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CHIPPEWA MAT-WEAVING TECHNIQUES

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CHIPPEWA MAT-WEAVING TECHNIQUES

By KAREN DANIELS PETERSEN

INTRODUCTION

“No class of articles of textile nature were more universally employed by the aborigines than mats,” says Holmes (1896, p. 18). Skinner (1921, p. 242) comments, “It has never been realized how many ingenious and often complicated styles and technics of weaving may be found among the mats of the . . . Central tribes, so that an insufficient number of examples are at hand for study.”

For comprehending the techniques of weaving, a study of examples in museums is inferior to observation of the process in the field. Yet, in the foreseeable future such observation will no longer be possible among the Chippewa. The more difficult arts are dying with the older generation. A wide acquaintance among Minnesota craftworkers over a period of 9 years failed to reveal any other practicing weavers of the mats observed for this paper except those herein mentioned. All of these women were past middle age, and in no case did the younger woman who assisted the weaver know the technique before seeing it done for the purpose of research. Therefore, convinced of the quality and ingenuity of Chippewa weaving, the writer and her husband, acting as a research team, visited northern Indian areas of Minnesota in July and October 1957, July and August 1961, and August 1962 for recording some of these vanishing techniques in the field.

Chippewa mats may be divided into two groups on the basis of size, usefulness, and universality. The three major mats and one of the minor—all the mats of which the technique is known except reed and sweetgrass—employ the loose-warp (Lyford, 1953, p. 77) or suspended-warp (Wissler, 1931, fig. 17) technique which characterizes much Chippewa weaving, including bags of cedar bark or roots (Densmore, 1929, pl. 64, *b*; p. 158), basswood bark (Lyford, 1953, pp. 78–80), and slippery elm; and the famous yarn bags (Densmore, 1929, pl. 67). The unsupported statement that one of “the most primitive materials [was] a cloth woven of nettle-stalk fiber . . . in ‘tubular form’ like the yarn bags” is made by Densmore (1929, p. 30). Finger-weave bands of yarn (Lyford, 1953,

pp. 69-75, pl. 36) and braids of yarn, leather, beads, basswood bark, rags, and rabbitskin (Densmore, 1929, pp. 36, 77, 111, 129; Lyford, 1953, pp. 95, 101) may also be called loose-warp weaving.

The weave is so called because, contrary to much primitive weaving, the vertical warp is not fastened at the lower end. Since it hangs free, no mechanical device can be used to raise or depress alternate warp strips at the same time so as to allow a shuttle to be quickly passed between the threads with a single motion. Hence a great deal depends on the skill of the worker's fingers.

Within a tribe as scattered as the Chippewa, diversities in details of techniques naturally arise. Moreover, the non-Indian unfamiliar with the crafts is bound to misinterpret some of what he sees and reports. It seemed wise, therefore, to draw in for a bibliographical roundtable not only the ethnologist, archeologist, and ethnobotanist, but a cross section that includes the army officer, missionary, trader, explorer, geologist, traveler, government employee, geographer, historian, Indian captive, hobbyist, craftwork specialist, and artist. Together they have woven the record of a fragment of the ancient culture that they witnessed for those generations who will never see it except through the eyes of these writers.

The writer is deeply grateful to those who have made this study possible: to the Chippewa weavers and interpreters mentioned in this paper, for patiently instructing a novice in their ancestral arts; to Dr. Elden Johnson, assistant professor of anthropology, University of Minnesota, for suggesting the first research trip, reading the manuscript, and demonstrating his confidence in the project by frequent helpful suggestions; to the Myers Family Foundation of St. Paul, Minn., for their financial assistance toward the research trips; to the Science Museum, St. Paul, for the typing of the manuscript; to the members of the staffs in the St. Paul Public, James J. Hill Reference, and Minnesota Historical libraries for their unfailing courtesy; to the Minnesota Archeological Society for sponsoring the first trip; to Conrad C. Reining, assistant professor of anthropology, University of Minnesota, for valuable advice; to Robert Spading, of Minneapolis, John Macfie, of Parry Sound, Ontario, and Edward S. Rogers, associate curator, Royal Ontario Museum, Toronto, for data on the reed mat; to John B. Baird, of St. Paul, for his assistance; to Dr. John W. Moore, associate scientist, botany department, University of Minnesota, and Dr. John B. Moyle, supervisor, Minnesota Game and Fish Research, for help on botanical problems; and most especially to her husband, Sidney A. Petersen, who preserved botanical specimens, took care of field photography, finances, and transportation, and helped the weavers with the heavier duties.

PHONETIC SYMBOLS

a as in art	ě as in met	ñ as in cañon
e as in prey	í as in bit	s as in since
i as in police	ũ as in luck	g as in give
o as in go	oo as in good	sh as in she
u as in rule		

Dt, td, gk indicate sounds between these consonants.

MAJOR MATS

CEDAR-BARK MAT

TECHNIQUE: PLAIN AND TWILLED PLAITING

“Plain plaiting is made by passing the elements over one and under one” (Lyford, 1953, p. 62). (See fig. 20.)

“A diagonal or twilled plaiting is secured by passing the [elements] over and under . . . in other combinations, such as over two and under two, over one under two The passage is alternated row after row so that a variety of angular, diamond, and diagonal patterns results” (ibid., pp. 62–63). (See fig. 21.)

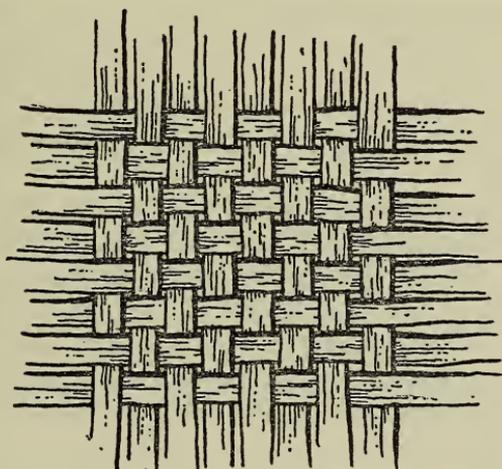


FIGURE 20.—Details of weaves: Plain plaiting.

BACKGROUND

“The acme of the northern Algonkin weaving is in twilled matting,” says Mason (1904, p. 374), adding, “The operation, technically, is just on the border between free-hand plaiting and loom work.”

The community of Nett Lake, on the reservation of the same name a little south of International Falls, by its remoteness has preserved this ingenious craft. Here lives Mrs. Peter Goodsky (*Běb ů ma bik'*,

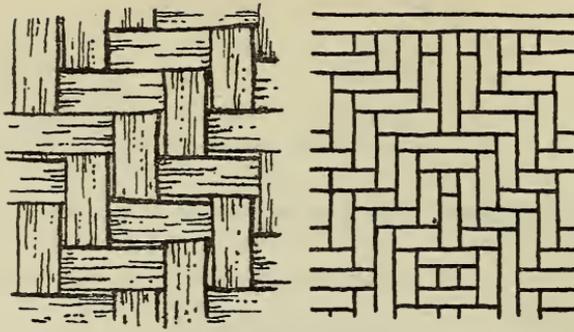


FIGURE 21.—Details of weaves: Twilled plaiting. (Courtesy Denver Art Museum.)

‘The snow is all over everywhere now’), formerly Edith Johnson.¹ Born across the lake to the south, she has lived on the reservation all her life, which she believes is 83 years (in 1957), and has been a widow since 1936. Only two of her nine children grew to maturity. Both of them assisted her with weaving and acted as interpreters: Annie (Mrs. Robert Strong), who was fairly familiar with the technique, and Lillian (Mrs. Tony Harding).

Constantly surrounded by three generations of descendants, she acts as matriarch of the household. Her wishes meet prompt and unquestioning compliance. At all times she carries pinned to her dress the key to the sturdy log storage building. Her industry is extraordinary, whether she is engaged in domestic duties, the braiding of rugs, or the weaving of cedar-bark mats and bags to supplement her income.

Her age no longer permits her to walk to the cedar grove several miles away, although she still goes half a mile into the woods for a little cedar. She learned matmaking by watching her mother, and she is respected in the community for her good weaving. Many residents referred to her as the only one who makes mats. “The old women are dying—three last winter. The younger don’t think it worth the time they put in. It’s a lot of work. Cedar trees are getting scarce.”

The writer found no recollection of the former manufacture of cedar-bark mats in any other area of Minnesota except Grand Portage Reservation, at the northeastern tip of the State. Densmore (1929, p. 122) finds them at Mille Lacs Lake; Cooper (1936, p. 16), at Rainy Lake; Reagan (1924, pp. 119–120; 1928, pp. 245–246), on Bois Fort (Nett Lake) Reservation; and Mason (1904, p. 374), at Grand Marais on Lake Superior—all in Minnesota. Volney Jones (1948, p. 341) reports them for Garden River Reserve, Ontario, near Sault

¹ Mrs. Goodsky died in May 1962.

Sainte Marie; Jenness (1935, p. 14) for Parry Island in Georgian Bay, Lake Huron; Chamberlain (1888, p. 155) for the Mississauga (Chippewa north of Lake Ontario); and Skinner (1912, p. 127) for the Northern Saulteaux (Chippewa east of Lake Winnipeg and considerably north of Lake Superior).

GATHERING MATERIALS

Mrs. Goodsky determined the time for stripping cedar bark (*g'ish' gi g'ōōb*) by testing a tree "when it gets warm in the spring, when the sap is up in the tree, any time in late May or in June." Densmore (1929, pp. 122, 123) finds it "can only be gotten in the spring" at Mille Lacs Lake in central Minnesota, and that mats were made there just before bulrushes were ripe for floor mats. She also states for Minnesota and vicinity (1928, p. 386) that "it was customary to gather as much bark as possible in June or early in July as the bark is more easily removed at that season." Lyford (1953, p. 93) reports "the middle of May to the middle of June, according to the season," for Ojibwa in general. Jenness (1935, p. 14) mentions midsummer on Parry Island. Volney Jones' very helpful study of cedar-bark mat technique (1948, p. 343) endorses removal "while the sap is flowing actively The most favorable months are June and July, when it 'slips' readily." The bark gathered in early August at his instance proved satisfactory, although "the bark 'stuck' on two trees." Possibly the inferior quality noted in his finished mat is due partly to the lateness of the date. Mrs. Goodsky said cedars used to abound in the community when she was young, but now she found them in a section of the woods a few miles east of her home where both cedar and birch grew so thickly that they produced the desired kind of growth—trees straight, slender, and tall, with few low branches. Volney Jones (1948, p. 343) reports preference for larger trees, "for the bark can be obtained from them in larger strips and is said to be tougher."

Densmore (1928, p. 377) lists "*Juniperus virginiana* L.—Red cedar" for mats. Lyford (1953, p. 91) calls it "*Juniperus virginiana* var. *crebra* Fernald and Griscom." Jones (1948, p. 342) gives "white cedar or arbor vitae, *Thuja occidentalis* L., and the present study concurs. Red cedar was available only to those Chippewa east of Lake Superior.

Mrs. Goodsky's equipment was a hand ax (*wa go gkwōōdt'*), while a double-bitted ax was used by her daughter. From life-long habit the octogenarian brought her packstrap, even though she had been assured that she would be exempt from burden bearing.

After all branches within reach are cut off, a horizontal cut about 1½ inches wide is made through the bark between 16 and 24 inches

above ground, where the trunk has a diameter of 4 to 6 inches. With the blade of the ax as a wedge, the bark above the cut is loosened enough to allow the fingers to grasp the bark and pull off a short vertical strip. This is removed to enable the fingers to grasp the next strip from the side.

Another cut 3 to 4½ inches wide, but usually 3 to 3½ inches, is made to the left of the first one. The ax pries the bark loose above the cut and for a few inches up the right edge of the bark, which is grasped with both hands, the right hand at the side. A sharp pull peels the bark for 12 to 16 feet up the tree. Strips are peeled off the rest of the tree in the same way. Nine trees were peeled for the mat in this study. Jones (1948, p. 343) reports a similar process, but finds that stripping only two-thirds of the bark from seven trees ranging "from six inches to one foot in diameter" provides sufficient bark because the strips are "from twenty to twenty-five feet long."

Mrs. Goodsky took advantage of the opportunity to gather other forest products unrelated to the mat. She peeled birchbark by making an 8- to 12-inch vertical cut, prying loose the bark to the left with the ax, and pulling off the bark from the whole circumference of the tree. This procedure was repeated above as high as she could reach. She also pushed over a punky poplar trunk and broke it into firewood-sized pieces to use in smoking a deerhide. Then, oblivious of thick swarms of mosquitoes, she sat down on the ground to begin preparing the cedar bark.

The heavy outside bark is stripped off at once and discarded. A strip is folded sharply near the center, cracking the rough bark on the outside of the fold. The worker grasps one edge of the cracked bark in her teeth and pulls the inner bark away from herself and downward for several feet (pl. 43, *a*). With teeth and fingers the bark is separated to the end of the strip, and the process is repeated for the other half. When about six strips are done, the ends of the strips of inner bark are laid one upon the other and the strips rolled into a loose coil, being straightened as they are coiled. The coil is flattened and tied with a piece of bark. Five bundles about 15 inches long were gathered in this instance. This amount can be carried in one load with a packstrap. An hour in the woods is required for three people to gather and prepare the materials as described.

The process noted by Volney Jones (1948, p. 344) differs substantially only in one respect. After the rough outer bark is removed "the remaining, more flexible, portion of the bark was further divided . . . so that the coarser, dark-brown, outer layers were detached from the softer inner layers of lighter color." Instead, Mrs. Goodsky, as hereafter described, scraped this coarse bark off with a knife, and split

the remaining strip into two thicknesses. The two studies agree on the length of time used so far.

Bark for dyeing part of the mat an orange color is obtained from the speckled alder (*ũ dop'*) (*Alnus rugosa* (Du Roi) Spreng). Mrs. Goodsky found this tree in the woods near her home, and with the assistance of her daughter she cut down six trees, trimmed off the branches, and carried the trunks home in 30 minutes' time. Trunks 4 to 7 feet long and 1 to 1½ inches in diameter are used.

The bark (*wũn ũ gĩk'*) is immediately scraped off with a knife; it peels easily while the sap is abundant. The longer strips are cut up to fit into a large kettle. The dye is derived from the inside bark, which has a rich orange color, but the outer gray bark is not separated from the inner. For this study, about one-sixth of a bushel of bark was stripped off in half an hour. Meanwhile an assistant built a fire under a kettle which was suspended by a chain from a "wigiwam" (tripod) behind Mrs. Goodsky's house.

The bark is just covered with boiling water and boiled for about 30 minutes. The kettle is then removed from the fire and the dye bath is ready.

Mrs. Charles Strong, a former matmaker also from Nett Lake, concurred in the use of alder, and named three other natural dyes with which she boiled cedar-bark strips: for yellow, willow ("the ordinary willow that grows in the swamp"); for black, "mud from the spring"; for red, "red willow," identified by Densmore (1929, p. 145) as *Cornus stolonifera* Michx., the common name of which she gives as redosier dogwood (1928, p. 369). Mrs. Goodsky's family chaffed her for using black commercial dye. She said the spring with "black mud" was a long way off. Her usual process was said to consist of boiling oak, willow, and red dogwood barks in a little water, dipping the strips into the dyebath, and covering them with mud from a certain spring. She could recognize the right spring by the bluish clay and the black color of a stick that had fallen into it.

Densmore (1929, p. 157; 1928, pp. 370, 372; 1928, p. 371) tells how strips may be dyed dark brown, black, or red, respectively, with natural dyes; Jones (1948, p. 347), dark red. Mason (1904, p. 374) mentions three colors in a mat, one natural. Cooper's (1936, p. 16) is undyed. Lyford (1953, p. 93) says, "The natural color was a beautiful golden shade," and this writer agrees.

In addition to the two barks, two kinds of ashes (*ĩsh ko dẽ' bĩn gwĩ*) are obtained: birchwood (in this instance about 2 quarts removed from the cookstove into a basin) and cedar bark (the residue of burning the scraps of bark left from the process described immediately below).

PREPARING MATERIALS

To retrocede, as soon as Mrs. Goodsky reached home with the wide cedar-bark strips (*mǎn dǐ tdo'*), she sat down in her customary place in the yard—an overturned washtub padded with a folded piece quilt. When the mosquitoes became troublesome she built a small fire to windward, using green wood to produce a smudge. In making narrow strips (*ǔ gash' i ñǐ*) for weaving, her only tools were scissors and a kitchen paring knife with an unusually long blade, pointed, curved on one edge, and nearly straight on the other. The length and width desired for the mat (*gǐsh gōōb' shi mǎn* in this study; according to Cooper (1939, p. 16) *kijikpicimán*) is now decided upon, and strips of bark about 4 inches longer than each dimension are set aside as measuring sticks.

The process used on each wide cedar-bark strip is this: More coarse, loose, outer bark is removed with the knife, and the bark is measured by one of the measuring sticks and cut off with scissors or knife. At a point halfway between the two ends of the strip the point of the knife is inserted and quickly drawn away from the worker and toward the right, slitting the strip. Similar cuts are made until the wide strip is cut into weaving strips five-sixteenths to seven-sixteenths of an inch wide. This process is repeated for the other half. Now all dark bark that can be readily scraped off is removed, with the teeth assisting. The edges are trimmed more evenly. Next each strip is split into two layers, the inside surfaces to be used as the front of the mat because of their uniform creamy whiteness, and the outside as the back because of remnants of dark bark and a color varying from light yellow to light tan. The splitting is begun with the knife blade at one end of the strip. One split end is put between the teeth, and the other is pulled downward and away from the worker, forming two strips (pl. 43, b).

When 34 to 44 strips of the same length are finished they are tied together at one end with a bit of bark and hung over a line to dry. If they are not dried at once, they are said to turn brown. They can be stored indefinitely or used at once, and dyed later or immediately. Fragments may be gathered into bundles to be used in making small bags.

In the long midsummer twilight characteristic of high latitudes, Mrs. Goodsky cut strips until after 9 o'clock. She worked about 6 hours, while her daughters assisted her for about 4 hours. Perhaps because of their inexperience, they were less skillful and quick than their mother.

Jones (1948, p. 345) records several divergencies in the preparation of the strips. Instead of slitting the wide strips with the point of a knife, utilizing the straight grain of cedar, his informants cut them with scissors. They omitted the use of a measuring gage and did not hang the strips up to dry. Rather than splitting the entire strip into two layers, they thinned one end to half its thickness for about 4 inches, and tapered the other end to a point. They made 100 long and 46 short strips in 3 hours as compared with Mrs. Goodsky's 175 long and 81 short strips in 10 hours of time. (The two mats were to be nearly identical in dimensions.)

When the strips are finished and the alder dye bath ready, one bunch of the shorter strips is untied, coiled loosely, put into the dye (*ũ dis' sũ gũn*), and stirred with a stick until thoroughly wet. Next the strips are removed from the kettle with the stick and dropped into the smoldering ashes from the burned cedar-bark scraps. This process is repeated for a second bunch of short strips. They are then turned and stirred in the ashes, placed on a piece of cardboard, sprinkled with birchwood ashes from the basin, turned over once, and sprinkled again. They are covered with a cotton blanket for perhaps 5 minutes, turned over, and re-covered for another 5 minutes.

A few strands are returned to the dye bath to become wet enough to dampen the rest when mixed with them. Again they are all covered for 5 minutes. The dampening and covering are repeated. Mrs. Goodsky was not satisfied with the way the dye was taking, and thought the water had not been hot enough. Her family said there had been too much water in the pot. She decided to give the strips more time. She returned all of them to the pot, wetting them thoroughly. She removed them to the cardboard (pl. 43, *c*), sprinkled them with cedar bark ashes, and covered them. She added more birchwood ashes, and covered them again. She then returned them to the dye bath, removed them, sprinkled them with birchwood ashes, and covered them. Now satisfied with the color, she picked the strips out singly, tied them into two bunches, and hung them up to dry (pls. 43, *d*; 46, *b*). Then she washed her hands thoroughly with soap and water.

The dyed strips were somewhat mottled and of varied shades of orange. Whether this was a normal condition or due to the trouble encountered, the variety added texture and interest to the finished mat.

An equal number of short strips were dyed black by dipping them into a deep pan in which Mrs. Goodsky had dissolved a package of commercial dye. She partly submerged them, turned them over, covered them with rags for a few minutes, and then repeated the

process a few times. When the color was uniform and satisfactory, she rinsed them in clear water and hung them up to dry.

By this time several of her grandchildren and their families had arrived from cities at some distance from the reservation for a visit. None of the score of young people had ever witnessed this process. An appreciative audience watched "Grandma" making a mat and exchanged banter over it.

Jones (1948, p. 347) describes in detail the process of using bloodroot for dyeing a mahogany red color. This process differs in some respects from that of the present study. Instead of boiling the vegetable matter for half an hour, removing the kettle from the fire, and steeping the loosely rolled strips, Jones' informants boiled the roots with the tightly bundled strips for 15 minutes, rinsed the strips, and hung them up to dry. No mordant was employed.

FIRST ROW

As soon as the dyeing is completed, the next step begins. Several informants had told us they could make a mat if only someone would do the first row. Therefore, this selvedge seems to be the key to the entire process.

A chair is placed in front of the weaver to which she may tie one end of her work, keeping a moderate tension by having someone move the chair farther away whenever the work sags much in the center. Heavy cotton twine from a ball is wound twice around a chairback rung and tied in a bow, leaving an end to the right of the chair equal to the desired length of the mat plus the width. The ball is on the left. A bunch of short strips of each color is laid near the worker and untied. If the strips are not damp from dyeing, they are sprinkled with a little water.

The twine between the chair and ball forms the foundation for the first selvedge. Mrs. Charles Strong used a strip of cloth instead of twine. Jones (1937, p. 12; 1948, pp. 344-345) mentions the use of twisted two-strand basswood cord for the border, and it is likely this was commonly used in earlier days. The twine close to the chair is pulled toward the worker with the left hand. One strip is laid across the twine at right angles to it with a 2-inch end of strip protruding above the string (fig. 22; pl. 44, *a*). This end is bent down and away from the worker, then across the strip and toward the left in a slightly diagonal direction (fig. 23). It is held against the string by pressing it between the left thumb and forefinger. With the right hand another strip is placed beside the first so as to conceal part of the end of the preceding strip, and the process is repeated, both ends now being held by the left fingers. When a third strip is added, all three ends are

held. Thereafter there are only three, because the end of the first has been passed by as the work proceeded (fig. 24).

Before Mrs. Goodsky reached the length desired, she discovered she had not dyed enough strips. Therefore after repeating a series of nine orange, nine black, and four natural strips eight times, she ended the top selvedge. To do this, the three remaining ends are temporarily tied together with a bit of string. A length of twine is left attached to the first row to equal the width of the mat, and the twine is cut from the ball. The appearance of the mat at this stage is best suggested by the question of Mrs. Goodsky's 6-year-old television-wise great-grandson: "What is Grandma making—a hula hula skirt?"

