for the West Coast and Interior Salish, Nootka, Kwakiutl and Kootney, and for the Squamish/Suquamish and Salish. Sewn cornhusk matting has been documented for the Iroquois, while fragments of sewn rush matting have been found in a gravesite in Maine. Cordage making has been recorded for many of these same groups of people.

Sewn matting appears to be a craft of the past; I am not aware of anyone making these mats today.

The Nova Scotian Pictou site BkCp-1, dated 1570-1590, contains several fragments of sewn-cattail matting. This is very exciting as it is the only site in eastern Canada yet to have revealed the use of this technique by its aboriginal peoples. Fortuitously, these fragments have survived burial in our acidic soil by having been fused to copper pots, a popular European trading item of the time. Although none of the tools associated with this craft were found at this site, bone sewing needles similar to those used by mat makers in other North American native cultures were discovered earlier in nearby Merigomish. (Figure 1)

This report is one in a series examining the woven plant textiles found at Pictou. (Whitehead, 1987; Gordon, 1993) Ruth Holmes Whitehead has written archaeological re-

ports for the Pictou BkCp-1 site (Whitehead, 1987 and 1993), while the Merigomish site was described by Smith and Wintenberg. (Smith and Wintenberg, 1973)

As we have no information—oral, written or pictorial—on Mi'kmaq sewn-cattail matting prior to the finding of the Pictou site, I will first give a review of the literature concerning the making of sewn mats by other North American aboriginal peoples. I will then describe the BkCp-1 fragments of sewn-cattail matting, along with the sewing and binding cords, followed by my analysis of the techniques used by the Mi'kmaq people in the creation of this matting at the end of the sixteenth century.

# SEWN-MAT CONSTRUCTION BY THE INDIGENOUS PEOPLE OF NORTH AMERICA

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## Gathering and preparation of plant materials

In the midwestern United States, the time for gathering the cattail leaves was late summer when the plants were full grown—late September or early October. (Lyford, 1953; Petersen, 1963) On the western coast of Canada, the gathering time was late summer. (Turner, 1979; Anonymous, 1985) This time difference was almost certainly due to climatic conditions in the two geographic areas.

Karen Petersen has written the most detailed account of sewn cattail matting, based on her work with Chippewa informant, Mrs. Maggie Skinaway Wadena, of Mille Lacs, Minnesota. She was a recognized source of Chippewa craft lore, her parents having assisted an earlier ethnographer in her research. Mrs. Wadena described the gathering and preparing of the cattail leaves:

*They selected plants with wide leaves and rejected fruiting stalks because of their short leaves. After cutting them close to the ground with a sharp knife, they delivered them to the women who set to work preparing them at once before they dried out...*

*The leaves of each plant are divided with the fingers into two parts between which a knife is inserted to separate them at the lower end where they are joined. After the short outer leaves are discarded, two long outside leaves and three to five inside leaves remain. Outside and inside leaves are tied in separate bundles 3 to 5 inches in diameter by means of strips of basswood fiber. The lower ends of the leaves are placed together evenly and the excess over 55 inches is cut off the upper ends by laying the bundle on the ground and cutting it with a knife (1963:253)*

To make a mat approximately four feet square, Mrs. Wadena prepared four bundles of outside leaves and five bundles of inside leaves.

The leaves were dried in the sun. Some people constructed the mats at the time of gathering, others stored the material until the winter months when they had more time for weaving.

## Tools

Soon after the founding of the Plimouth Plantation in Massachusetts in 1620, Thomas Morton described the native use of a needle made from "the splinter bones of a Cranes legge", possibly the fibula, for sewing cattail matting. Unfortunately, there were no illustrations in his work.

Charles Willoughby illustrated the bone needles (Figure 2) thought to have been used in "flag leaf mats" found in shell heaps in New England.

*Double-pointed needles for sewing flag (cat-o'-nine-tail) leaves together in making mats for covering wigwams. One of these...has been broken through the perforation and re-drilled, thus converting it into an ordinary single pointed needle. The larger specimens are made from deer ribs. This type of needle is still used by the more primitive Algonkians of the Great Lakes area for mat making. (1935:226)*

Frances Densmore described the Ojibwa/Chippewa bone mat needles.

*The needle was slightly curved and was usually about 9 inches long. In a majority of instances the "eye" was near one end, but a very old needle was obtained in which the eye was midway the length. This needle was very long.(1929:157)*

Petersen reported that her informant, Mrs. Wadena, used a wooden needle. It was "three-eighths of an inch wide, one-eighth of an inch thick and nearly 11 inches long, with one end tapered like a slightly blunted dagger point, and an eye burned somewhat farther from this end than from the other." (1963:255)

In earlier times, Mrs. Wadena used sharply pointed deer-rib needles flattened "by removing the rounded surfaces with a knife." One informant told Petersen of seeing needles "made of steel by a blacksmith." Needles were used in pairs, so that two workers could sew on a large full-length mat at the same time.

*Other equipment needed includes scissors for cutting the cord, six 8 and 1/2 inch pegs whittled out of branches five-eighths of an inch in diameter, two side sticks and two needles. The side-sticks are as long as the bundles of cattails, one-fourth of an inch thick and about five-eighths of an inch wide. They are whittled from freshly cut white ash wood, are rounded on the edges and have a hole burned with a hot wire 1 inch from one end of each. (1963:254)*

The use of these pegs and sticks is found in Appendix Two.

On the western coast of Canada, sewn-mat makers used needles of wood and bone. Their long, thin mat needles were made of *Holodiscus discolor*, also known as ironwood or ocean spray wood, or some other hardwood. The length of the wooden needles varied from

11 inches to 38 inches; the width from 3/8 to 1/2 inch. Shorter bone needles were made of split deer ribs or the splinter (fibula) of a crane's leg. They were about 6 inches long and 1/4 inch wide. The eye was set either at one end or about mid-length. Generally, the needles were sharply pointed and slightly bowed to facilitate the threading of the leaves.

The sewn-mat makers on the West Coast also used a mat creaser, a tool not found in other native cultures. (Figures 3 and 4) The mat creasers were described in an anonymous catalogue, *The Eyes of Chief Seattle*, by The Suquamish Museum:

*This small hand-held tool, usually made of maple, takes the shape of a semicircle with a handle on top. The rounded bottom has a triangular groove cut in to fit over the mat needle. The upper edge is usually ornamented with carvings of birds or animals.*(1985:24)

After impaling the cattails on the needle, the mat creaser was firmly pressed around the leaves, opening up the spaces in the leaves through which the thread could be drawn. The longer needles threaded the leaves for the entire width of the row, while the shorter bone needles were used in sections across the width of the mat.

## Archaeological, historic and ethnographic evidence

Charles Willoughby reported that while woven bulrush matting was common in the archaeological record of New England, sewn bulrush mats were rare. He described finding fragments of a sewn-bulrush mat from a protohistoric grave in Harpswell, Maine, which had "evidently been used for wrapping the body". (Figure 5) "The rushes were twisted together in pairs and sewed as in the drawing, the cords being placed at intervals of about an inch." (1935:246)

In conclusion, Willoughby states, "I had never before seen this type of mat, nor do I recall a description of one." Indeed, the twining of the doubled-warps, the stitching through the centre of the warp-twists, and the closeness of the one-inch intervals of the stitching lines are most unusual. To my knowledge, this remains the only example of sewn-bulrush matting from this area.

Wendell Hadlock reviewed the woven-plant textiles found in this part of North America. He determined that "mats were known to have been made and used by all tribes of the Northeastern Indians, but few, if any, have been preserved." Historical accounts frequently mentioned their use, but rarely mentioned their process of manufacture. He compiled references to the making of mats for house construction—for outer walls, inner wall linings, and on the floors.

Two very early sources specifically mention the making of cattail matting: William Wood, in the 1634 edition of the *New England Prospect*, recorded one of the women's occupations, "In summer, they gather flagges, of which they make Matts for houses." (Wood in Hadlock, 1947:59) G. Mourt, in the *Journal of the Pilgrims at Plymouth in New England* in 1620, noted "when the Pilgrims landed on Cape Cod some of them found outside a wigwam, 'sundry



bundles of Flags and Sedges, Bulrushes and other stuffe to make Matts'." (Mourt in Hadlock 1947:59)

Another early reference to the making of sewn cattail matting, including the use of bone needles and hemp thread, is found in the first volume of Thomas Morton's *New English Cannan* in which he recorded the manners and customs of New England natives. They used such mats to cover the openings in their bark wigwams:

*...some made of reeds and some of longe flagges, or sedge, finely sewed together with needles made of the splinter bones of a Crane's legge, with threads made of their Indian Hempe, which their groueth naturally, leaving several places for dores, which are covered with mats, which may be rowled up and let downe againe at their pleasures, making use of the severall dores, according as the winde fits. (1637/1967:135)*

In reviewing the textile fabrics of the New England natives, Willoughby noted that while comparatively little is known of these perishable arts, including "the flag matting", they appear to resemble those done in the past by other eastern Algonquian tribes and those objects still made at the turn of the twentieth century by the remoter Ojibwa. (1905:85)

He felt that the plant textile arts among the native New Englanders were "doubtless inherited principally from the old Algonquian group which entered New England from the Southwest."

*These textiles included various types of matting, baskets of many varieties, certain clothing such as capes or mantles, also bags, quivers and burden straps. Mats for covering wigwams were usually made of flag leaves sewed firmly together with twisted cords of bast, the needle used for sewing being often made from half of the split rib of a deer. (1935:244)*

He reported that similar mats were once made by Algonquian tribes from the Great Lakes region.

*They are made of leaves of cat-o'-nine-tails strung together on cords in such a manner that each alternate leaf lies upon opposite sides and covers the junction of two other leaves. These mats are usually four to five feet in width and eight to ten feet long. The ends are furnished with a strip of wood to which the tying cords are attached. (1935:244)*

These mats would have been well used, and due to their structure and organic nature, very friable. He knew of "no existing example of this type in New England but there is no doubt of their extensive use in this locality."

With the introduction of European trade goods, this method of manufacture for the smaller mats was lost. However, as witnessed by several writers, larger mats sewn of either rushes or cattails remained popular for house construction in many native groups until relatively recently. There is a rather obscure reference to "weaving" bulrush mats with bone

needles in Densmore's study of the Ojibwa/Chippewa, when 74-year-old Nodinens explained her seasonal pattern of living:

*I, as the eldest daughter, boiled basswood bark, and made cord and grandmother made the bone needles that we would use in the weaving of mats. When the rushes were ready, we laid a cord on the ground and measured the right length for the mats. My mother knew just how long they should be to go around the wigwam, and we made five long ones, four middle size, and two small ones. The long ones were two double-arms lengths, and the middle sized ones were about one and a half double-arm's lengths. We laid the rushes two layers deep on the ground with the ends resting on the cord, after which we fastened the cord to the pole that was the upper, horizontal part of the weaving frame. My grandmother directed everything and she had a large quantity of thorns from the thorn-apple tree in a leather bag. She had been gathering these all summer, but she made sure she had plenty. We all three worked hard getting ready for winter. When my mother had finished the bulrush mats, she made more, mats for the floor, using either fresh reeds or some that she had gathered during the summer. (1929:120-121)*

Although she mentions the use of bone and thorn needles, and basswood cordage, there is no direct reference to sewing, but it appears to have been done that way.

Charles Callendar, Richard Pope and Susan Pope in their chapter on the Kickapoo of Oklahoma in *Handbook of North American Indians* show photographs of sewn "tule mats" used as walls and rooves in house construction. The vertically placed tules/rushes look very much like they were held together by regularly spaced rows of horizontal stitching down their length.

Callendar described the use of sewn cattail matting in the homes of Fox in Iowa:

*Winter camps varied in size from one to two families through larger clusters up to an entire band. Their component dwellings were dome-shaped round or oval structures whose pole frameworks were covered with layers of cattail mats. (1978:637)*

In this work, he included a 1923 photograph, taken by Huron H. Smith, of Mrs. Charles Keosatok of Tama, Iowa, preparing to sew a very large cattail mat with a curved bone needle. (Figure 6) Two other Huron photographs show Mrs. Keosatok making string to sew the mat (Figure 7) and her method of adding the cattail leaves to the foundation cord. (Figure 8)

In her 1929 work on the Ojibwa/Chippewa in Mille Lac, Minnesota, Frances Densmore described the making of both the rush and cattail mats in wood frames:

*These mats were made from cat-tail reeds (*Typha latifolia* L.) and were woven on the same frames as the floor mats. The reeds were turned in the same manner to form a selvedge at the beginning of the work, but the method of work was entirely different. The floor mats, as already stated, were woven with basswood twine, but in these mats the reeds were strung together with strands of basswood fiber which had been boiled to*

*make it tough. This fiber was threaded into a bone needle, which was passed horizontally through the reeds at intervals of 8 or 10 inches...*

*The ends of the reeds were often left free, so that only one side of the mat had a selvedge. This made it easier to place the mat in an upright position against the side of the wigwam. (1929:157)*

In the early part of the 1940s, Carrie Lyford found the Ojibwa/Chippewa in Minnesota continued to make cattail matting for house construction (Figure 9):

*Large cattail mats were used for covering the frames and lining the sides of wigwams... When the mats were made, the cattails were attached to a cord as when making rush mats. Basswood fiber that has been boiled to make it tough was threaded into a long bone needle and passed horizontally through the cattails at intervals of 8 or 10 inches... The cattails were lapped in such a way that the threads were not visible. The lower ends of the warp were often left free so that only one side of the mat had a finish or selvedge, and the mat could more easily rest in an upright position against the sides of the wigwam. The lapping over of the cattails when sewn insured warmth and prevented water penetrating the lodge. Six mats were needed to cover the sides of a good sized dwelling. Twelve mats might be needed when a lodge was to be entirely covered by them. The cattail mats could be easily moved. The women would roll them up in a big pack and put them on their backs to transport them from one place to another, as they followed their seasonal activities. There is little demand for such mats today, but the art of making them has not been entirely forgotten, and some are still being made today. (1953:90-91)*

Indeed, twenty years later, Karen Petersen described in further detail the sewn-cattail matting made by the Ojibwa/Chippewa people as outer coverings for their homes.

