

Boatmen poling cargo bullboats, made of buffalo hides, on the North Platte River at Scotts Bluff. Note the Indian in the small, saucer-shaped bullboat at right.

SKIN BOATS OF THE FUR TRADE

By Bruce M. Day

Previous to the expansion of the fur trade into the Upper Missouri River Basin, skin covered boats were well known to the explorers of North America. Even prior to the Roman occupation of the British Isles, hide boats, known as “coracles” (from the Welsh “cwrwgl”), consisted of a single hide, wooden frame, and bowl shape boats were a common sight on the waterways of the British Isles. The shapes and sizes of the coracles among the European builders were as variable as the skin boats were with the Native American tribes. Yet, the size, shape and construction were very similar to both continents. Today, the popularity of coracle boats is increasing in Europe with the new generation of the boat makers.¹

¹ Kenny, Terry. *The Coracle- a One Person Boat with an Ancient Lineage*. Shropshire, England, UK: The Coracle Society, Newport, 2016. web site.

Lewis and Clark's Corp of Discovery knew the advantages the light weight; skin cover boats would have during their expedition and had carried the supplies for the construction for such a boat. The men of the Corp christened this skin boat "The Experiment" of Lewis and Clark.²

During Lewis' months of planning, the captain tried to solve many of the "what if" scenarios they might experience. Meriwether Lewis brought many advanced engineering ideas on the expedition, one being the .31 caliber air rifle made by Isaiah Lukins of Philadelphia.³ The main purpose of the air rifle in Lewis' mind was in the event their gunpowder had become wet or lost, the air rifle would become their only useable firearm. During their travels, the real effectiveness of the rifle was during the demonstrations to the Native Americans. The rifle performed relative quiet and had no need for powder, which astounded the different tribes. Another advancement of Lewis was to have their gun powder encased in lead boxes so that if submerged the powder would not be affected by moisture or loss. The lead containers were of the proper size that it would have made the exact number of bullets that the enclosed powder could shoot. The most unusual and unique of Lewis' supplies was the iron framed canoe that he personally designed and had built.⁴

In 1803, boat travel was considered the only means of transportation for the Corp into the wilderness. On January 18, 1803, Lewis was granted the amount of \$2,500 from President Jefferson and the U.S. Congress to attain all the supplies for an expedition to cross the continent by way of the Missouri River.⁵ During the next two months, Jefferson and Lewis discussed what would be needed on his travels. The idea of a boat that would be easily assembled, covered with animal skins and effortlessness in portage, was obviously alluring. By the first of March, Lewis had now completed the design of his iron framed boat. It was considered a modern technology of the time. On March 13, 1803, Meriwether Lewis traveled to the Harper's Ferry armory to order fifteen .54cal Harper Ferry rifles that were needed for the trip and to oversee the fabrication of his vision of the boat.⁶ For nearly thirty days, he remained at the foundry to supervise the construction of the Iron-Frame craft. Upon

² Woodger, Elin and Toropov, Brandon. *Encyclopedia of The Lewis & Clark Expedition*. New York, NY: Checkmark Books, 2004. page 184.

³ Woodger, Elin and Toropov, Brandon. *Encyclopedia of The Lewis & Clark Expedition*. New York, NY: Checkmark Books, 2004. page 137.

^{iv} Woodger, Elin and Toropov, Brandon. *Encyclopedia of The Lewis & Clark Expedition*. New York, NY: Checkmark Books, 2004. page 184.

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⁵ Woodger, Elin and Toropov, Brandon. *Encyclopedia of The Lewis & Clark Expedition*. New York, NY: Checkmark Books, 2004. page 102.

⁶ Woodger, Elin and Toropov, Brandon. *Encyclopedia of The Lewis & Clark Expedition*. New York, NY: Checkmark Books, 2004. page 137.

its' completion, he wrote to Jefferson that the boat frame was 36' long, 4 ½' wide and 2'2" deep and could carry 1,770 pounds of supplies.⁷ How much the craft weighted or how it was packaged for the trip, I have not found any records.

After 2,500 miles and 13 months, the expedition reached their greatest water obstacle. The Great Falls of the Missouri River, at the site of today's town of Great Falls, Montana. The falls were nearly 400 foot in height and on June 16, 1805, the 18 mile portage began.⁸ On June 22, at the arrival to White Bear Island, the portage for the Corp ended and their assembling of the Iron Framed boat began. The following day, Lewis' boat frame was completed. He and several of his men spent the next 11 days hunting and dressing the 28 elk and four buffalo hides needed to cover the frame⁹.

The process of sewing the hides to the proper size and shape proved to be the craft's Achilles heel. The needles they brought on the expedition were considerably large and had resulted in causing "ample" holes from the needles.¹⁰ From the very start of their journey, Lewis believed there would be no problem in finding pine pitch from the surrounding forest. But when the boat was ready there were none to be had.¹¹ Pine pitch was the main outer sealing component of the time but now Lewis was forced to develop his own. His only option was a mixture of beeswax, charcoal (a thickening agent) and tallow, all of which was the common sealant for wooden canoes.¹² It was recorded that over 100 pounds of buffalo tallow was rendered down but not the amounts of beeswax and charcoal that was used.¹³ For two days, Lewis and George Drouillard applied their mixture to the outer skin of the boat. On July 9, the boat was launched and was named by the men as "**The Experiment**".¹⁴ Lewis

⁷ Woodger, Elin and Toropov, Brandon. *Encyclopedia of The Lewis & Clark Expedition*. New York, NY: Checkmark Books, 2004. page 184.

⁸ Woodger, Elin and Toropov, Brandon. *Encyclopedia of The Lewis & Clark Expedition*. New York, NY: Checkmark Books, 2004. page 132, 365.

⁹ Woodger, Elin and Toropov, Brandon. *Encyclopedia of The Lewis & Clark Expedition*. New York, NY: Checkmark Books, 2004. page 137.

¹⁰ Woodger, Elin and Toropov, Brandon. *Encyclopedia of The Lewis & Clark Expedition*. New York, NY: Checkmark Books, 2004. page 184.

¹¹ Woodger, Elin and Toropov, Brandon. *Encyclopedia of The Lewis & Clark Expedition*. New York, NY: Checkmark Books, 2004. page 184.

¹² Woodger, Elin and Toropov, Brandon. *Encyclopedia of The Lewis & Clark Expedition*. New York, NY: Checkmark Books, 2004. page 184.

¹³ Woodger, Elin and Toropov, Brandon. *Encyclopedia of The Lewis & Clark Expedition*. New York, NY: Checkmark Books, 2004. page 184.