Jones' informant (1948, pp. 347-349; figs. 2, 3), contrary to Mrs. Goodsky, worked from left to right, stood while working, pinned

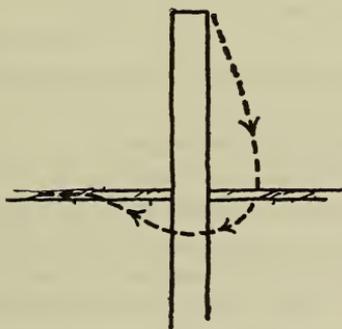


FIGURE 22.—Cedar-bark mat selvedge: Strip laid across cord.

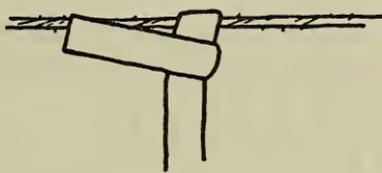


FIGURE 23.—Cedar-bark mat selvedge: Strip brought across itself.

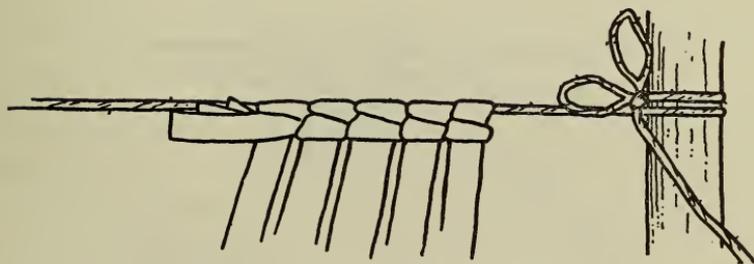


FIGURE 24.—Cedar-bark mat selvedge: Selvedge begun.

the string to the wall of the house, and occasionally lightened the pull of the warp on the string by looping the finished part over the pin.

WEAVING

The completed selvedge is now lashed to a straight pole (*ũ pish' i mũn ni kan nak' kan*) about $1\frac{1}{2}$ inches in diameter and 16 inches longer than the desired width of the mat. The lashing begins at the piece of twine tied to the chair, which is now instead tied with a bow to a place 4 inches from the end of the pole. Four inches beyond, a piece of ordinary string is wrapped twice around the pole and the twine, tied in a slipknot, and thereafter wrapped around the pole and selvedge after every two or three strips (fig. 25). As work progresses the end of the pole where this work began rests on the ground in front of the worker, the unused part under her left arm and behind her. The string is passed under the pole with the left hand and pulled upward and toward the worker with the right. The completed lashing is secured by wrapping the string three times around the pole and first row just past the last strip and tying in a slipknot (fig. 26). The twine at the beginning end is untied from the pole.

To make a support for the work during the weaving, two fairly straight poles about $1\frac{1}{2}$ inches in diameter and 7 feet long are driven into the ground at a distance apart about 8 inches less than the length of the crosspiece. This piece is lashed to them at a height which the weaver can easily reach. The piece of twine at each end is now wrapped two or three times around the nearest upright at a point

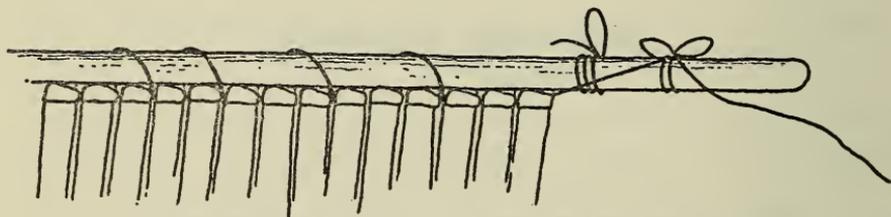


FIGURE 25.—Cedar-bark mat selvedge: Selvedge lashed to pole.

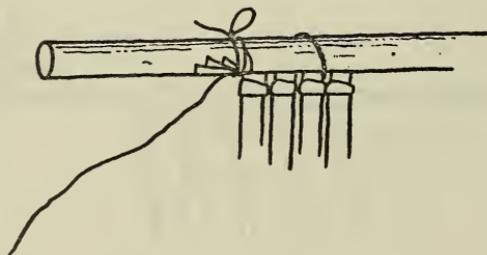


FIGURE 26.—Cedar-bark mat selvedge: Lashing tied.

about 12 inches below the crosspiece, and tied in a bow. This twine serves as the foundation for the selvedge at each side, while the hanging strips become the warp for the weaving proper.

Mrs. Goodsky's son-in-law set up and tied the frame for her. This was the only part of the procedure in which a man took part.

In Jones' study (1948, pp. 342-346; fig. 1; p. 350; pl. 1, fig. 1) the weaver's son-in-law gathered the bark, removed the outer bark, and erected a frame made of heavy two-by-fours nailed together and fastened to the ceiling beams for support. It was erected before the selvedge was lashed to the crosspiece, but Mrs. Goodsky attached her selvedge while the light crosspiece was free and conveniently handled. If Jones' figure of 6 feet for the height of the crosspiece were correct, it would be difficult to attach the selvedge or to weave. The height indicated in his photograph appears from the length of the strips to be closer to 5 feet, or to the top of the weaver's head. Better work could be done with a movable crosspiece like Mrs. Goodsky's, by which the weaving could be kept at a convenient height as work progressed.

The weaving starts at the left end where the top selvedge ended. The three short ends are untied, bent down at a right angle to the first row, and fastened to the vertical twine by the end of the first weft strip in the same way as were the ends in the top selvedge. The strip is then woven in plain plaiting under-one-over-one (see fig. 20) to the right edge, where the end is trimmed with scissors to about 3 inches and secured to the vertical twine by the same stitch as began the top selvedge, except for a reversing of the direction. Thereafter as either end of a row is reached, the short ends of the preceding work are concealed and carried along as in the top selvedge. Work is from left to right, with the right fingers lifting a warp strip, pulling it a little to the right, and laying it over the weft strip, the left thumb and fingers keeping the previous work flat and tight (pl. 44, *b*). When the left hand is holding about six warp strips, it moves ahead.

To prevent cracking, the materials must be kept slightly damp. Spare weft strips are coiled in a pan with a little water in the bottom and at times patted with a damp cloth. The unwoven warp is dampened by occasionally dashing on it a little water from a cup. When the sun shone on the mat, Mrs. Goodsky had the frame uprooted and leaned against the shady side of her house.

After the first two rows are done the mat is kept straight by fastening it to the side poles by a bit of narrow bark slipped between the side selvedge and the first warp strip, and tied around the upright pole. The work is so tied about every 4 inches. As work progresses the twine for the side selvedges is also tied lower on the side poles, about 8 to 11 inches below the point which the weaving has reached.

To prevent sagging of the weft when work temporarily is halted or as the mat nears completion, a warp strip is bent double about an inch below the last weft row and pushed up between the last two weft strips from behind, every 3 to 6 inches across the row. They are pulled down as work proceeds. Mrs. Goodsky removed the crosspiece from the uprights, laid the mat on the woodpile in the shed, and locked the door, when she stopped for the night.

When a point is reached where the weaver has to stoop, the horizontal pole is raised to near the tops of the uprights. This move necessitates readjusting the bark ties along the side, which no longer fit because of irregularities in the uprights.

Occasionally a weft strip breaks, particularly when being fastened into the right-hand selvedge. A few inches are then ripped back and another strip inserted. Thus a double strip is carried along for a few inches.

Three variations occur in the weaving of Jones' mat (Jones, 1948, pp. 350-352, fig. 1). From the first, the cords for the side selvedges "are allowed to hang slack to below the level of the lower ends of the warp, where they are tied around the uprights." Mrs. Goodsky's were never tied more than 12 inches below her weaving, and were taut. This may have helped to keep the side selvedges straight. Her device to prevent sagging of the weft was apparently unknown to the other woman. Jones' weaver believed "it is necessary to tie the strip ends in place after each attachment [of a weft strip], for otherwise they will come loose." Such tying was not done by Mrs. Goodsky, probably because her more pliable and narrower strips (about half as wide) could be pulled more tightly at the selvedge.

Jones' mat (*ibid.*, pp. 350-351; pls. 1, 2) and Cooper's mat (Cooper, 1936, p. 16) are done entirely in plain plaiting. By twilling (carrying a weft strip over more than one warp strip at a time—see fig. 21) and combining colored strips, a great variety of patterns may be obtained. Densmore (1929, pls. 1, *a*; 61, *b*) shows two zigzag patterns and Mason (1904, pl. 122) another. He says (pp. 374-375), "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 technic so lends itself to charming effects of light and shade that there is not a monotonous square inch on the surface" (pls. 56, *a*, *b*; 59).

Mrs. Goodsky chose to use a diamond pattern on the colored strips (pls. 45, 46, *a*). For this, all weft strips were undyed. Before reaching the lower edge she saw that she had not prepared enough long strips to make the size of mat desired. Therefore, on completing a pattern unit she cut off 7 or 8 inches of warp, leaving about 4 inches

surplus. She relied on her memory, like Densmore's informants (1929, p. 194) who "have the pattern in their heads." Working in the oppressive mid-day heat, she noticed she had inadvertently omitted one diamond of the pattern. She pointed it out to bystanders, chuckling at her error, but was unable to remedy it because the ends were trimmed at the selvedge. Apparently she gaged her design by the work above it rather than by counting strips, for the next diamond below her error was out of line.

The twine is now untied from the right upright and pulled toward the left, to form the basis for the lower selvedge. The edging stitch is continued from the right selvedge across the lower edge, while the 4-inch ends are carried along pointed toward the left. About every third end is tapered by a long cut, to prevent too thick a selvedge. At the lower left corner all the ends are tied together firmly with several turns of sewing thread and several knots. Then the ends are cut off to one-half of an inch in length.

Jones records (1948, p. 353) that while the lower selvedge was being made its cord was stretched between two nails in the upright posts. Whatever the reason for this, it resulted in surplus cord at the left corner, which "was looped around the border of the mat a couple of times, tied, and cut off." However, the other corner was neatly finished in a braid turned under the mat and bound there.

Mrs. Goodsky's upper and lower selvedges both run in the same direction, from the weaver's right to her left. A mat by left-handed Mrs. Charles Strong that is in the writer's possession and Jones' mat (1948, fig. 4) have both selvedges running left to right. Side selvedges of necessity run from the top toward the bottom.

Dyeing and weaving had taken Mrs. Goodsky 12 hours, plus about 6 hours' assistance from her daughters. The entire work of making a mat 3 feet 1 inch by 5 feet 4 inches had consumed about 20 hours of her time and 13 hours of her assistants' time. Considering her diligence, it is surprising to find Mason's report (1904, p. 375) of a mat "6 feet 5 inches long and 4 feet 5 inches wide" that was made "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." In 1956 another informant, Mrs. Charles Strong, who had completed the first selvedge row on a mat that was to be a little over 3 by 5 feet, asserted she would begin the weaving in mid-afternoon and complete it by the evening of the following day. This is longer than Mrs. Goodsky's time. Probably Mason's worker had, like Mrs. Strong, completed all but the weaving proper in advance. Possibly quality was sacrificed to speed. The time could also be shortened with an assistant, or two of them such as Jones' weaver had (1948, p. 350-351),

one working at each side selvedge and one doing the weaving between. His workers used 11 man-hours for the dyeing and weaving process, while the present study shows 18. However, in chronological time the figures are 5 for three weavers to 12 for two. Total man-hour figures for the mat are 20 to 33.

Densmore's procedure (1929, pp. 156-157; pls. 1, *a*; 61, *b*) is essentially like Mrs. Goodsky's. Lyford (1953, p. 93) corrects Densmore's obvious error of $1\frac{1}{4}$ inches as the width of strips to $\frac{1}{4}$ inch, but repeats Densmore's statement that the edges "were turned and 'sewed over and over' with narrow strips of cedar." The unfinished mat pictured by both appears "sewed over and over" in the unrolled portion, for the reason that this is the way the selvedge always appears on the back. Its front, clearly visible on the rolled portion in Lyford's more enlarged picture (1953, pl. 51), uses the interlocking selvedge described above. The two sides of the mat in the present study are shown in plate 45.

William Jones (1906, p. 142) in a brief summary concurs with Mrs. Goodsky in the process used, but Mason (1904, p. 374) says that "the weaving is done from below upward," and that "the warp strings are suspended freely [over] a small rod or stiff cord of bark." Both these statements would apply to the making of a cedar-bark bag, which hangs upside down during weaving (Densmore, 1929, pl. 64, *b*) and of which Lyford (1953, p. 86) says, "The strips of fiber are hung across a single stick." Mason's picture (1904, pl. 122) confutes his first statement applying to a mat and makes the second highly unlikely. Other minor differences in Mason's process are the use of forked upright sticks and the long loops by which the mat is suspended. No indication of weaving technique is given by Chamberlain (1888), Cooper (1936), Jenness (1935), or Skinner (1912). In the absence of evidence of any other process of making cedar-bark mats, the writer assumes that they refer to mats made in the way described herein.

USE OF MATS

Mrs. Goodsky wove her beautiful mats to sell. In an earlier day she might have used them to sleep on, and as carpets, dining tables, partitions, or doors (Lyford, 1953, p. 93), "in the drying of berries and other foods in the sun and as a shield for the fire in the smoking of meat" (Volney Jones, 1948, p. 360). She remembers that when she married and came to Nett Lake about 1897 the people lived close to the lake with cedars all around and lined the walls of their wigwams with bright cedar-bark mats.

Additional data on these mats are found in the following section under "Predominance of rush over cedar-bark mats."

RUSH MAT (RECTANGULAR)

TECHNIQUE: PLAIN PLAITING AND POSSIBLY TWINING

“Plain plaiting is made by passing the elements over one and under one” (Lyford, 1953, p. 62). (See fig. 20.)

Of twining Lyford says (1953, p. 77), “The weft threads were arranged in pairs to cross the warp [elements]. One weft thread was carried over a warp [element]. . . . The other weft thread passed behind the warp [element]. . . . At each intersection the two weft threads were twisted half way around each other enclosing the warp [element]” (fig. 27).

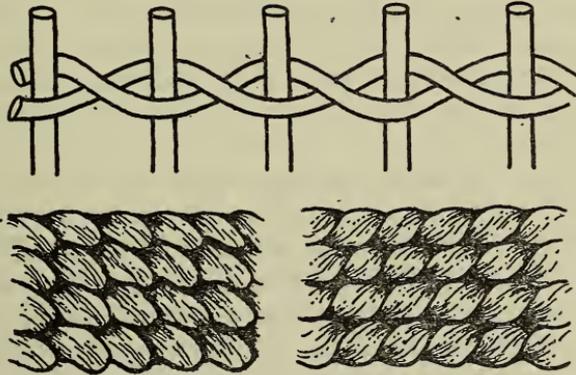


FIGURE 27.—Details of weaves: Twining. (Courtesy Denver Art Museum.)

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. It seems reasonable that a few skillful weavers may have transferred the twining complex from bag to matmaking, just as they applied it to the weaving of rag rugs (Lyford, 1953, pp. 93–95; Coleman, 1947, p. 38; pls. 7, *a*; 8, *a*—mistakenly called a rush mat), bulrush baskets (Mrs. Maggie Skinaway Wadena, oral communication to the writer, July 16, 1961), and bark bags (Densmore, 1929, pl. 55, *a*).

DEFINITION OF TERMS

The distinction between the second major mat and the third, that of cattails, is in need of clarifying. Writers have confused us by a multiplicity of names for each mat. Rush mats are called “reed” by Densmore (1929, pp. 123, 156; pls. 60–61); Hilger (1935, p. 41;

1939, pp. 158, 159; 1951, pp. 136, 137); Kohl (1860, p. 10); Lyford (1953, p. 19, pl. 78); Reagan (1924, pp. 118, 119); Winchell (1911, p. 588); "flag reed" by William Jones (1906, p. 142); and "grass" by Boyle (1898, fig. 32).

Cattail mats are designated "rush" or "bulrush" by Bushnell (1919 a, pl. 2, *b*; 1919 b, 614; 1922, pl. 12, *b*); Beaulieu in Clark (1885 p. 376); Densmore (1929, pp. 12, 21-24, 119, 120); Henry (1897, p. 133); Hilger (1939, p. 45; 1951, pp. 136-140); Jenks (1900, pl. lxxix); Jenness (1935, pp. 112, 113); Kane (1925, p. 4); Radin (1928, p. 663); Snelling (1936, p. 69); Thayer (1940, p. 97); Thompson (1916, pp. 246, 247); and Warren (1885, p. 40).

They are called "reed" by Clark (1885, p. 113), Densmore (1929, p. 157), Jenness (1935, p. 113), and Winchell (1911, p. 586); "cat-tail flag" by Reagan (1924, p. 117), James in Tanner (1830, p. 55), and Winchell (1911, p. 586); "flag" by Peter Jones (1861, p. 72) and Willoughby (1905, pp. 85 and 89); and "grass" by Mooney and Thomas (1907, p. 279).

Several general reference sources consulted ("Dictionary of American English," 1944; Funk and Wagnall's "Standard Dictionary," 1960; Webster's "Third New International Dictionary," 1961; Gray's "Manual of Botany," 1950), while allowing wide latitude in the meaning of some of the terms noted just above, agree in limiting the use of "cattail" to some species of *Typha*, the plant commonly recognized by its furry spike resembling a wiener on a stick and found in watery ground. In this they bear out the usage in sources devoted primarily to the botanical aspect of Chippewa culture, such as those of Densmore (1928, p. 378), Gilmore (1933, p. 124), Reagan (1928, p. 245), and Smith (1932, p. 423). This usage is followed in this paper.

While the general reference sources mentioned do not show unanimity on the meaning of "bulrush," they usually mention for the United States some species of *Scirpus*, the leafless plant commonly encountered standing like a whip in the shallow water of a lake. For the large rectangular mat, the bulrush or rush, as *Scirpus validus* Vahl., is concurred in by Densmore (1928, pp. 293, 295, 378), Gilmore (1933, p. 124), Kinietz and Jones (1942, p. 525), and Smith (1932, p. 418). In contrast to this soft-stem rush, the hard-stem variety, *Scirpus acutus* Muhl., was found for the mat in this study.

The student may judge for himself what mat is intended when various terms are used, only if he knows some of the differences between the two types. (See checklist for distinguishing rush and cattail mats at the end of "Cattail Mat" section, p. 264.)

The Chippewa terminology, too, is in need of clarification. References to mats frequently employ some variation of the word "*a pūk'we*," which this writer finds as "*ū pūk'we*." Longfellow confuses the meaning in the familiar lines in "The Song of Hiawatha" (1898, canto IV, ll. 175 and 181):

But the ruler of the West-Wind . . .
 Seized the bulrush, the Apukwa.

That the poet intended by "Apukwa" the cattail and not the bulrush as we are using the word here is apparent from later lines which locate it in "the margin of the meadow."

The derivation of *a pūk'we* according to Densmore (1929, p. 21) is "*apūkwa*, 'to lap on to.'" The allusion is to the overlapping of the mats used to cover the framework of the lodge. The cattail or birchbark mats used for the sidewalls lap horizontally like modern siding, while the birchbark roofing mats lap over the upper edge of the sidewalls and over each other like shingles. Thus the strict meaning of *a pūk'we* is "lodge cover." From it, apparently, is derived the name for the cattail plant, found by this writer to be *ū pūk wesh' kwe ūk*, by Smith (1932, p. 423) to be *abūkwe' skwe*, by Tanner (1830, p. 55) to be *puk-kwi*, and by Gilmore (1933, p. 124) to be *pokwiššk*, which he says "is derived from *pokwan*, 'roof'+*wišškok*, 'grass.'" Densmore gives (1928, pp. 294, 297) *apūk'we* for the cattail plant. It appears also to be loosely used to indicate cattail mats as distinguished from birchbark mats, which have their own appellation *wi' gwas* (birchbark) *apūk'we* (Densmore, 1929, p. 12).

The writer finds the Chippewa word for rush mat to be *ū na'kūn*, sometimes given as *nākōn* (Hilger, 1951, p. 136) or *a na'kūn* (Densmore, 1929, p. 21), which is also used for the bulrush plant (Densmore, 1928, pp. 293, 297). Lyford (1953, p. 88) notes *ana'kanashk* for bulrush; Smith (1932, p. 418), *ḡka'miūsūkūn*; Kohl (1860, p. 10), *Kitchi Gamī-washk*, 'Great Lake bulrush'; and this writer, *ga mi' wūshk*. Smith (1932, p. 418) gives *ana' ganūsšk* for rushes in general. Gilmore (1933, p. 124) says, "Great bulrush. *Nakunašškok*. The name is derived from *nakun*, 'mat,'+*wišškok*, 'grass.'"

BACKGROUND

The weaver of the second major mat, the rush mat (rectangular), is Mrs. Maggie Skinaway Wadena (*Bwa nes'*, 'Little Sioux'). Mille Lacs Lake, near the center of Minnesota, is the hub around which her 74 years of life have revolved. A fullblood Chippewa, she was born just south of that lake, near Lake Onamia. At the time of this study she was living with a younger couple, the Ole Sams. They had brought her from their home at Isle, on the east shore of Mille Lacs, to the road-

side stand where they sold their birchbark work in the summer, on the west shore. Four years earlier, in 1957, she had made a cattail mat for the writer near Glen, north of the lake.

Mrs. Ole Sam (Maggie Bedausky) acted as interpreter, assistant, and eyes to the dim-sighted older woman, while Mr. Sam assisted in gathering and processing the rushes and bloodroots. Both of the Sams remembered watching their mothers make bulrush mats. Mrs. Wadena, who had learned the technique from her mother, had been producing a mat or two each year, notably for use in the Mide lodge.