*In the cattail mat the aborigine's genius for adaptability to his environment is strikingly revealed. In a climate of great extremes, the Chippewa have contrived a rain-repellant, wind-resistant, portable, pliable, obtainable and lightweight lodge-covering. Most remarkable of all, he has hit upon the principle of insulation by means of walls enclosing a dead-air space in which convection currents are retarded by filaments. The walls are the outer layers made up of the hard lower half of the leaves, while the filaments are the inner layers of thin leaf tips.*

*The weatherproof quality derives from the construction. As mentioned above, the leaves lap like board siding, but vertically, making a rain-shedding covering... (1963:261)*

Petersen compared the advantages and disadvantages of the cattail matting in house construction versus the covering of birchbark sheets among the aboriginal peoples of the midwestern United States, noting that "apparently preference changed with the season."

The cattail-mat covered dwellings proved warm and comfortable in the coldest winters, while the birchbark and leather tents were used in the hot summers. (Figure 10)

Cattail mats were lightweight and easily rolled, making them not only transportable, but also a method of carrying household goods as Petersen illustrated in a quote from Alanson Skinner's study *Material culture of the Menomini*:

*Though bulky, the (cattail) mats are not heavy. They are rolled up lengthwise, and the culinary utensils are placed inside. The whole is then made fast by lashings of wi'kop or basswood bark. The load is packed longitudinally on the woman's back, and is supported by means of two packstraps, one around her waist, the other around her chest and shoulders. It projects far over her head, and gives her a remarkable appearance as she trudges along. (1963:262)*

Only Petersen in her 1963 study has given us a detailed description of the sewn-cattail mat-making technique as executed by her Ojibwa/Chippewa informant, Mrs. Maggie Wadena. It includes the step-by-step method of adding the leaves to the foundation row, the use of the side-pegs, the exact method of leaf-stitching, and the final row of plaiting. (See Appendix Two for a full account.)

In what Petersen calls "the upper edge" of the mats, paired of cattails leaves, carefully sorted for size and with their concave sides together, were folded over a foundation cord and bound to the next pair of leaves with a "tying cord". (Figure 11 and 12) Although the first pair of leaves was tied in a slip-knot, the remaining pairs appear to have been bound together with 2-strand twining using the tying cord. To produce a double-layered mat with a "durable and fairly smooth exterior shell and a tender and more irregular lining," the leaves were paired with the heavier leaf on the outside and the thinner leaf inside. They are then alternately folded over the foundation cord from each side, front and back.

The mat was tied to side-sticks. (Figure 13) Petersen felt they must have been used universally, "They prevent the end of the cord from tearing the leaves during sewing, they support the leaves while the mat is standing erect, and they protect the mat while in transit." (1963:258)

The mat also used wooden pegs driven into the ground to hold the mat in place while sewing. Two pegs were set on either side of the first row to hold the foundation cord.

*Two others are driven beside the mid-point of the side sticks, at such a distance apart that the side sticks are 2 inches farther apart here than they are at the ends of the first row. The third pair of pegs is placed near the free ends of the sticks but between them and at such a distance that the sticks are 4 inches farther apart than they are by the second pair of pegs. (1963:258)*

The placing of these pegs created a flare at the bottom of the mat which allowed it to conform to the shape of the wigwam.

In sewing the leaves, the work progressed from right to left across the mat and at intervals of seven inches. The leaves were picked up in pairs.

*...the right hand inserts the needle on the under side at a point nearly the centre, piercing the thin leaf and the underside of the thick leaf. Then the needle follows the pithy inside channel of the thick leaf and emerges on the far side of the leaf. (Petersen, 1963:259)*

This method of stitching allows the sewing cord to be "nearly invisible." No mat creaser was used; the left hand held the leaves firmly on the ground while the needle and cord were drawn through.

After a few rows, the outer and inner leaves reversed positions:

*When the fourth row is reached the topmost leaf has become so thin that it must be used as the lower leaf of the pair, and conversely the other is now heavy enough to be treated as an upper leaf. Hence, the pair is given a half twist to reverse their positions, and the work proceeds as before. (1963:259)*

The leaves were stitched in such a manner to the last row, which was not put in until the whole mat was turned over, re-tied to the pegs, and sewn on the other side. The final row was not sewn, but "made by plain plaiting which binds the two sides of the mat together." The cord held the leaves together in groups of five across the width of the mat, followed by a second row of catching the other side of each group. Petersen's informants could give no reason for this row except to say "that's the way they're supposed to be." She felt that "It appears to be used to keep the two layers of leaves from spreading apart while in use, thereby weakening the mat and impairing its effectiveness." (1963:259)

On the west coast of both Canada and the United States, near what is now the International Border, the native people were well known for their sewn-cattail, or "cattail-rush", matting. (Figure 14) The historian Homer G. Barnett considered it "practically universal" among the Salish. (1955:122)

*The flat, spongy leaves [of the cattail] were, along with the tule stems, the most important mat-making material of the Salish peoples in the Province [British Columbia], and were used by other groups as well... Mats were constructed by laying the leaves out side by side alternating top and bottom, and threading them together transversely at about ten-cm intervals, using a plant fibre such as nettle twine, or the lower edge of the cattail leaf itself. A long, thin needle of "ironwood" or some other hardwood was used in this procedure. It was poked through an entire row of leaves and the leaf tissue was firmly pressed around it with a "mat creaser", often of broad-leafed maple wood, to make an opening for the thread. Selvedge pieces of braided cat-tail leaves were sewn at the edges and the ends were folded over and bound. These mats were up to two meters in length and of a width varying with the number of leaves used. They were used by the Coast and Interior Salish, Nootka, Kwakiutl and Kootenay for insulating the walls of winter houses, for kneeling on in canoes, sitting on, drying berries on, covering doors and windows and as saddle blankets, mattresses, or mattress underlay and carpeting. For extra softness, three or four mats would be piled on top of each other. (Turner, 1979:150)*

Examples of matting used as an outer house covering can be seen in Figures 15 and 16.

The cattail plant was second in importance to the cedar tree to the Suquamish and other Puget Sound Salish peoples living further to the south, "A mat creaser, mat needle, and a good supply of cattails were all that was needed to make mats used for cushions and protective cover in canoes, to line walls, for sleeping, to serve meals on and for housing." (Anonymous, 1985:24)

Another group of Salish, the Quinault, not only sewed the cattail leaves into "mattress" matting (Figure 17), but they also made baskets of the same material, "sewed in the same way as the mat." (Olson 1936:85) The same author, working in the field in 1925-27, also found the Quinault were sewing "cattail rush" raincoats seen in Figure 18. Using a needle made from the wing bone of a sea bird, the leaves were sewn in two-inch intervals with a cord made from the edges of the cattail leaf, finely split and braided:

*The garment reached to the thighs or knees. The neck and bottom edges were usually lined with the skin of a surf duck or, more rarely, with fur. (1936:56)*

These raincoats were cone-shaped with a hole at the smaller end for the head. The closeness of the vertically placed leaves would repel the rain very well. A hat was worn to protect the head.

Plant leaves other than rushes and cattails were used to make sewn matting. Carrie Lyford described the arts of the Iroquois and reported their making sewn mats using corn husks.

*The cornhusk sleeping or lounging mat is thought to have been used by the Indians prior to the coming of the Europeans. There are many references to the use of mats in the folklore of the agricultural tribes. The corn husk lounging mat was made up of rows of husks of equal length neatly rolled with the ends folded. The husks for the second row were inserted in the ends of the husks of the first row and tied or stitched in place with basswood cord. The finished mat showed a stitching of basswood cord crossing the husks at regular intervals several inches apart. The edge of the mat was finished with a tight braid. (1945/1982:65)*

Cattail leaves were used to make cordage as well as mats. On the western coast of Canada, the Saanich, a Straits Salish group "split the leaves and spun them on the bare thigh to make storage baskets for camas bulbs and crabapples..." (Turner, 1979:151)

Other types of plants were used to make cordage. The twines were used not only for sewn-mat making, but also for other types of mat weaving and basket making, for tying stones to fish nets to serve as sinkers, and for a multitude of other purposes. The Ojibwa/Chippewa primarily used the inner bark of the basswood tree, *Tilia americana*, although slippery elm bark, *Ulmus fulva* was also used.

*For some purposes the fiber was used without twisting, the width of the fiber depending on the strength required; thus a strip of fiber as soft and fine as cotton string could be obtained, or a heavy fiber that would hold a considerable weight. The fiber was boiled to give added toughness...*

*In preparing the fiber it was customary to cut the bark from the basswood tree in long strips, put it in the water at the edge of the lake, among the rushes, for a few days, after which the soft inner bark could be separated from the outer bark. The fiber thus obtained was separated into strips less than an inch wide and stored in large coils until needed. The twisting of the fiber into twine could be done at any time. (Densmore 1928/1974:378;and Densmore 1928/1987:378)*

In 1929, Densmore described in detail both the gathering of the basswood bark and the twisting and plying process to create cordage. The Ojibwa/Chippewa, like the Menomini, rolled two moistened fibers back and forth across the thigh; the forwards motion created the S-twist in each of the two fibers, while the backwards motion twisted them together in a Z-twist, 2-ply twine. The Ojibwa/Chippewa also used nettle, *Urticastrum divaricatum*, obtaining a finer twine used for sewing, fish netmaking and weaving cloth; the root covering of bulrushes, *Scirpus validus*, to make a strong 2-ply rope; and deer sinew to make a 2-ply bow string. (1929:152-153)

The Ojibwa/Chippewa informant, Mrs. Wadena, used basswood fibre twine both for a foundation cord in her sewn-cattail mats and for sewing, but the stronger nettle-fibre cord for tying the first row. However, in 1963, she used "two kinds of commercial cord: for the foundation of the first row, two strands of ravelled burlap bags twisted together, for tying the first row and for sewing, soft rayon and knitting crochet yarn of the diameter of fourfold knitting worsted, which she always used doubled." (Petersen, 1963:254)

The Iroquois made thread, twine and heavier rope from the inner bark of basswood, moosewood and slippery elm trees.

*Bark that was to be used for thread was usually gathered in the spring when the sap was running. The outer surface of the bark was removed, then the inner bark was peeled off in narrow strips six or eight feet in length, loosely braided and tied in bundles until needed for use. It was then boiled and pounded to render it pliable. It was sometimes necessary to repeat this process three times. Then it was washed thoroughly and dried in the sun. (Lyford, 1945/1982:53)*

In addition they made finer twine from Indian Hemp, *Apocynum cannabinum*, Swamp Milkweed, *Asclepias incarnata*, and nettle fibers *Laportea canadensis*. The Iroquois also made a cord of 3-strand braided cornhusks which they bound to the edges of their sewn cornhusk mats. (1945/1982:65)

# SEWN-MAT CONSTRUCTION

## BY THE MI'KMAQ PEOPLE OF NOVA SCOTIA

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### Archaeological, historic and ethnographic evidence

Although it is not sewn, the earliest cattail-leaf matting in the Maritime region was found during the excavation of the Augustine Mound at Red Bank, New Brunswick. The material in this site is approximately 2500 years B.P. The vertical cattail leaves are held together with rows of evenly spaced twining with a material which looks either like fine cattail leaves or rush. (Figure 19) Fragments of a 3-strand cordage possibly made of cattail leaves were also found at this site. (Figure 20)

Partial evidence for sewn cattail mat making in Nova Scotia may be assumed from the bone needles found on Quarry Island. The Quarry Island shell heap in Merigomish Harbour was discovered in 1914 by W.J. Wintemberg, 41 years before the discovery of the Pictou BkCp-1 site, only a short distance away. (Smith and Wintemberg, 1929/1973; Tuck, 1984) It is interesting to observe that of the many shell-heaps reported by Smith and Wintemberg in the Merigomish area, only one revealed bone needles. (Figure 21) The needles were thought to have been used for sewing, possibly for filling snowshoes.

*No very fine needles were seen, but about twenty fragments of objects made of rather thin-walled bone, which appear to have been coarse needles, were found in heap A... (1929/1973:65)*

Unfortunately, no measurements were given for these needles, in either publication cited. According to Smith, the needle eyes appeared to have been gouged from both sides of the bone, rather than having been drilled, and the opening was "longitudinal in at least four of the six specimens showing perforations." The needle is believed to be "slightly curved" in shape. Smith felt that this may have been due either to a natural warping of the bone, or that this curved shape may have been "intentional and of service in certain kinds of sewing." As we have seen from other cultures using needles for sewn-matting, their needles were curved to allow easier threading of the leaves.

The hard evidence was found in a single site at Pictou, BkCp-1, dated 1570-1590 A.D. The Mi'kmaq people have been living in the Pictou-Merigomish area of Nova Scotia well before the coming of the Europeans.