¹⁴ Woodger, Elin and Toropov, Brandon. *Encyclopedia of The Lewis & Clark Expedition*. New York, NY: Checkmark Books, 2004. page 184.

recorded, with pride, his endeavor as *“she lay like a perfect cork in the water”*.¹⁵ But within moments after loading her of supplies to continue with their journey, a strong storm front had engulfed the crew. The high wind and waves forced *“The Experiment”* to be unloaded and be removed from the water.¹⁶ Just the short time of her maiden float, the tallow, beeswax and charcoal sealant proved to be a total failure. In the eyes of Lewis, *“The Experiment”* would have proven herself a worthy cause. *“She was very light that it only required five men to portage her and yet she could carry one ton of supplies and men. Nothing but pine pitch would make her worthy to continue the trip.”*¹⁷ It’s now apparent the stitch that Lewis used to sew the 32 hides together was a whip stitch, if an overlap or “blind” seam was used, it could have proven more reliable stitching. After several attempts of reworking the seams, they abandoned the project. I wonder what Lewis was considering when he wrote in his last entry *“it was too late to introduce a remedy and I bid a dieu to my boat and her expected services”*.¹⁸ She was cache along with supplies for the return trip but was never recovered.



The Single Hide Bull Boat

The skin canoes that were commonly seen along the waterways of the Missouri River were similar to Lewis’ design and shape. But on October 6, 1804, arriving within site of the Arikara village, the Corp

¹⁵ Woodger, Elin and Toropov, Brandon. *Encyclopedia of The Lewis & Clark Expedition*. New York, NY: Checkmark Books, 2004. page 184.

¹⁶ Woodger, Elin and Toropov, Brandon. *Encyclopedia of The Lewis & Clark Expedition*. New York, NY: Checkmark Books, 2004. page 184.

¹⁷ Woodger, Elin and Toropov, Brandon. *Encyclopedia of The Lewis & Clark Expedition*. New York, NY: Checkmark Books, 2004. page 184.

¹⁸ Woodger, Elin and Toropov, Brandon. *Encyclopedia of The Lewis & Clark Expedition*. New York, NY: Checkmark Books, 2004. page 184.

of Discovery gained their first sight of a circular hide boat or bull boat.¹⁹ The Corp soon discovered this new design of boats were very common with the tribes that lived north of the Republic River and east of the Rockies. The men of Corp of Discovery were so impressed of their worthiness, Captain Clark wrote into his journal his description that was very similar to many of the fur trade journals. He depicted their construction as *"2 Sticks of 1 ¼ inch diameter is tied together so as to form a round hoop of the size you wish the canoe, or as large as the Skin will allow to cover, two of these hoops are made one for the top or brim and the [other] for the bottom the deabth [depth] you wish the canoe then Sticks of the same size are crossed at right angles and fastened with a thing [thong] to each hoop and also where each Stick crosses each other, then the Skin when green is drawn tight over this fraim and fastened with thongs to the brim or outer hoop as a to form a perfect bason."*²⁰

On their return trip homeward, four members of the Corp of Discover, Sergeant Nathaniel Pryor, Hugh Hall, Richard Windsor and George Shannon found a need to build two bull boats of their own. On July 24, 1806 the Corp of Discovery had divided into two parties.²¹ Lewis was to explore the area of Northern Montana while Clark, who had just completed a wooden canoe, was to travel down the Yellowstone and then to the Missouri River. Sergeant Pryor had orders to travel cross country with the Corps' horses and to meet Clark at the Mandan village that was 200 mile to the east. Two days after departing Clark, Sergeant Pryor lost all of the horses during the night. Now afoot and in hostile territory, the party back tracked the 30-40 miles to the Yellowstone River, killed two buffalo and assembled two skin boats. Lewis described the sight as *"Pryor's two canoes were nearly the same size, 7 feet 3inches in diameter and 16 inches deep, with 15 ribs or cross sticks in each."* On August 8, they were able to catch up with Clark who was 150 miles downstream.²²

Another like story was told in Washington Irving's 1832 book, *A Tour on the Prairies*, where two men from the Irving party, Beatte and Tonish, *"had an opportunity of displaying their Indian adroitness and resource"* with use of a dry buffalo skin that they procured from the Osage village two days earlier. At the Red Fork (Cimarron River), *"a cord were passed through a number of small eyelet holes with which it was bordered, and it was drawn up, until it formed a kind of deep trough. Sticks were the placed athwart it on the inside, to keep it in shape."*²³ Once the party's equipment was across *"the*

¹⁹ Woodger, Elin and Toropov, Brandon. *Encyclopedia of The Lewis & Clark Expedition*. New York, NY: Checkmark Books, 2004. page 63.

²⁰ Woodger, Elin and Toropov, Brandon. *Encyclopedia of The Lewis & Clark Expedition*. New York, NY: Checkmark Books, 2004. pages 63-64.

²¹ Woodger, Elin and Toropov, Brandon. *Encyclopedia of The Lewis & Clark Expedition*. (New York, NY: Checkmark Books, 2004) page 64.

²² Woodger, Elin and Toropov, Brandon. *Encyclopedia of The Lewis & Clark Expedition*. (New York, NY: Checkmark Books, 2004) page 64.

²³ Irving, Washington. *A Tour on the Prairies*. (Norman, OK: University of Oklahoma, 1956) page 70.

*Commissioner and myself were so well pleased with this Indian mode of ferriage, that we determined to trust ourselves in the buffalo”.*²⁴

To understand the construction of the skin boats, one needs to make one or maybe two...

My first bull boat was made with the instruction of Dale Bollman, better known as “Rabbit”, based on the design of the Mandan. The bottom was more rounded than other Missouri Basin tribes and the user needed to maintain a lower center of gravity and to show caution in rough waters. The bowl shape allowed the hide to become stretched more evenly compared to crafts with more vertical sides. The craft performed very well in calm waters.



The Smithsonian’s Hidatsa bull boat

The Smithsonian possesses a Hidatsa bull boat that was collected by Drs. C.C. Gray and W. Matthews in 1865-67. An opportunity was given to George Metcalf to measure and in 1972, he published his detailed description on its construction. This boat is circular shaped and I have used his description to make several similar crafts. Another variation of the shape of these craft was recorded in Captain Randolph B. Marcy’s 1859 “The Prairie Traveler” also states an elongated “*frame-work in the shape of a half egg-shell cut through the longitudinal axis*”.²⁵ The German artist Kurz had also illustrated the elongated shape frames in the Mandan “Women with bullboat and paddle” sketch.

²⁴ Irving, Washington. *A Tour on the Prairies*. (Norman, OK: University of Oklahoma, 1956) page 71.

²⁵ Marcy, Randolph B. *The Prairie Traveler*. (Bedford, MA: Applewood Books, 1859) pages 83-84.



Constructing a Single

Hide Bull Boat

The Native American women were the builders and main user of these skin boats. Once the rivers were free of ice, the bull boats were again put to use for collecting firewood along the river banks. Many of the older crafts needed to be replaced as well as the addition of new boats. The size of the craft depends on either the size of the hide or one's personnel preference. I found that a two year old buffalo cow hide usually measures nine by seven foot and would require the use of 19 willow limbs. The limbs for the frame would have normally been cut during the spring and summer seasons when the willows are in their growth period. I found cutting limbs before the spring growth; the limbs were very difficult to make the proper bend of nearly 90 degree without cracking or splitting. Col. Marcy in his book *The Prairie Traveler* wrote that one can sometimes heat the limbs over a fire to achieve the proper shape without breakage.²⁶ I have also attained the same results by soaking limbs in boiling water which usually only requires ten minutes to gain the needed results.