Aside from Mille Lacs, the writer found evidence of former mat-making only at Nett Lake, Red Lake, and Ponsford on White Earth Reservation. Rush mats are reported at Mille Lacs by Densmore (1929, p. 154) and Coleman (1947, pl. 8, *b*; the rag rug in pl. 8, *a*, is erroneously called a rush mat); near the mouth of the Winnipeg River, Manitoba, by Kane (1859, p. 71); on White Earth and Red Lake Reservations by Densmore (1929, pp. 155, 156; pl. 1, *b*) and Hilger (1939, pp. 145, 158, 166; 1951, p. 137; 1935, p. 41); at Leech Lake by Smith (1932, p. 418); on Manitou Rapids Reserve, Ontario, southwest of Rainy Lake (Densmore, 1928, p. 370); on Bois Fort Reservation by Reagan (1924, pp. 118, 119); at Basswood Lake on the Minnesota-Canada border by Bushnell (1919 *b*, p. 613); at Grand Portage Reservation by Eastman Johnson (pl. 58 of the present paper); and in northern Minnesota by Whipple (1902, p. 42) and Gillfillan (1901, pp. 59, 62). They occur at La Pointe, Lac Courte Oreilles, and Lac du Flambeau Reservations in Wisconsin (Kohl, 1860, p. 10; Smith, 1932, p. 418; Hilger, 1951, pp. 136, 137); at L'Anse and Lac Vieux Desert Reservations, Michigan (*ibid.*; Kinietz, 1947, pl. 31; Kinietz and Jones, 1942, pp. 525-537); at Walpole Island Reserve, Ontario, south of Lake Huron (*ibid.*; Volney Jones, 1937, pp. 6, 12); and southwest and northeast of Lake Huron (Gilmore, 1933, p. 124; Boyle, 1898, p. 26—at Sturgeon Falls near Lake Nipissing).

GATHERING MATERIALS

Rushes inspected in Mille Lacs Lake were not found to be tall enough for use on July 16, presumably because of the low level of the water. In Whitefish Lake, a small and shallow nearby lake, they were tall and abundant, growing in about 2½ feet of water on a very mucky bottom. As Mrs. Wadena preferred thick rushes so that the weaving would proceed faster, effort was made to select this kind. The amount needed was guessed at. The length of the rushes ranged from 89 to 114 inches.

In harvesting rushes, a rowboat is taken out into the midst of the rushy area. Rushes are grasped with both hands and pulled up carefully so as not to crush them. Some come with difficulty or not at all,

and some break off. The roots of a few come with them, but usually only the entire stem comes up, including the white tip formerly eaten by the Indians.

Other accounts of the gathering of rushes agree essentially with this one. Densmore (1929, p. 123) observes that by the time the cedar-bark mats were made, bulrushes were ready. Kohl (1860, p. 10) says they "must only be cut at one period of the year, when they have attained a certain ripeness." Lyford (1953, p. 88) specifies that they were "gathered from canoes in late June and July after they were full grown." Kinietz and Jones (1942, p. 526) say, "midsummer, when they approach their maximum growth. At Walpole Island they were collected in early August. . . . The women waded into the water to get the stems, selecting mature plants of medium size"—from 5½ to 6½ feet long. The selection of rushes is pictured in their plate 1, figure 1.

Quality varied with the location. The writer learned at Red Lake, Minn., that rushes were not usable for mats and had to be imported from Cass Lake. Hilger (1935, p. 41) asserts this was because they were brittle in Red Lake. She notes (1951, p. 136), "Although the bulrushes growing near the edge of any lake or river were usable, the ones in small lakes were choicest since they were least brittle. Those grown in rivers were not used because of their shortness, unless lake grown ones were not available. Today, as in days past, rushes are pulled up by the roots or cut off with a knife." Smith (1932, p. 418) says "they are pulled, rather than cut, in order to obtain the maximum length"—a credible statement. He goes on, "They select long rushes, with small diameters, so that the pith content is small. When the mat is in service, such a fiber will not crush readily."

Mrs. Wadena had often used the bloodroot (Indian paint, *Sanguinaria canadensis* L., *m̄s go j̄' b̄'k*) for dyeing some of the rushes for her mats. Her assistants entered a nearby woods where they had seen the familiar square white flower in early spring and searched until they found the characteristic round leaf. Shallow-growing roots the size of the little finger and bright red where injured are easily dug from the leafmold with the fingers. After being gathered they are washed at once, and the smaller, fibrous roots picked off. Six hours of work resulted in 3 quarts of roots.

PREPARING MATERIALS

When the harvesters arrive home with the rushes, they cut them to the proper size with a butcher knife. The 6-inch white end is removed and enough from the small end to leave whatever length of warp is desired, 59 inches in this case. The trimmed rushes are divided into

bundles of about 46 each, and tied in the center with a strip of *wi'gōōb* (inner bark of the basswood tree).

At once the rushes are started on the "cooking" process. Without this they are said to be brittle and to break. Mr. and Mrs. Sam and three assistants did this cooking. A large rice-parching kettle of cast iron is placed over a brisk fire and half a kettle of water is brought to a boil. Thereupon a worker seizes two bundles of rushes, stands the small end in the kettle at an oblique angle, and by encircling the other end with her arms uses her weight to press downward on the bundle (pl. 47, *b*). As the lower end wilts it curves to fit the contour of the kettle. When partly wilted the bundle is rotated so that the part near the surface of the water will be on the bottom.

When the rushes are wilted the bundle is removed and retied, this time at the small end. Now the thick end is placed in the water and subjected to the same treatment as the small end. Next, the entire bundle is immersed in the water, curling around to fit the kettle. With two sturdy forked sticks about 53 inches long, two workers press on the rushes and hold them below the surface. After boiling them about 20 minutes the worker tests them by hand. When she decides they are rubbery and soft enough and do not crack on bending, they are lifted from the kettle with the forked sticks and thrown on the ground to cool while the next lot is being processed. When cool enough to handle, a bundle is seized by the small end, swung over the head, and slammed forcibly on the ground. This frees the large end of most of the thin brown sheathing scales. The rest are removed by hand. The rushes are now a less intense green.

When "cooking" is completed, the rushes are spread out to bleach in the sun for a week until they are the color of old ivory. If the weather is rainy they are left bundled at the thin end and hung over a pole, so that air circulating through them may prevent molding. On sunny days the Sams spread them on the roof of a shed, turning them over once each day. Once bleached they can be kept indefinitely before use.

The gathering and cooking process consumed 18 man-hours of time. Apparently there was variance in the amount of cooking. Hilger (1935, p. 41; 1951, p. 136) says "until the green color has disappeared"; Kohl (1860, p. 10), "three-quarters of an hour. Without this process the reeds would become harsh and brittle." Kinietz and Jones (1942, p. 527; pl. 1, fig. 2) describe and picture a worker "standing the bundle in a wash boiler and pouring scalding water over the rushes several times. . . . Formerly it was customary to immerse the rushes in boiling water in a hewn wooden trough. . . . Rushes allowed to dry without such treatment are said to be brittle, less firm, and to

have a less desirable color." Smith (1932, p. 418) asserts that rushes were treated by being "immersed in water for a few days and then cleansed," and pictures them in plate 51, figure 1. Jenness, in an obscure reference (1935, p. 113) says they were "soaked for a week or more in cold water."

Kinietz and Jones (1942, p. 526) describe stripping the brown basal scales off at the time of gathering, and washing the stem "by swishing it through the water."

Hilger (1935, p. 41; 1951, p. 136) mentions the rushes as "being turned several times each day" during bleaching, and adds, "They are taken in at sunset before the dew falls—dew causes them to turn yellow while in the process of bleaching." Bleaching on a rack or a pole is described by Densmore (1929, p. 154), who on the next page adds they "were 'boiled up' before being woven."

On the day selected for weaving, the dye bath is first prepared. The bloodroot roots are broiled so that "the color will come out better." They are spread on a window-screen resting on four stakes over a small but hot fire. To prevent burning they are moved about by hand and by shaking the screen. They are ready for removal when they are heated through, softened somewhat, darkened outside, and intensely red inside (about 20 minutes). It was said that in earlier days they were buried in hot ashes. "They have to be baked, like bread."

The roots are next crushed until they crack open, by pounding each one lightly along its length with a hammer or pebble as it rests on a flat rock (pl. 47, *a*). They are put into a large kettle with enough boiling water to cover the rushes to be dyed, and are brought to a boil.

After a rain the preceding evening, the rushes had been placed in a storage shed to keep them damp for use. This assured the necessary dampness in the bundle to be dyed. Any too thick for use are culled out (there were eight in this case). The rest are divided into two parts, each of which is rolled into a coil 11 inches in diameter and tied with a strip of basswood bark. One coil at a time is immersed in the kettle, held down with a stick, turned occasionally, and simmered for 20 minutes. The result is a shade of yellow-orange resembling a light orange peel. The rushes are drained briefly on the ground, and covered with a blanket to keep them moist. An hour and a half served for broiling, crushing, and dyeing.

Mrs. Wadena described two other methods of dyeing rushes. The lead is removed from three indelible pencils, broken up, placed in boiling water with half a bundle of rushes, and thereafter treated as the roots were, except for boiling 30 minutes. A bright purple

color results which is often seen in mats made around the turn of the century.

The same process is used for "black mud," a blue-black clay sometimes occurring at the mouth of springs. Two quarts of mud and four strips of walnut bark are put in the kettle. The inside bark of the walnut tree is gathered in the same manner as the cedar described earlier. Strips about $2\frac{1}{2}$ inches wide are rolled and bundled before they are dropped into the kettle.

Reference to these and other dyes for bulrushes is found in the literature. Bloodroot is named by Hilger (1935, p. 41; 1939, p. 158; 1951, p. 136—two references) and Kinietz and Jones (1942, p. 528), but they call the resulting color red, contrary to the yellow-orange found in the present study. Hilger also (1951, p. 136) says "brown-orange." She elsewhere mentions the lead from indelible pencils (1939, p. 158). "Black muck found in certain ponds, a black color," is a dye listed by Hilger (1935, p. 41; 1951, p. 136—two references). Kinietz and Jones (1942, p. 528) speak of "a black earth, which we think may be peat, for a purplish black." Densmore (1928, p. 370) says, "A black earth which 'bubbled up in certain springs' was used in black dyes. . . . The Chippewa women buried their rushes in the black earth for a few days and thus secured a satisfactory black color."

Other substances are given for dyeing black (*ibid.*, p. 372); mahogany (Hilger, 1935, p. 41); yellow, red, purple, mahogany, green, blue, black (Hilger, 1951, pp. 136—137); brown (Kinietz and Jones, 1942, pp. 528, 529). Several substances to use in dyeing unspecified colors are listed by Hilger (1939, p. 158). There were differences in methods used: "One informant swished bulrush reeds in ashes. . . . Some informants boiled reeds in decoctions; others soaked them overnight. Boiling, said some, made them too soft." "The material used to make the dye was boiled in water which was later strained off. The reeds were then boiled in the colored water" (*ibid.*, 1935, p. 41; 1951, p. 137). Densmore says (1928, p. 369; 1929, p. 163), "Rushes are the hardest material to dye and often require several 'dippings' before the desired shade can be procured." This may be one reason that, although the vegetable dyes were "rich, but quiet in tone" (Boyle, 1898, p. 26), native dyes gave way to commercial (Densmore, 1918, p. 98; Hilger, 1935, p. 41; Smith, 1932, p. 418).

Rushes must be bleached before successful dyeing can be assured. Reports on the color after bleaching are in conflict: "pure white . . . ivory white" (Smith, 1932, p. 418), and "natural straw-color" (Boyle, 1898, p. 26). "Those prepared at Walpole Island [standing upright] appear to have been poorly cured," say Kinietz and Jones (1942, p. 528), "for they retain considerable green."

Basswood twine (*bi mī nū kwūn'*) for weft had been prepared the week before by Mrs. Wadena. To make enough for a mat, a melon-shaped ball 9 inches long and 6 inches in diameter, 62 hours was required by the visually handicapped woman. The armload of *wi'gōōb* needed had been purchased from a friend, who estimated that 5 hours went into its preparation. It is prepared by stripping off the dark outside bark of the basswood and soaking the inner bark, weighted down with stones, at the edge of a lake for 15 days, "without looking at it, or it won't separate." Now by working it between the hands the layers separate easily. Twine is made by pulling off two dry strands about one-fourth of an inch wide and rolling them on the shin with two motions. The first roll is toward the worker, and the second, more brief, is away from her. *Wi'gōōb* is added to overlap a strand running out. It makes a strong and very satisfactory weft.

One other material required was cord for the first row. Formerly nettle fiber cord (*ū sé ū sūb*) was used because of its strength. Since this was out of season, 20-pound test green fishline was used. Smith alone (1932, p. 418) mentions that "the edge is bound securely with nettle fiber cord." Others name basswood twine for the first row (Kinietz and Jones, 1942, pp. 525, 531; Densmore, 1929, p. 155). With one exception, all find basswood twine for the weft: Densmore (*ibid.*; 1928, p. 378), Hilger (1935, p. 41; 1951, pp. 135, 137—all "warp"), Gilmore (1933, p. 124—"warp"), Volney Jones (1937, pp. 6, 12), Lyford (1953, pp. 89-90), Kinietz and Jones (1942, pp. 525-526). Kinietz and Jones add, "At present, commercially manufactured cord is often used. Through a part of one mat . . . alternate pairs of weft strands are of basswood cord and cotton fishline."

In contrast to Mrs. Wadena's 62½ hours to make the twine, Volney Jones' informant (1937, p. 6), together with her sister, made it in 1 day. A full and informative discussion of basswood twine may be found in this work by Jones.

FIRST ROW

For making the first row (*ni bi da'so*) or upper selvedge, Mrs. Wadena dispensed with the white man's furniture and sat on a cushion on a blanket spread on the ground. She used 12 of the 14 prepared bundles (pl. 46, *b*), discarding a few rushes she judged too large. Two lengths of fishline cord are prepared, each four armspreads long. (An armspread is approximately 5 feet.) They are placed parallel and are hereinafter treated as one cord of double thickness. At the center of the cord is tied a knot with a small projecting loop, which is in the worker's left hand and points toward the left. Except for about a yard on either side of the knot, each of the two ends of cord is rolled

into a little ball and fastened to prevent tangling. The balls rest on the ground at the right of the worker. Farther to the right are two untied bundles of rushes, one with the large end toward the worker and one with the small.

The basic process continuously repeated for the first row is this (fig. 28):

1. Holding the knot end of the cords in the fingers of her left hand, the worker twists the two cords together for one-half turn toward herself (counterclockwise) and holds the uppermost cord in her teeth for tension.
2. With her right hand she grasps the 4-inch end of the uppermost of the two rushes last added, bends the end to the right and away from herself so that it lies between the two cords, and holds it with her left thumb and index finger.
3. With her right hand she grasps the 4-inch end that is farthest away from the end just bent down, and bends it down next to this one, on the way passing it under the first 4-inch end that it passes by, and over the next 4-inch end.
4. Holding both ends with her left hand, she trims them with scissors to one-half of an inch in length, at a somewhat oblique angle.
5. Fanning the ends out she conceals them with two rushes, one laid over them and one under them, but both lying between the two lengths of cord. Four inches of the rush extends beyond the cord and points toward the worker. The remainder rests on the ground, pointing away from her. She uses the thick end of one rush and the thin end of the other, reversing the order the next time rushes are added.

She repeats the twisting of the cords and the other four steps until the length of the mat is reached. Only the beginning necessarily varies from this procedure, because there are no previously added rushes. The beginning is thus (fig. 29):

1. She picks up four rushes in the right hand, two by their thick ends and two by their thin ends, lays them at the V formed by the knot in the center of the cord, with 4 inches extending beyond the cord as described in step 5 above, and twists the cords as described in 1 above.
2. She bends as described in 2 the rush nearest the twist.
3. She bends as described in 3 the rush farthest from the twist and nearest the knot.
4. She trims, and adds two rushes as in 4 and 5.
5. She twists cords.
6. She bends the uppermost rush just added.
7. She bends the second rush from the knot, passing it under and over the other ends of the way.

Thereafter she twists the cords and continues the basic process (pl. 47, *c*).

Mrs. Wadena interspersed the plain rushes with series of dyed ones, not counting or measuring for the intervals except with her dim eye. She had estimated the number of colored ones needed before dyeing took place. She used 34 plain, 7 dyed; 43, 6; 38, 7; 74, 5; 48, 6; 44—a total of 312 making 61 inches. Working time was 3 hours.

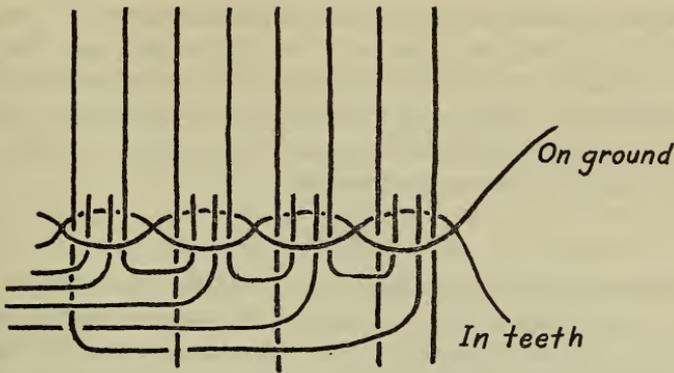


FIGURE 28.—Rush mat selvedge: Basic process.

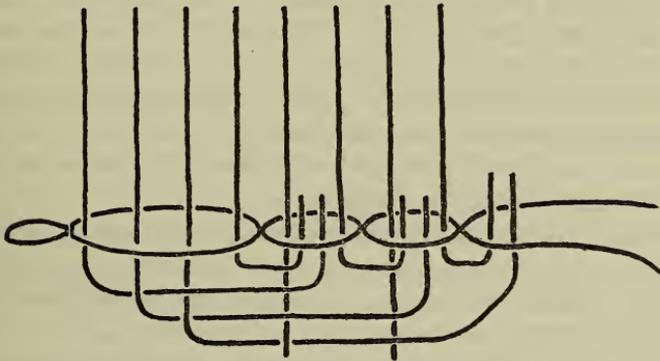


FIGURE 29.—Rush mat selvedge: Beginning.

If a thinner mat is desired, a "3 braid" edging could be used instead of the "4 braid" here described. A thicker mat can be secured by doubling the number of rushes added at a time, using two below and two above the bent-over ends. This mat would wear better.

The literature provides few accounts of the making of the first row. Densmore's one-sentence explanation and the accompanying detail photograph (1929, p. 155; pl. 60, *a*) give no clue on how to go about beginning a mat. Neither does the following picture of a worker who is making the first row, nor Lyford's illustration of the same subject (1953, pl. 48, *b*). Only Kinietz and Jones' admirable study of the making of a mat provides a lucid description of the technique (1942, pp. 531-533; fig. 2; pl. 3, fig. 1), which resembles that of the present study to a marked degree.² Their process adds

² Herbert H. Shippen's "A Woven Bulrush Mat from an Indian Tribe of the Great Lakes Region" (Michigan Acad. Sci., Arts and Letters Pap., vol. 39, 1954) also contains useful data, sketches, and photographs. It is not cited in this paper because from the design the mat appears to be Sauk and Fox (cf. Smith, 1925 a).

four at a time instead of two, as Mrs. Wadena suggested as an alternative. The only notable difference lies in the fact that their edging omits the weaving or braiding of the 4-inch ends that is both beautiful and durable. They also mention that the ends are "tucked in" between the newly added rushes, rather than that the ends are first bent over and the rushes then added.

WEAVING

The first row is now lashed to a pole, which in the present instance was 101 inches long and $1\frac{1}{2}$ inches in diameter. With a knife the pole may be notched slightly on two sides on the same circumference, to keep the lashing from slipping. The material used is $\frac{1}{4}$ -inch strips of *wi'göob*, not twisted to twine or even soaked in the lake. It may be prepared simply by stripping off the basswood bark and removing therefrom the outer bark. The worker sits on the ground with one end of the mat and pole in her lap and the rest of the pole extending under her left arm and back to the left. Starting at the end at which work ceased (left end of mat) but leaving 1 inch free at each end, she lashes the row to the pole at $1\frac{1}{2}$ -inch intervals in such a way that the row is in front of, not below, the pole.

It is nailed to two trees at the eye level of the weaver and is raised during the weaving whenever the work becomes inconveniently low (pl. 48, *a*). Stakes are driven into the ground at the lower corners of the warp, slanting so that the upper ends are $1\frac{1}{2}$ feet from the upper corners of the mat. The upper ends of the stakes are secured by nailing to the tree or tying to the pole. Tension on the mat is obtained by tying to each of these stakes at a point one third of the way from the top a strand of *wi'göob* twine twice the width of the mat in length and doubled in the middle, where it is attached to the end of the green cord of the first row. These pieces of *wi'göob* twine form the side selvages. To the left one are attached the weft strands, two of which are made by doubling in the middle a piece of *wi'göob* twine twice the length of the mat and looping it around the left selvedge. Six double weft strands are fastened to begin with, and others are added as work progresses. The free ends are looped around the upper end of the nearby stake with a slipknot until needed. This preparation for weaving took an hour.

The several accounts report the same procedure in lashing the first row to the pole (Densmore, 1929, p. 155; Kinietz and Jones, 1942, p. 533, fig. 1). However, there are several possibilities in structures for weaving. A light and portable three-sided frame such as was used for the cedar-bark mat of the present study is recorded (Kinietz

and Jones, 1942, pp. 529-530, fig. 1; Densmore, 1918, p. 98, fig. 100; 1928, pl. 48, *a*; 1929, p. 155, pl. 61, *a*; Lyford, 1953, p. 89; pls. 48, *a*, 49—after Densmore's pl. 61, *a*). Lyford also reports "a temporary shelter of leaves or other shade," and Kinietz and Jones agree (1942, p. 530). Densmore (1929, pp. 155-156, pls. 62, *a*, *b*; 1928, p. 379, pl. 48, *c*) details the construction of a pine bark weaving house containing a heavy permanent frame for mats. She mentions the alternative of a dark shed for storing supplies "of birch bark, rushes, and strips of basswood bark." In just such a structure these same materials were stored by Mrs. Sam in the present study.

A refinement of the crude frame is described and sketched by Boyle (1898, p. 26, fig. 32). He notes "an upright pole at each side, one end of which was fitted into a hole at the extremity of the cross-bar." It leaned against the house, "the upper bar being supported by the wall." An ingenious device is shown by Kinietz and Jones (1942, p. 534; pl. 2, figs. 1, 2—the latter picture also found in Kinietz, 1947, pl. 31). It adjusts the height of the work "by providing arrangements to lower the crosspiece down the back of the supports and by having another top crosspiece over which the mat may hang." What appears to be the same apparatus is pictured by Densmore and described as a permanent support against which to lean the portable frame (1929, p. 155; pl. 1, *b*).

Kinietz and Jones (1942, p. 533, fig. 1) give essentially the same method for forming the side selvedge and attaching the weft strands as does the present study. Densmore says only (1929, p. 156), "The ends of the mat were tied to the upright posts."

Weaving is begun with the uppermost single weft strand, and moves from left to right. The weaving process consists simply of the weft strand's passing over one warp rush and under the next. To speed the process the fingers of the right hand raise the rushes on the front of the mat to separate them from those on the back, which are grasped between the left thumb and fingers, the thumb being toward the worker. When the left hand can conveniently hold no more (about seven rushes), the right hand pulls between the two layers the weft strand, which is then grasped by the weaver's teeth for tension. The process is repeated until the row is finished and the end of the twine secured to the selvedge strand by a double knot.

