

THE NAVAJO TANNER.

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(With Plates XXIII-XXVIII.)

During the summer of 1887, and at a time when the writer was stationed at Fort Wingate, N. Mex., he received a letter from his friend Prof. Otis T. Mason, Curator of the Department of Ethnology of the National Museum, informing him of the fact that there was on record no special account, so far as he was aware, describing the manner in which the North American Indians tan and prepare their buckskin.

As is well known, all of our Indians, from time immemorial, have skillfully manufactured this material and put it to an infinite number of uses to meet the necessities of the life they lead. So Professor Mason was thus prompted to contribute to this branch of our literature of the subject, and did me the honor of asking me to render an account of the process as it is practiced among the Navajoes, a tribe of Indians of which many are found living in the valleys and among the mountains about Fort Wingate.

Circumstances soon admitted of my undertaking this matter, and a Navajo hunter was dispatched to bring in a deer, for the purpose of preparing its hide directly under my personal observation, and thus allowing me to record carefully each step of the operation.

In a day or two this Indian returned with a fine doe, an adult specimen of *Cariacus macrotis*. He had skinned the legs of the animal from the hoofs up as far as the ankles, which he disarticulated partially, so the limbs could be tied more compactly together, and thus be less liable to either frighten his horse or catch in the low timber as he returned home with his game. Strange to say, this was the hardest part of my task to undertake, for the Navajo Indians have a belief that when one of them kills a deer for the purpose of tanning its skin, to make buckskin, the hide must be removed on the spot where the animal was slain, or else the successful hunter will lose his eyesight before the next moon.

I had great difficulty in finding a Navajo that had sufficiently little faith in this superstition to be overcome by a generous reward for his pains. The deer which had been captured for me had already been eviscerated and the skin divided from its chin to its tail—the entire length of the under side of the animal. He threw it down upon the ground in front of his lodge, and, as I had my camera with me, prepared for the emergency, I directed him to commence operations at once. In a moment, with a sharp hunting-knife, he divided the skin on the inside

of the thighs, from the ankles to the abdominal division, making similar incisions on the inside of the fore-limbs. The legs were quickly skinned, the small tail split up on its under side and the vertebræ removed, while with his knife the hide was started on both sides from the abdominal and throat incision and quickly removed in the direction of the animal's back. Thus it was that the skin was removed from the entire body and up to the ears first; then as he arrived at these latter, their cartilages were cut through close to the skull, leaving the great ears of this species of deer attached to the hide. When he arrived at the eyes, these were skinned round, much in the same way as a skillful taxidermist manages the eyes in any vertebrate specimen he may be preparing. Upon arriving at the muzzle he simply divided the skin all around, posterior to the external nostrils, and the operation of removing the hide was completed. During the time he was engaged in skinning the sides towards the back I succeeded in making a successful photograph of him in the act. It forms one of the illustrations of this paper. He next proceeded to dig a hole in the ground (with a spade that stood near) of a capacity about as big as a bushel. The bottom of this excavation was tramped hard with his feet and the hide placed therein, hair side up, and immediately covered entirely over with cold water from a neighboring spring. On top of the hide he placed a camp-kettle, bottom side up, and braced it down with the spade. This was to prevent the skin from drying and the kettle to keep the ravenous Indian dogs from eating it up during the night.

He now informed me that was all that was to be done to it at present, and he would not touch it until I arrived there again in the morning. Bright and early I was upon the ground, and he left camp with an ax to soon return with the trunk of a small pine tree which he had cut down in the mean time. At its thickest end it was about 6 inches through, and about 4 at the smaller extremity. From one side of the larger half he removed the bark, completely exposing the smooth surface of the wood beneath it. He next cut a deep notch in the big end of this stick, so as to assist in bracing it against the limb of a small cedar tree near by, with smooth surface facing him and the small end of the stick resting firmly upon the ground some 2 feet from the base of the aforesaid cedar tree. Around about was plentifully bestrewn some clean, short hay, to prevent the hide from being soiled upon the ground beneath. We now returned to the hole where the skin had remained over night, and it was taken out to be washed in clean water, when he proceeded with a sharp knife to remove all superfluous tissue from its raw side, skinned the ears carefully by removing completely the cartilaginous parts, then cleared away the muscles which had remained attached about their bases, trimmed off the remains of the *panniculus* muscle, and indeed left nothing but a thoroughly clean hide, which received its final dip in clean water.