Once peeled, the limbs should be no greater than $1\frac{1}{4}$ to $1\frac{1}{2}$ inches and seven to nine feet in length with the smallest end not less than $\frac{1}{2}$ inch diameter. By laying out the buffalo hide, you can measure the overall length and width of the

²⁶ Marcy, Randolph B. *The Prairie Traveler*. (Bedford, MA: Applewood Books, 1859) page 84.

hide. The boat sides should be 16 to 18 inches in height, you will need to subtract 32 to 36 from the length and width of the hide's measurement to obtain the size of the two hoops, the top "gunwale" hoop and the lower loop. Even though you can stretch several additional inches when covering the frame, you need to be cautious of over stretching the skin. The upper hoop is several inches larger than the lower hoop due to the outward flare of the ribs where it is tied to the upper or gunwale hoop. The construction of the two hoops is seen in the two photos of bull boats, the Hidatsa boat in the Smithsonian and in the photo from North Dakota heritage Center - Mussulmen, Joseph's *Bull Boats: Float Craft on the Middle Missouri*. Each hoop is crafted by adjoining two willow limbs together. The narrow end of one limb is shaped and tied to the base or butt end of the second limb together. The two limbs should overlap 12 -18 inches and at the overlap, you will need to thin both limbs to half of their total thickness. The goal is to maintain the nearly consistent limb thickness of the entire hoop. The two joints are then heavily wrapped with raw hide. The North Dakota Historical Society photo shows a slightly oval shaped frame and the over lapping joints are positioned at the bow (front) and stern (back) of the boat. With the lower hoop on the ground, the five longest limbs are now placed on top of this hoop and are equal spaced at about 8 inches from each other. Tying the



limbs to the hoop with 3/8 inch raw hide thong cut from either deer hides or from your buffalo skin, is historically correct. Thong material can be cut from the excess areas of the buffalo hide that will be removed during the final trimming of the hide over the frame. I have found two patterns for tying the limbs, the Hidatsa at the Smithson and in the drawing of Frederick Kurz. The Hidatsa boat was assembled with a single loop tie and was considered as a poorly built craft.²⁷ Kurz showed a cross pattern tie was used to hold the ribs in place sufficiently to get the hide in position and dried. Continue the process of frame work by lashing three 7 foot limbs perpendicular to the five limbs and to the lower hoop. The next step is to gradually bend the limbs upward. I start by bending all of them halfway or at 45 degrees while placing enough weight to hold the framework in place. Returning to the first limb, continue the bending process until the finish angle of 90 degree is achieved. The mountaineers' journals refer to the willow limbs as "knees" and the later writings they were also called ribs. The upper hoop, called the gunnel/gunwale, is positioned 16–18 inches above the lower hoop. The knees are tied on the outside of the upper hoop, as seen in the North Dakota Heritage Center photo. To make the process easier, stakes are sometimes

²⁷ Metcalf, George. *The Bull Boats of the Plains Indians and Fur Trade*. (Chadron, NB: The Museum of the Fur Trade Quarterly Vol. 8, No. 2, Summer 1972) page 5.

hammered into the ground to hold the framework from moving and to retain the boat shape.



The knees are usually cut at the same height above the gunnel, the Smithsonian bull boat is cut flushed to the gunnel.²⁸ In the paintings of Karl Bodmer and Alfred J. Miller, the knees are several inches above the gunnel, in fact, this is the better way. The tail should extend above the stern gunnel and again, this is based on the tribe or builder. In the Fredrick Kurz's sketches, the stern knee was cut six to eight inches above the gunnel. The frame is now positioned over the hide where the head to tail runs the length from bow to stern. Both Fredrick Kurz and Alfred J. Miller's artwork illustrates the buffalo hide was cut so it could be pulled over the stern knees. During skinning of the animal, I will pull the tail bone from the skin so that the tail skin can be tied or slid over to the stern knee. The hide is pulled up to the gunnel and is attached by cutting holes and pulled over at each knee or tied with raw hide thong. W.H. Hutton described Jim Bridger's craft as "*the hides were drawn tight by hand and fastened by putting hide over the frame work through holes cut in the hides*".²⁹ Karl Bodmer shows the hide was pulled over and then lashed to the gunnel with raw hide thongs. The Smithsonian's Hidatsa boat had the hide attached in this matter. AMM Brother, William Bailey, states that the buffalo hides should not be pulled too tightly but needs some play because while drying these hides can and will cause deformation and breakage of your frame work. This is seen with the Smithsonian's boat. The bull boat is now finished.

Their Use

The Native Americans utilized their boats for multiple purposes and for many months regardless of the season. In the treeless plains, the only source of firewood for the people along the major waterways was what had floated down the river. It was customary for the women of the tribe to

²⁸ Metcalf, George. *The Bull Boats of the Plains Indians and Fur Trade*. (Chadron, NB: The Museum of the Fur Trade Quarterly Vol. 8, No. 2, Summer 1972) page 4.

²⁹ Hanson, James A. *James Bridger et al., Boat Builders: The Skin Canoes Of The Great Plains and Rockies*. (Chadron, Nebraska: The Museum of the Fur Trade Quarterly Vol. 16, No. 1, Spring 1980) page 2.

gather the firewood that was along the river sandbars and banks and were the predominate user of



the bull boats.³⁰

When not in

the water, the boats had as many other uses as there were tribes. Before the hunter/gatherer tribes began their seasonal travels, a bull boat tied to a horse travois loaded with their possessions and children. Hunting parties would often build a boat from the hide of the harvested animals and then load it with large quantities of meat. The agricultural tribes who commonly built the more enduring lodges, such as the Mandans, Arikara and Hidatsa, found additional uses for their boats. In George Catlin's "View of the Mandan Village", there are several bull boats that were stored upon the roof tops of their dwellings. Animal's hides as well as the bull boats were commonly used to cover the smoke holes during heavy rains and snows. The European-American had only a limited need for these crafts, to cross a stretch of river or to transport their supplies and pelts to the nearest fort and then, the boats were abandoned. The Native Americans appreciated and understood the value of their boats. William Clark during their trip homeward, wrote the Native's aspect on these crafts. The four members of the Corp of Discover, Sergeant Nathaniel Pryor, Hugh Hall, Richard Windsor and George Shannon after catching up with the William Clark party, had one of the "leather canoes" received serious damage. The decision was made to abandon their crafts but the men first repaired the damage and then left the craft along the river bank. William Clark recorded this action "in accordant to Indian etiquette"³¹ to leave their canoes for other travelers. Not all occasions would the user of the bull boat want others to know of their presence. A more cautious Blackfoot tribe man, when