*Merigomish...seems to have served as their headquarters. This was a favourable position for them. It was near the fishery in the Gulf; the islands abounded in wild fowl, the rivers swarmed with fish, and the woods in the rear were plentifully stocked with game. Their principal place of encampment [in the nineteenth century] was at the foot of Barney's River, on the east side, where they had, when the English settlers arrived, some clearings on which they raised a little Indian corn and a few beans. Other places around,*



*such as Big Island, some of the smaller islands in the harbour, and some of the points on the shore, were also sites of their encampments.... Their burying ground, when the English settled, and for how long previous we know not, was near the west end of Big Island. (Patterson, 1877/1972:26-27)*

Following their customary beliefs, the Mi'kmaq burials included artifacts to be used by the deceased in the life hereafter. The most spectacular of the grave-gifts were the copper pots. These copper pots, introduced by the French-Basques at the end of the sixteenth century, were valuable trade goods to the Mi'kmaq. Gravesites containing these pots are commonly referred to as "copper kettle burials" and the quality of the associated grave goods is incredible.

*The presence in many of the burials of copper cooking pots has resulted in greater than usual preservation of organic materials, due to the sterilizing effect of copper salts preventing bacterial breakdown of the wood, bark, fur and feathers in close association with the burials. (Whitehead 1993:23)*

Thus, the copper salts present at BkCp-1 have preserved for us all we know about cattail sewn-matting in Nova Scotia.

The Pictou gravesite was discovered by Kenneth J. Hopps in 1955 while digging a drain in the back yard of his home near Lowdens Beach. The following year, he uncovered an adjacent grave. J. Russell Harper of the New Brunswick Museum was called in to view the material and he described the site in two publications. (1956; 1957) Hopps had the latter article typed and offset-printed for sale in the small museum which he built to house the find. He had previously given various of the recovered items away, some of which directly and indirectly came to the Nova Scotia Museum.

In 1984, Hopps gave the remaining collection to the Nova Scotia Museum. The bulk of the material is found in accession 84.22.1-856. This accession contains the cattail matting and associated cordage under discussion: 7 fragments of sewn-cattail matting fused to copper pots (Figure 22), 16 fragments of sewn-cattail matting not fused to copper pots (Figure 23), several lengths of cattail braid and many pieces of twisted and plied plant cordage. (Figure 24) See Appendix Three for a complete catalogue.

In her extensive study of the material found at Pictou, Whitehead stated, "The Pictou material includes the largest collection of objects worked in plant fibres known for the Maritimes, and possibly for northern New England." (1987:42)

As stated earlier, prior to the finding of the Pictou site, there was no information, either oral, written or pictorial, regarding sewn-cattail matting in Nova Scotia. Only one seventeenth-century observation of Mi'kmaq matting may possibly refer to sewn-cattail matting, both from its use as a house covering, and its rain-shedding properties. Father Pierre Biard, one of the first Jesuit missionaries to describe the customs of the Mi'kmaq in Nova Scotia, wrote to his superiors in France about the differences between the bark-covered winter wigwams and summer homes:

*In summer the shape of their houses is changed; for then they are broad and long, that they may 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. (Jesuit Relations, 1611-1616/1897, III:77)*

Despite their use as a house-covering, I feel it is doubtful these are sewn-cattail mats; they are most likely twine-woven rush mats. The author described the material as "reeds" and marvelled at its fineness; cattail leaves are not a fine material and they do not resemble straw, whereas thin, narrow rushes do.

Harper compared the Pictou material to similar weaving found in nearby New England. The basketry techniques used by both groups of protohistoric weavers to produce mats and bags were similar, however, "a third matting fragment from Pictou is made in quite a different manner, employing sewing." He compared it to the Morton description, and to the Harpswell grave matting fragment illustrated by Willoughby.

*The Pictou specimen is made by stringing the flat bulrushes together on a fine 2-ply twisted twine to make a soft thick mat admirable for a floor covering but useless for shedding rain. (Harper, 1956:49)*

In his paper, he gave an illustration of the matting. (Figure 25) In this drawing, the leaves look as if they were sewn alternating top and bottom, as done by the western makers of sewn-cattail mats.

In 1957, Harper wrote a more detailed description of the material found in the Pictou gravesite for *Anthropologica*. The work included further information on the cattail matting:

*Bulrush mats of two types were recovered. In Grave Pit No. 1, the bulrushes were sewn together at six inch intervals with a two ply twisted thread, the sewing going right through the thin part of the leaf blade. With the leaves threaded tightly on the twine, the resultant mat was the thickness of the width of the blade which was sufficient to have considerable cushioning qualities. However in Grave Pit No. 2 mats were made in which thread was sewn through from side to side the width of the bulrush blade; the resulting sheet is only the thickness of the thin part of the blade. Several of these thin sheets were then lightly sewn together to give the mat some thickness. Such mats must have been used on the floors or on couches since they would be impractical for shedding rain. (Harper, 1957:57)*

Whitehead, reviewing Harper's work, suggested that although he referred to them as bulrush mats, "The material used here may have been the cattail (*Typha latifolia*), as this process sounds remarkably like a method still employed by certain native groups for use with cattail leaves." (1980:51)

In 1986, this material was examined by Mary Lou Florian, the ethnobotanist in the Conservation Department of the Royal British Columbia Museum in Victoria. Florian confirmed the identification of the broad-leafed material in the sewn matting as cattail, *Typha latifolia*, and the sewing cord to be a monocot leaf.

The sewn-cattail matting fragments are not in good condition; they are in a bad state of deterioration, irregularly shaped, and some are fused to pieces of flattened, broken and twisted copper pots. They show us, however, that while the Mi'kmaq matting is similar in some instances to western mats, there are also some striking differences.

The most obvious similarity is that the mats are constructed with the pierced warp technique, as defined by Mason. It is difficult to make a firm analysis, due to their friable state and possible loss, but most of the leaves appear to have been sewn across the full width of the leaf, rather than through the centre of the thin leaf and through the centre-pith of the half the width of the thicker leaf as in the western mats.

Harper noted there were two methods of stitching: Grave Pit One having the leaves stitched through the leaf blade, while Grave Pit Two had the leaves stitched their width. None of the existing fragments show stitching *only* through the leaf-blade, most show stitching the width of the leaf-blade. A few fragments, however, have a mixture of both methods of stitching. It may be possible that more matting had been made using both methods of stitching, and that over time, the smaller leaves which were stitched through the blade, deteriorated and fell off, leaving those stitched through their width.

It is also difficult to determine if the leaves were sewn in two separate layers. Some fragments show only one layer of leaves fused to the copper pots, while others appear to be several layers thick. (Figure 26) None of the remaining fragments show the layers of leaves stitched together as Harper suggested to give the mat greater thickness.

The top edge of the Mi'kmaq matting is quite unlike the western mats. There appears to be no foundation cord over which the leaves are added. Pairs of leaves, possibly the thin tip of an outside wide leaf and thick bottom end of an inside narrower leaf, appear to have been joined together with a row of 2-strand twining. The material used in this row of twining is unlike the twisted and plied grass cordage used for leaf stitching; each strand is untwisted and thicker than the elements used in the cordage. This material may possibly be either fine strands of rush, *Scirpus lacustris*, or heavier strands of American Beach Grass, *Amophila brevingulata*. The overall appearance of this row is a very tight and even, but flat in comparison to the depth of the Ojibwa/Chippewa mat. A possible difference may be that the Mi'kmaq matmakers added the paired leaves with twining, rather than alternately folding the heavier outer leaves over a foundation cord. Another difference may be the size of the leaves; the eastern leaves are smaller than those from the west.

One similarity, the reversal in position of the leaves partway down the length of the mat, was found on fragment 84.22.010e. (Figure 27) Petersen described this as a solution to making a square mat with a tapering leaf; reversing the tapering thin tips with the thicker bottom ends halfway through stitching the mat solves this problem. We are very fortunate to have this fragment survive.

Other information is lost. No fragments reveal a bottom edge of the mat; none show a side-edge. As discussed below, one of the braided cattail cords is pierced suggesting it may have been used as a side-edge, but no braided cords remain attached to the matting.

Positive identification of the sewing cord has proved difficult. In her review of the literature, Whitehead gave a number of cordage sources - Basswood (*Tilia americana*), inner White Cedar bark (*Thuja occidentalis*), Indian Hemp (*Apocynum cannabinum*) and members of the nettle family (*Labiatae*). (1980:51-52) Florian determined the cordage was of a plied monocot leaf, but further identification by embedding a sample is needed to determine the species. Monocot leaf plants growing in close proximity to the cattails beds at the site include American Beach Grass, *Amophilia brevingulata*, and sweetgrass, *Hierochlœe odorata*.

The sewing cords appear to have been made by twisting each of two strands, or groups of strands to the right, in an S-twist, and then plying them together with a twist to the left, a Z-twist. (Figure 28)

The other type of plant cording found with the cattail matting fragments were several strands of 3-strand braid, woven with cattail leaves, as confirmed by Florian. These may have been used as an edging cord on either side of the mat anchoring the ends stitching lines. Indeed, one fragment, 84.22.572, has been pierced with a plied cord, possibly the sewing cord. The ends of some of the braided cords have been bound with plied cord to hold the strands in place. (Figure 29)

# MODERN RECONSTRUCTION OF SEWN-CATTAIL MATTING

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## Gathering and preparation of the plant materials

Because the sewing cordage material has yet to be identified, I experimented with two grasses found growing near the cattail beds in the Pictou area—American Beach Grass, *Amophilia brevingulata*, and sweetgrass, *Hierochlœ odorata*. Both grasses were collected in mid-summer and dried away from the sun to prevent bleaching. The evening before working, a small amount of the grass was sprayed with warm water and wrapped overnight in a tea towel, a process called “mellowing” by basketmakers. Both grasses made cordage suitable for sewing. Although I had no way of testing, the beach-grass cord seemed stronger.

The twining cord used in the upper edge of the original Mi'kmaq matting has not yet been identified. Based on the size of the material, which was used untwisted or plied, I experimented with heavier strands of American Beach Grass, *Amophilia brevingulata*, and thinner pieces of rush, *Scirpus lacustris*. Both plants were gathered in late July, dried in the sun and then wrapped for storage. The day before working, they were sprayed with water and wrapped in a tea towel overnight to mellow. Both plant materials worked well, however the beach grass appeared to me to be stronger.

The material in the 3-strand braided cordage has been positively identified as cattail, *Typha latifolia*, by Mary Lou Florian. In preparation of making the 3-strand braid, I gathered the cattail leaves at the end of July, beginning of August. They were dried in the sun for a week, bringing them indoors each night away from the moist dew. They were stored wrapped up in an old blanket for winter. The night before working, a small bundle of leaves were sprayed their entire length with water, then firmly wrapped in an old blanket overnight to mellow.

In preparation for making the mat, I sorted the leaves according to size with the thin inner leaves in one pile, and the heavier outer leaves in another. Both groups of leaves were cut to the same length. The length depends on the size and shape of the leaves; the longer the better. The evening before working, a bundle of each size was mellowed. About a 10-15cm length of both the tips of the outer leaves and the butts of the thinner inner leaves were sprayed with water, wrapped in a towel, and left overnight to soften.

## Twisted-grass cordage

To make the two-strand (2-ply) cordage, loop a single piece of grass over a hook. (Figure 30)

Hold each piece of grass with the forefinger and thumb of each hand. Rotate each piece of grass in a clockwise direction (left to right); an S-twist. (Figure 31) The direction of the twist is in the same direction as the centre-line of the letter S.

When about 1cm of each grass blade has been twisted, twist the two twisted strands together with an opposite twist, a counter-clockwise twist (right to left); a Z-twist. (Figure 32) 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 piece of grass, lay the new blade over the old one and twist them together. (Figure 33)

There is another method of making 2-ply cord which I have yet to master. 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 to be used today in many cultures, using a variety of plant materials—grasses, rushes, reeds, strips of soft inner bark, and thin ribbon-like pieces of wood.

## Braided-cattail cordage

To braid, select 3 leaves about the same size. I like to alternate tips and butts to make an even braid. Tie the leaves together at one end, preferably with grass cordage.

To braid, spread the leaves out evenly. (Figure 34)

First, fold the right-hand leaf over the centre-leaf to lie on the inside of the left-hand leaf; the outer leaf becomes the new center leaf. (Figure 35) Next, the left-hand leaf is folded over the centre-leaf to lie on the inside of the right-hand leaf. (Figure 36) Continue in this way, alternating with each outside leaf.

To add a new leaf, lay the new leaf on top of the old leaf and braid them as one. (Figure 37) Bind ends together with cord.

## Sewn-cattail matting

The initial row of twining is important. By placing the leaves in the consecutive spaces, or loops, created by the action of the twining, the leaves are held firmly in place ready for stitching.

Unfortunately, we have no remaining artifact to show either the beginning or the ending of this row of twining; only centre portions. Thus, I have had to speculate both the beginning and the ending of this row.

To begin, take a piece of either a thin piece of rush or beach grass (I used grass) and loop it in half. Into this loop, place about 2-3cm length of one tip from the heavier outer leaf-pile and one butt from the thinner inner leaf-pile; a total of 2 leaves. Tightly twist the two pieces of the grass once in a clockwise direction. (Figure 38)

Into the next loop, bend down the tip and the butt from the previous loop, and add 2-3cm length of one new tip from the heavier outer-leaf pile and one new butt from the thinner inner-leaf pile. (Figure 39) Each loop of twining now envelops 4 leaves.

Tightly twist the two pieces of grass once in a clockwise direction. Continue adding leaves in this way for the desired width of the mat. (Figure 40)

At the end of this row, overlap one cattail leaf to one grass strand and two cattail leaves to the other grass strand and begin a 3-strand braid for the side-length of the mat. Another 3-strand length of cattail leaf braid can be bound to the other end of this row with grass cordage.

To stitch the leaves together, first spread them out on the ground in the desired shape of the finished mat. With a needle (I used a regular steel wool darning needle) threaded with grass cordage, bind the end of the cord around the cattail braid about 10cm down from the initial row of twining.