1. NAVAJO INDIAN SKINNING DEER. (Page 59.)

It was now ready to have the hair shaved from it, and it was interesting to see how the parts of the animal are converted into instruments to be used again in converting other of its parts into material to supply the wants of the Indian. This seems to obtain in all of the simple manufactures of the aborigines, and deer are slain with arrows, the heads of which are attached to the shaft with sinews from the body of one of their own species; indeed, the hunter himself may be clothed in buckskin. My tanner obtained his scrapers from the bones of the forelimb of the deer he had killed, and the ulna and radius of this limb are wonderfully well-fitted to perform the work of this natural spokeshave. These bones, as we know, are in a deer, as in many other hoofed animals, quite firmly united together, having a form well known to the comparative osteologist. The shaft of the ulna, which is closely approximated to the shaft of the radius, has its posterior edge thin and sharp, which is still further improved by the tanner scraping it with his knife. The olecranon process, with the deep sigmoid notch, forms an excellent handle at one end, while the enlarged distal end of the radius, with the carpal bones, which are usually left attached, forms a good one at the other. Moreover, the curvature of the shafts of this consolidated bone is favorable for the use of our Indian tanner, who, in using this primitive instrument, seizes it at either end in his hands, and works with it in shaving off the hair much in the same manner as one of our carpenters uses a spokeshave, only here the sharp edge of the ulna bone takes the place of the knife edge in doing its special work. (See plate.)

Before proceeding further, I should mention that after removing the hide, on the first day, he placed the skinned head of the deer, without the lower jaw, in the ashes of a low camp-fire, where the brains were able to become semi-baked during the first night, as these parts, too, are utilized in the tanning process.

Next to shaving off the hair, the hide is thrown over the small log he had arranged against the tree in the morning, being held in place by catching the skin of the head between the notch and the limb, the skin of the hinder parts being always nearest the ground, and as the work proceeds it is deftly shifted about by the tanner.

Now all the hair except on the lower parts of the legs and the tail, is rapidly scraped off with these bone scrapers, including the black epidermis.

Some tanners use a deer's rib, or a beef's rib, and others a dull hunting-knife, but the bones of the deer's forearm is the usual instrument, and it is quite remarkable to observe how handily it is managed, and how rarely a hole is cut in the skin. The shaving is carried to the very edges of the hide all around, and even the backs of the ears are carefully scraped, the entire operation lasting from two to four hours, depending upon the size of the deer. After my Navajo had got well started into this part of his work, I was successful in obtaining a good