With the second half of the doubled twine the process is repeated except that this time the rushes from the back are raised. The two rows are repeated until the lower end is approached. The ends are then trimmed off evenly. Weaving ends 4 inches from the bottom, and the mat is removed from the frame for completion. A row like

the first is used as a finish (pl. 49), ending at the lower right corner, where the meeting strands are knotted together. Ends of weft twine are now trimmed to a 1-inch fringe.

Several procedures are followed during the weaving. Whenever the pole is raised, the side selvages must be retied.

To keep the weft from sagging, several wedges must be used in each row. They are formed by tucking up a warp rush behind which the weft strand has just passed. The left index finger pushes a loop of the rush up behind the strand. The loop is pulled down as the next row of weaving reaches it.

Work must be watched closely to keep it straight, not only horizontally but along the vertical edges, where too hard a pull on the weft may cause a bowing in of the edge. Several women may work on the mat at once, to speed the process. When one weaver is halfway across, a second may start the next weft strip, and when there is room for her a third may join. This is the maximum number of workers for a mat of this size. Men did not assist anywhere in the process except in gathering and processing materials, perhaps because they were engaged elsewhere on the day of the weaving proper.

Rushes must be kept damp. If they are thoroughly damp to begin with, occasionally splashing water on the part being woven will be sufficient. When they become dry throughout, work must cease pending wetting by rain or night dew. For this reason it is best to begin at daybreak. A dry mat will bulge and be difficult to weave straight. The mat in the present study shows the effect of weaving the center portion when the rushes had dried out (pl. 48, *b*).

When a rush breaks, a new one is added and carried along with the stub of the old for about $1\frac{1}{2}$ inches. Protruding ends are later clipped off. Mistakes are rectified by ripping back individual rushes as needed. If an error is too difficult for correction to be practical, offending rushes are snipped off.

Weaving proper took 21 man-hours, and edgings 3 hours apiece. Total man-hours consumed in the manufacture of the $40\frac{1}{2}$ - by $58\frac{1}{2}$ -inch mat were 121.

Mats do not differ greatly in width because this dimension must conform to the length of the rushes. The size of finished mats is variously said to be "from 36 to 45 inches wide and from 2 to 3 yards long" (Lyford, 1953, p. 89); "3 feet wide and from 4 to 8 feet long" (Smith, 1932, p. 418); "26 to 42 inches in width . . . 49 to 87 inches" in length (Kinietz and Jones, 1942, p. 536). Using Indian measurements,

an informant measured the width of a bulrush mat with seven hand stretches (from tip of thumb to tip of long finger). . . . The length of a mat was a

double arm stretch and a half (one-half was distance from tip of hand to shoulder). When a mat was completed, it was stretched, the give of the weave lengthening it to two double-arm stretches. [Hilger, 1951, p. 104.]

The same "over-under" weave is mentioned by Boyle (1898, p. 26, fig. 32—detail), Densmore (1928, p. 378), and Kinietz and Jones (1942, p. 533), the latter concurring in essential details of weaving proper. Lyford's claim for twining in rush mats was discussed earlier under "Technique." Densmore notes (1929, p. 155) that the weft cord was "held in a little roll in the weaver's left hand." On the following page she characterizes the lower edge as being finished "in a manner somewhat similar" to that of the upper, while Kinietz and Jones (1942, p. 534) find it identical with the first row. Their worker took down the mat to do the last row, ended at the right-hand corner, and, in place of a fringe, finished the right-hand edge by binding the weft cords over the ends of the preceding ones as work progressed. Side borders were kept straight by the tension of cords running from the mat to the uprights. Splicing of broken rushes was done as noted above. Variations in closeness of weave resulted from the spacing of the weft strands on the side selvages, the amount of upward pull on weft cords, and the maintaining of moistness (*ibid.*, pp. 533, 534).

For moistness many devices are used. Kohl records (1860, p. 10) :

The Indians told me they did not plait these mats in dry and cheerful weather, but on damp and rainy days, else the reeds would become brittle. I lived once in the house of a very industrious mat-plaiter; every night she laid her work out in the dew. The next morning she brought it in, and plaited a bit more, till the sun rose too high. I asked her why she did not pour water on it during the day, but she said that would turn the reeds black.

Contrary to this mat plaiter, Kinietz and Jones find (1942, p. 534), "Water may be applied by pouring from a vessel, sprinkling with the hand, or blowing from the mouth." Hilger's informants also used the last-named practice (1935, p. 41; 1951, p. 136) and utilized the dew (Hilger, 1951, p. 136). Says one, "I rose very early one morning, while the rushes were yet damp with dew, to make a bulrush mat. It was still dark" (*ibid.*, p. 72).

Rushes for the first row are dampened, according to Kinietz and Jones (1942, p. 532),

by pouring water over them or by wrapping them in a moist blanket or quilt and leaving them there overnight. Water may be poured on them at intervals; hot water hastens the process. The worker generally does the border in a cool, shady place. . . . The cord may also be dipped into the water to soften it.

The weaving house, storage shed, and shelters described earlier were built to protect the rushes from drying, as well as for the comfort or convenience of the weaver. Without them,

she could work only in the early morning or late evening when the condition of the atmosphere was such as to moisten the rushes. Her work was a constant care to her as the rushes must not "dry out" before the mat was completed. [Densmore 1929, p. 155.]

"Occasionally on a rainy day," says Lyford (1953, p. 90) "several women would work together on a mat, completing it in a short time." She also mentions (*ibid.*, p. 88) that "the gathering of bulrushes . . . was one of the activities of special interest to the women." Densmore notes (1929, p. 123), "The girls carried them to the camp." Hilger (1951, p. 136) and Kinietz and Jones (1942, p. 536) find the entire process to be woman's work, and the latter say it was particularly for older women. They add that two or three may weave, as well as cooperate in the entire work. If men help, it is with the construction of the frame.

Several factors rendered the mat in the present study somewhat inferior in workmanship. Because of her handicap Mrs. Wadena had to surrender the weaving proper to younger women with little or no experience, and to simplify the pattern used. The mat was uneven not only in weft and margins, but in diameter of warp strands. The weaver preferred larger rushes for the sake of speed. Such a rush tapers considerably to the small end. If small rushes had been selected, they would be more uniform throughout their length. In addition, they are firmer and do not bulge on either side of the tight weft strands. Rushes averaged 5 to the inch, while in other older mats they may average 8, or, in one of remarkably fine texture made by Mrs. Goodsky, the cedar-bark weaver, 11 to the inch.

The only pattern consisted of bands of color, unevenly distributed. This is the simplest of the mat patterns, which range in complexity up to what must have been one of the most difficult, recalled by a Red Lake informant—the figure of a horse. Only a skilled weaver would be able to make "a mat with flowers effectively spaced" or "a vine with leaves crossing the mat at intervals" reported seen by Densmore (1929, pp. 155, 156). She goes on, "This was very difficult to make, as the rushes are likely to be broken on a curved pattern. In old times the pattern often covered the entire mat, the center having a design of its own and a border being placed around its edge." A mat in the writer's possession, from White Earth Reservation, shows a cluster of leaves (?) at each end (pl. 57, *b*).

Ornamentation and design may be introduced into rush mats by coloring some of the rushes, by varying the technique of the weave, or by a combination of these two methods. Dyed rushes may occur in plain stripes, with no variation in the weaving—a very common practice—and several colors may appear in a single mat, the colors being alternated in spaced bands. Ordinarily only a relatively small percentage of the rushes in a mat are dyed. Design by weave

variation is achieved by crossing the rushes over each other between the weft strands, which gives a zigzag appearance [see pls. 57, *a*; 59]. . . . By this device rushes may be inclined diagonally across the mat for some distance, with more or less abruptness. Another method of modifying design is by twisting adjacent rushes about each other, so that a raised effect results. The rushes may be manipulated in pairs or in groups of four. Variations in weave are sometimes carried throughout the entire mat, but are usually confined to areas of dyed rushes. The combination of color and weave variation may result in elaborate and intricate geometric patterns. [Kinietz and Jones, 1942, p. 535.]

"A diagonal plaid was woven by carrying one-half the rushes diagonally to the left, the other half to the right," says Lyford (1953, p. 90).

Rush mats do not photograph well, so that their patterns cannot be positively identified from illustrations. The following appear to be the designs used in pictured mats: bands of geometrical designs (Boyle, 1898, fig. 32); bands and zigzag lines (Coleman, 1947, pl. 8, *b*; the mat in pl. 8, *a*, is not of rushes); no pattern (Densmore, 1918, fig. 100); bands (*ibid.*, 1928, pl. 48, *a*); diamonds joined by lines (*ibid.*, 1929, pl. 1, *b*); intricate framed geometric design and bands (*ibid.*, pl. 63); no pattern (*ibid.*, pl. 61, *a*; also reproduced in Lyford, 1953, pl. 49); bands of latticework (*ibid.*, pl. 48, *a*); bands of geometric designs (*ibid.*, pl. 48, *b*); bands and geometric blocks (Kinietz and Jones, 1942, pl. 3, fig. 2); zigzag bands (*ibid.*, pl. 2; also reproduced in Kinietz, 1947, pl. 31).

A page of design elements copied from mats (Lyford, 1953, pl. 78) shows diagonal lines, zigzags, latticework, a design made up of geometric figures, and an intricate design of angles.

Occasionally one still sees rush mats [in 1938]. . . . The colored pattern of diamonds made by using colored rushes is seldom seen, however. Generally no artistic design is used, borders of colored reeds making them attractive. [Hilger, 1939, p. 158.]

Though they are little used today [1953], the rush mats are still made with straight line and diagonal designs worked out in colored rushes. Occasionally they are offered for sale. Old ones are to be found in many of the homes where they are valued as keepsakes from mothers and grandmothers. [Lyford, 1953, p. 90.]

USE OF MATS

At Mille Lacs the rush mat is still occasionally seen on the floor of a summer tent, or beneath the sacred water-drum in the Mide ceremony. In 1938 on White Earth Reservation, "eight of the seventy-one families living in tar-paper shacks possessed bulrush mats. Some were merely keepsakes . . . while others were used for squatting purposes in berry patches or while out gathering wild rice, moisture penetrating them less easily than rag rugs." In earlier times, "they squatted on rush mats . . . when at work or when eating, and

l lounged on them while at leisure" (Hilger, 1939, pp. 146, 166). Their use for lining the walls of the wigwam is noted by Willoughby (1905, p. 89) and Gilmore (1933, p. 124). A hundred years ago Eastman Johnson, a visitor to Grand Portage, Minn., painted the only known pictorial record of a Chippewa rush mat used in this way (pl. 58). At about the same time two travelers were attracted by them and recorded:

The interior of their [Mide] lodge or sanctuary was hung round with mats constructed with rushes, to which were attached various offerings consisting principally of bits of red and blue cloth, calico, &c., strings of beads, scalps of enemies. [Kane, 1859, p. 71.]

These mats, with which the Ojibbeways cover the walls of their wigwams, and which also serve as carpets, beds, and sofas, are the handiwork of the women, and are excellently made, . . . very soft and lasting mats. [Kohl, 1860, p. 10.]

PREDOMINANCE OF RUSH OVER CEDAR-BARK MATS

Rush mats are often bracketed with cedar-bark as being used interchangeably. "Both types of mats, when new, served largely as tables, being spread out on the ground with food and dishes resting on them. They were rolled and stored near the wall of the wigwam when not in use. Worn mats were used as rugs, the family squatting or resting on them" (Hilger, 1939, p. 166). The only difference in use appears to rest on Densmore's citation (1929, p. 27) of "cedar mats" for the lower part of the exterior walls of a peaked lodge in Canada. However, because of the weave of cedar-bark mats, they would be impractical for such use, and mats in the sense of sheets of bark were probably intended.

Yet rush mats must have been far more commonly made than cedar-bark, for in illustrations they outnumber cedar-bark by three to one. Although cedars grew throughout the rush-mat region, Densmore's observation (1929, p. 156) bears out the lesser role of cedar bark: "In northern Minnesota and Canada, where rushes were not abundant, the floor mats were made of strips of cedar." The reason for the predominance of rush mats is an interesting question.

According to informants, although both rush and cedar-bark mats are durable, the latter are more resistant to dampness. Volney Jones (1948, pp. 360, 345) mentions this quality and the resins in cedar bark. Both mats appear about equally portable, being compact, light in weight, and pliable. The warm months are the season for gathering materials and for weaving in each case. Both kinds of mats provide opportunity for creative expression.

A time study of the manufacture of these mats throws little light on the question. The time used for the cedar-bark mat in the present

study, in which commercial cord was used, was 33 hours; for that in Volney Jones' paper, in which the worker made her own twine, was 20 hours (1948, p. 354). Mrs. Wadena's bulrush mat needed an astonishing 121 hours of time.

For many years commercial dye and cord have been widely used for mats. If we exclude the time consumed in making these two items, the cedar-bark mats require 29 and 17 hours respectively; the bulrush, 46. Even allowing for the diversities in time used brought about by personal factors such as experience, nimbleness of finger, speed, good eyesight, high standards of craftsmanship or their lack, rush mats appear to be much more time consuming.

A clue to the reason for the predominance of bulrush mats lies in a fact noted by other writers as well as this one—the occasional survival today of a few keepsake rush mats. In contrast, the preservation of any cedar-bark mats in the field has not been recorded. Mrs. Goodsky warned that the cedar bark would crack if flattened while rolled. Rush may be rolled, folded, or crushed into a compact bundle without adverse effects. It seems likely that rush mats were preferred because they were better adapted to survive the rigors of a seminomadic existence.

CATTAIL MAT (RECTANGULAR)

TECHNIQUE: PIERCED WARP WITH TWO ROWS OF PLAIN PLAITING

Pierced warp is defined as "the form of weaving in cat-tail and other soft material when the weft strings pass through the warp. The warp stems are strung on the weft strings" (Mason, 1904, p. 195).

"Plain plaiting is made by passing the elements over one and under one" (Lyford, 1953, p. 62). (See fig. 20.)

BACKGROUND

As with the previous mat, only Mrs. Maggie Wadena possessed the knowledge, experience, and physical condition required for making a cattail mat, as far as considerable investigation throughout northern Minnesota could determine. Small wonder that she was a repository of Chippewa craft lore; she came of stock noted for skill in craft-work. Her parents, Mr. and Mrs. Tom Skinaway, had been valued informants to Miss Frances Densmore in the early part of the century.

At the time of the present study she had a temporary lodging to the northeast of Mille Lacs Lake, where she had just completed harvesting and processing wild rice. Since all of her children were deceased, she had joined forces for the strenuous ricing season with the Ole Sams, the younger couple who were mentioned previously as her helpers for the rush mat.

Mrs. Sam interpreted and gave the assistance necessitated by Mrs. Wadena's failing eyesight. Mr. Sam procured the cattail leaves and supplied information gathered while watching his mother make cattail mats in earlier days. Mrs. Wadena, too, had learned the art from her mother, but had not made a mat for 10 years.

Except for one informant who formerly lived at Whipholt, 60 miles northwest of Mille Lacs, only in the Mille Lacs area do residents still retain a recollection of the use of these mats. Writers mention Mille Lacs for them more frequently than any other locale (Brower, 1900, pls. 28, 34; Bushnell, 1919 a, pl. 2, *b*; 1919 b, p. 614, pl. 3; 1922, p. 14; Densmore, 1929, pp. 119-120; Hilger, 1951, pp. 137, 139). Others find them all across northern Minnesota, from its western extremity on the Red River south of Pembina (Henry, 1897, p. 133) to Lake of the Woods (Snelling, 1936, p. 69), White Earth Reservation (Hilger, 1951, p. 140; Beaulieu in Clark, 1885, p. 376), the upper Mississippi (James in Tanner, 1830, p. 55), Leech Lake Reservation (Bushnell, 1922, pl. 6, *b*), and Nett Lake Reservation (Reagan, 1924, p. 117; 1928, p. 245). They continue across northern Wisconsin from Danbury on the St. Croix River (Thayer, 1940, p. 97) to two at Lac Courte Oreilles and three at Lac du Flambeau Reservations (Hilger, 1939, p. 45; 1951, pls. 26, *1*, and 27, *3*; and Smith, 1925 b, fig. 21; 1932 p. 340). At Lake Huron, Gilmore (1933, p. 124) and Radin (1928, p. 663—near Sarnia) note them to the south and southwest; and Jenness (1935, p. 113—at Parry Island) and Kane (1859, No. 1; Bushnell, 1922, pl. 7, *a*—after Kane, 1859; Bushnell, 1940, p. 4, fig. 1—on the Spider Islands), to the northeast. Kane (Kidd, 1946, p. 5) sees them to the northwest at Sault Sainte Marie, while Peter Jones (1861, p. 72) records "nets, made of flags" southeast of the lake. Willoughby (1905, pp. 85, 89) and Holmes (1896, p. 19) find a similarity of these mats to those encountered on the East coast by early European visitors.

GATHERING MATERIALS

Ole Sam asserted that the time to gather cattails (*ũ pũk wesh' kwe ũk*) is "after ricing" (late September or early October) or "when they lose their green color." Other informants said "only when the leaves fall; the cattails are not strong enough earlier."

Some writers give the season for gathering and some for weaving the cattails. Assuming that both processes take place within a few days of each other, we find a wide range for the proper season, although the instances are all in Minnesota. Densmore's Mille Lacs informant (1929, p. 119) concurs in the after-ricing date. Henry (1897, p. 133) specifies November 1, 1800. Hilger (1951, p. 139) says fall; Reagan (1924, p. 117) and Lyford (1953, p. 90), when full grown

in summer; and Winchell (1911, pp. 586-587), midsummer. As maximum size is desirable, it would be logical to wait to gather them until growth ceases, after frost. This date varies with location and season, but usually occurs in October or late September.

While driving in the vicinity of his house, Mr. Sam noticed that the tallest growth of cattails, about 5½ feet, was in a swamp near a creek.³ Here he and a friend cut in 2 hours enough for the mat in this study. 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 writer's finding of the botanical name of this plant as *Typha latifolia* L. is confirmed by Densmore (1928, pp. 294, 295, 378), Gilmore (1933, p. 124), Lyford (1953, p. 88), Reagan (1928, p. 245), Smith (1932, p. 423), and Tanner (1830, p. 55). Two writers say that gathering cattails was the particular duty of the women (Lyford, 1953, p. 88; Winchell, 1911, p. 587); and Hilger says the women "pulled" the cattails (1951, p. 138). This term is probably an error, and may arise from her use of "bulrush" as the name for both cattail and rush. (For definitions of the two, see p. 234.)

PREPARING MATERIALS

The leaves of the plant (pl. 46, *b*) 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 (pl. 46, *b*). Mrs. Wadena determined the length by holding a leaf in one hand and sliding the other along it until the fingers reached what she thought was the right length. Her poor vision may account for this procedure. She prepared four bundles of outside leaves and five of inside for the mat in this study, and she leaned them against the house to dry in the sun. They dry in 5 days in clear weather and must be taken in if it rains. It took the two women about 2½ hours to prepare the bundles.

Radin (1928, p. 663), too, mentions drying them. Densmore's informant (1929, p. 119) cites another method of drying: "She selected a nice smooth piece of ground and spread them out."

³ When he gathered them there a year later they broke so easily as to be useless. He believed the condition might be due to the dry summer.

An additional material needed is cord (*o kwe ga ne' ab*) to be used in three ways. Mrs. Wadena formerly used *wi'gōōb* (basswood-bark fiber) twine for a foundation and for sewing, and the stronger nettle fiber cord (*ũ sé ũ sũb*) for tying the first row. Reagan (1924, p. 117) says mats were "strengthened at the edges by being counter wrapped with basswood twine." Jenness (1935, p. 113) ambiguously mentions that they were "stitched together at top and bottom with thread from boiled basswood root [bark] that had been scraped while soft and then twisted on the leg." Densmore (1929, pp. 119, 157) finds "boiled basswood bark" cord for the foundation, and "strands of basswood fiber which had been boiled to make it tough" for sewing. Gilmore (1933, p. 124) notes that stitching was done "with twisted thread of basswood fiber, or with the fiber of *Apocynum cannabinum* [Indian hemp] or of *Asclepias incarnata* [swamp milkweed]." Henry (1897, p. 133) tells of "threads of the inside bark of bois blanc [basswood] of the thickness of sturgeon twine" for sewing; and Smith (1932, pp. 340, 423), "nettle string" and "basswood fiber."

Details of the manufacture of twine from natural fibers may be found in Volney Jones' thorough study (1937) and further details in Densmore (1928, p. 378; 1929, pp. 152-154), Hilger (1951, p. 125), and Lyford (1953, pp. 44-46).

For the present study Mrs. Wadena used two kinds of commercial cord: for the foundation of the first row, two strands of raveled burlap bags twisted together; for tying the first row and for sewing, soft rayon knitting and crocheting yarn of the diameter of fourfold knitting worsted, which she always used doubled.

Other equipment needed includes scissors for cutting the cord, six 8½-inch pegs whittled out of branches five-eighths of an inch in diameter, two side sticks, and two needles. The side sticks (*sa ga kwe' gũn ũn*) 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.

One of the men made the pegs, side sticks, and wooden needles. The needles (*na mũng'*, pronounced with a hard *g*) are 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 (pl. 46, *b*). In earlier times Mrs. Wadena used needles made from deer ribs flattened by removing the rounded surfaces with a knife (pl. 46, *b*). They were similar in dimensions to the wooden ones but somewhat wider. They were also sharply pointed and slightly bowed,

facilitating the sewing of cattails. Another informant told of seeing needles (*okan ĩ sha' bo nĩ gũn*) made of steel by a blacksmith.

Smith (1932, pp. 340, 423) and Densmore (1929, p. 119) mention bone needles. The latter adds (pp. 157, 169; pl. 9, *a(g)*), "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." "The ribs of rather small animals were used in making the needles." Thayer (1935, pp. 3, 4) pictures both bone and steel needles. Elsewhere (1940, p. 97) he pictures and describes a bone needle "made of split rib" and "polished."

Needles are furnished in pairs so that two workers can sew at the same time, one at each end, when a full-length mat is made.

FIRST ROW

Mrs. Wadena said that for a wigwam four mats were required, each "2 arm-spreads long" (10 to 12 feet). For the present study she made a mat (*ũ pũk' we*) 4 feet 2½ inches long at the selvedge by 4 feet 5½ inches wide and indicated that it should be 3 inches wider.