³⁰ Brackenridge, Henry Marie. *Views of Louisiana; together With a Journal of a Voyage Up The Missouri River, In 1811.* (Pittsburgh, PA: Cramer, Spear and Eichbaum, 1814) page 245.

entering into the country of the Sioux, told “in the night, he crossed the river, put some stones in his boat, then cut a hole in the bottom, so that it filled with water and sank”³²

Good facts to know

The name “skin boats” was the common name for the hide boats but buffalo were not the only animals that were killed for the use of its skin, also elk, oxen and even horses were harvested for this purpose. Washington Irving in The Adventures of Captain Bonneville wrote of his party “to kill their horses, dry the flesh for provisions, make boats of the hides, and in these, commit themselves to the stream – a measure hazardous in the extreme.”³³

Hair on the inside, outside or none at all



Hair In - The bull boat of the Mandan,

Arikara and Hidatsa tribes were described by Will and Spinden as to have their crafts as “a raw buffalo hide was stretched, **hair in**, and sewed to the upper rim.” Within the surviving journal of the trappers, they described the construction of their canoes being “sealed” with a coating of tallow and wax, etc. This sealant would have been applied on the hides from the outside of the craft. If they had left the hair on the hides, the skin would then be stretched with hair inside the craft. The strength of the hide boats comes from the hides itself and the only purpose of the willow frame is to keep a desired shape until the hide has become dried and harden. The greatest challenge with a skin boat is with the absorption of water. These boats required frequent and long duration stops for drying the skin covering. Henry Brackenridge, on May 20th 1811, told that he had ascended a bluff that overlooked the Missouri River and “Hailed a trader, descending in a large canoe, made of skins of the buffalo,

³² Schultz, James Willard. *My Life as an Indian*. (New York, NY: Doubleday, 1907) page187.

³³ Irving, Washington. *Adventures of Captain Bonneville, or Scenes Beyond the Rocky Mountains of the Far West*. (Rue du Coq, France: Baudry’s European Library, 1837) page 166.

upwards of twenty feet in length, who wintered at the river a' Jaque." He continued "These skin canoes are stretched over the red willow, and require to be frequently exposed to the sun, and dried, as they would otherwise become too heavy, from the quantity of water absorbed."³⁴



Hair Out – George

Catlin and Karl Bodmer paintings of the same name "Mandan Village" illustrated the craft as possibly having the hair on the outside which is directly contrary to Will and Spinden's finding. Most museum displays will have the bull boats with the hair on the outside as was mine. The only reference that I have found about hide boats having hair on the outside was Gilbert Wilson's *The Horse and Dog in Hidatsa Culture*. There are numerous references about the Hidatsa tribe stating their bull boats had the hair inside, i.e. Will and Spinden *The Mandans, a Study of Their Culture*. Although, hair on the outside makes a wonderful display, there are no advantages beyond this. The hair can reduce some wear from sand and gravel abrasion upon contact but the hair from the animal would not offer any large amount of protection from limbs and rocks. These crafts follow the speed and direction of the river's current and only the paddle can change the direction of these forces. Hair on the outside is very difficult to repair any damage from cuts and punctures. If the trappers' were using their boats for several days or months, they wrote of applying sealants, then hair was on the inside. Any craft that were built for quick crossing, the animal was likely not well cleaned of all the flesh/meat; it would be wiser that trappers' possessions be next to the hair than in contact with the odor and remains of a fresh kill. Skin boats, regardless if the hair was inside or outside, these boats would require more frequent stops to dry the covering due to the hair causing an abundant amount of moisture to be absorbed.

No Hair - In the sketches of Frederick Kurz, "Women with bullboat and paddle" (plate 16) and "Hidatsa group with bull-boats" (plate 37), were drawn without any hair on their boats. This might be due to the artist's desire for drawing only sketches and not on specific detail of his subjects. Even today, the Northern Canadian tribe in the 1968 Film, directed by Gordon Eastman, "*High, Wild and Free- This Immersive Experience in the British Columbian Wilderness*", shows the tribe removing the

³⁴ Brackenridge, Henry Marie. *Views of Louisiana; together With a Journal of a Voyage Up The Missouri River, In 1811*. (Pittsburgh, PA: Cramer, Spear and Eichbaum, 1814) page 230.

hair from the three moose hides by soaking **overnight** in the stream and pulling the hair off the next morning. The Smithsonian's Hidatsa bull boat shows only a few remnant patches of hair on the outside. It was suggested that the hair has either luffed off because of its age or was purposely soaked to remove the hair. In Gordon Eastman's film, the women building the moose hide boat had removed nearly all of the hair but a few patches remained. Using their knives, they shaved or cut the remaining hair very short. These women had positioned the outer skin to the outside of the canoe. Whether they had hair in, hair out or no hair may only depend on the builder and the purpose of the craft.

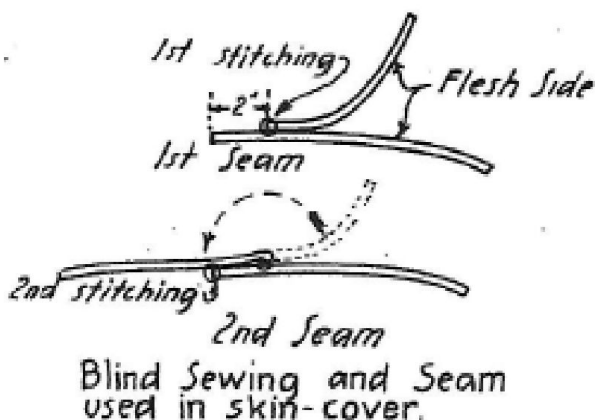


Figure 170

MAKING THE BLIND SEAM: two stages of method used by the Eskimo to join skins together. The edge of the skins are placed flesh side to flesh side with one overlapping the other about 2 inches. Then, by means of a thin needle and slender sinew, the skins are sewn together, with an over-and-over stitch, care being taken not to penetrate through the lower skin. When this is completed the skins are opened out and the second seam made on the grain side to complete a double seam without penetration of either skin. The width of the seam varies somewhat.

Seams

George Metcalf, during his studies of the Hidatsa boat found in the Smithsonian, described the seam that repaired a damaged area as “*tightly sewn with heavy sinew cord at a rate of 4-5 stitches the inch.*”³⁵ In John Townsend's description of the “Kanzas” tribe's canoes revealed more insight of the craftsmanship of these people when he observed “*the seams sewed with sinews, and so closely, as to*

³⁵ Metcalf, George. *The Bull Boats of the Plains Indians and Fur Trade*. (Chadron, NB: The Museum of the Fur Trade Quarterly Vol. 8, No. 2, Summer 1972) page 6.

be wholly impervious to water.”³⁶ In the film “*High, Wild and Free - This Immersive Experience in the British Columbian Wilderness*”, when joining three moose hides together, the Northern Canadian tribe had double lapped the joint of the hides with a “Blind Seam”. The illustration of a double Blind Seam is from a drawing of an Umiak canoe made by Eskimos from Cape Prince of Wales, Alaska. The system works so well there was not a need to apply any sealant directly to the seam.