With the left hand, lift up the upper layer of leaves and insert the needle through the width of the cattail leaves, making an effort to alternate the thinner inner leaves and the thicker outer leaves. (Figure 41) Another method of stitching is to take the leaves in pairs, thin and thick, and pierce the thin leaf while inserting the needle through the centre pith of the thicker leaf. (Figure 42)

This process is repeated across the width of the mat. At the other side, the cordage is pierced and wrapped around the cattail braid and cut. This method of stitching is repeated at 10cm intervals down the length of the mat.

When one side is completely sewn, the whole mat is turned over and the sewing process repeated on the other side down the length of the mat. The two layers of stitching create an insulating space in between.

To keep the sides equidistant, the two rows of pegs driven into the ground on either side of the mat to which Petersen referred would be most useful; when stitching, the ends of each row are bound to these pegs.

## CONCLUSIONS

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Because of their deterioration, it is difficult to determine not only the original form of the Mi'kmaq sewn-cattail fragments, but also their purpose.

In their original form, they may have been as wide as their purpose dictated and as long as the length of the leaves available. Because this site contains fragments of braided cattail-leaf cordage, one of which is perforated with a fragment of twisted and plied grass cord, together with the known use in other native cultures, I feel we can safely surmise that the Mi'kmaq people stitched a length of 3-strand braided cattail cord to each side of the mat. This braid not only gave a finished edge to the mat, but also provided an anchor for the transverse stitching lines. Whether or not, a pole was wrapped to each side of the mat for added support, as in some other cultures, is unknown.

I agree with Harper's suggestion that the layered leaves would make "a floor covering," but that their present state of being so loosely sewn together would make the mat "useless for shedding rain." Perhaps their deterioration is a direct result of having been buried for 350-400 years. It may have been that when they were first made, the leaves were more closely sewn together, in which case one could understand if the mats were used as a house covering, the rain would easily run down the vertically placed wide, flat leaves.

From my examination of the cattail fragments in this collection, there are some similarities and some differences when comparing the construction techniques used by the Mi'kmaq and the western weavers.

### *Similarities*

1. The cattail matting in this collection appears to have been constructed using the pierced warp technique as defined by Mason.
2. The leaves appear to have been sorted before being added to the upper edge in pairs, one butt and one tip. The average is 1.8 leaves per cm. This row is tightly woven. The leaves may have been twisted to remove air bubbles thus compacting their size. The leaf blades are relatively wide, measuring 1.0-1.5cm across.
3. In some fragments, there appears to be two layers of sewn leaves.
4. In one fragment, there appears to be a reversal in positioning the leaves, thick with thin, partway through making the mat.
5. The rows of stitching are 10-15cm apart.
6. The possible use of a 3-strand braided cattail cordage as an edging. One fragment shows a piece of sewing cord.
7. The sewing cord is a 2-ply strand made from a monocot leafed plant.



## Differences

1. The most important difference is the method of constructing the upper edge of the mat. There appears to be no foundation cord over which the paired leaves are folded. Rather, a more complicated weaving pattern is created by adding first the butt of one leaf and then the tip of another in a definite sequence while holding them in place between consecutive loops of a single row of two-strand twining using an as yet unidentified leaf. This row of twining is tight enough to hold all the leaves in place. Petersen reported that the Chippewa bind the butt end of a thin leaf together with the tip of a thick outer leaf so that the thick leaves will stand in their original position of growth, making the mat sturdier for standing. The fragments in this collection are deteriorated so that it is difficult to tell which leaves are used where. The upper edge, however, appears to have an even appearance, as though the thin butt ends and the heavier tip ends were used, following Petersen's description.
2. The upper row of twining does not appear in the sewn cattail matting of other cultural groups. It appears to have been executed with an untwisted, single strand of plant material, smaller and rounder than cattail. It may be a fine piece of rush, *Scirpus lacustris*, or a grass like American Beach Grass, *Amophila brevingulata*.
3. There do not appear to be any definite creases on either side of the rows of stitching; this would suggest that a tool such as a mat-creaser was not used in the construction of the Mi'kmaq mats.
4. The majority of the leaves were sewn through sideways, the width of the leaf, unlike the Ojibwa/Chippewa mats in which the alternate thinner leaves were sewn at right-angles.
5. There do not appear to be as many cattail leaves per measured distance in this collection as in the matting from the western groups.
6. There is no evidence of the bottom plaiting as described by Petersen in the Ojibwa/Chippewa mats; it is possible that they may have been done and lost.
7. The size difference between the cattail leaves grown in the East, mid-West and the West of North America, would result not only in the size difference in the completed mat, but also in the number of cattail leaves per distance in the upper edge. From personal observation, the cattail leaves on the West Coast are larger than those on the East Coast.

## APPENDIX ONE - Plant Nomenclature

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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. Until recently, the Latin name was not only always underlined, but it also included the name of the botanist who first described the plant. Nowadays, the accepted practice is to use only the italicized Latin name.

While each plant has only one Latin name which is used universally, whatever the spoken language, one plant may have several common names. To add to this confusion, not only may some plants have the same common name, but also their accepted usage changes with time.

Such is the case with the common names of many of the plants cited in this report. In North America, the common name "cattail" refers to the plants *Typha latifolia* and *Typha angustifolia*, while the name "bulrush", or "bullrush", is used to describe both the cattail plant and the rush plant, *Scirpus lacustris*. In 1956, when J. Russell Harper first described the sewn-cattail matting fragments discussed in this report, he referred to the material as "bulrush". Apparently, "bulrush" was the accepted common name at that time for what we now call "cattails". The Salish group, Quinault, in the state of Washington in the early 1930's referred to the same material as "cattail rush".

At the present time in North America, the word "rush" refers to plants in the sedge family Cyperacea, most familiarly the genera *Scirpus*, and plants in the rush family Junacea, most familiarly *Juncus*. "Bulrushes" usually refers the large species of *Scirpus lacustris*, also known as "tule reeds", or "tule stems", on the West Coast.

## APPENDIX TWO - Chippewa mat-weaving techniques

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This is the only detailed description of sewn-cattail matting we have to my knowledge. It was collected by Karen Petersen from Ojibwa/Chippewa informant Mrs. Maggie Skinaway Wadena of Mille Lacs, Minnesota and published by the Smithsonian Institution, Bureau of American Ethnology, Bulletin 186 in 1963.

The first step in making the mat is to fashion what will be the upper edge when the mat is in use. This is done by tying the cattail leaf warp strands onto the foundation twine by means of a tying cord. The foundation twine is cut about 8 feet longer than the desired length of the mat and hung by a slipknot from a hook in the ceiling in such a way that one end just reaches the floor. Before this the worker seats herself on the floor and knots the end of the doubled tying cord to a point about a foot from the lower end of the foundation twine. Hanging the twine provides the necessary tension while the tying cord is pulled tight...

It will be recalled that in bundling the cattails, the outside leaves were separated from the inner leaves. The former are to stand upright in their natural positions when the mat is in use, while the latter are to be inverted. The greater width, thickness and curvature of the outside leaves at their lower ends suggest several reasons for using them in their natural positions: they provide a strong footing for the mat in use, they widen the lower edge of the mat so it will better fit the lodge frame, and they would be difficult to tie into the upper edge.

Hence, for making this edge the lower ends of the inside leaves and the upper ends of the outside leaves are used. In order to soften them, the bundle end to be used is rested in a basin, and boiling water is poured over it while the bundle is rotated. Two bundles each of outside and inside leaves are treated first, and others when needed. The treated bundles are opened and laid to the left of the worker with the ball of doubled tying cord to her right...

A leafy upper treated end is always laid inside a concave lower treated end. When they are folded the leafy upper end is invisible.

To tie the first pair of leaves to the upper edge:

1. The worker grasps a pair of leaves, concave side toward her, with the thumb and the index finger of the left hand about two inches from the end, which is in front of her and near the hanging foundation twine.
2. With her right hand, she loops the tying cord loosely around the leaves and the two fingers holding them, winding in the direction away from herself and keeping the loop open with the two fingers.
3. She places the leaves behind the foundation twine and about 1 and 1/2 inches projecting on the right side of the twine.
4. She turns the ends of the leaves over the foundation twine, toward her.
5. She slips the ends under the loop, her fingers assisting.
6. She pulls downward hard on the side of the loop away from her, to pull the ends of the leaves closely together, and ties the end of the cord in a slipknot. (This knot is not repeated in the rest of the process.)
7. She pulls the excess tying cord to the front.

To tie the second pair of leaves, the same process is used except for a reversing of certain directions as noted:

1. The concave side is away from her.
2. She places the leaves in front on the twine.
3. She turns the ends away from her.

These two processes are repeated alternately until the desired length is reached. They produce two layers of cattail warp strands, each layer consisting of a durable and fairly smooth exterior shell and a tender and more irregular lining. The foundation twine is lowered occasionally as the work proceeds. It is now unhooked and the side sticks are added. Before the sticks were added in this study, the work was moved outdoors in order to photograph the tying of the first row.

These sticks are mentioned in the literature only by Willoughby but they must by necessity been universally used. They prevent the end of the cord from tearing the leaves during sewing, they support the leaves while the mat is standing erect, and they protect the mat while in transit. When the first row is finished the foundation twine is threaded through the hole in each stick and a triple knot is made which will not pull through the hole. The row took 3 hours to complete, with two women working...

The warp is now laid on the ground for sewing with the weft cords. Pegs are driven into the ground 6 inches from each end of the first row and in a line with that row. The foundation twine is tied to these pegs. Two others are driven beside the mid-point of the side-sticks, at such a distance apart that the side sticks are 2 inches farther apart here than they are at the ends of the first row. The third pair of pegs is placed near the free ends of the sticks but between them and at such a distance that the sticks are 4 inches farther apart than they are by the second pair of pegs. When the mat is finished, the sticks keep their flare. The additional width of the mat at the lower edge conforms to the shape of the wigwam. Because the season for making mats occurs late in the year, sewing may be difficult owing to the cold, rain and wind, as it was in the present instance. If conditions become intolerable, work is continued in the house, where nails in the floor replace the pegs. This practice appears to be a transfer from wigwam life.

The leaves are sprinkled with water from a dipper before beginning work and occasionally during the process. The worker sits on the ground with the place where she began the first row before her. A doubled cord a little longer than the mat is tied securely to the stick nearest the worker about 7 inches from the first row. It is then threaded into the needle, passed through the upper pair of warp leaves in the pierced warp technique, and fastened to the farther stick, thus moving from right to left on the mat. This operation is repeated every 7 inches except for the next-to-last row which is not put in until the mat is turned over and the other side sewn in the same manner as the first. Then this row is made by plain plaiting which binds the two sides of the mat together near the lower edge. This plaiting consists of passing the threaded needle over five leaves that are visible on the upper surface of the mat, then under the lower layer for an equal distance, and so on across. This process is repeated

starting from the same point but passing under the leaves passed over before and over those previously passed under. The cords are not drawn up tightly to distort the positions of the leaves.

The informants in this study could give no reason for using this row except "that's the way they're supposed to be". It appears to be used to keep the two layers from spreading apart while in use, thereby weakening the mat and impairing its effectiveness.

The manner of sewing each layer is this: the left hand barely lifts a pair of leaves and the right hand inserts the needle on the under side at a point nearly the centre, piercing the thin leaf and the under side of the thick leaf. Then the needle follows the pithy inside channel of the thick leaf and emerges at the far side of the leaf. Eight to ten pairs of leaves are pierced in this way before the cord is drawn through. While the right hand pulls the needle, the left is pressed down on the leaves to keep them in place. This process is repeated until the row is finished. The leaves now lap like the siding on a house, but vertically, and the sewing cord is nearly invisible.

When the fourth row is reached the topmost leaf has become so thin that it must be used as the lower leaf of the pair, and conversely the other is now heavy enough to be treated as an upper leaf. Hence the pair is now given a half twist to reverse their positions, and the work proceeds as before. About 4 1/2 inches below the last row the cattails are trimmed off, and the mat is completed. (Petersen, 1963:256-260)

## APPENDIX THREE

### Catalogue of BkCp-1 cattail matting and cordage fragments

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*Information in boldface extracted from Nova Scotia: The protohistoric period 1500-1630, Nova Scotia Museum Curatorial Report No. 75. (Whitehead, 1993:108-122)*

#### Sewn-cattail matting fragments fused to copper pots:

As the copper pot fragments are important to the matting fragments, I have included their accession numbers, as well as their overall dimensions.

**POT 84.22.007a copper pot fragment 88 x 52cm**

**84.22.007c cattail matting fragment**

A small fragment of matting, approximately 6 x 9cm, with layers of matting on top of one another. The leaf width varies from 0.8, 1.1, 1.2, 0.9cm. No top rim edge, no side edge.

**POT 84.22.010a base of pot fragment, flattened 39 x 40cm**

**84.22.010c cattail matting fragment**

A very irregularly shaped piece of matting, single layer of leaves flattened to metal, in some places fused. the stitching is the width of the leaves in many places. the width of the leaves varies 1.3, 1.1, 1.3, 1.3cm. No upper rim edge; no side edge.

**POT 84.22.010b copper pot fragment, rim 10 x 49cm Figure 26**

**84.22.010e cattail matting fragment**

A long piece of metal, the broken off rim of a pot, with a narrow piece of matting, 26 x 6cm showing three bands of stitching at intervals of 11cm. The middle band of stitching shows the leaves alternating positions.

**POT 84.22.011a copper pot fragment, 86 x 26cm**

**84.22.011e cattail matting fragment**

Two large fragments with leaves only, no upper rim edge, no side edges. The leaves vary in width 1.2, 1.3, and 1.5cm. One matting fragment has possibly two layers of leaves with four bands of stitching at 13, 12 and 14cm intervals down the length of the fragment.