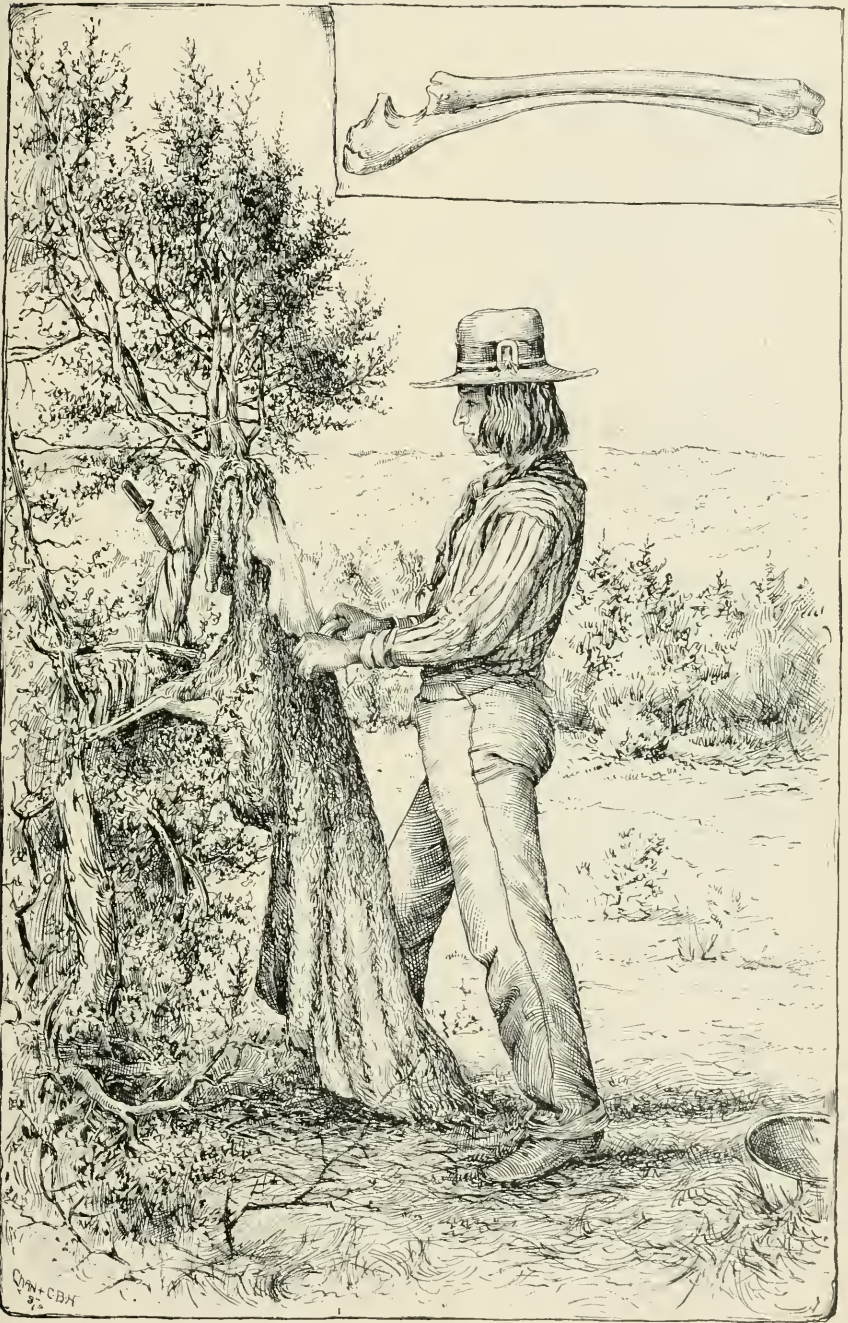
photograph of him, a copy of which is herewith presented in fig. 2 (see plate), showing him in the act of drawing down his scraper.

In appearance the hide now has the same form as when removed from the animal; the hair side is clean and white, the body side devoid of all superfluous tissue, the backs of the ears still showing the black epidermal layer of the skin, as it is only from these parts where it is not scraped off with the hair; the hair also is left on the skin of the lower halves of the four limbs.