The size and number of mats were determined by the size of the lodge and the proportion of its surface which the cattail mats covered (pl. 52, *b*). Sometimes a double tier was used on sidewalls (Jenks, 1900, pl. LXIX; Lyford, 1953, pl. 50), surmounted by a proportionately smaller area of roofing bark. Bushnell (1922, pl. 8, *a*) pictures a tipi with a lower tier of birchbark and an upper of bark and cattail matting. Gilmore (1933, p. 124) and Lyford (1953, pp. 17, 91) cite mats for roofing wigwams, Lyford adding, "Sheets of . . . bark were laid over the upper mats to provide a waterproof roof." "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." It is likely that beneath the more waterproof bark roofing, cattail mats were frequently used for additional warmth. Here they could pass undetected by a writer or his camera.

Other tribes of the western Great Lakes, however, regularly used them for top roofing. They are pictured used this way by Smith for the Meskwaki or Saux and Fox (1925 *a*, fig. 15; 1928, pl. XXXVII, 4); Skinner for the Mascoutens or Prairie Potawatomi (1926, pl. IX, 2); and Radin (1923, pl. 18, *a, b*; pl. 19, *c*), Bushnell (1922, pls. 36-37), and Seth Eastman (Schoolcraft, 1853, vol. 2, pl. 23) for the Winnebago. Such use by the Menomini is cited by Smith (1923, p. 74), Skinner (1921, p. 246), and presumably by Hoffman (1896, p. 258).

"My mother knew just how long they should be to go around the wigwam," Densmore's informant (1929, p. 120) relates, "and we made five long ones, four of 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-arms' lengths." Henry (1897, p. 133) says, "They are made from 12 to 18 feet long, and 5 or 6 wide." Hilger (1951, p. 139) cites mats 49 and 50 inches in width; Reagan (1924, p. 117), "from 3 to 5 feet in width and from 10 to 20 feet in length," a figure which he later amends (1928, p. 242) to "20 to 25 feet in length"; and Willoughby (1905, p. 89), "4 to 5 feet in width and about 10 feet in length."

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. Smith (1925 a, fig. 18) pictures a Meskwaki (Sauk and Fox) woman obtaining tension by fastening the twine to a point above her on the wall.

It will be recalled that in bundling the cattails, the outside leaves were separated from the inside 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 that 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. Because of Mrs. Wadena's poor vision and to speed the work, her assistant selected long and wide leaves and handed her each pair. 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 for the upper edge :

1. The worker grasps a pair of leaves, concave side toward her, with the thumb and index finger of the left hand about 2 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 (fig. 30, *a*).

3. She places the leaves behind the foundation twine with about 1½ 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 left 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 (fig. 30, *b*), 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.

3. She places the leaves in front of the twine.

4. 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 leaf 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 (pl. 50, *a*).

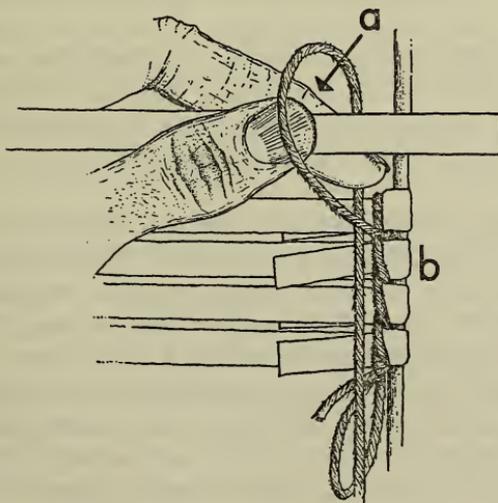


FIGURE 30.—Cattail mat technique: Loop made for selvedge.

These sticks are mentioned in the literature only by Willoughby (1905, p. 89) but they must by necessity have 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 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.

Parenthetically, it is interesting to notice that this first row is constructed in the same manner as a head roach made of small bunches of porcupine, deer, or moose hair. Although the work is much finer, the only difference in technique is that the steps for the second pair of leaves are omitted, leaving all the short ends on one side of the work. Densmore (1929, pl. 16, p. 161) pictures the process and describes another method of maintaining tension on the foundation twine.

WEAVING

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 set of pegs (fig. 31). 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 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 (pl. 50, *b*). A doubled cord a little longer than the mat is tied securely to the side stick nearest the worker about 7 inches from the first row. It is then threaded into the needle, passed through the upper pairs of warp leaves in 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-the-last row which is not put in until the mat has been turned over and the other side sewn

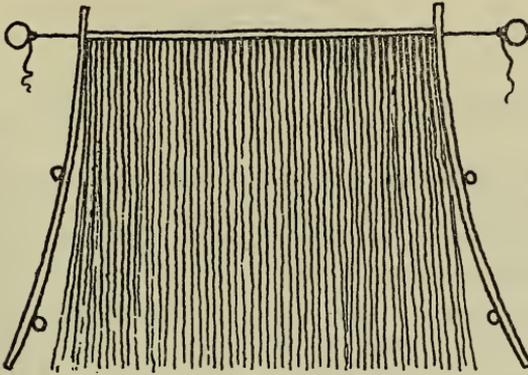


FIGURE 31.—Cattail mat technique: Mat pegged down for sewing.

in the same manner as the first. Then this row is made by plain plaiting (see fig. 20) 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 so tightly as to distort the position of the leaves (pl. 52, a).

The informants in this study could give no reason for using this row (*ka shka na ni i gūn*) 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 at the center, 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 (fig. 32). 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 (pl. 52, a). About 4½ inches below the last row



FIGURE 32.—Cattail mat technique: Path of needle in sewing a pair of leaves (cross section).

the cattails are trimmed off, and the mat is completed. Densmore (1929, pp. 157, 23) mentions this trimmed edge: "The ends of the reeds were often left free." "The woven edge of the mats was placed at the top, and tied to the framework; the rushes at the other edge of the mat, not being fastened together, had enough 'spring' to assist in holding the mat upright." A finished edge would also tend to slide outward because of its smoothness. Mrs. Cecilia A. Burnette, who saw her grandmother make the mats near Whipholt on Leech Lake Reservation, suggests another reason for this type of edge. In moving the mats to sugar camp in March the lower edge was often found to be embedded in ice and had to be cut off to free the mat.

As Densmore intimated in the paragraph just above, the lower edge was sometimes finished. Apparently this was done only when the mat was to be used as an upper tier, as pictured by Jenks (1900, pl. LXIX). Jenness (1935, p. 113) reports that cattails were "stitched together at top and bottom," while Reagan (1924, p. 117) says they were "strengthened at the edges by being counter wrapped." These two references are not clear enough to confirm the finishing of both edges.

A close view of a section of the completed mat (pl. 51) is very similar to one by Bushnell (1922, pl. 12, b).

The time normally consumed after completion of the first row must be estimated, since in this study the weaver's handicap required that an assistant pick up each pair of leaves to be sewed, keep the sewing in a reasonably straight line, and rip out unsatisfactory work. Cold, stiff fingers slowed the work somewhat, too. Between 4½ and 6½ hours would probably suffice for a single worker to sew, bringing the total time for this sample-sized mat (4 feet 2½ inches by 4 feet 5½ inches) to between 19½ and 21½ hours. Skinner (1926, p. 292) observes that if five or six women are sewing, "two mats are considered a day's work."

Very little on the sewing of cattail mats is to be found in the literature. Densmore's informant recalls one aspect not mentioned elsewhere. She says (1929, p. 120), "We laid the rushes two layers deep on the ground with the ends resting on the cord, and then fastened the ends of the rushes to the cord, after which *we fastened the cord to the pole that was the upper, horizontal part of the weaving frame* [writer's italics]." Later Densmore pursues the idea further (p. 157): "These mats . . . were woven on the same frames as the

[bulrush and cedar-bark] 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 reeds were strung together . . . [using] a bone needle, which was passed horizontally through the reeds at intervals of 8 or 10 inches."

Obviously Densmore erred as to the selvedge stitch, since the three mats each employ a different first-row technique. Moreover, the reports of several informants consulted in the present study and other literature on tribes of the western Great Lakes agree that the mat was sewed while on the ground.

Several other writers devote only a sentence to the making of mats, as Gilmore (1933, p. 124), Henry (1897, p. 133), Radin (1928, p. 663), Willoughby (1905, p. 89), and Jenness (1935, p. 113), who notes the double thickness of mats. Lyford (1953, pp. 90-91) largely paraphrases Densmore, but adds mention of the concealed stitch, as does Smith (1932, pp. 340, 423) in his two-sentence summary.

CHARACTERISTICS

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-repellent, 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 as mentioned by Gilmore (1933, p. 124), Henry (1897, p. 133), Jenness (1932, p. 89), Lyford (1953, p. 91), and Smith (1932, pp. 412, 423). It was also windproof (*ibid.*, pp. 340, 423). In addition, the first row is contrived "in such a manner that each alternate leaf lies upon opposite sides and covers the junction of two other leaves" (Willoughby, 1905, p. 89). Because of the separation into two layers, "when the rain falls on the mat, the water usually follows the leaves on the inside of the mat" (Hoffman, 1896, pp. 258-259).

Why birchbark frequently replaced cattails for sidewall mats is a pertinent question. Both materials were available in most Chippewa regions, although birch trees were scarcer in some areas. Kane (1859, p. 6) notes, "When the birch tree cannot be conveniently had they weave rushes into mats," and Waterman (1925, p. 463) concurs.

Bushnell (1919 b, p. 614) suggests that the region of large birch trees in Minnesota was at its northern boundary, while farther south, as at Mille Lacs Lake, big birches were not to be had.

Probably bark mats were more durable and certainly more easily and quickly made. The process consisted merely of stripping the bark from the tree, sewing the sheets together, and adding wooden strips to the ends.

Relative ease in moving was undoubtedly a factor in the choice of material. "Unfortunately," says Thompson of birchbark (1916, pp. 116-117), "the cold of winter renders it brittle and liable to accidents; and it must be warmed before it can be rolled up for removal; and the same to unroll it." Henry (1897, p. 133) asserts, "Bark . . . is much lighter and less bulky." These qualities were important, for, as Kohl (1860, p. 10) says, "The [birchbark] *apakwas* are so arranged that every woman has two to carry, in addition to the other 'plunder'. Every little girl also has one to carry." But Skinner (1921, p. 247) notes in his study 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.

Obviously birchbark is less bulky, and the writer's study of the weight of two coverings of each kind confirms the advantage of bark in this respect also. Per square foot it weighed 2.05 and 3.46 ounces compared with 3.66 and 3.83 ounces for the cattail mat.

Apparently preference changed with the seasons. Says Henry (1897, p. 133), "With these [cattail] mats the Saulteurs construct their winter tents and cabins. They are warm, yet airy, and far more comfortable than the birch bark covering or the leather tents of the Meadow Indians. The Saulteurs use bark for the summer only, as it makes a cooler cabin than the rush mats." Smith (1932, p. 412) adds that the Ojibwa "can even live very comfortably in their [cattail mat] wigwams in sub-zero temperatures." Kane (1859, pp. 7-8), however, equates the birchbark- and cattail-covered tipis: "These lodges are much more comfortable than one would at first suppose from their loose appearance—that is, as far as warmth is considered."

A very different opinion of the winter lodges of the "Chippaways (or Ojibaways)" is expressed by Thompson (1916, pp. 246-247). They "are mostly of rush mats neatly made, sometimes of Birch Rind, or Pine Branches, always low, and seldom comfortable." He goes on to cite the summer use of "Birch Rind, sometimes rush mats, and pine branches."

Clark alone (1885, p. 112-113) finds an opposite seasonal trend and offers an explanation. "They use quite extensively," he says, "reed matting for the sides of the summer lodge, and birch bark for the roof. The matting can be easily transported, and it is claimed that mosquitoes do not infest these lodges as much as other dwelling-places of either skin, canvas, or wood."

USE OF MATS

Consulting the list of cattail mat illustrations that follows will suggest that by far the most common use of these mats was as exterior sidewall covers for domed wigwams (pls. 52, *b*; 59), but they were used as covers for other structures, too. Densmore (1929, pl. 6, *a*) pictures a gabled rectangular lodge with matting sidewalls, and Beaulieu refers to one also (Charles H. Beaulieu quoted in Clark, 1885, p. 376). McKenney (1827, p. 269) mentions a juggler's tent covered with mats, presumably cattail. Smith (1925 *b*, fig. 21; 1932, p. 340) describes and pictures a long domed Mide lodge with matting sides, and Lyford (1953, p. 22) concurs in this use of mats "in rainy weather." She also (p. 17) cites their use on the peaked lodge with long ridge pole, as does Thompson (1916, pp. 246-247). Mrs. Wadena recalled seeing this lodge as well as the domed one, while Jenness (1935, pp. 112, 113) mentions the peaked lodge and tipi. Wissler (1931, p. 111) cites the tipi, which Kane describes and pictures (1859, pp. 6-7, No. 1; Bushnell, 1922, p. 10, pl. 7, *a*; Bushnell, 1940, fig. 1). Bushnell (1922, pl. 8, *a*) shows a tipi.

Sometimes cattail mats were doubled against severe winds. They were fastened to the inside according to Bushnell (1919 *b*, p. 615; 1922, p. 14), Hilger (1939, p. 143; 1951, p. 137), and Lyford (1953, p. 90). Whether inside or out is not clear in Densmore's reference (1929, p. 23). Incidental to their function as wall coverings was the part played by cattail mats as an auxiliary to transportation. Skinner, quoted above, notes that in moving camp they formed a container in which culinary utensils might be carried. Densmore's informant recalls from her girlhood in the Mille Lacs Band:

We rolled the blankets inside the mats; and if there was a little baby, my mother put it inside the roll, cradle board and all. It was a warm place and safe for the baby. [Densmore, 1929, p. 120.]

CATTAIL-MAT ILLUSTRATIONS IN LITERATURE CITED

Domed wigwams with matting sidewalls

- Brower, 1900, pl. 28 on p. 68 and pl. 34 on p. 86
 Bushnell, 1919 *a*, pl. 2, *b*, fol. p. 111 (after Brower p. 68)
 Bushnell, 1919 *b*, pl. 3, 1, 2, fol. p. 617 (after Brower pp. 86 and 68)
 Bushnell, 1922, pl. 6, *b*, opp. p. 10

- Densmore, 1929, pl. 3, *b*, opp. p. 24
 Hilger, 1951, pls. 26, *1*; 27, *3*; 28, *1*, *3*—all fol. p. 187
 Jenks, 1900, pl. LXVII, *B*, opp. p. 1043; pl. LXIX opp. p. 1053
 Kane in Kidd, 1946, p. 5
 Lyford, 1953, pl. 50 on p. 91
 Smith, 1932, pl. 46, fig. 2, fol. p. 460
 Waterman, 1925, pl. 1, *1*, fol. p. 485 (after Bushnell, 1922)

Other lodges using matting

- Bushnell, 1922, pl. 8, *a*, opp. p. 12: tipi
 Densmore, 1929, pl. 6, *a*, fol. p. 28: gabled lodge
 Kane, 1859, No. 1 on p. 7; in Bushnell, 1922, pl. 7, *a*, opp. p. 11; in Bushnell, 1940, fig. 1 on p. 5: tipi
 Smith, 1925 *b*, fig. 21 on p. 43: Mide lodge

Needles

- Densmore, 1929, pl. 9, *a* (*g*), opp. p. 36: bone needle
 Thayer, 1935, p. 3: bone and steel needles (sketches)
 Thayer, 1940, p. 97: bone needle (sketch)

Technique

- Bushnell, 1922, pl. 12, *b*, fol. p. 16: section of mat
 Smith, 1925 *a*, fig. 18 on p. 37: Meskwaki (Sauk and Fox) woman starting mat

CHECKLIST FOR DISTINGUISHING RUSH AND CATTAIL MATS

	<i>Rush mat</i>	<i>Cattail mat</i>
Chippewa name of mat...	<i>ü na' kün</i>	<i>ü päk' we</i>
Region of manufacture...	Great Lakes area.....	Great Lakes area
Time to harvest chief material	July.....	October
Chippewa name.....	<i>gami' wüshk</i> , etc.....	<i>ü päk wesh' kwe ük</i>
Botanical name.....	<i>Scirpus validus</i> Vahl. or <i>Scirpus acutus</i> Muhl.	<i>Typha latifolia</i> L.
Appearance.....	Leafless, whiplike.....	Leaves of plant with "weiner on a stick" fruit
Habitat.....	Water at edge of lake or slow stream	Low ground
Method of harvesting....	Pulling.....	Cutting
First processing.....	Trim, kill with hot water, dry and bleach a week	Split plant, sort, trim, dry 5 days
Coloring.....	Various dyes.....	None
Tools for manufacturing.	Cutting tools.....	Cutting tools and large, flat needles
Uses of cord.....	Tying edge, weft, and lashing	Foundation, tying edge, and sewing
Other equipment needed..	Frame for suspending mat	Side sticks and pegs
Further processing of material	Keep damp.....	Soften ends, sprinkle all over

CHECKLIST FOR DISTINGUISHING RUSH AND CATTAIL MATS—continued

	<i>Rush mat</i>	<i>Cattail mat</i>
First row construction---	A pair of cords-----	Foundation and tying cords
	Cord free or held with teeth	Cord under tension
	Lacy edge-----	Tight edge
	Ends carried along from one group to another	Ends tied in immediately
Position of mat in weaving	Lashed to upright frame-	Lying on the ground
Method of weaving-----	Left to right-----	Left to right
	Under-one-over-one (and possible twining)	Sew through warp, and two rows of under-over
	Varies from closely woven to wefts 1 inch apart	Sewn every 7 inches
Ornamentation-----	Design by weave variation and color	None
Size-----	2 to 3½ feet wide × 4 to 9 feet long	3 to 6 feet wide × 9 to 20 feet long
Finish of side edges-----	Left: weft looped around edge Right: tied in a thicker edging or fringe	Sticks on both
Finish of lower edge-----	Similar to first row-----	Usually unfinished
Layers-----	One-----	Two
Use-----	As carpet, as bed, to line wall, as table, as seat, on bottom or top of grave	Covering for lodge exterior sidewall and possibly roof; to line wall
Characteristics-----	Wears well under pressure and abrasion Open weave not wind or water resistant Rollable----- Lightweight----- Compact----- Exercises artistic talents of weaver	Fragile under pressure and abrasion Water repellent, wind resistant Rollable Lightweight Bulky Functionally artistic

MINOR MATS

REED MAT²

TECHNIQUE: KNOTTED WEFT

What may be called knotted-weft weaving employs paired weft elements, of which one continues behind the warp elements and the other in front of them. Between every two warp elements the pair of weft elements is knotted.

² The description of this mat, a specimen of which was examined by the writer in August 1962, was added after this paper had gone to press.

The product of this technique may be indistinguishable from that of twined weave except for the twisting (instead of knotting) of weft elements in the latter that brings one element alternately to the front and the back of the warp elements. However, by using knotting, the technique moves away from the common concept of weaving, in which elements simply cross, and toward the realm of network, in which crossing elements are knotted. Any presentation of knotted-weft technique is lacking in the sources consulted for this study. Nevertheless, it falls within the broad limits of weaving accepted here.

MANUFACTURE

A completed reed mat was examined by the writer in August 1962 at Fort Mille Lacs. Robert Spading, of the Fort, who had observed the making of the mat there in July 1961, outlined the process which is here augmented by facts derived from examination of the finished mat. Two Chippewa women of Mille Lacs Reservation, Minn., made the mat: Mrs. Maggie Nequonabe, about 73 years of age, who knew the technique, and Mrs. Susan Shingobe, a younger woman to whom the process was unfamiliar.

Materials needed are strips of unprocessed *wi'gōōb*, about one-fourth of an inch wide, and freshly gathered stalks of the reed (*Phragmites communis* Trin. var. *berlandieri* (Fourn.) Fern.), the common lowland grass 8 or 9 feet tall recognized by the plumed head, inch-wide leaves, and stalk with joints every 3 to 5 inches. The fairly tough stalks, from one-eighth to three-eighths of an inch in diameter, are cut with a knife when mature enough to use (in this case at the end of July). The workers strip the leaves from the heavier part of the stalks, bundle the reeds, and cut off the tender flexible tips.

The work is suspended by two strands of *wi'gōōb* from a frame similar to that used for cedar-bark and rush mats. The strands are hung at a distance from each other about 10 inches less than the width desired for the mat. Two weavers work simultaneously, each at a strand on the end of which she kneels to hold the work steady (pl. 60, *a*). As the weaving progresses upward, the mat is lowered by an additional length of *wi'gōōb* allowed for the purpose. When the mat reaches the ground the weaver no longer kneels on her strand, but relies on the weight to steady the work. At a point within convenient reach each worker securely knots to the suspended strand a strip about twice the length desired for the mat. A reed is laid horizontally between the knotted strands in such a way that the suspended strands are at the far side of the reed from the workers, and the free strands are on the near side. Each worker knots the free

or active strand around the inactive hanging *wi'gōōb* above the reed and about 5 inches from the end of the reed (fig. 33). The rest of the work is merely a repetition of the adding of reeds and the

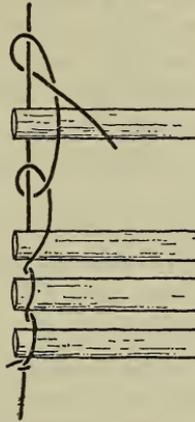


FIGURE 33.—Reed mat technique.

knotting of *wi'gōōb*. At completion of the mat each pair of strands is tied in a firm knot, and the small ends of the reeds are trimmed off.

The knot used in weaving is a half hitch, in which the free end, pointing toward the left, is crossed over the inactive strand on the side toward the worker, is doubled back behind the strand so as to point to the right, and is pulled toward the worker through the loop formed by the active strand until the knot is fairly tight.

The berry-drying mat examined measured about 3 by 7 feet. In use it was supported by a tablelike structure of sticks and covered with grass to prevent the berries on top from falling through. A mat of fresh reeds will permit a fire hot enough to dry blueberries in a day. At the conclusion the mat is laid on a blanket, the grass is plucked out, and the berries fall onto the blanket.

A presumably Chippewa mat similar to this one was collected in July 1956 by John Macfie of Parry Sound, Ontario, Canada, in an abandoned blueberry-picking camp near Pickle Lake, Ontario, about 115 miles northwest of Lake Nipigon (pl. 60, *b*; *Crafts of the Cree*, 1957, p. 57). Through Chippewa informants, Isaac Lawson at Pickle Lake and Joe Wesley at Sioux Lookout, to the southwest, Mr. Macfie learned that his find was a *pas' soomin an*, used in blueberry drying (letter to the writer [May 1961]). Details on the mat were provided by Edward S. Rogers, of the Royal Ontario Museum, Toronto, Ontario, where the mat is deposited:

The ends of the mat are secured each to a length of speckled(?) alder. The reeds are secured parallel to each other with 7 rows of lacing, each consisting of 2 strands of string. These 2 strands of string are not woven by twining but

appear to be a somewhat similar technique Occasionally the bottom strand appears to be looped twice over the top one. The mat is approximately 3 ft. wide and 4 ft. long. [Letter to the writer, July 19, 1961.]