The other matting fragment, many leaves deep, is aligned across the width of the metal fragment, the width of which, 15cm, approximates the stitching interval; no stitching cord remains. The ends of the leaves have been sheared off on both sides of the metal fragment, removing all traces of the stitching cord.

**POT 84.22.011b copper pot fragment 45 x 22cm**

**84.22.011f cattail matting fragment**

Length of cattail matting with top edging 12cm long. Five rows of stitching at 9, 7, 8, 7.5, and

10cm intervals. The width of the leaves varies 1.4, 1.5, and 1.8cm. The width of the leaves in the top edging varies 0.6, 0.5, 0.6, and 0.5cm. The width of the row of twining in the top edging varies 0.2, 0.4, 0.3, and 0.3cm. No evidence of side-edging. It looks as if it may be double-layered; in one area the matting has fused to the metal with another layer of leaves resting on top.

**POT 84.22.011c copper pot fragment 24 x 7.5cm Figure 21**

**84.22.011g cattail matting fragment**

A smaller fragment showing a 9 - 10cm length of top edging, folded on itself at one end. In the edging, the width of the leaves varies 0.3 - 0.4cm, while the width of the fiber in the row of twining approximates 0.2cm. In the matting, the leaves vary in width 1.0, 0.7 and 0.6cm, while their length is short, only 3 - 4cm. There is no evidence of a side-edge.

**POT 84.22.011d copper pot fragment 16.5 x 10cm**

**84.22.011h cattail matting fragment**

A small piece of fragmented metal with a few lengths of fused leaves varying in width 1.5, 1.3, 1.5cm. There is one free piece of cattail leaf, 14 cm long and 1.5cm wide.

### **Sewn-cattail matting fragments not fused to copper pots:**

**MAT 84.22.550 260 x 200mm fragment**

broken up; no stitching lines; no edge

**MAT 84.22.551a 145 x 85mm fragment- Figure 22**

fused to moosehair; one line of stitching

**MAT 84.22.552 520 x 430mm fragment**

largest piece; several layers; 3 lines of stitching; no edge

**MAT 84.22.564 220 x 120 x 25mm fragment- Figure 25**

bundle of leaves; 2 stitching lines

**MAT 84.22.579 119 x 12mm fragment**

few leaves with short lengths of cord

**MAT 84.22.682b no mm fragment**

fused to birchbark fragment .682a

**MAT 84.22.684b no mm fragment**

fused to birchbark fragment .684a

**MAT 84.22.855 125 x 60mm edging fragment**

very compressed sample, possibly top edge of mat

**MAT 84.22.856 110 x 70mm edging fragment**  
few leaves and piece of cord

## Cattail braid fragments associated with cattail matting

**MAT 84.22.569a 90 x 40mm edging fragment-Figure 28**  
3-strand braid of cattail leaves

**84.22.569b 4mm**  
twisted and plied cord binding braid

**MAT 84.22.570 240 x 19mm edging fragment**  
3-strand braid of cattail leaves

**MAT 84.22.571a 135 x 10mm edging fragment-Figure 28**  
3-strand braid of cattail leaves

**84.22.571b 3.7mm**  
twisted and plied cord binding braid

**MAT 84.22.572a 130 x 13mm edging fragment-Figure 28**  
3-strand braid of cattail leaves

**84.22.572b 4mm**  
small fragment of twisted and plied cord piercing the braid

## Twisted and plied cordage associated with cattail matting:

There are 77 pieces of plant cordage listed by Whitehead, all assumed to be from the sewn-cattail mats. Their accession numbers range from 84.22.556 to 84.22.670. We photographed the following three examples for this study:

Figure 27

**84.22.605 81 x 3.0mm**  
One length of S-twisted and Z-plied leaf-plant cord

Figure 27

**84.22.608 112 x 4.0mm**  
One length of S-twisted and Z-plied leaf-plant cord

Figure 27

**84.22.648 126 x 3.0mm**  
Two lengths of S-twisted and Z-plied leaf-plant cord which have been bound together at one end with another length of twisted plant cord.



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ILLUSTRATIONS

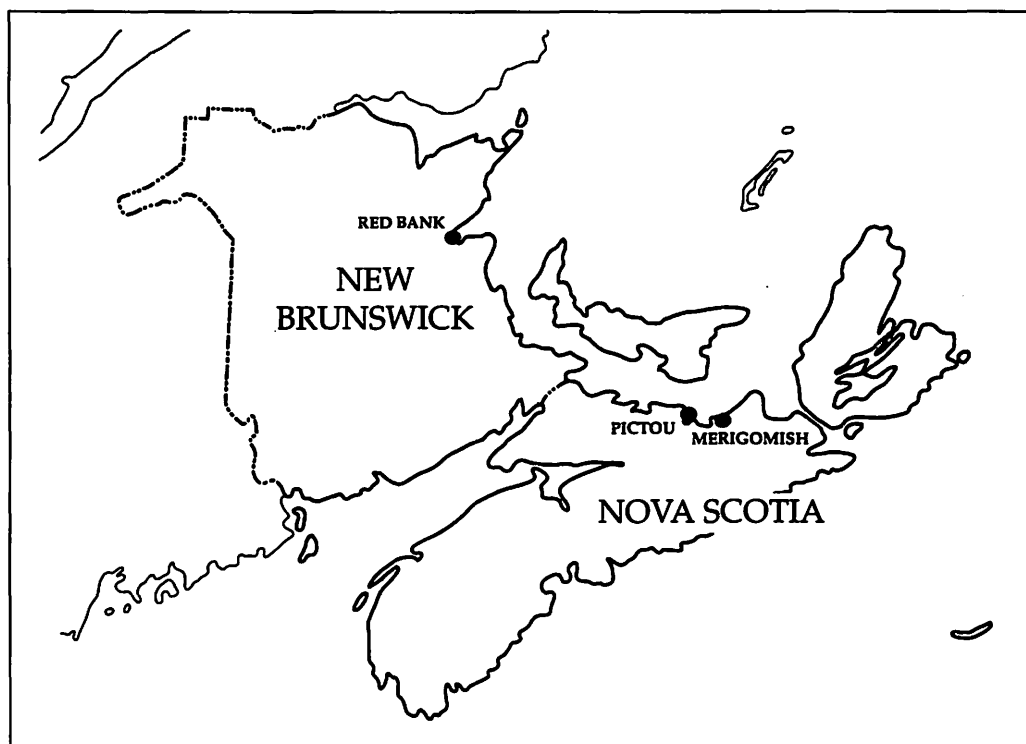


Figure 1. Map of the Maritime Provinces in Eastern Canada showing the locations of Pictou and Merigomish in Nova Scotia and Red Bank in New Brunswick.

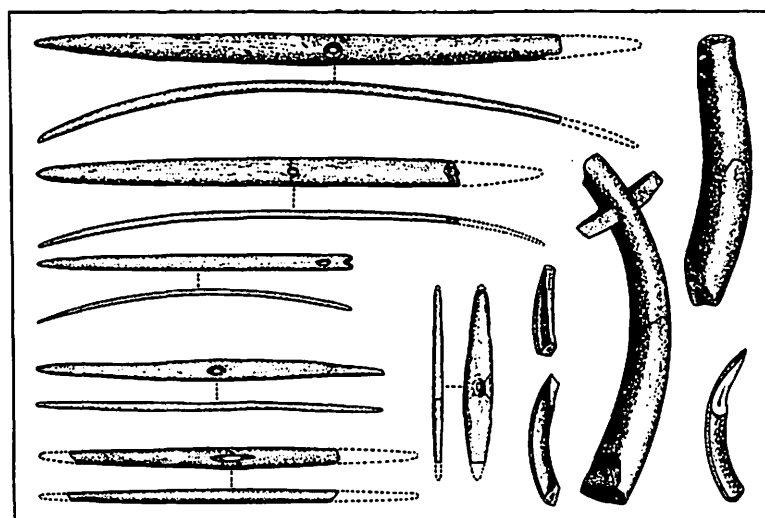
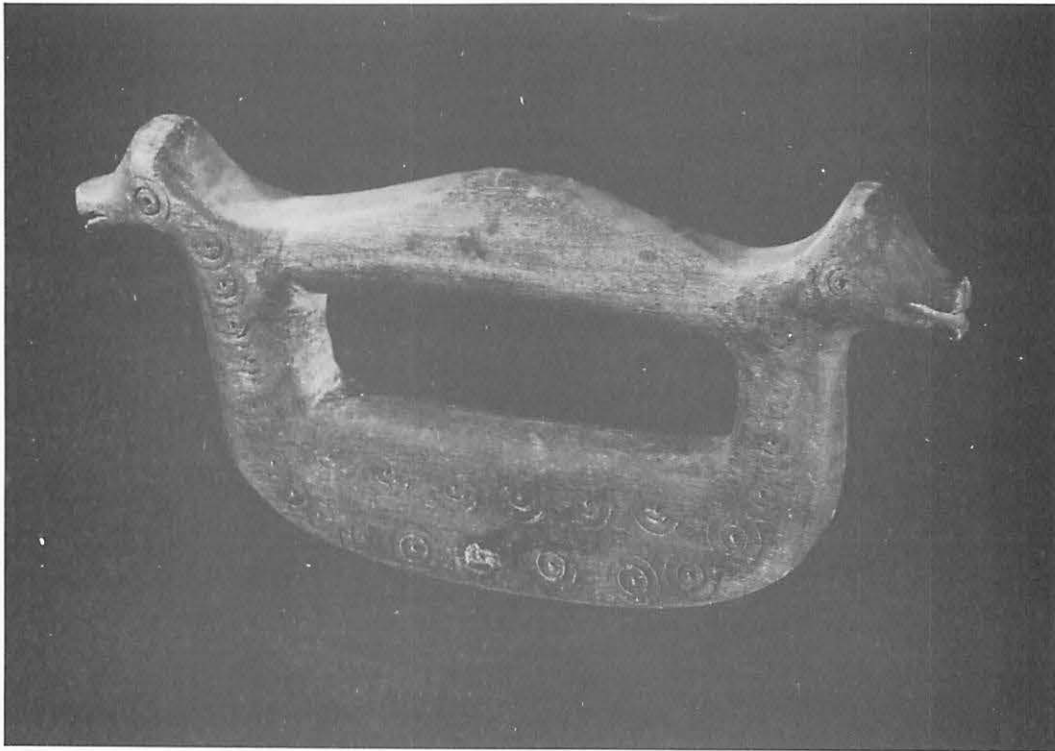
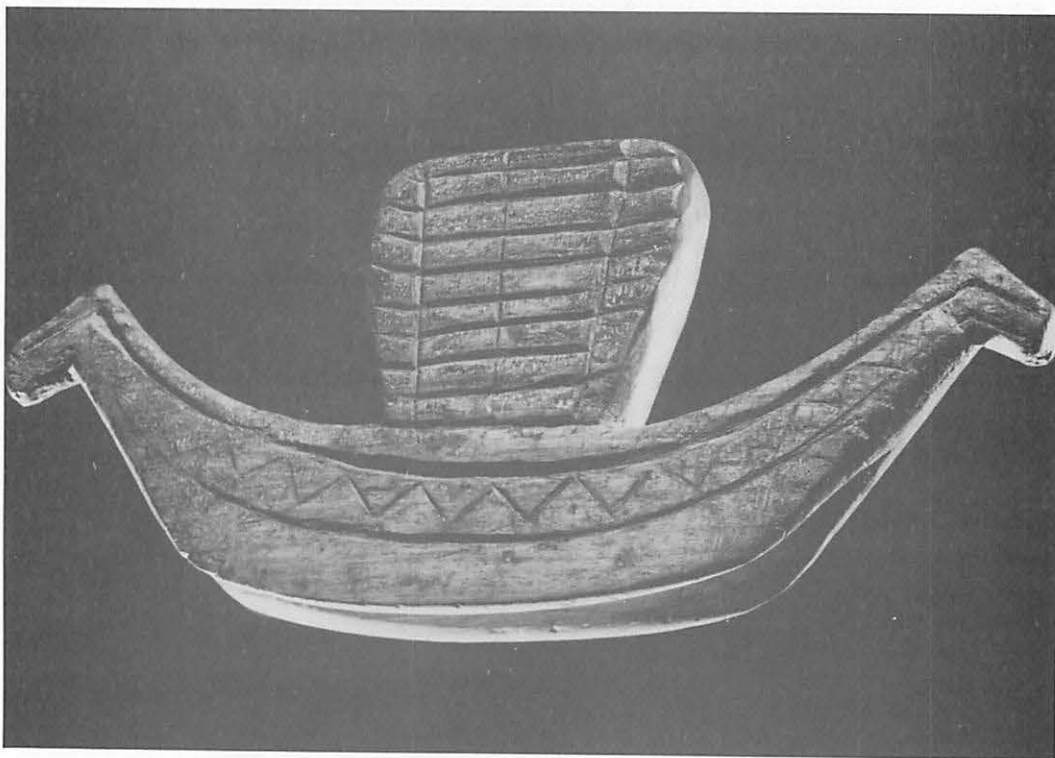


Figure 2. Bone needles (upper left) from New England thought to have been used in the sewing of "flag leaf mats".  
From Willoughby, 1935. Photo courtesy Peabody Museum of Archaeology and Ethnology,  
Cambridge, Massachusetts.