Sealants

“You use what you have” best describes the variation and mixtures the tribes and explorers/trappers used. John B. Wyeth’s bull boat was completed after “*they rubbed buffalo tallow all over the outside of it, so as to allow it to enter into all seams of the boat*”.³⁷ During the Warren’s 1856 survey of the Yellowstone, W. H. Hutton had described the skin boat that Jim Bridge constructed “*was coated with a mixture of tallow and ashes*”.³⁸ Robert Stuart had only **mud** to fill the seams.³⁹ The Corp of Discovery used a mixture of charcoal, beeswax and buffalo tallow but Lewis was unable to locate the needed pine pitch to seal the seams. Even before the period of Fur Trade, pine pitch, sometimes mixed with tallow, was and is still considered the best natural seal that can be gathered from the wilderness.

Bark on or off

I have not found any literary description regarding the Native American boat builders removing of the bark before starting their framework. Willow do not start developing rough surface bark until the limbs have obtained a one inch or more diameter and would not need peeling. The fact that most of the limbs were thinned in the process of construction, peeling the rest of the limb would have been easy. The photo of the two North Dakota women indicates they had peeled the limbs before they started construction of their craft. I have left the bark on several of my crafts and I found an increase in deterioration where the rough bark was in contact with the skin. Another possible good reason for peeling was that I experienced the limbs started growing new growth from the branches. With the

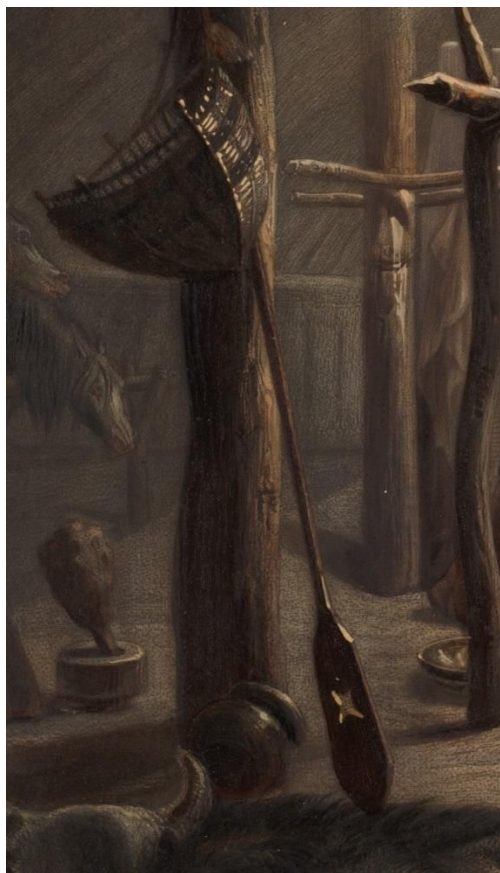
³⁶ Townsend, John K. *Journey Across the Rocky Mountains, to the Columbia River, and A Visit To the Sandwich Islands, Chili, &c.* (Boston, MA: Henry Perkins, Perkins & Marvin, 1839) page 33.

³⁷ Wyeth, John B. *Oregon; A Short History of a Long Journey From the Atlantic Ocean to the Region of the Pacific. By Land* (Cambridge, MA: 1833) page 34.

³⁸ Hanson, James A. *James Bridger et al., Boat Builders: The Skin Canoes Of The Great Plains and Rockies.* (Chadron, Nebraska: The Museum of the Fur Trade Quarterly Vol. 16, No. 1, Spring 1980) page 2.

³⁹ Stuart, Robert. *The Discovery of the Oregon Trail, Narrative of His Overland Trip Eastward From Astoria in 1812-13.* (Charles Scribner’s Sons New York, NY 1935. Paperback edition: University of Nebraska Press, Lincoln, NB, 1995) date of entry 7th March, 1813

European-American, the thought of peeling the limbs in constructing their larger boats had no advantages. In several journals the trappers used their boats for several months but the main purpose was for short trips and crossing rivers.



Paddles

The most common written description of paddles was just *“two bitts of planks to make paddles”*.

During his month stay, July of 1806, Alexander Henry found the Mandan use simple materials and very little work to construct the means for crossing water ways. Henry description *“In lieu of a paddle they used a pole about five feet long, split at one end, to admit a piece of board about two feet long and half a foot broad, which is lashed to the pole and forms a kind of a cross; there is but one for each canoe.”* Henry continues *“every stroke he gives[,] turns his dish almost entirely round; to recover his position and go on his intended route, he must give a stroke on the other hand, which brings him up again , and so on...”*⁴⁰

Will and Spinden verified Henry’s findings, they wrote *“For a paddle a pole some five feet long was used. It was split up the end where a flat board about two and a half feet long was inserted and*

⁴⁰ Henry, Alexander. *The Manuscript Journals of Alexander Henry and David Thompson 1799-1814*. (New York, NY: Francis Harper 1897) page 331.

bound on. The boat was paddled from a **standing position**, and made half a revolution at every stroke.”⁴¹ I have yet to try this. A traveler in 1877 witnessed the Mandan’s “paddles could be made entirely of wood, or else of sticks fastened to shoulder blades of bison.”⁴²

Bodmer and Kurz’s art work shows more crafted paddles. It usually takes about two hours to rough construct a paddle like the one in Bodmer’s painting. You will need to begin with a knot free, eight inch diameter drift wood, with a finished length of 57 ½ inches. The first step is to shape the top to form the hand grip by rounding a 2-2 1/2 inches diameter knob. Once the handle is shaped, the entire log is cut into a plank that is 1 3/8 inch thick and eight inches wide. The blade of the paddle is made starting at the bottom or base up to the height or length of 22 inches. The blade is then tapered to 3/8 to ½ inch around both the edges and end point. The top of the blade or the throat, is formed by gradually thinning the width to the handle that is 1 3/8 inch circular staff. A design or a pattern, displaying ownership, is cut from the center of the blade. The maximum width should be 2 inches and a height of 3-4 inches for these designs.

Brackenridge was surprised how skilled the Arikara women were with the bull boats, “There was one woman in each canoe, who kneeled down, and instead of paddling sideways, placed the paddle before; the load is fastened to the canoe. The water being a little rough these canoes sometimes almost disappeared between the waves”.⁴³

Trappers’ Skin Canoes

Beside the single skin boat, the trappers commonly assembled larger canoes made from multiple hides from various kinds of larger animals. These canoes proved to be superior for the waterways of the Northwest.

One year of trapping within the Blackfoot territory, General Thomas James and eight others, and endured the continuous harassment from the Blackfeet, they decided to leave the Upper Clark River Valley. James wrote... “Here we made three canoes of buffalo bull’s skins, by sewing together two skins, for each canoe, and then stretching them over a frame similar in shape to a Mackinaw boat. Our

⁴¹ Will G.F. and Spinden, H.J. *The Mandans, a Study of Their Culture, Archaeology and Language*. (Cambridge, MA: Peabody Museum of American Archaeology and Ethnology, Harvard University, 1906) page 113.