An accompanying sketch showed a knotted weft identical to that in the Mille Lacs mat. However, the use of seven rows of weaving, within easy reach of two weavers, held the reeds straighter. This condition, together with a tighter half-hitch knot that brought the reeds closer together, provided a surface that, over most of its area, would not require grass to keep the berries atop the mat. Again the material appears to be a *Phragmites* reed.

Densmore once identifies the reed on her "frames for drying berries" as *Phragmites phragmites* (L.) Karst (1929, p. 157), but elsewhere uses the newer name *Phragmites communis* Trin. (1928, pp. 378, 379). Her details correspond closely with those above:

They were made on a frame like the preceding [bulrush, etc.] mats and were woven with basswood twine, but differed from the floor mats in that the twine was placed at intervals of 8 or 9 inches instead of close together, and the twine was knotted between each reed. This separated the reeds, and in the finished mat produced spaces through which the air could circulate, thus assisting the drying of the berries. These mats were about 24 by 36 inches in size. [Ibid., 1929, p. 157.]

Perhaps similar are Seymour's "mats on a scaffold over a fire" at the Upper Mississippi and in northern Minnesota (1850, p. 183) and Keating's "fine sieve made of reeds, secured in a square frame" (1825, p. 156), both for drying wild rice.

In speaking of the Saulteaux north of Lac Seul, Ontario, who were on the periphery of Chippewa culture, Skinner (1911, p. 127, fig. 45) describes "mats of bundles of straw . . . sewed together These were formerly placed on the floor of the lodge to sit or recline upon." The sketch indicates a variant of reed-mat technique: the paired weft is knotted between bundles with not one but two half hitches.

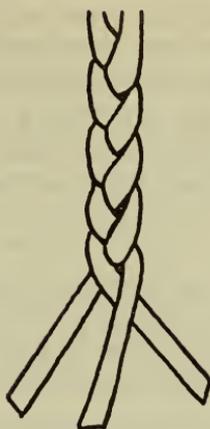


FIGURE 34.—Details of weaves: Braiding.

CATTAIL AND RUSH MATS (OVAL)

TECHNIQUE: BRAIDING AND SPIRAL WINDING

“In braiding, three or more lengthwise or warp strands are crossed diagonally and lengthwise in such a way that each of them lies alternately over and under one or several of the others thus making a texture with the use of warp threads only” (Lyford, 1953, p. 66). (See fig. 34.)

DISTRIBUTION

Except at Parry Island in Georgian Bay, Lake Huron, mats braided from natural materials appear to have gone unrecorded for the Chippewa. This lack of interest may be due to the resemblance of these mats to the braided rag rugs of Europeans. Even should they prove to be the result of borrowing, they remain an interesting example of the adaptation of familiar materials to a new technique.

However, mats braided of natural materials have been widely distributed in the Great Lakes area for some time. Informants recall such mats of cattails or rushes from their childhood in a range from a point in Manitoba 12 miles north of Pembina, to White Earth Reservation and Gull Lake north of Brainerd, both in Minnesota, to the Superior, Wisconsin, area.

Johnson (1929, p. 203) says of Parry Island:

Braided cornhusk mats, similar to the Iroquois type, are found in practically every household. That these mats follow the distribution of the cultivation of corn seems to go without saying; it appears as though their origin might be traced to southern sources. One must consider, however, the braided basswood

mat which is made by the Algonquin. The technique of these two types of mat seems to be identical, but their relationship must await further investigation.

The Iroquois cornhusk mat mentioned is described and pictured by Lyford (1945, p. 64, pl. 58): "By a technique of braiding, coiling, and sewing, the shredded [corn] husks were used to make mats." The picture shows it to be very like the cattail mat of this study.

MANUFACTURE

The chief informant was Mrs. John Benaise (Little Partridge), whose Indian name is *Ūm boy ash' i*, 'The wind blowing up.' She was born in Manitoba and in 1957 resided on the southwest shore of Red Lake, Minnesota, on the reservation of the same name. She had learned the technique from her grandmother.

The principal material is leaves of the same cattail as used for the cattail mat (rectangular), but cut when the plants are only partly grown (July 9). The leaves are spread out on the grass to dry for 3 days, and require no other preparation. They are braided in the same way as rag rugs, except that each of the three strands is made up of three to five leaves. Before a leaf is completely used another is added. Braids average nearly 1 inch in width. The end of the braid is tapered off to nothing.

Thread for sewing is the ubiquitous *wi'gōōb* (basswood bark) (pl. 53, *a*) in a darning needle. Blind stitching is used to conceal the thread; that is, the thread is slipped through the loop formed by the bend in an outside warp strand, and passes through alternate loops of adjacent coils of braid. Just as for oval rag rugs, work is begun by sewing the first portion of the braid (about 9 inches) to the next portion, then winding the rest around and around this core until the desired size is reached (pls. 53, *b*; 54, *a*).

The mat in this study is 27½ by 34¾ inches. Nearly 5 hours of diligent work was required for sewing the mat after the braids were finished. Mats of this size or larger were made by Mrs. Benaise and sold in communities off the reservation for scatter rugs. For this purpose she sewed them with doubled white No. 10 cotton thread.

To flatten, she advised, "Put it under the mattress." However, care must be taken to dry it promptly and thoroughly, lest it mold. When dried it is a pleasing combination of shades of gray-green, cream, tan, and brown. It is practical for light use on a floor.

Smaller mats are made from bulrushes in nearly the same way. Mrs. Benaise pulled the slender, short rushes growing in Red Lake and cut off the lower ends. She merely spread the rushes out for 3 days to dry, but another informant disagrees with this procedure. Mrs. John Mountain (Mary Smith) of Redby, Red Lake Reservation,

and formerly from Gull Lake north of Brainerd, says they should be killed with hot water "so that they won't break so easily and get stiff." However, Mrs. Benaise's untreated rushes result in a mat of flexibility satisfactory for table use. Braiding is done with only three rushes, producing a braid three-eighths of an inch wide. The braids are sewn together with *w'gōōb* or thread (pl. 54, *b*), and Mrs. Mountain specified a bone needle. In other details the process was that of the preceding mat.

Rugs braided of rags in this manner are noted by Lyford (1953, p. 95) and Hilger (1939, p. 167). The latter found that six- or eight-ply rugs outnumbered traditional rectangular bulrush mats nearly ten to one in 1938 on White Earth Reservation, Minnesota.

SWEETGRASS MAT

TECHNIQUE: COILING

"In coiling, a horizontal warp is sewn over and over with a vertical weft thread of flexible material each stitch interlocking with one immediately beneath it" (Lyford, 1953, p. 60). (See fig. 35.)

Mason (1904, p. 195), who treats matting as a form of basketry, says, "Coiled basketry is sewed, not woven," and defines sewing as "the joining of parts with an awl and splint," which in the case of sweetgrass mats are a needle and thread. Yet on the same page he defines pierced warp as "the form of weaving in cattail . . . when

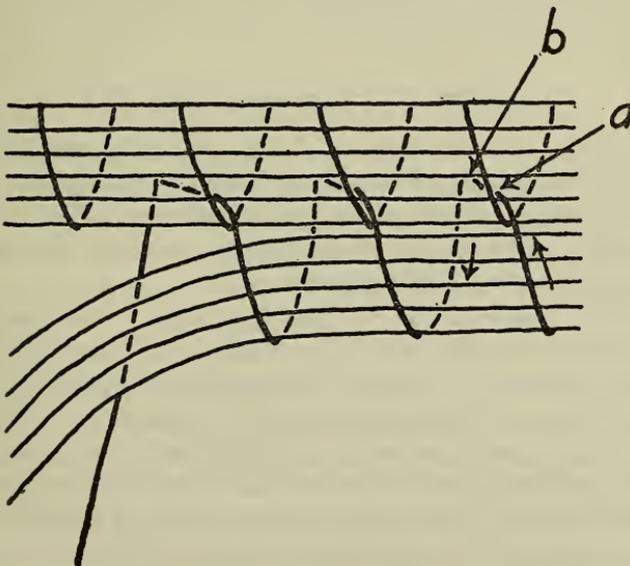


FIGURE 35.—Details of weaves: Coiling used in sweetgrass mat.

the weft strings pass through the warp." Since a needle and thread is employed in both, there seems to be no warranty for saying one mat is weaving and the other is not. As Mason says elsewhere (p. 189), "No wide gulf separates the different varieties of textiles, however, beginning with such coarse products as brush fences and fish weirs and ending with the finest lace and needlework." The broader interpretation of weaving is used in this paper.

BACKGROUND

The writer did not observe the making of a complete sweetgrass mat, but in August 1961 elicited from two practicing weavers of sweetgrass their directions for making a mat. In essential agreement except for the divergencies noted below were Mrs. Susan Pemberton, living on Cass Lake in Leech Lake Reservation, and Mrs. Margaret Bigbear of Ponsford on White Earth Reservation.

The utilization of sweetgrass for mats, baskets, and ornamentation of baskets of other materials, while rare today, is not extinct. The writer found other sweetgrass weavers in the communities of the informants as well as at Naytahwaush on White Earth Reservation and Garden River Reserve, Ontario, near Sault Sainte Marie. Volney Jones in his fine all-inclusive paper (1936) reports them for Walpole Island, south of Lake Huron (p. 23). Smith (1932, p. 419) mentions them at Lac du Flambeau Reservation, Wisconsin, and the Leech Lake, Minnesota, area. The present study found all the sweetgrass workers to be women, and Jones concurs with but one exception (1936, p. 28).

GATHERING AND PREPARING MATERIALS

The popular name "sweetgrass" derives from its vanillalike odor, which develops as it dries. The scent sometimes persists for years, and is especially noticeable when the grass is damp. The Indians say that when they smell this odor on entering a room where there is sweetgrass, they know it is going to rain.

The scientific name of the "Indian's perfume" was found in this study to be *Hierochloe odorata* (L.) Wahlenb. Jones (1936, p. 21) reports this name and a number of synonyms (*Hierochloe borealis*, *Savastana odorata*, and *Torresia odorata*). Densmore (1928, pp. 294, 296) finds the last-named and adds "(L.) Hitche." Smith's name (1932, p. 419) of "*Anthoxanthum odoratum* L." is refuted by Jones (1936, p. 22). The Chippewa name was variously given as *wicko'bimûcko'si* (Densmore, 1928, pp. 294, 298; Smith, 1932, p. 419) and *wicko-mash-kossiû* (Lyford, 1953, p. 63).

Sweetgrass occasionally is found in dry lands, but usually grows near a lake or other water. It may be recognized by its leaves that are shinier and wider than those of other grasses near it, and by its rosy or purplish lower end.

The glossy upper surface of the leaves and the semierect habit are features useful in its recognition.

The grass is harvested from the middle of July [cf. *ibid.*—the middle of June] until it begins to dry in September. . . . The midseason product is considered most desirable. The leaves are gathered by grasping the shoots firmly near the ground and pulling steadily until they break loose from the rootstocks, which are an inch or two under the surface. Careless jerking is liable to break the shoots above the ground and to leave ragged ends and cause waste. Gathering is slow and tedious since the grass is usually scattered and mixed with other plants. [Jones, 1936, p. 22.]

A family of several members was reported to have spent a morning picking a bunch of sweetgrass $1\frac{1}{2}$ inches in diameter. Maximum length of the grass is about 3 feet. Any adhering root is picked off at once. That it grows readily is apparent from the fact that Mrs. Pemberton reported that roots she had discarded grew into plants.

Mrs. Bigbear stressed the "cleaning" of the grass (i.e., discarding the short pieces and reddish lower end) as essential to a pretty mat, while Mrs. Pemberton used the colored ends but trimmed off the heavy part. Jones' informants (1936, p. 28) cut off the coarse bases just before beginning the sewing. The grass is tied near its lower end in bunches about one-fourth of an inch in diameter. Mrs. Bigbear then tied the bunches together in pairs and threw them over a line in the house to dry for about 2 days. Mrs. Pemberton hung the bunches in the house or outdoors in the shade for two weeks after wrapping each bunch spirally with string for about two-thirds of its 3-foot length, so that when it shrank in drying it would not slip out of the string. She mentioned that if the grass was used before it was entirely dry the completed work would not be tight and firm after the grass finished drying and shrinking. Grass that is not to be used at once is wrapped and tied firmly in newspapers and stored away. Mrs. Bigbear dampened her grass before using it by moistening a towel and rolling up the grass in it.

Two methods of drying are reported by Jones (1936, pp. 23-24), outdoors in the shade and indoors over a stove. He, too, found the cured grass to be "wrapped tightly in newspapers, and put in a dark place." He adds, "If the grass is allowed to dry quickly in the sun the color and the odor are soon lost, and the grass becomes stiff and brittle. Some of the color, odor, and pliability can be retained for 2 or 3 years if the grass is properly cured immediately after gathering." He observed that before using the grass dried outdoors, "it is dipped

into boiling water and withdrawn almost immediately. This restores the pliability and brings out the odor." However, the stove-dried product after 2 years had retained its color, odor, and sufficient pliability to be used without dampening.

Grass prepared for use is shown in Densmore (1928, pl. 49), Jones (1936, pl. 3, 1), and the present paper (pl. 55).

MAKING THE MAT

To begin a mat, the root ends of about 10 shoots, used without separating them into their approximately 16 separate leaves, are wound into as small a coil as possible. A sewing needle is threaded with a single or double strand of lightweight cotton crocheting thread knotted at the end. Jones (1936, p. 27) specifies No. 10 thread to which beeswax is applied to make the sewing easier on the worker and on the strands of grass. Sewing is begun in the shape of the spokes of a wheel, each stitch passing around the outside of the coil and halfway through the opposite coil. This step as described by Jones (1936, p. 28) differs in beginning with knotting the end of the bundle and sewing the first coil to it.

After the completion of a round, the interlocking stitch is begun. The thread encircles the free end of the grass and passes through the point of the V formed by the thread on the previous coil (fig. 35, *a*), and then through the coil itself (fig. 35, *b*). When the thread returns to encircle the free end again, it has completed an inverted V linked through the V of the first coil. Thus the thread may be pulled tight without damaging the grass, and a very firm basket may result.

In order to line the stitches up in a pleasing pattern, the needle is always inserted just to the right of the thread of the previous coil, and about a third of the way from the edge of that coil, so that the stitches in successive coils overlap slightly. The result is a diagonal tendency of the rows of thread to the right, which may be exaggerated to the interesting central design in the grass mat of plate 55 made by Mrs. Pemberton. The same design is visible in Mason (1904, pl. 124), although this may be a basket rather than a mat.

Usually the work is held in the fingers of the left hand, with the long end of the coil to the left and closer to the worker than is the previous coil. Holding it tightly is said to keep the mat flat. The work is rotated toward the right as work progresses. This position allows maximum control over the placement of stitches, and a natural slant to the angle of the needle that brings it out at the back at a point midway through the coil and centered between two threads of the previous coil. The result is an attractive bricklike pattern on the wrong side.

Shortly before a strand of grass runs out, another strand is added to bring it up to the original thickness. The new ends are hidden among the old so as not to be visible from the right side.

As the circumference increases and the "spokes" of stitches become farther apart, it may be desirable to interpolate more spokes. It is sufficient to add a row only after alternate rows. To do this, a stitch is not lined up directly with that of the preceding coil, but is made a little farther to the right. The next stitch, instead of lining up with the following row, again utilizes the same row, but tends somewhat to the left. The next stitch follows its normal row, and the successive one is doubled, and so on around the circle once. Thereafter the stitches line up with those of the preceding coil.

Another answer to the widening space between rows is to interpolate a row of zigzag grass, as in the all-grass mat in plate 55. To do this, the last stitch is doubled and the thread is wound around the long end of the coil for $\frac{3}{4}$ of an inch to 1 inch, with the thread spaced at the same intervals as will be used between the rows that will be added when the zigzag pattern is finished. The grass is bent with care at a right angle toward the mat, the wrapping is continued an equal distance, and the strand is joined with a double stitch to the mat proper at a point where a row of stitches ended. The grass is bent at a right angle away from the mat, and the process is repeated to the point where the zigzag pattern began. Here, after the free end is double-stitched, there is a choice of several terminations. The free end may be carried to the back side of the mat, and cut off. It may follow closely the first element of the zigzag and be wrapped with it. Or it may bend more sharply than the first element and form an acute angle.

Thereafter additional rows of coiling are added at will, starting at the outside bend of a zigzag with a double stitch if one of the first two methods of termination was used. For the first coil, the thread is wrapped around the long end at the interval desired, until the outside angle of a zigzag is reached and the grass is secured to it by a double stitch. The process is repeated all the way around the circumference. Successive rows are like those in the central portion. When the desired size is reached, work continues until the strand of grass ends.

A row of overcasting may be added in which the thread passes through the grass at the same point as the last row, but in the opposite direction, giving an attractive zigzag stitch. Another row of zigzag strands may be used as a finish instead. The smaller mat in plate 55 shows the former edge, and the larger utilizes the latter and also interpolates birchbark with porcupine quill embroidery.

Details of the process given by Lyford (1953, p. 64) and Jones (1936, pp. 28-29) are similar except for the latter's method of adding rows of stitches. "When they become as much as three-eighths of an inch apart," he says, "a stitch is made midway between two of the previous round, and thus a new radius is begun."

When birchbark is used in mats, it is usually ornamented with quill-work. This must be applied before the sweetgrass is sewn on because a lining of bark is required beneath the embroidered piece, to cover the cut ends of the quills. The grass is sewn onto the bark with stitches through both layers and about one-fourth of an inch from the edge. Warping of the bark is minimized by running the grain of the two layers in opposite directions, and sometimes a piece of cardboard is interposed as a further precaution.

Usually a simple isolated design element is made from the quills. Coleman (1947, p. 40) mentions "leaves, trees, flowers, or geometric figures," some of which are discernible in her three pictured mats (pl. 6, *b*—one of which may be a basket), as well as in plate 55 of the present paper. Today, quills are dyed with commercial dyes except when an all-white pattern is desired or when the natural brown tip of the quill (pl. 55) is used in creating a brown and white design. The finer the quills the more artistic the result that can be obtained. Before being used, the quills are soaked half an hour or until damp. The design is drawn on the wrong side of the bark and holes are punched with an awl on the right side, from which side both ends of the quills are inserted, sometimes flattened and sometimes not. The writer has tweezers made of metal by the husband of a quill-worker to facilitate pulling the sharp quills through. The bark may be backed up with a piece of oilcloth to prevent its splitting. All but one-fourth of an inch of the quill-ends is cut off. Mrs. Bigbear was careful to burn up the cut ends at once.

In older specimens black thread predominates, with green second. Some present-day workers use various bright colors singly or combined that eclipse the subtle shades of the grass itself.

USE OF MATS

Ethnologists speculate that the coiling technique is a trait of great age among the Chippewa (Jones, 1936, pp. 29-31; Mason, 1904, pp. 376-377). Mason quotes Charles C. Willoughby's belief that it dates back to pre-White contact, while Jones brings up the possibility of modifications due to the influence of the White man. It appears likely that the sweetgrass mat was a product of this influence. While a coiled basket or bowl would be useful to a primitive Chippewa, a fragment of bark could be readily procured to serve for a plate. Only the

table of the European settler had need for an ornamental mat to use under teapots or hot dishes.

MATS OF UNKNOWN TECHNIQUES

References to several minor mats are not clear as to the techniques employed but extend the range of materials used in matmaking.

Black ash and cedar strips were also used in making inside-wall mats for the wigwam.

The Indians looked for straight cedar or ash that was free from many lower limbs. The trees were cut to the desired length, peeled and pounded in order to break the trunk up into splints. These were then split down to the desired thickness. The splints were strung, each splint lapping over the other. As in basket weaving, the cord was worked over the splints a foot apart. [Parker, MS., 1936-1940.]

“A mat woven of narrow strips of basswood bark,” says Densmore (1928, p. 311) in describing maple sugarmaking, “was placed over an extra kettle, and the sirup was strained through this mat.” This could be similar in construction to her gum-boiling bag of basswood bark (*ibid.*, p. 158; pl. 55, *a*), which was “woven somewhat like drying frames for berries.” (See pp. 265 ff.) Although the techniques of the finished products look much alike, twined weave is used for the bag and knotted weft for the drying mat. Probably the fine straining mat was not intended in Chamberlain’s reference to basswood or cedar-bark mats on rice-drying racks of the Mississagua (1888, p. 155). Certainly he implied some other process when he said, “Of the inner bark of the pine and basswood they made beautiful mats” (*ibid.*, p. 156).

Mats were sometimes made of three small rushes: the bog-rush (*Juncus stygius* L.), 3 to 12 inches high, used at Bois Fort, Minn. (Reagan, 1928, p. 245); the soft rush (*Juncus effusus* L.), 1 foot high, “for weaving little bags, pouches, and small mats such as table mats . . . [and] larger mats, as much as three feet wide and three or four feet long,” southwest of Lake Huron (Gilmore, 1933, p. 125); and Dudley’s rush (*Juncus dudleyi* Wiegand), 1 foot high, at Leech Lake, Minn. Smith says (1932, p. 419), “The Pillager Ojibwe use this tiny rush in their finest mat work, for small pieces.” On page 418 he lists woolgrass (*Scirpus cyperinus* [L.] Kunth.), noting that “the Flambeau [Wisconsin] Ojibwe use these small rushes for a certain kind of mat.” Several of the techniques treated herein may be used for these small mats.

The disappearance of mat weaving is observed by Skinner (1914, pp. 316-317) among the Plains Ojibwa branch known as the Bungi, of Manitoba: “While the art of weaving was absent from the Plains,

the Bungi for a long time retained it, though it is obsolescent today Reed mats . . . were . . . made, and a few examples are yet to be seen." If these were like the reed mat discussed on pages 265-268, they probably would not have been singled out as worthy of mention. Reed here presumably means rush or cattail.

A final reference cites materials discussed above but suggests a new way of preparing and perhaps of using them at Parry Island in north-eastern Lake Huron:

Mats made of rushes were in everyday use for both the outer coverings and the floors of wigwams. The rushes [cattails or bulrushes?] were gathered about the end of August and soaked for a week or more in cold water. They were then split while still soft, dried in the sun, rubbed between the hands, and pleated [braided or woven?]. Many women did not soak them at once, but tied them in bundles and stored them away in a dry place for treatment later

A few mats were pleated, not from rushes, but from the husks of corncobs. [Jenness, 1935, p. 113.]

SUMMARY

Chippewa mat weaving is an art rapidly disappearing in Minnesota. Over 50 sources that give some information on Chippewa mats fail to record with any completeness the technique of manufacturing them, with but three exceptions.