*Figure 3. Maple mat creaser used in the sewing of cattail mats by the Coast Salish.  
Photo courtesy Royal British Columbia Museum CPN 10695.*



*Figure 4. Maple mat creaser from the Coast Salish.  
Photo courtesy Royal British Columbia Museum CPN 10782.*

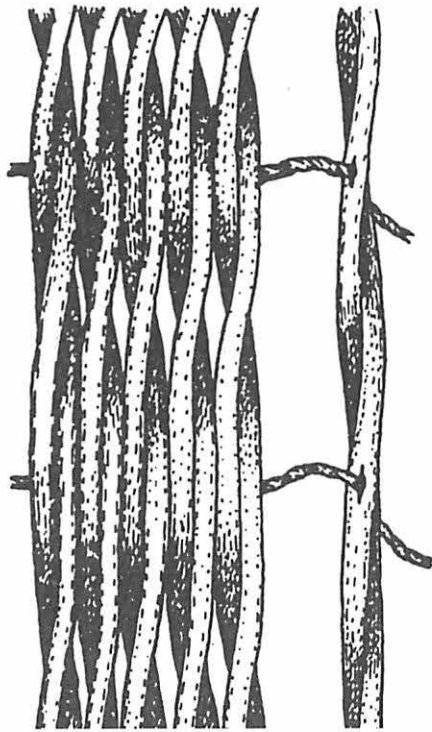


Figure 5. G. Sewn-rush matting from the Harpswell gravesite in Maine. From Charles Willoughby, 1935, *Antiquities of the New England Indians*, figure 132. Photo courtesy Peabody Museum of Archaeology and Ethnology, Cambridge, Massachusetts.

Figure 6. Mrs. Charles Keosalok, a Fox native of Iowa, preparing to sew a cattail mat using a long, curved bone needle. Photo by Huron H. Smith, 1923, courtesy Milwaukee Public Museum, Milwaukee, Wisconsin, #46760.



*Figure 7. Mrs. Keosalok making string to sew the cattail mat. Photo by Huron H. Smith, courtesy Milwaukee Public Museum, Milwaukee, Wisconsin, #46761.*



*Figure 8. Mat making of cattails by Mrs. Keosalok, adding the leaves to the foundation cord. Photo by Huron H. Smith, 1923, courtesy Milwaukee Public Museum, Milwaukee, Wisconsin, #46758.*



*Figure 9. Sewn-cattail matting covering a framework for an Ojibwa summer home.  
Photo courtesy The U. S. Dept Interior.*



*Figure 10. Sewn-cattail mats used as walls in wigwam.  
Photo courtesy Science Museum of Minnesota, #28320.*

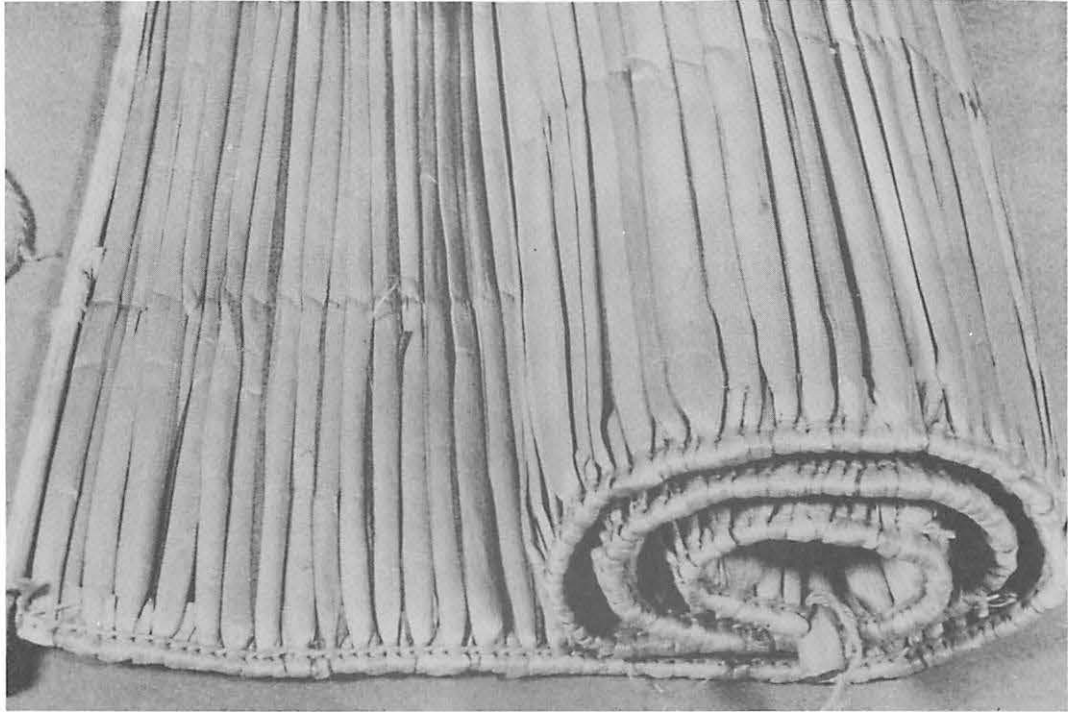




*Figure 11. Mrs. Maggie Skinaway Wadena tying cattail leaves into the upper edge of the mat.  
Photo courtesy Smithsonian Institution, Washington, D.C.*

*Figure 12. Mrs Wadena beginning to sew her cattail mat.  
Photo courtesy Smithsonian Institution, Washington, D.C.*





*Figure 13. Detail of completed mat showing the upper edge, the stitching lines, and the poles tied to either side of the mat. Photo courtesy Smithsonian Institution, Washington, D.C.*



*Figure 14. Woman sewing mat at Sand Spit.  
Photograph by Harlan Smith in 1900 of probably a Stillaguamish woman sewing a mat  
"probably intended for use in a canoe". American Museum of Natural History #12134.*



Figure 15. "Fishing Camp: Skokomish, 1912" showing a temporary summer house of cattail mats.  
Photo by E.S. Curtis courtesy British Columbia Archives and Records Service #74443 D-8249.

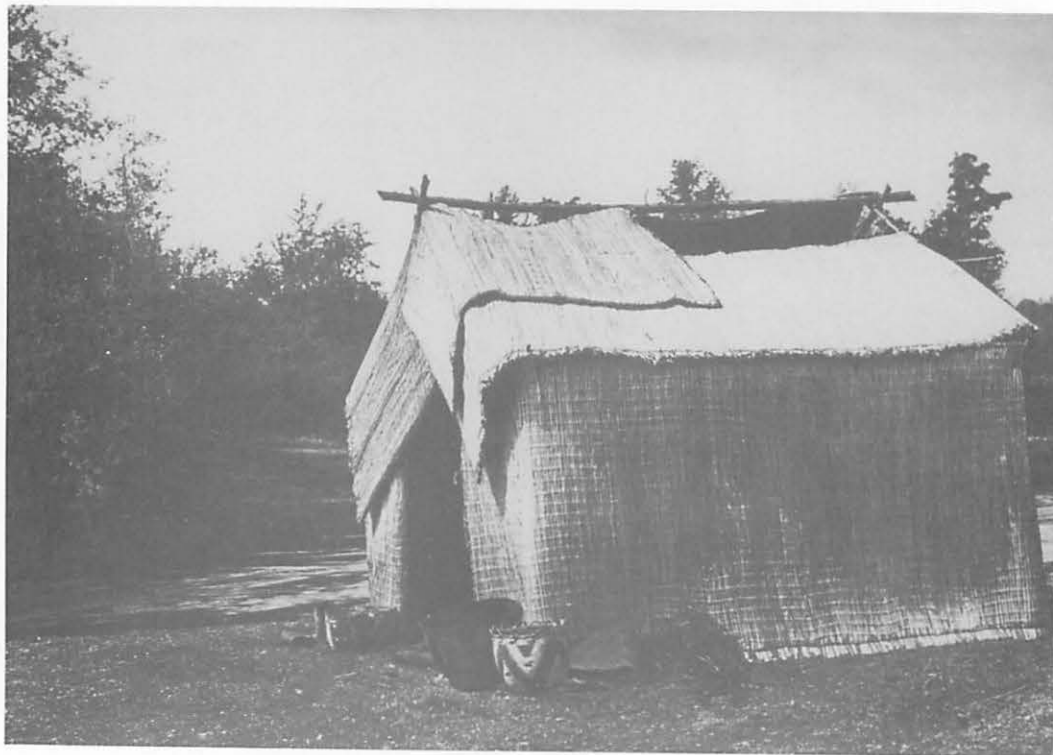


Figure 16. "Fishing Camp: Skokomish, 1912".  
Photo courtesy British Columbia Archives and Records Service #74443 D-8248.

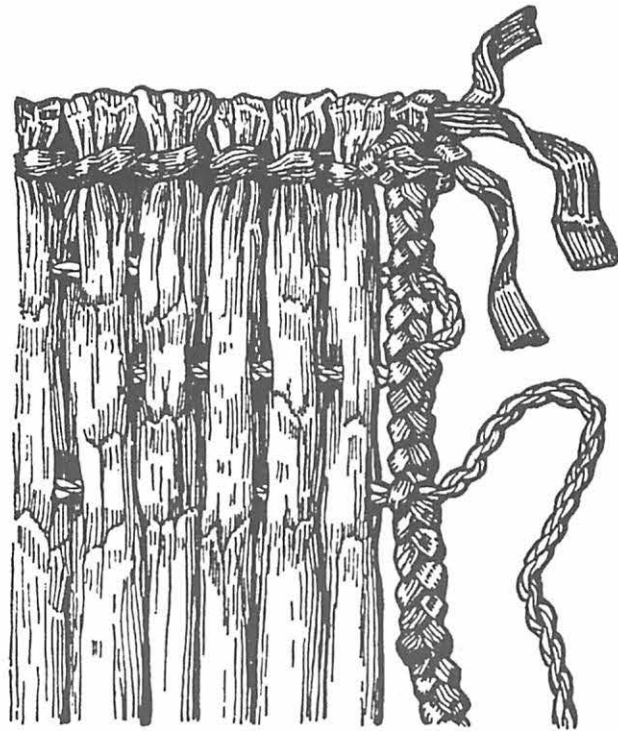


Figure 17. Drawing of a Quinault Indian sewn cattail mat from Olson, 1967.  
Permission University of Washington Press.

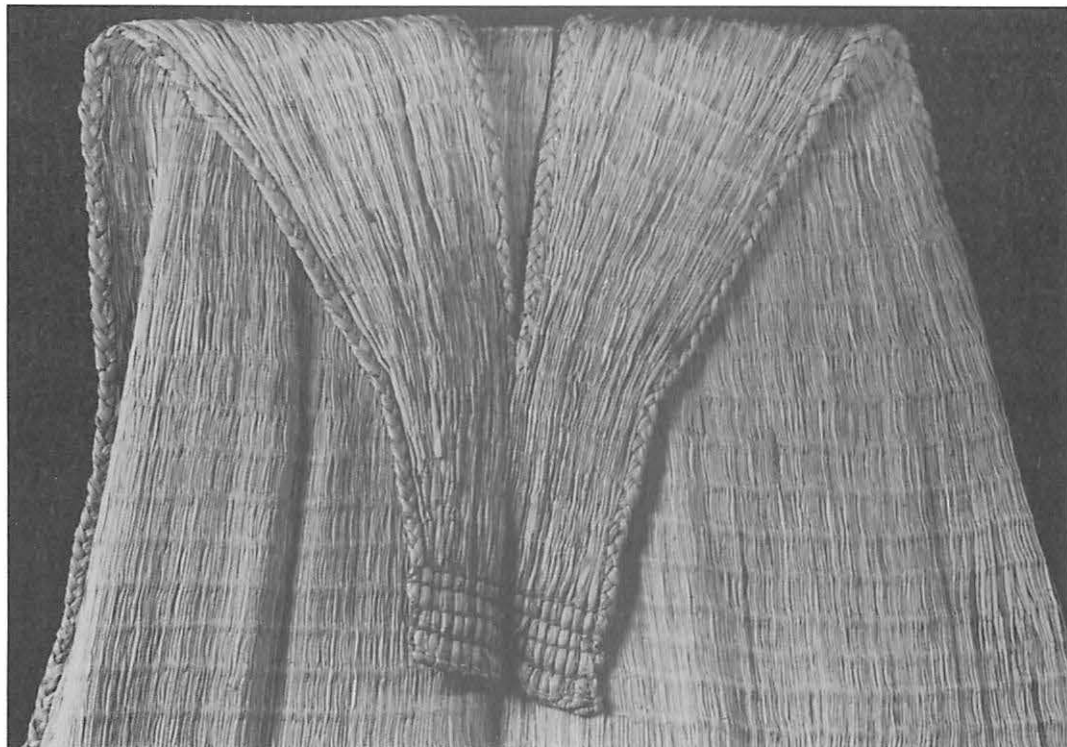
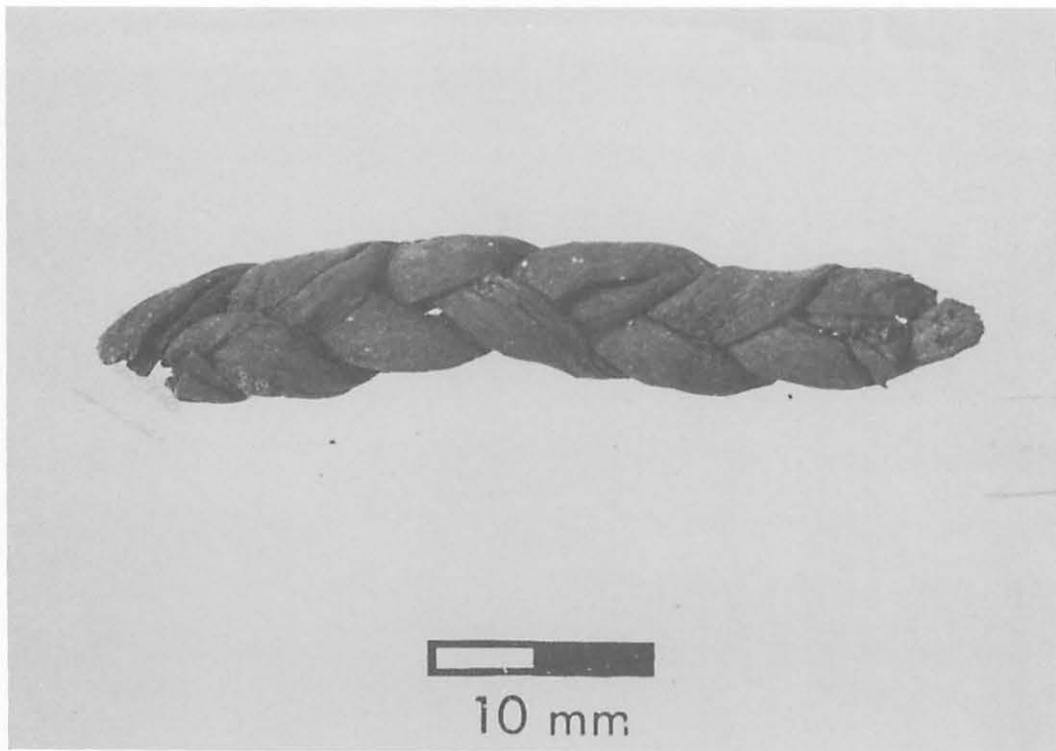


Figure 18. Sewn "cattail rush" raincoat with braided edging made by the Quinault of Oklahoma.  
Photograph by M. Burger, Peabody Museum of Archaeology and Ethnology, Harvard University 10/65511.