⁴² North Dakota Heritage Center. *Crossing Rivers, Indian Style* (Lewis and Clark Organization Bismarck, ND 2016) Article 1002.

⁴³ Brackenridge, Henry Marie. *Views of Louisiana; together With a Journal of a Voyage Up The Missouri River, In 1811*. (Pittsburgh, PA: Cramer, Spear and Eichbaum, 1814) page 245.

canoes contained three men, about sixty steel traps, five hundred beaver skins, our guns and ammunition, besides other commodities.”⁴⁴

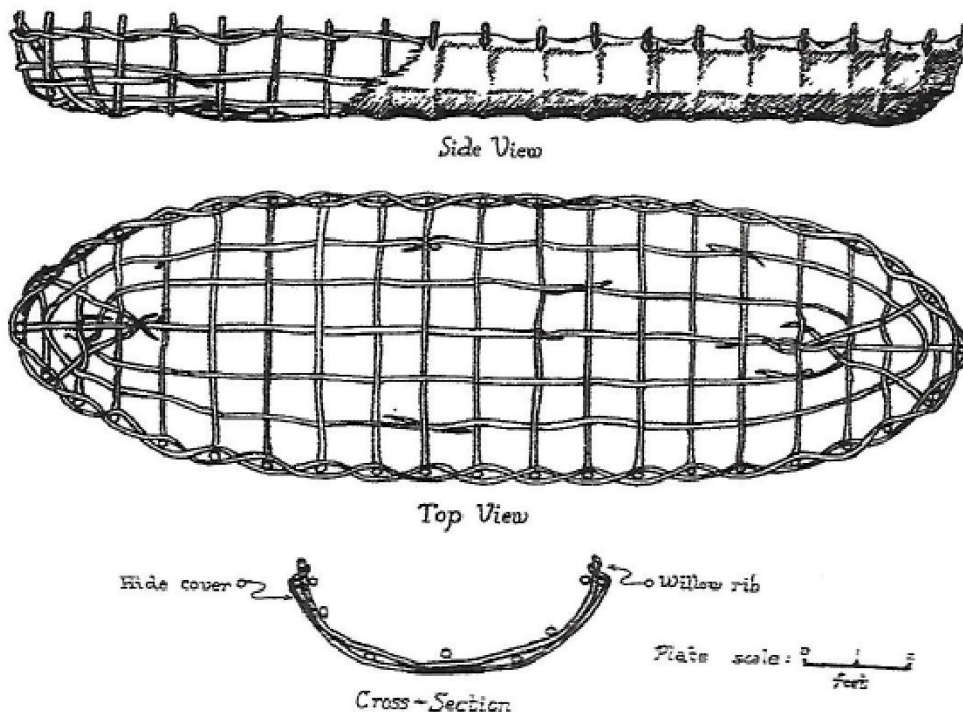
Two years later on March 7th, 1813, a member of the Astorians, Robert Stuart, noted having spent several days in making two dugout canoes from cottonwood trees. He was unable to use their new craft because the North Platte did not have enough water to float their new crafts. After several days of struggling with them, the canoes were abandoned and the party continued on foot. Reaching an Otto Village near present day Yutan, Nebraska, Stuart traded for the materials to make a new canoe. Stuart described the craft as: *“Our Canoe was finished last evening and consisted of five Elk & Buffalo hides sewed together with strong sinews, drawn over and made fast to a frame composed of Poles and Willows 20 feet long 4 Wide and 1 1/2 deep, making a vefsell [vessel] somewhat shaped like a Boat, very steady and by the aid of a little mud on the seams remarkable tight—in this we embarked at an early hour...”⁴⁵* With the new boat, their travel began on the Platte River, travelled to the Missouri River and then to Fort Osage for a distance totally nearly 270 miles. Stuart’s experience illustrated the great advantage of the skin canoe and why they were constructed. These boats would drift only several inches even when fully loaded and were very stable in rough waters.

Trappers’ Canoes

In April 9, 1825, William H. Ashley and seven of his men, finished their construction of several bull boats to float the shallow waters of the Green River. After two weeks, on April 25, 1825, the party had reached Expedition Island, Wyoming. Two months after their departure, they had reached the mouth of the Uinta River. Ashley and his men had travel through the area now known as “The Flaming Gorge”, and had discovered the falls that carried his name “Ashley Falls”. He was the first known individual to float the Green River and did this in a skin canoe. He recorded his canoe measured “16 by 7 feet” and was made from six buffalo hides. He and his party travelled over 225 miles over some of the roughest waters of the West.

⁴⁴ James, General Thomas. *Three Years Among the Indians and Mexicans*. Waterloo, Ill: Office of the “War Eagle”, St Louis MO: Missouri Historical Society, 1846) page 84.

⁴⁵ Stuart, Robert. *The Discovery of the Oregon Trail, Narrative of His Overland Trip Eastward From Astoria in 1812-13*. (Charles Scribner’s Sons New York, NY 1935. Paperback edition: University of Nebraska Press, Lincoln, NB, 1995) date of entry 7th March, 1813



The 1856, the survey party of Lt. G.K. Warren was in the area of the Powder and Yellowstone Rivers, their guide was James (Jim) Felix Bridger. Jim brought the party to the edge of the Yellowstone River where it became necessary to cross the river. The field notes of W.H. Hutton described the craft that Jim Bridger made, *"engaged in getting up our 'Bull-boat' as they are called by the trappers, they are made by forming a wicker work of willow or young cottonwood, which need not possess very great strength as it will be strongly braced by the hide when stretched over it and dried-the skins are then sewn together with sinew, and being moistened with water, are stretched over the frame, with the hair inside, drawn tight by hand, and fastened by putting the ends of some of the strongest knees or ribs of the frames through holes cut in the hide."* The skin was then coated with a mixture of tallow and ash. He also noted *"Our boat, which to our inexperience we were 2 days (Warren noted it was 5 days) in the making, was 18 feet long, 4 feet wide and drew 2 ins. water when fully loaded."*⁴⁶ The boat was manned by four oarsmen.