This paper presents in detail the techniques for cedar-bark and rush floor mats and cattail lodge-cover mats, as well as minor mats of braided cattails and rushes. These processes were observed by the writer and her husband on Chippewa reservations in northern Minnesota, July and October 1957 and July 1961. Principal informants were Mrs. Peter Goodsky of Nett Lake, Mrs. John Benaise of Red Lake, and Mrs. Maggie Wadena of Mille Lacs Reservations. The details of making a sweetgrass mat were obtained in August 1961 from Mrs. Susan Pemberton of Leech Lake and Mrs. Margaret Bigbear of White Earth Reservations. The reed mat was studied in August 1962.

(1) The technique employed in cedar-bark mats is plain and twilled plaiting.

In late spring, bark is stripped from *Thuja occidentalis* L., the white cedar. The dark outer bark is discarded. The inner bark is cut to the desired length or width of the mat, and slit into narrow strips which are split into two layers. Some of the strips are dyed with natural or commercial dyes. One end of each shorter or warp strip is fastened to a foundation cord in such a way as to conceal the cord and the end of each strip. The cord bearing the strips is lashed along a stick that is then tied to upright poles, with the warp strips hanging down at a height convenient to the weaver.

A weft strip is carried from left to right across the warp in plain or twilled plaiting, each end being fastened in a way similar to that used in the first row. The final row employs the same selvedge technique. Thirty-three man-hours were required for the mat in this study.

Now produced for sale, these mats were formerly used as ground coverings, partitions, or doors, in the drying of food and smoking of meat, or sometimes as liners for the walls of wigwams.

(2) The technique employed in the rush mat (large rectangular) is plain plaiting, with possible twining.

A confusion of terminology prevalent in the literature referring to two mats may be clarified by calling the plant used for this mat bulrush or rush (a *Scirpus*) and that for the other mat cattail. Often a student may determine which mat is intended by writers only if he knows the differences between the two types.

Bulrushes are pulled in midsummer, trimmed to the width desired for the mat, boiled, and bleached in the sun. A few are colored with natural or commercial dyes. Each rush is tied into the selvedge, the ends being concealed in the decorative edging. This row is lashed to a pole which is fastened to uprights at a height suitable for weaving.

Rushes become the warp, and twine, either commercial or made from basswood bark, is the weft. Weaving is from left to right in plain over-under plaiting except for variations to form patterns. At each end the weft twine is fastened to side-selvedge twine. The last row is like the first. Time used totaled 121 hours.

Once extensively used on the ground or the inside walls of wigwams, the rush mat is still sometimes seen. Its suitability for primitive life probably accounts for its preferment over cedar-bark mats.

(3) The technique employed in the cattail mat (rectangular) is pierced warp, with two rows of plain plaiting.

When the *Typha latifolia* L., or cattail, is mature in fall, the leaves are cut, separated, bundled, trimmed, and dried. One end of each pair of leaves for the warp is fastened to the foundation twine by means of a strong tying cord, and side sticks are added for strength. The resulting warp is pegged down to the ground and sewn through with long flat needles at 7-inch intervals. The next-to-the-last row is not sewn but plaited. The lower edge is usually unfinished. Time consumed for the small mat in this study would probably be about 20 hours under normal conditions.

The cattail mat was remarkably adapted to its use as the exterior covering of a lodge. It was rain repellent, wind resistant, portable, pliable, obtainable, lightweight; and it employed the principle of insulation. It was sometimes used to line interior walls. As a secondary function it served as an auxiliary to transportation.

Birchbark mats frequently replaced cattails for lodge coverings because they were more durable, more easily made, lighter, less bulky, and cooler in summer. Cattail mats were warmer and therefore preferred for winter use.

(4) The technique used in the reed mat may be called knotted weft. The reeds are cut, stripped, trimmed, and bound side-by-side with a double weft of *wi'gōōb* knotted between every two reeds. Knotting produces an open texture that facilitates drying of foods on the mat. A straw-bundle mat is made by a variant of this technique

(5) Braiding followed by spiral winding is the technique used in cattail and rush mats (both oval).

Even if adapted from European-type rugs of braided rags, these mats are interesting as an example of adaptation of familiar materials to a new technique. Similar mats are made of several materials by the Algonquin and Iroquois.

The plants are cut, and dried for 3 days. Rushes are sometimes killed with hot water. Three strands are braided, the length of the braid being determined by the size of mat desired. Braids are sewn together as they are wound into a spiral. A mat about 2 by 3 feet requires 5 hours of work.

Cattail mats are suitable for light use on the floor, while those of rush are used as table mats.

(6) The technique of coiling is employed in the sweetgrass mat. Sweetgrass is picked, cleaned, trimmed, and dried for use. A small bunch is coiled and sewn with needle and thread, the coils being bound together by an interlocking stitch. Frequently birchbark embroidered with porcupine quills is used for a center or between coils of grass. A zigzag open pattern is also sometimes interpolated or used as edging.

The questionable value of such a mat in a primitive culture casts doubt on its antiquity. This may be an adaptation of an old basket-making technique to a new use.

(7) Mats of unknown techniques were made from black ash and cedar strips, pine bark, cornhusks, and four small rushes: bog-rush, soft rush, Dudley's rush, and woolgrass.

Mat weaving died out among the Bungi after removal to the Plains.

A mat of narrow strips of birchbark was used in straining maple sirup. Presumably the technique was that used in birchbark gum-boiling bags: twined weave.

Several ambiguous descriptions of processes defy interpretation.

(8) In reviewing the list of mats, the variety of techniques, uses, colors, patterns, materials, and sizes is surprising. The mat was ubiq-

uitous; it accompanied the Chippewa literally from the cradle to the grave. A baby was delivered on a grass-covered mat (Hilger, 1951, p. 13) and was rolled in its cradle inside the family matting when the camp was moving (Densmore, 1929, p. 50). Later a mat provided a dry, smooth surface for working on damp ground (Hilger, 1951, p. 136) or in berrying or ricing (Lyford, 1953, p. 90). Finally, a mat might line and cover a Chippewa's grave (Hilger, 1951, pp. 80, 82).

Kohl leaves us this enthusiastic testimonial (1860, p. 11): "I confess such a new, clean wigwam, with its gay matting, looks very comfortable, especially when a fire is crackling in the centre, and such a house would amply satisfy a Diogenes" (pl. 59).

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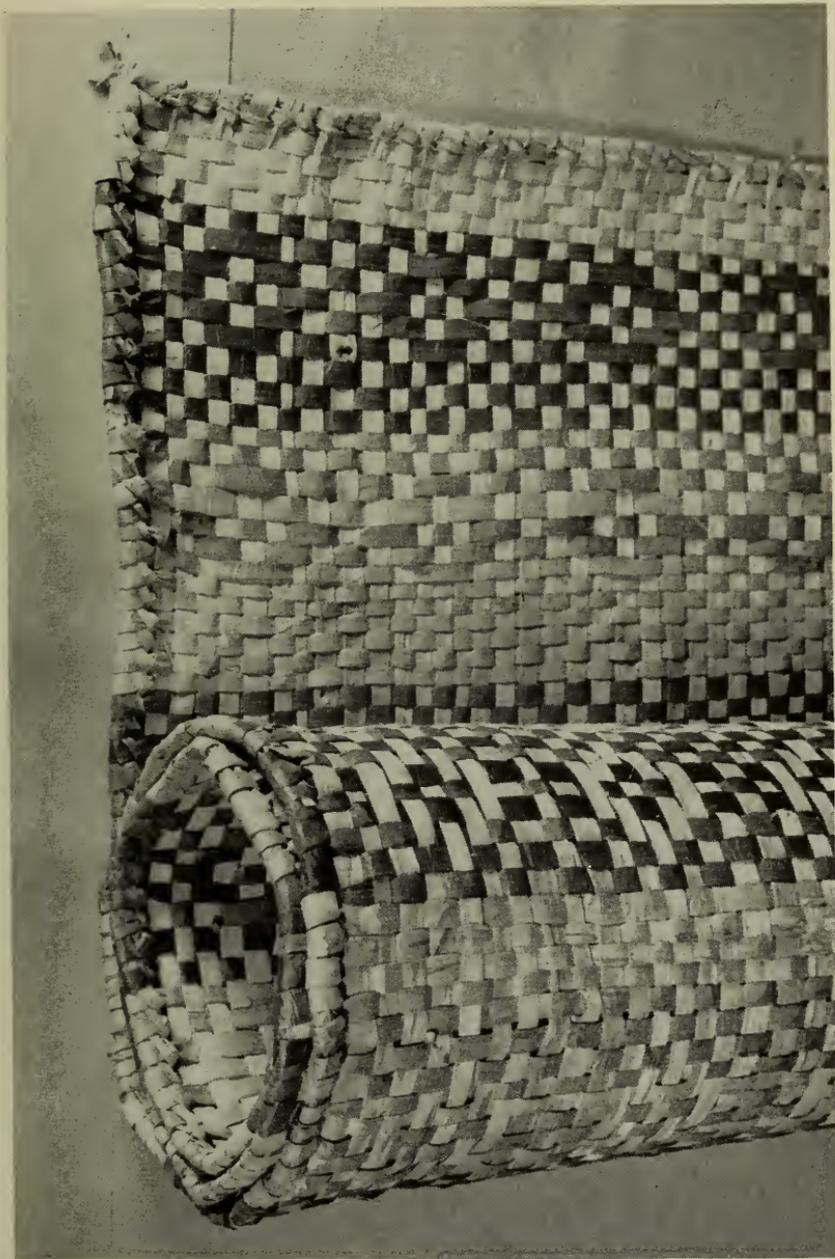
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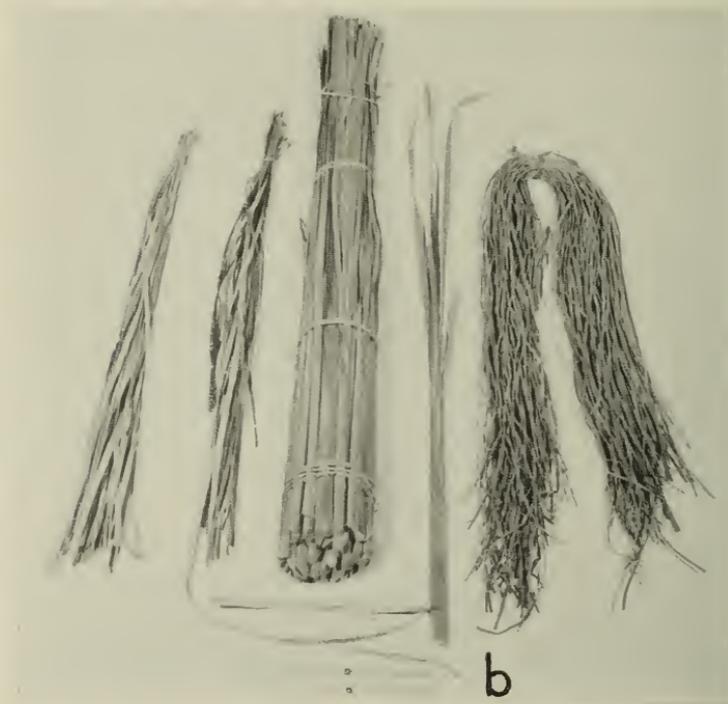
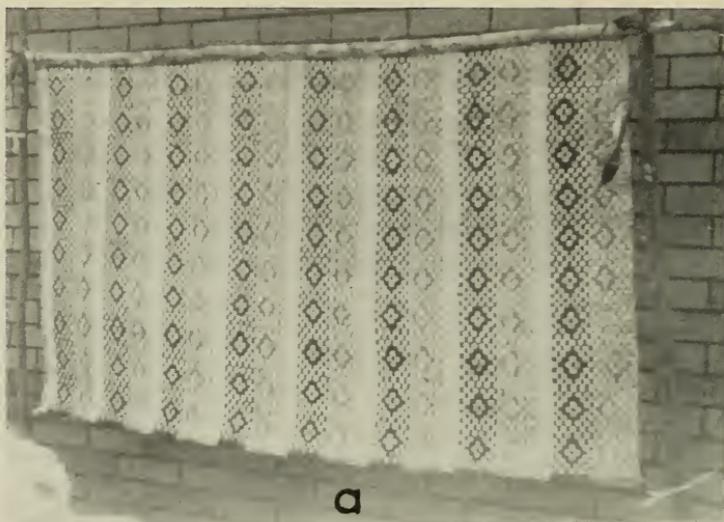
Cedar-bark mat: Preparing strips. *a*, Mrs. Robert Strong pulling inner bark away from outer; stripped tree in back. *b*, Mrs. Peter Goodsky splitting strips. *c*, Removing two bunches of strips from dye bath. *d*, Weaving a bag from fragments; mat strips at rear.



Cedar-bark mat weaving. *a*, Adding a strip to selvedge. *b*, Position of left hand during weaving.



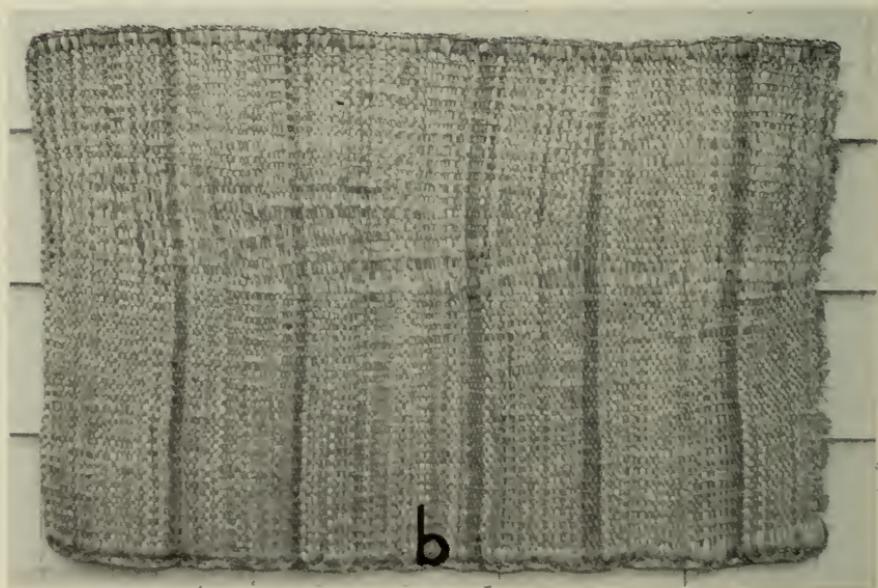
Cedar-bark mat detail. Unrolled portion shows right side; rolled portion shows back of mat. Corner is point where work ended.



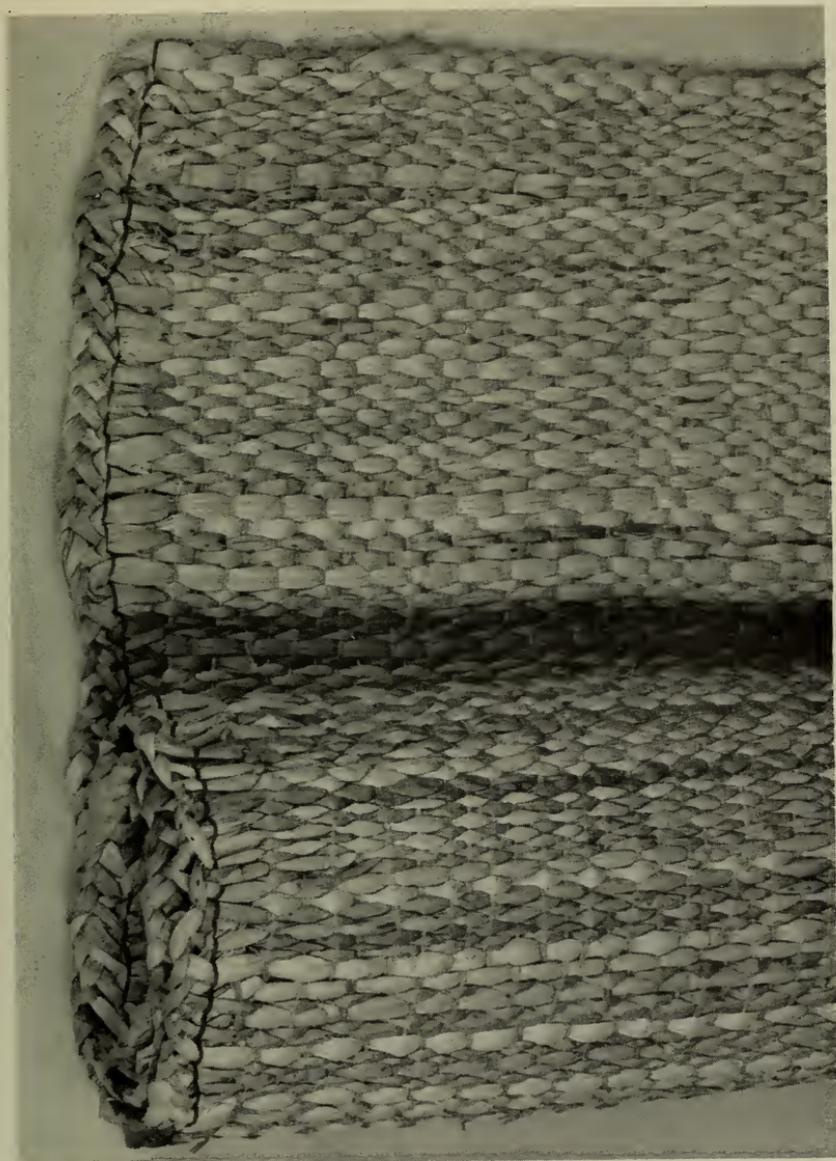
a, Completed cedar-bark mat on frame. *b*, Materials for mats: undyed and dyed cedar-bark strips, prepared and unseparated cattail leaves, treated bulrushes, deer-rib and wooden needles for sewing cattail mats.



Rush mat. *a*, Mrs. Ole Sam and Mrs. Maggie Skinaway Wadena crushing bloodroots for dye. *b*, Mrs. Sam "cooking" bulrushes. *c*, Adding rushes to the selvedge.



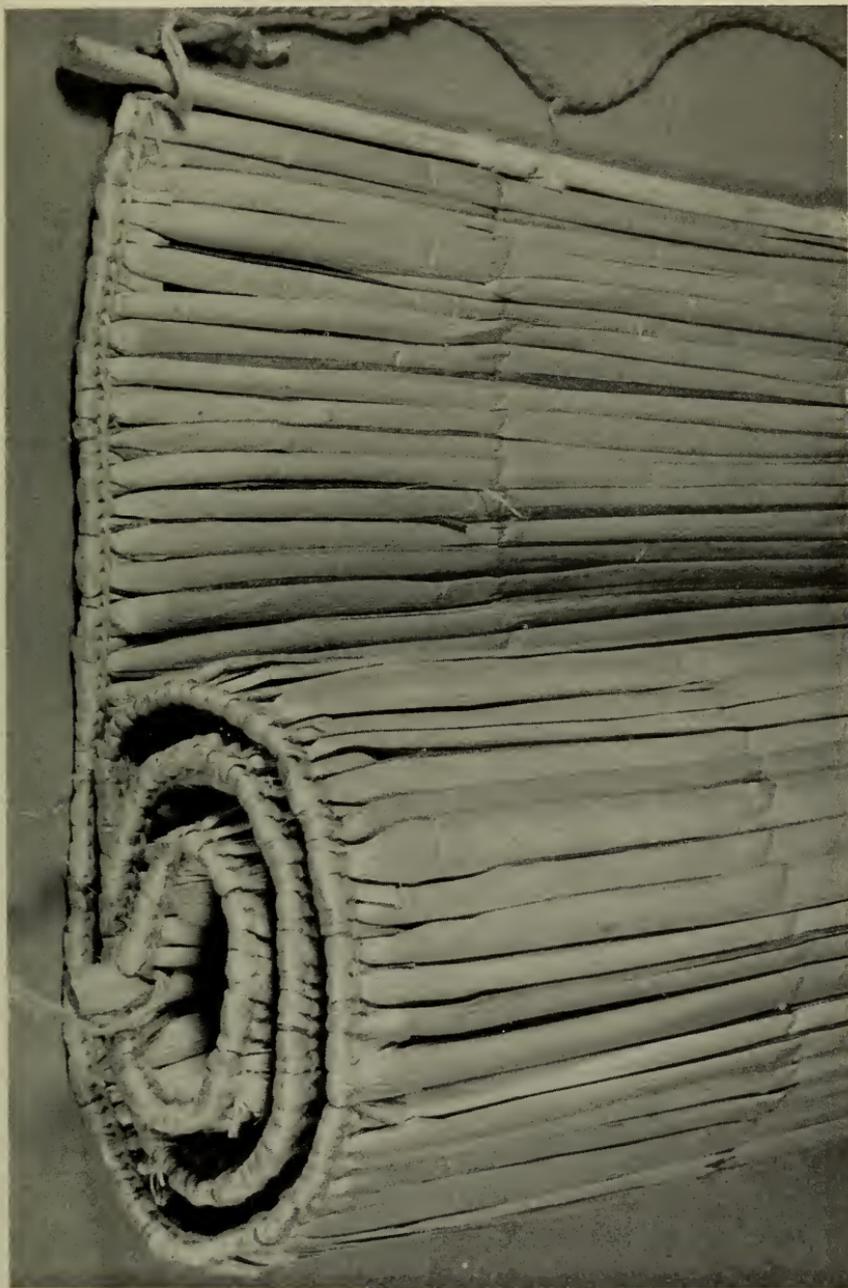
Rush mat. *a*, Karen Sam and Mrs. Selma Nickaboine weaving. *b*, Completed striped mat showing uneven area where rushes were dry.