*Figure 19. Use of cattail leaves in a twined textile fabric from the Augustine Mound Site dated 2500B.P. from Red Bank, New Brunswick.*



*Figure 20 possible use of cattail leaves in a 3-strand braid cordage from the Augustine Mound Site dated 2500B.P. from Red Bank, New Brunswick.*



Figure 21. Bone needles found in Shell Heap A on Quarry Island in Merigomish Harbour, Pictou County, Nova Scotia.  
*Drawing after Smith and Wintemberg, 1929/1973.*

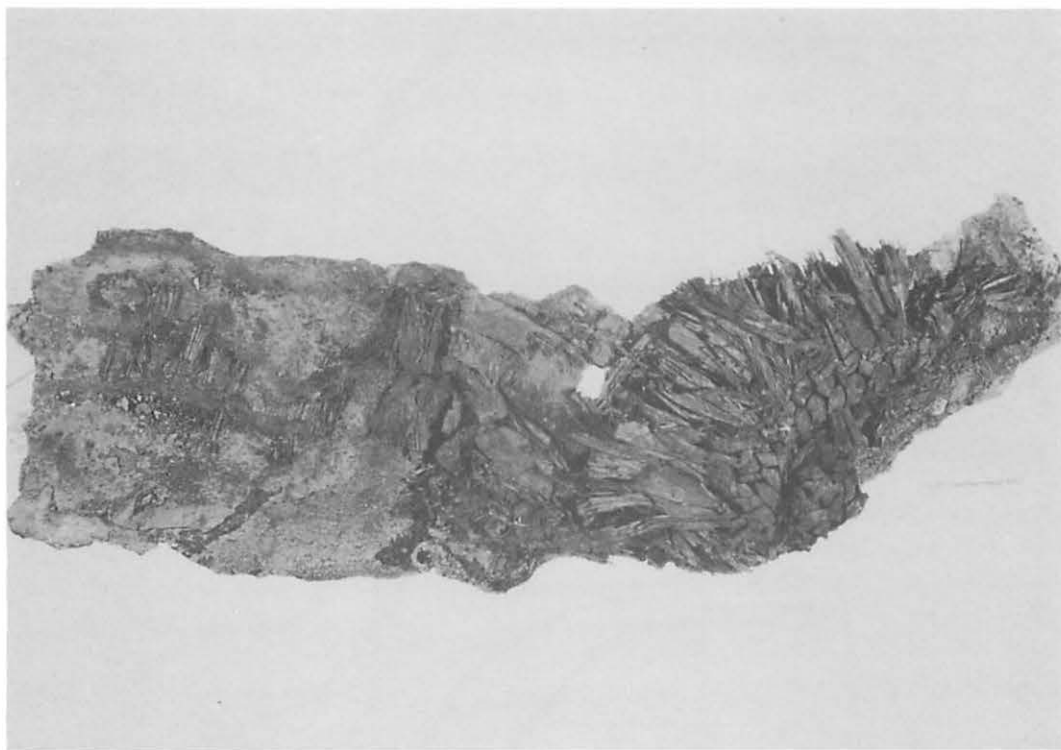


Figure 22. BkCp1 copper pot fragment with sewn-cattail matting fragment;  
84.22.011c and 84.22.011g respectively. This fragment illustrates the construction of the top edge of the mat.

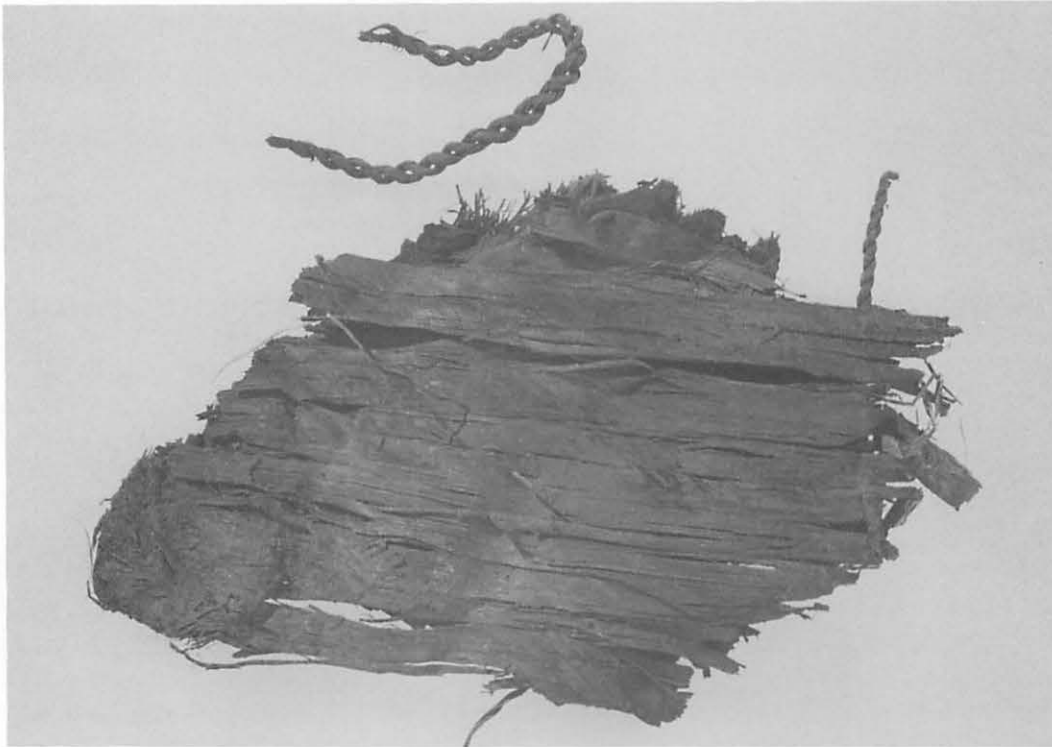


Figure 23. BkCp1 sewn-cattail matting fragment fused to moose hair; 84.22.551a,b.



Figure 24. BkCp1 assorted lengths of cattail braid and twisted and plied sewing cord.

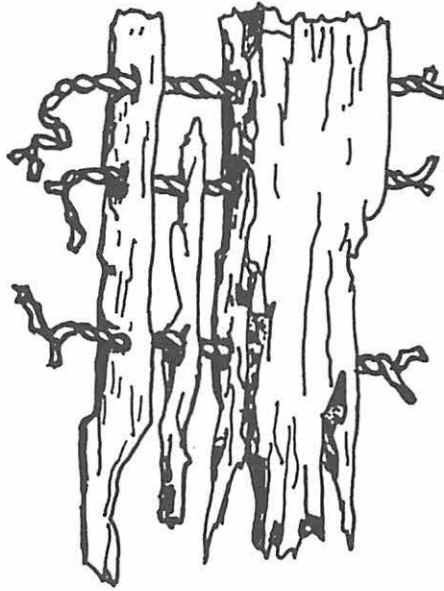


Figure 25. *E. Sewn-cattail matting fragment from Pictou, Nova Scotia, according to Harper, 1956.*  
*Drawing after Harper, 1956.*



Figure 26. *BkCp1 sewn-cattail matting fragment several layers thick; 84.22.564.*





Figure 27. BkCp1 copper pot rim fragment and sewn-cattail mat fragment showing reversal of leaves in row of stitching; 84.22.010b, 84.22.010e.

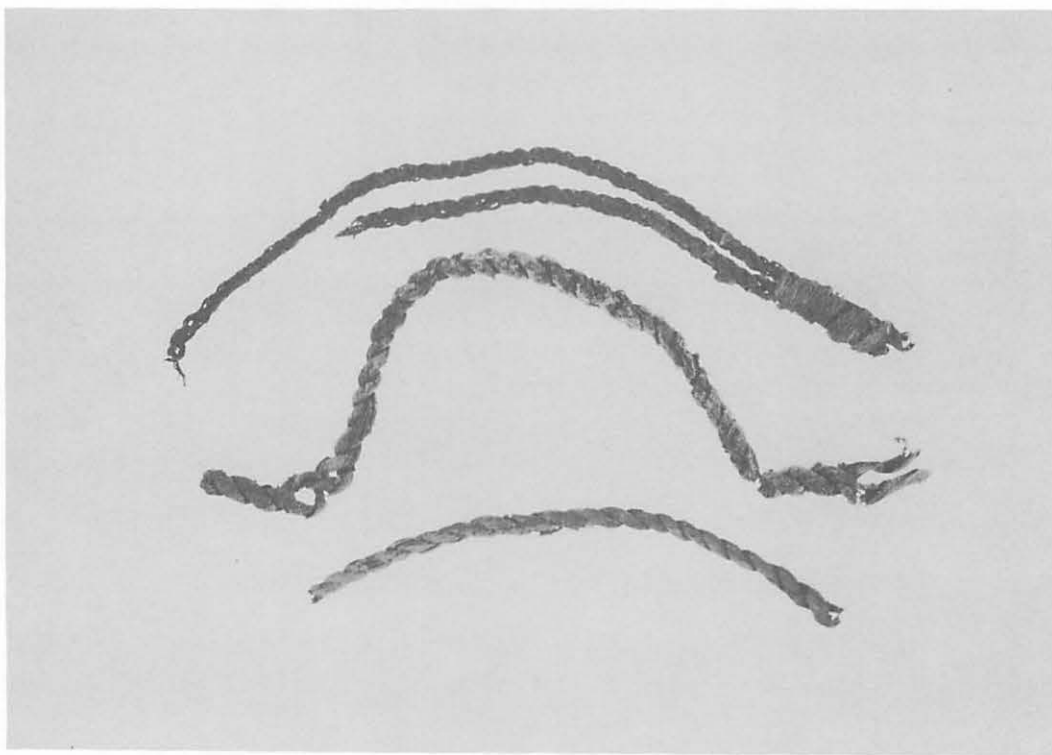


Figure 28. BkCp1 three sewing cords, the top one has 2 cords bound with another cord:  
84.22.605; 84.22.608; 84.22.648.



Figure 29. BkCp1 cattail braids with ends bound with cord: 84.22.569a,b; 84.22.572a,b; 84.22.571a,b.  
The middle cord is pierced with a length of 2-ply cord, possibly a sewing cord.

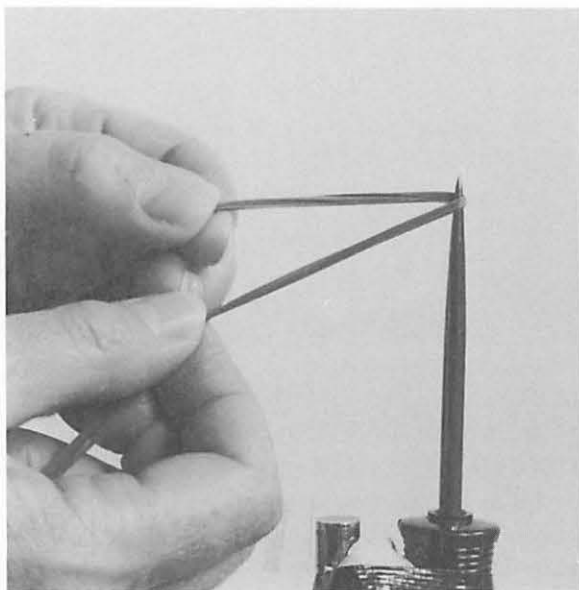


Figure 30. Loop a length of grass approximately in half around a hook.

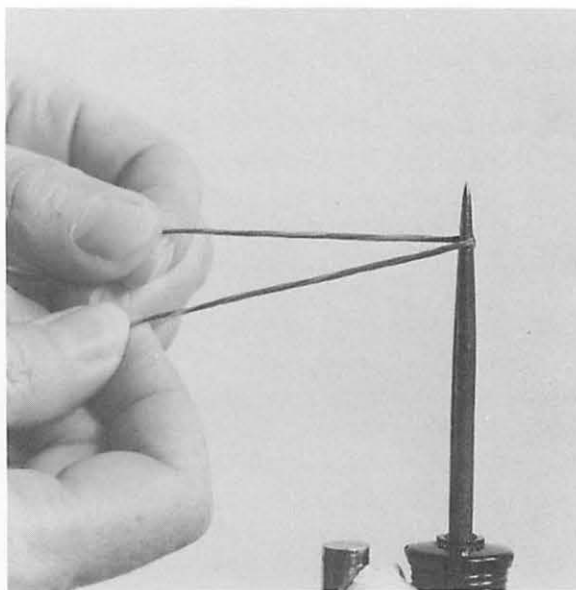


Figure 31. Make an S-twist in each piece of grass.