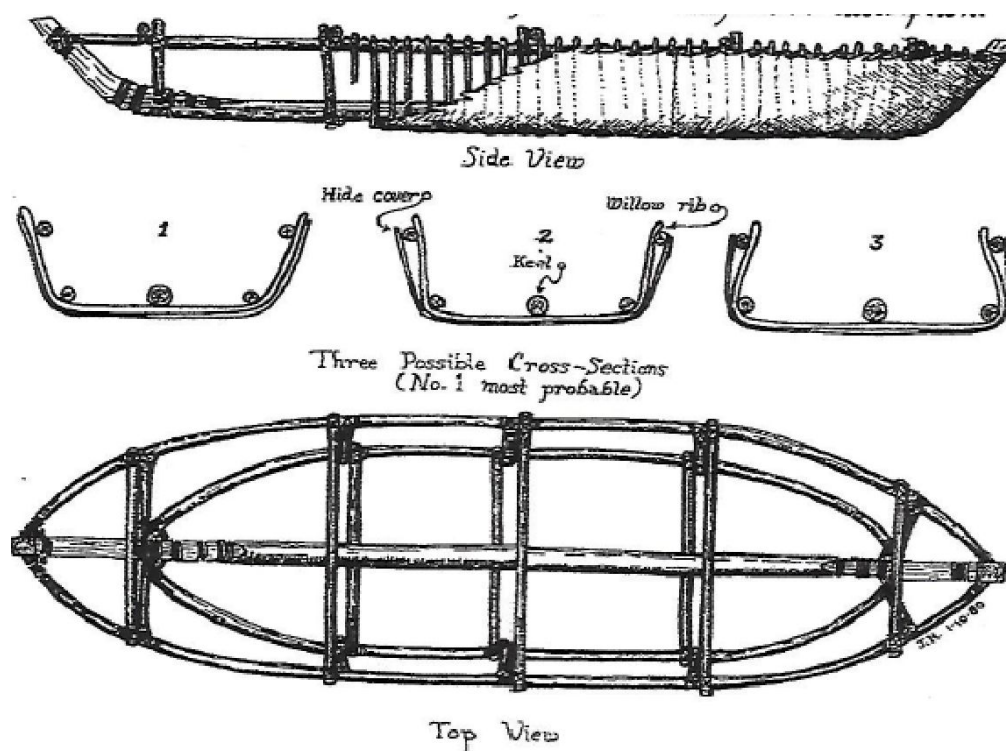
In 1859-60, Captain W.F. Raynolds lead an expedition to survey the Yellowstone River Basin. Capt. Raynolds divided the party into various groups to record different regions of the land; two of the party leaders were Jim Bridger and Paul DuVal. The experience and knowledge from these two men were documented as two different designs of skin canoe that were made during the same expedition.

The Willow Framed Canoe

⁴⁶ Hanson, James A. *James Bridger et al., Boat Builders: The Skin Canoes Of The Great Plains and Rockies.* (Chadron, Nebraska: The Museum of the Fur Trade Quarterly Vol. 16, No. 1, Spring 1980) page 2.

John Wyeth 1832 having to cross a major branch of "La Platt" River, "They first cut a number of willows (which grow everywhere near the banks of all the rivers we travelled by from St. Louis), of about an inch and a half diameter at the butt end, and fixed them in the ground at proper distances from each other, and as they approached nearer one end they brought them nearer together, so as to form something like the bow. The ends of the whole were brought and bound firmly together, like the ribs of a great basket; and then they took other twigs of willow and wove them into those stuck in the ground so as to make a sort of firm, huge basket of twelve or fourteen feet long. After this was completed, they sewed together a number of buffalo-skins, and with them covered the whole."⁴⁷ Captain Sublet and his men had sewed the gunwales with buffalo sinews to increase the craft's strength. He sealed the skin with tallow and added "was carefully pulled up from the ground, and behold a boat capable of transporting man, horse, and goods over a pretty strong current."⁴⁸

The Keel Structure Canoe



This is the drawings of the Maynadier party canoe. It was constructed by their mountaineer guide, Paul DuVal who sent hunters to collect the skins of three buffalo and an elk. The rest of the camp collected "poles of cottonwood and willow, and cutting thongs of parfliche. A stout cottonwood poles is laid for the keel with knee-pieces lashed at each end to form the bow and stern, then other poles are bent and

⁴⁷ Wyeth, John B. Oregon; *A Short History of a Long Journey From the Atlantic Ocean to the Region of the Pacific. By Land* (Cambridge, MA: 1833) page 34.

⁴⁸ Wyeth, John B. Oregon; *A Short History of a Long Journey From the Atlantic Ocean to the Region of the Pacific. By Land* (Cambridge, MA: 1833) page 34.

*...tied at each end to the keel and to the upper ends of the bow and stern-post, cross pieces and ties are inserted at intervals to strengthen the frame, and so the whole is fastened with strips of wet parfliche it becomes, when they dry, as rigid as if put together with iron; then willows of about an inch in diameter are bent over the frame, passing from on gunwale to the other over the keel, and placed about three inches apart; finally, two or three buffalo skins are sewed together and stretched tight over the frame, hair-side in, and the boat is complete.”⁴⁹ The boat was 18 feet by 5 feet and she was christened as the “**Rose of Cashmere**” but not because of sweet odor.*

Randolph B. Marcy’s book “The Prairie Traveler” describes how “*to build a boat with two or more hides: A stout pole of the desired length is placed upon the ground for a keel, the ends turned up and secured by a lariat; willow rods of the required dimensions are then cut, heated, and bent into the proper shape for knees, after which their centers are placed at equal distances upon the keel, and firmly tied with cords. The knees are retained in their proper curvature by cords around the ends. After a sufficient number of them have been placed upon the keel, two poles of suitable dimensions are heated, bent around the ends for a gunwale, and firmly lashed to each knee. Smaller willows are then interwoven, so as to model the frame.*” He continues “*Green or soaked hides are cut into the proper shape to fit the frame, and sewed together with buckskin strings; then the frame of the boat is placed in the middle, the hide drawn up snug around the sides, and secured with raw-hide thongs to the gunwales.*”⁵⁰

No Hides to Use

Captain W. F. Raynold’s “Yellowstone Expedition of 1859-1860”, the guide James Bridger, was ordered to design and build a craft to ford or run the rivers. In Captain Raynold’s journal “*The framework was of course easily constructed, but our great difficulty was to devise a covering, there being no skins in our possession, and our gutta-percha blankets...being almost worthless.*” With no other source of covering, Bridger compelled to use the blankets and added his lodge-skin for added protection. He continued “*to render them more completely impervious to water I had large quantities of resin gathered from the pine in the vicinity, and thickly coated them with this substance. By night a respectable boat was completed, rude in appearance, but promising to be serviceable. Its length was 12 ½ and its beam 3 ½ feet, and it was remarkable for the fact that it was constructed entirely without nails or spikes, the framework being bound together with leather thongs and the covering fastened on by this common device to the traders of this section.*”⁵¹

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⁵⁰ Marcy, Randolph B. *The Prairie Traveler*. (Bedford, MA: Applewood Books, 1859) pages 84-85.

⁵¹ Hanson, James A. *James Bridger et al., Boat Builders: The Skin Canoes Of The Great Plains and Rockies*. (Chadron, Nebraska: The Museum of the Fur Trade Quarterly Vol. 16, No. 1, Spring 1980) page 2-3.