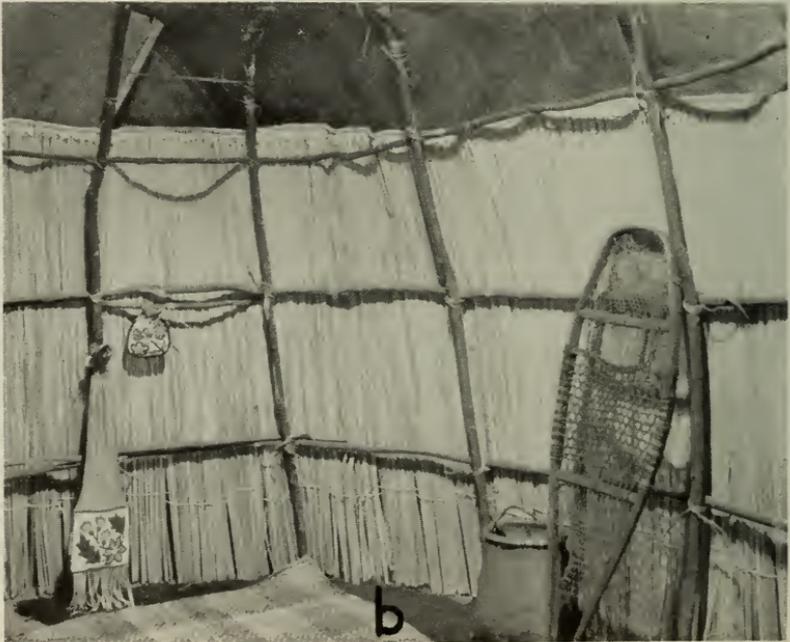
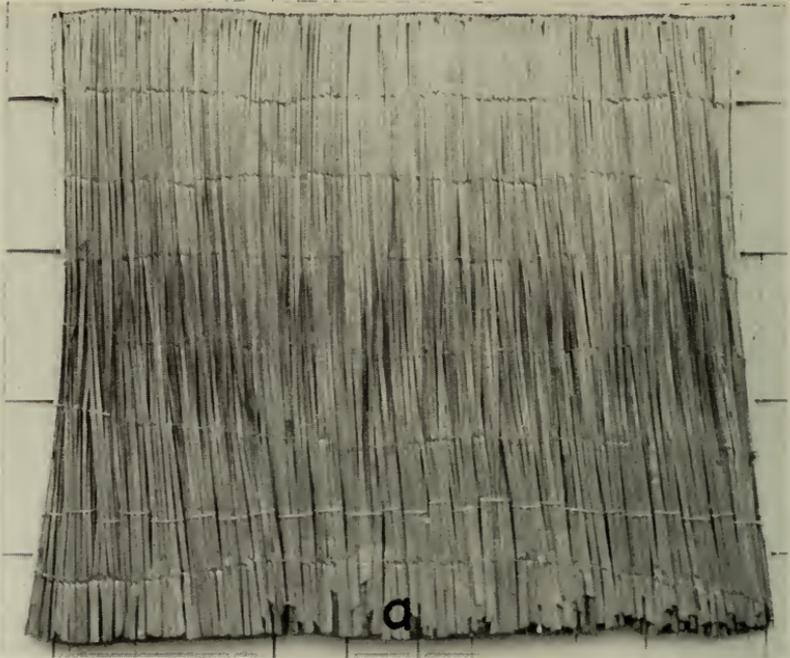
Rush mat detail. "Four-braid" edge appears the same on back and front.



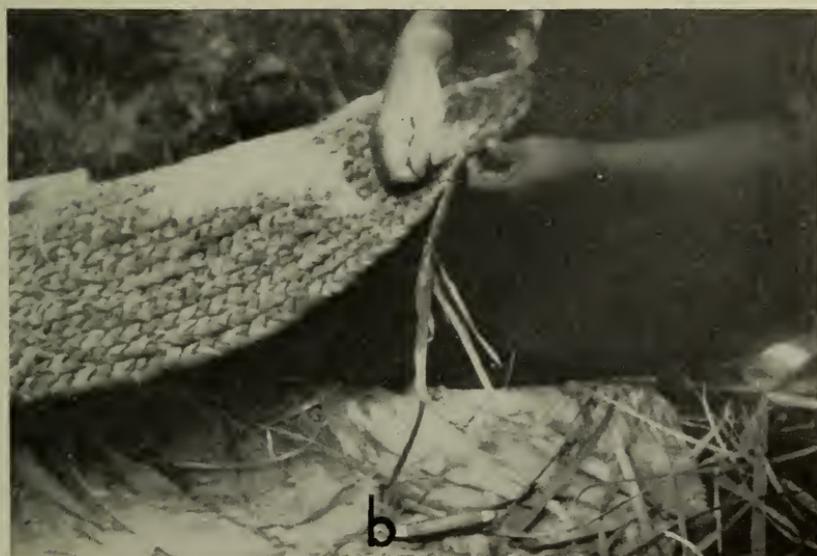
Making a cattail-mat wigwam cover. *a*, Mrs. Wadena tying a leaf into the selvedge. *b*, Beginning the sewing of the mat.



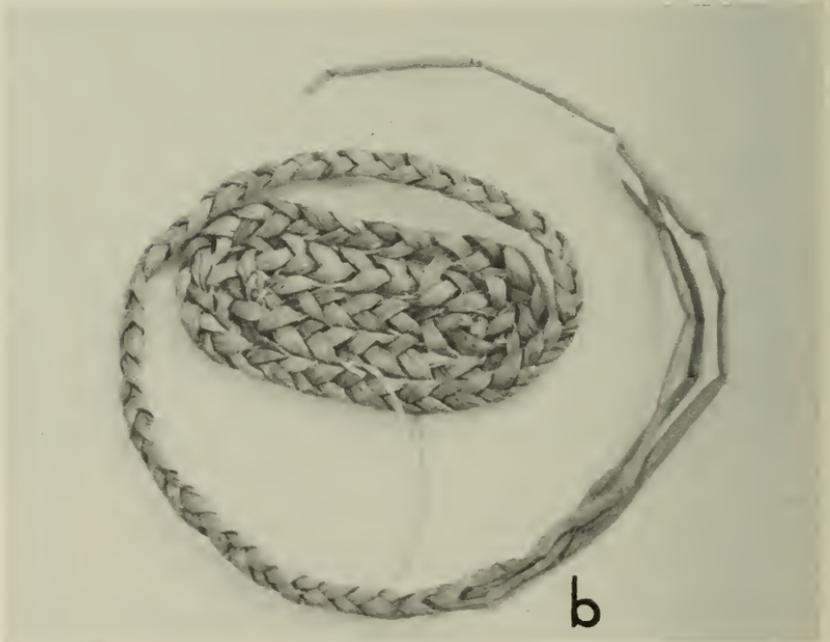
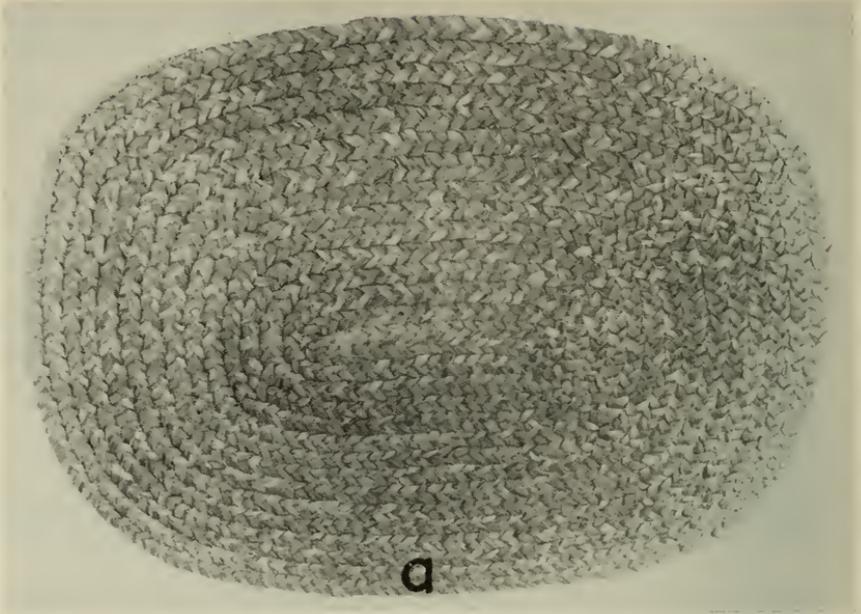
Cattail mat detail. Unrolled and rolled portions show two sides of mat each a separate layer. One row of sewing may be seen.



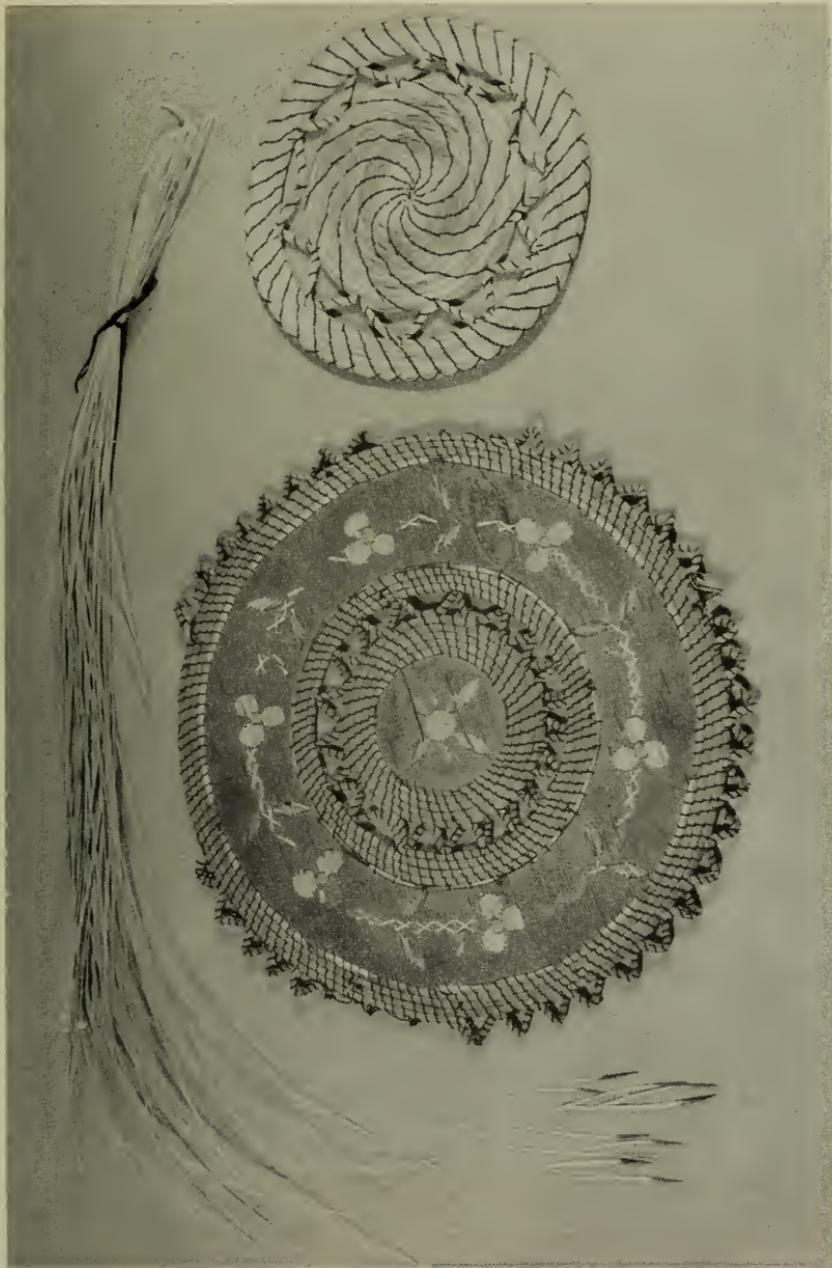
Cattail mat completed. *a*, Short demonstration mat. *b*, Full mat on wigwam. (Courtesy of the Science Museum, St. Paul, Minn.)



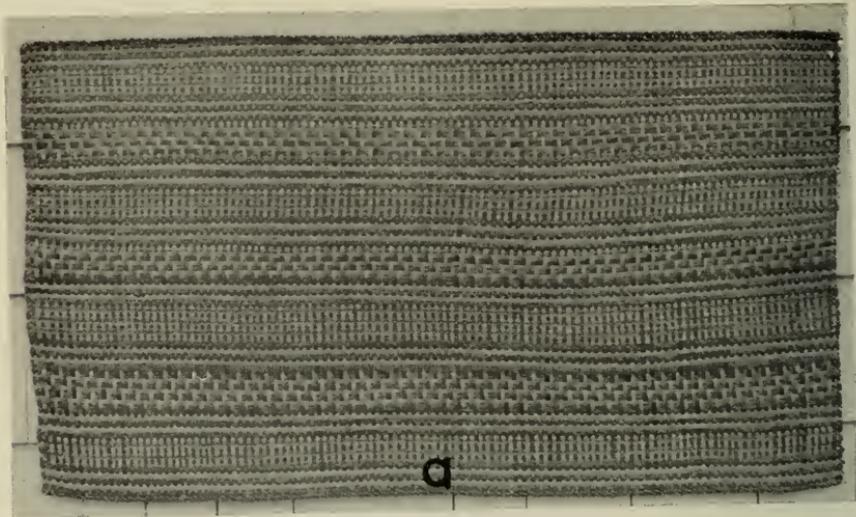
Braided cattail floor mat. *a*, Mrs. John Benaise peeling *wi' goōb* from basswood sapling.
b, Completing sewing of mat.



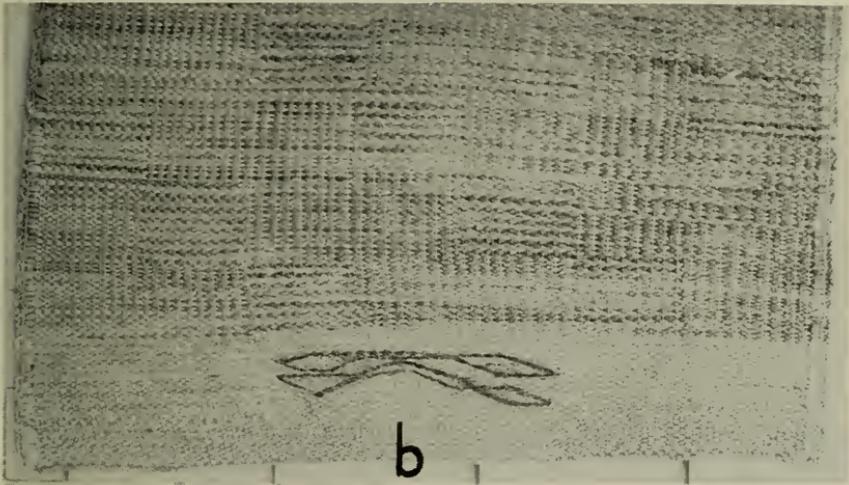
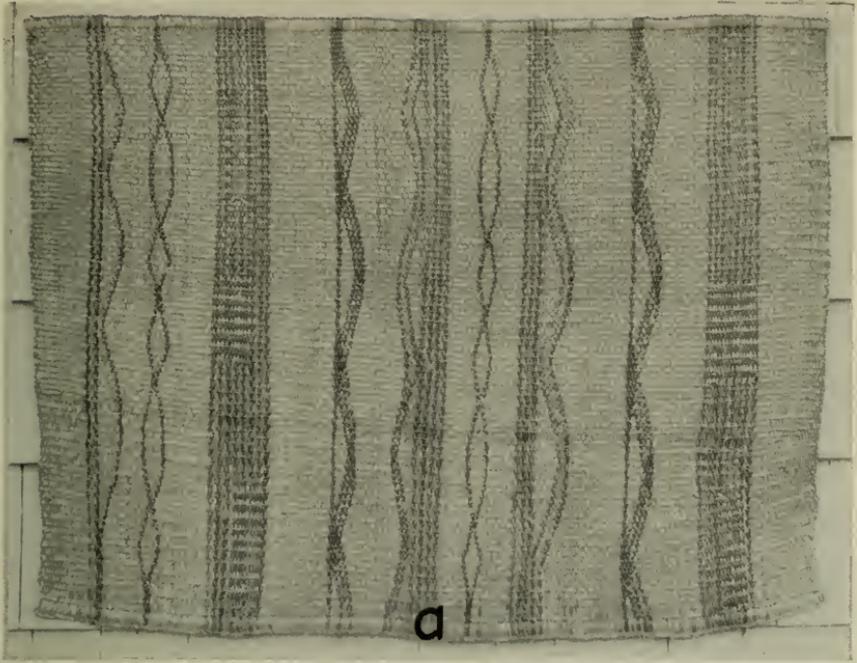
Braided mats. *a*, Cattail mat. *b*, Detail of beginning of small bulrush mat.



Sweetgrass bundle, old tablemat of sweetgrass and birchbark ornamented with dyed quills (collections of the Science Museum, St. Paul, Minn.), and mat of sweetgrass.



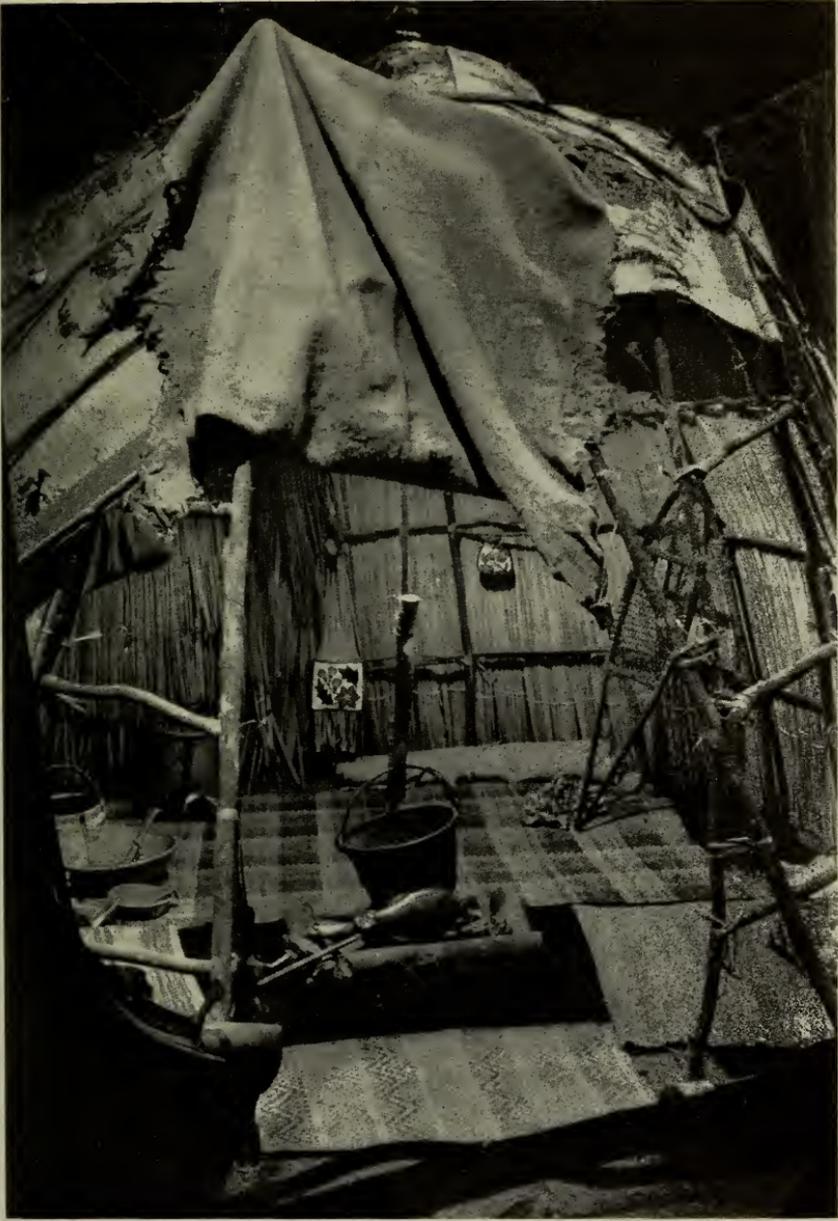
Cedar-bark mats made at Nett Lake Reservation in the period of this study. *a*, Geometrical pattern by Mrs. Charles Strong. *b*, Plaid by Mrs. Peter Goodsky.



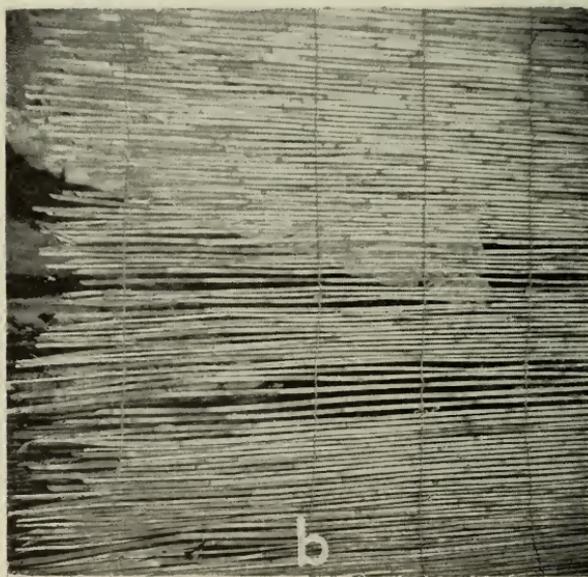
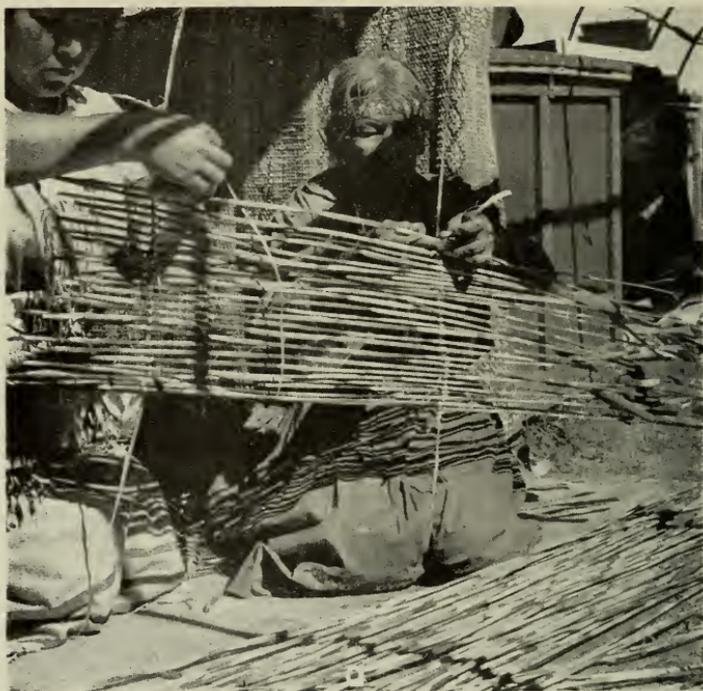
Old rush mats. *a*, Zigzag patterns including otter-tail pattern, and block pattern.
b, Floral (?) pattern and blocks, from Ponsford, White Earth Reservation.



Rush mat used to line the wall of a birchbark peaked lodge, in a painting done by Eastman Johnson at Grand Portage Reservation, Minnesota Territory, 1857-58. (Courtesy of the St. Louis County Historical Society, Duluth, Minn.—cat. No. 10.)



Wigwam showing mats in use. Rear and foreground floor, cedar-bark mats. At sides, rush mats. On walls, cattail mats. (Courtesy of the Science Museum, St. Paul, Minn.)



Reed mat. *a*, Mrs. Susan Shingobe and Mrs. Maggie Nequonabe weaving. *b*, Section of mat used for drying blueberries near Pickle Lake, Ontario, Canada.