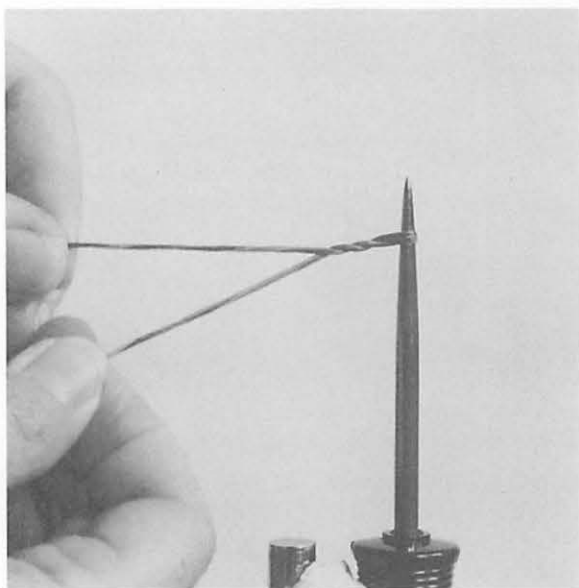


Figure 32. Twist the two plied grasses together in a Z-twist.

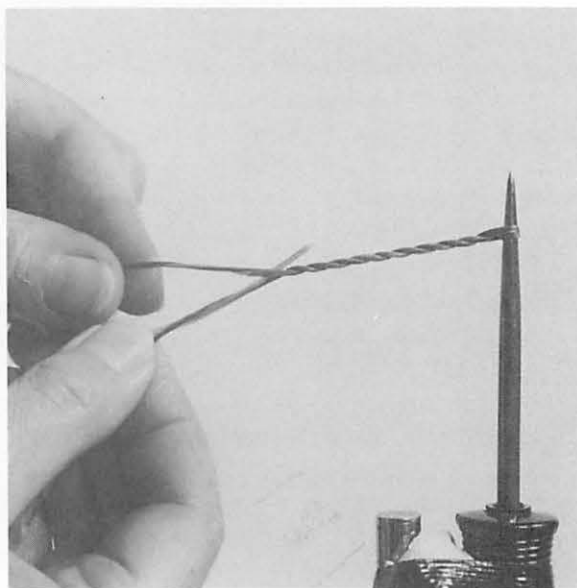
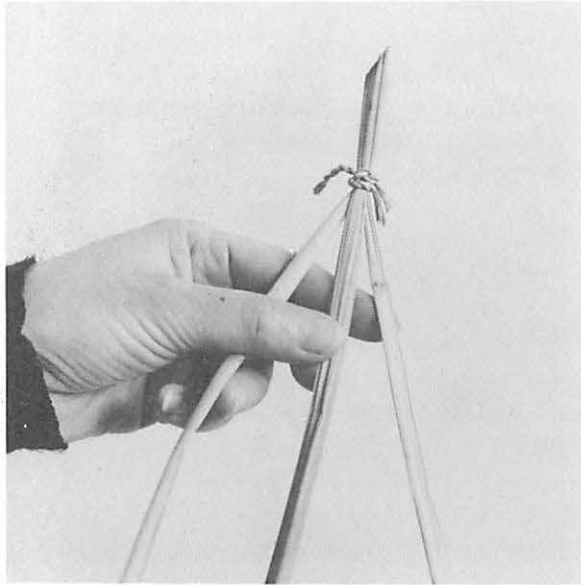
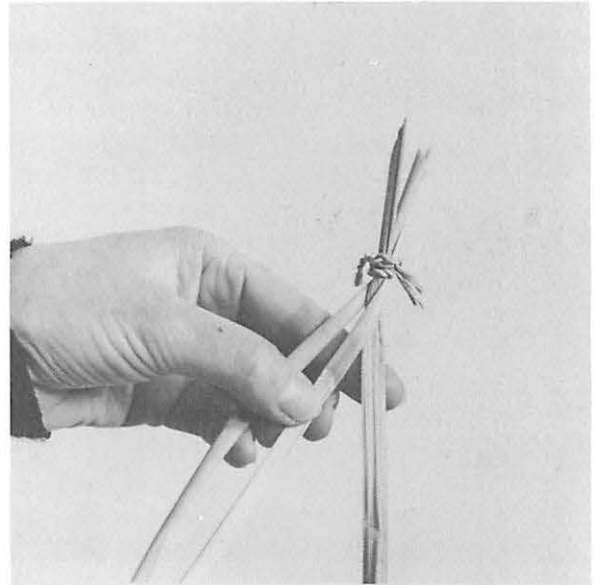


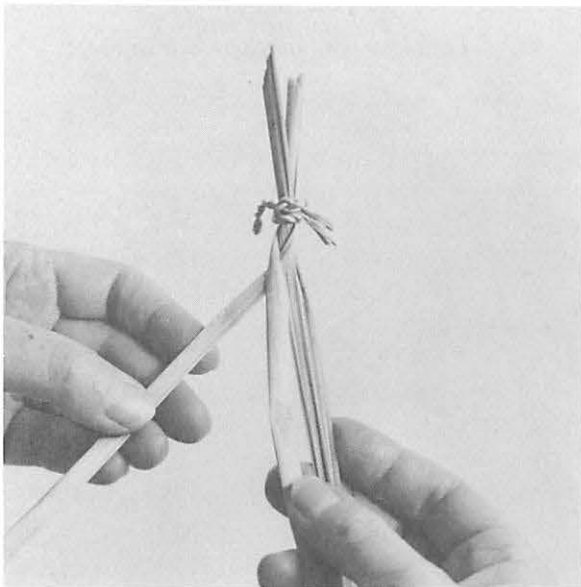
Figure 33. Add a new piece of grass to the S-twist.



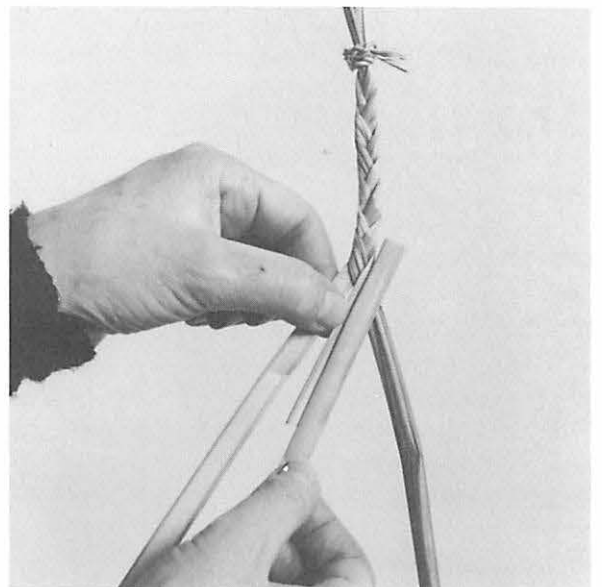
*Figure 34. Tie 3 cattail leaves together and spread the leaves out evenly.*



*Figure 35. Place the right-hand leaf over the centre leaf to the left.*



*Figure 36. Place the left-hand leaf over the centre leaf to the right.*



*Figure 37. Add a new leaf by placing it on top of an old one.*

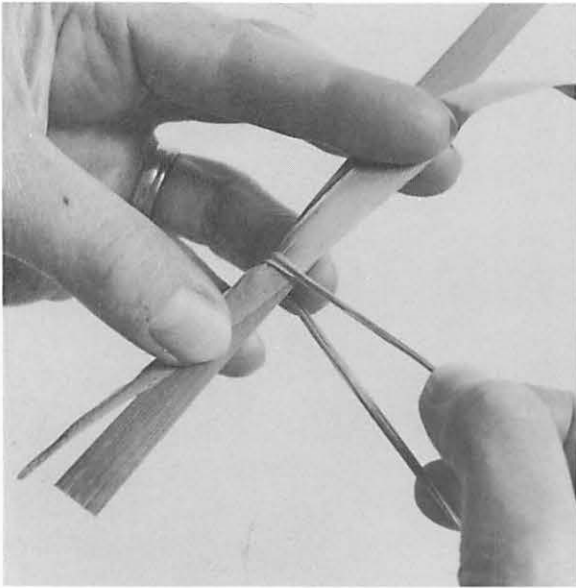


Figure 38. Loop a piece of grass in half, place 2-3cm of two leaves in the first loop: one tip from the heavier outer-leaf pile and one butt from the thinner inner-leaf pile, and twist the two pieces of grass together in one clockwise turn.

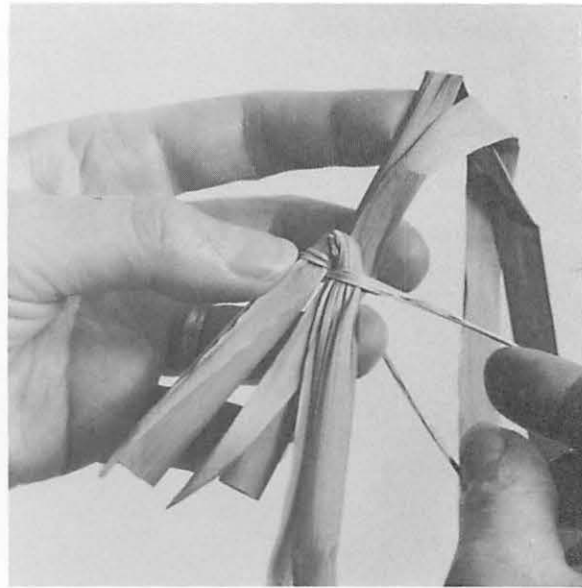


Figure 39. In the next loop, bend down the leaves from the first loop, and add a 2-3cm length of one new tip from the heavier outer-leaf pile and one new butt from the thinner inner-leaf pile. Each loop now envelops four leaves.

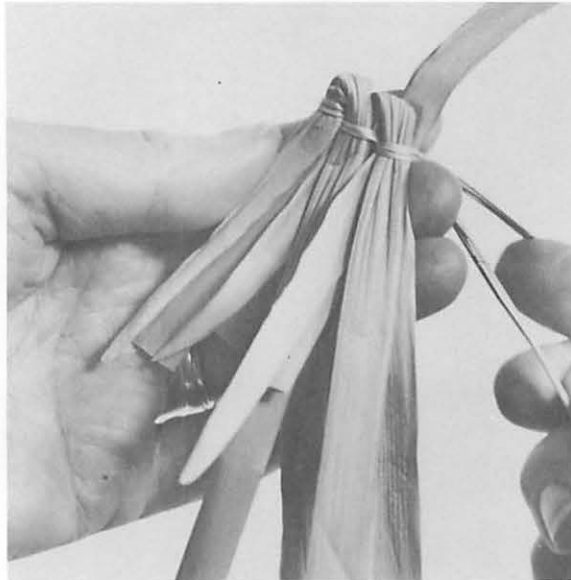
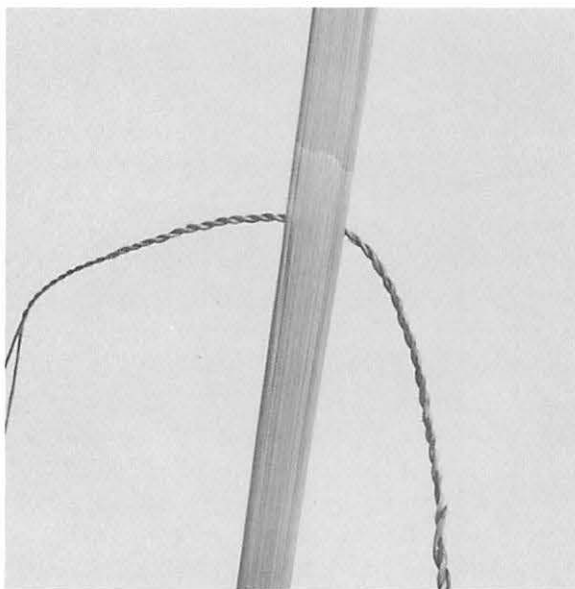
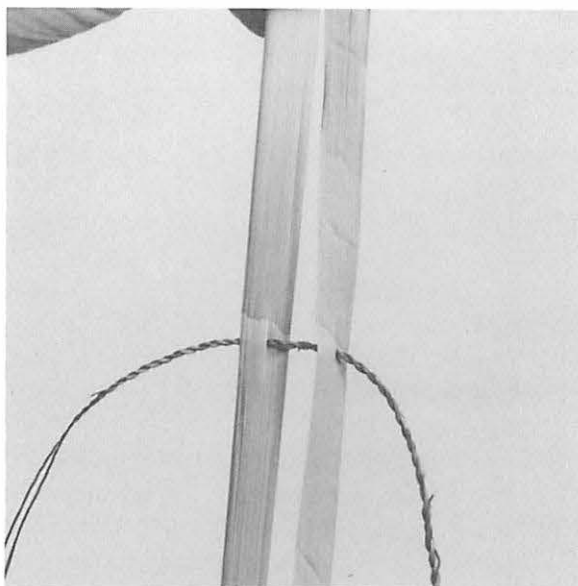


Figure 40. Add two more leaves in pattern.



*Figure 41. Stitch the cord through the width of each cattail leaf.*



*Figure 42. Stitch the cord through paired leaves, piercing the centre of the thin leaf and inserting the needle through one half the width of the thicker leaf.*