Building of the AMM Territorial Canoe

Since the time of America's first explorers, "skin canoes" or bull boats were recorded as a common method of transportation. The journals of America's early trappers and explorers wrote of constructing boats by only using willow limbs and the skins of large animals. The 2015 AMM Western Territorial had a project in mind, to build a skin covered craft using only the tools and materials found in the wilderness. The task seemed simple enough, with a material list being buffalo and deer hides, deer sinew and willow limbs. Three buffalo hides were scraped and fleshed, two being bull hides, were prepared earlier. Seven deer hides, in the form of "parfleche" or rawhide, were to be used for lashing the frame work together. I had a small stack of deer hides from the previous years of hunting, that I de-haired with hardwood ashes and then stretched and dried. We gathered the required twenty five willow limbs of the size of 1 to 1 ½ inch that were at least 8 foot in length. There were four poles that were 2 inch in diameter and over twenty foot long, for the use of the gunnels and also for the lower frame. We also needed one four inch by 14 foot pole to be used as the keel. The two bow pieces were four inch by 6 foot limbs that had a 45 degree bend. We collected nearly all of the



materials from our camp area.



We had only one rule, all of the tools in the building of this boat had to be period correct and common to the ownership of the men in the mountains.

Most of the first day, Monday, Jim “Old Goat” Miller, Bill “Calhoun” Vannoy and I, spent looking at the drawings and the description of Maynadier’s canoe that was published in the *Museum of the Fur Trade Quarterly* (vol. 16, no.1). Once our method\plan became apparent, we properly cut the length for the keel and the project had begun. Bill was soon hacking on the second bow piece, while Jim and I started lashing the first bow piece to the keel with the parfleche thongs that Cuz had cut. (Another recorded variation of the keel with two separate pieces for the bow/stern, was written in Washington Irving’s *The Prairie Traveler*. Irving wrote the keel beam was nearly cut in half at the length about two feet from either ends to allow the ends to be bent upward.) The top gunnels were then positioned and tied to bow and stern and the shape of the canoe started taking form. With the gunnels in place, the interest of the project within the AMM brotherhood started to increase and more helpers joined in the cause. The first day was nearly done, we now had a few vertical supports in place and our work started to have the appearance of a boat.



The second day, we soon had the five “cross tie” boards lashed to hold the two vertical sides together. We then began lashing of the ribs across the bottom of the frame and up to the gunnels. The bow was formed by tying two limbs that were less than two foot in length, on either side. These ribs required no shaping or bending before being put into their place and now the bow and stern were finished. The boat needed only a small number of the limbs that required the 90 degree bend. Several of these rib/limbs started breaking before the proper shape was completed. I remember Marcy stating that heating the limbs might be the cure to our problem and soon, we had a fire going. We improved on Marcy’s method by boiling each end of the limbs in water for the duration of about ten minutes. We found this process to be quite successful. By evening, we were able to complete a third of the rib placement on ends.



The third day, we had the final placement of the remaining ribs and now the framing of our canoe was complete. The three buffalo hides were washed down with pails of water and then carried up to the canoe frame for sizing. Charles Hanson's article on the buffalo hide boat, had estimated the



size of the boat based on the average size of three buffalo being 6 foot by 8 foot. Our two bull hides were greater than 7 foot by 9 foot but the cow hide became our limiting factor as it was 6 foot by 7 foot. The hides were laid out so that a bull's tail could

be wrapped on to the stern. The cow hide would cover the middle section. The hides had to be aggressively cut to obtain a straight edge for stitching and also to remove some of the thick neck portion of the bull hides. With the three hides now aligned, everyone started the process of sewing the hides into one continuous skin covering. The sinew was stripped to proper thickness and twisted.



The rest of the day was consumed by stitching the two eight foot seams to join the three hides together. The next morning, we started the process of fitting the hides by centering and stretching the hides to the frame of our boat. Large portions of the hides were removed around each of the bows and stern to gain the needed tapered appearance. The hides were then pulled across the ribs/knees and over the gunnels to the inside of the boat. Sixty feet of a half inch wide rawhide was used to lash the skins to their final purpose. By midday, it was necessary to straighten and align the boat's shape. All that was remaining was to dry it in the sun and seal the seams with pine resin. The canoe was set upon four stumps while AMM Brother Skunk headed into the woods to collect the resin. Only a cup of pine resin was needed to complete the final step of sealing the boat's seams. Our camp's grand finale was to launch the canoe in the waters of Buffalo Creek. We had not sealed the seam as of yet and a search for "volunteers" to man the possible sinking of our labor. We figured the canoe weighed round 180-200 pounds because the wood we cut was still green. The degree of faith to the performance of the boat was illustrated when one of the Brothers tied a long rope to her bow. Two individuals were found to be expendable, so Jim Miller and I launched the craft into the creek's deep waters. We found her to be quite stable and one that could obtain good speed if it became necessary. She performed beautifully and upon beaching, she had only an inch of water across her floor, because of the unsealed seams. The seams

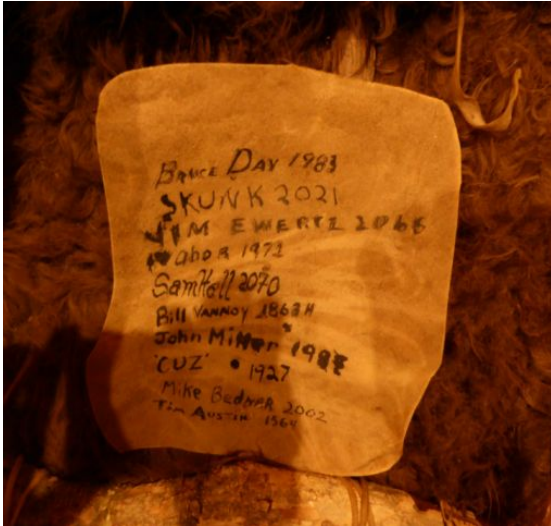
were later sealed with pine pitch and coated with tallow and bee wax, our labor was now complete. In understanding the minds of the original builders, Maynadier named one of his boats "Rose" in hopes to help the occupancies to tolerant the strong odor of the green buffalo hides. While bringing our boat from the water's edge, one of the Brothers gave this craft her proper name... ***The Territorial***.



The Territorial is now on display within the walls of "The Museum of the Mountain Men" in Pinedale, WY.

The greatest thanks to the builders of ***The Territorial*** and to the spirit of our forefathers: Wayne "Skunk" Edgar, Bill "Calhoun" Vannoy, Jim Ewertz, William Bailey, Joe Salhan, Denny Leonard, Mike "Too Tall" Bednar, Sam Hall, Jim "Old Goat" Miller, Cliff Tiffie, Gerry Messmer, Pete Swelton, Melvin "Broken Toe" Boyers, Eddie "Deacon" Reese, Darrell "Nabor" Plenert, Tim Austin, Phil "Cuz" Trumble, Kevin Hiebert, Al Hobbs, Conan Asmussen, Kraig Fallwell, Jason "Coon Ass" Mays, the AMM Brothers

of the Western Territorial and Carrie Beauchamp, Museum Specialist, Department of Anthropology at the Smithsonian Institution.







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