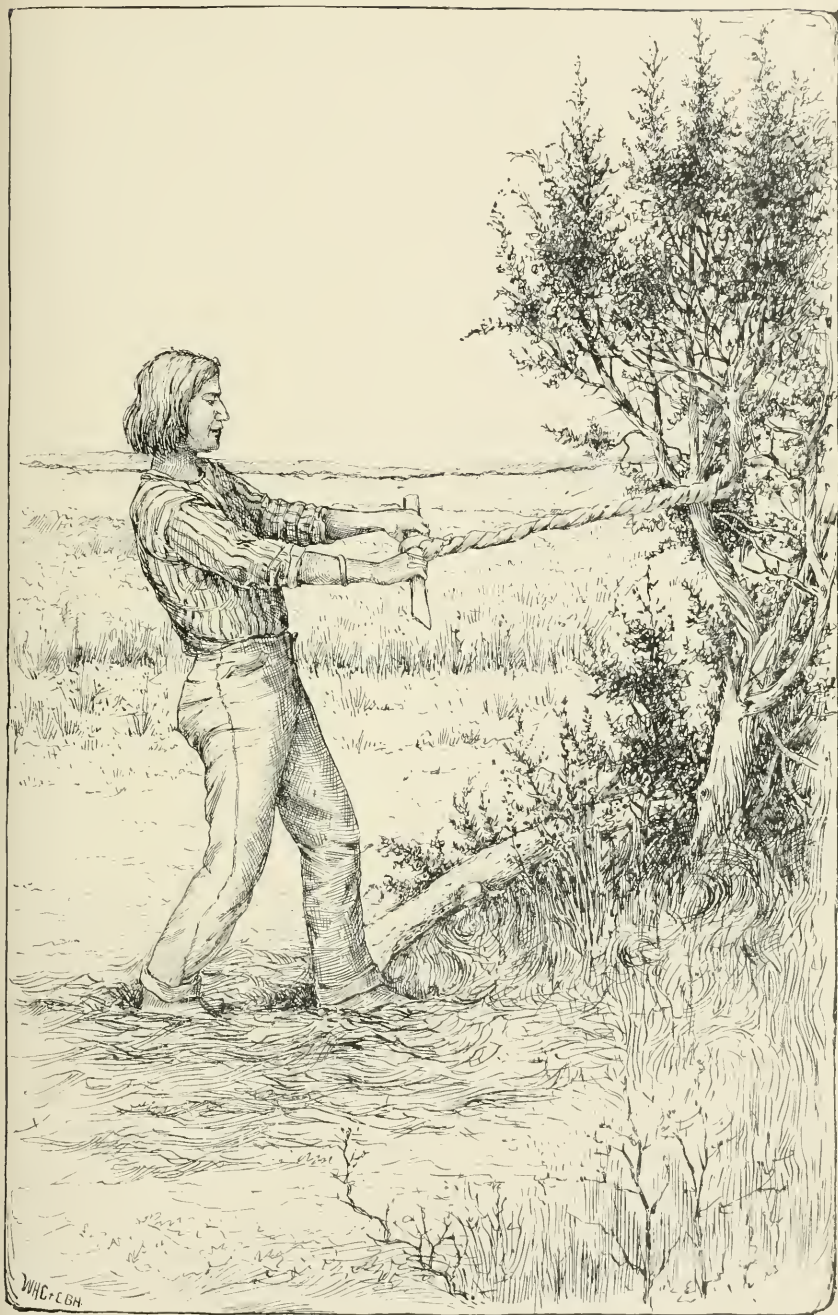
A thorough washing is now given it in several changes of clear, cold water, though sometimes in the last wash the water may be made slightly tepid, and in this it is allowed to stand while the tanner prepares the brains of the animal soon to be used in another stage of his work.

Picking up the deer's skull from the ashes where he had left it the night before, he took an ax and split it along the bifrontal suture, cleaving the skull partly in two; then chipping off the parietal bones he was enabled to lift out the brains nearly entire. They were at once transferred to a basin of tepid water, where by gentle manipulation the little slivers of bone (which had gotten into it while splitting the cranium), the blood, etc., were effectually removed. Next they were placed in a small quantity of tepid water in another basin and put upon a low fire, where they were allowed to simmer for over an hour. At the end of this time the water then being not so hot but that one could comfortably hold his hand in it, had come to be of a muddy color, and our tanner, using the fingers of one hand as a sieve, lifted out from the water the little particles of brain in a small pile upon the palm of his opposite hand; then, by rubbing this together between the palms of his hands, it was soon reduced to a pasty mass. This process was continued until all the brains were thus reduced and dissolved, and then the water in which they were had about three times its quantity of clear tepid water added to it, nearly filling the small basin. The fluid had every appearance of, and quite agreed in consistency with, a big bowl of ordinary bean soup, and it was now ready for use, being left just near enough to the camp-fire to keep it warm, and no more.

Returning to the skin, it was now removed from the water where it had been left, carefully rinsed, and wrung out with the hands in a manner much as we see washerwomen wring out clothes, and carried over to the tree where the scraping process had been done. Here the tanner selected a small limb, about 5 or 6 feet from the ground, and passed the head and neck of the hide under and over it, and then carefully folded this latter part lengthwise along the middle of the body surface of the hide, and twisted the whole over and over till he came to the forelegs. It will be seen that the limb was firmly infolded within a loop of the hide, and by pulling heavily upon it I saw that there was no such thing as its slipping. In a similar manner the skin of the forelegs was folded lengthwise inside the hide; then the borders of the abdominal in-



2. NAVAJO INDIAN REMOVING HAIR FROM DEERSKIN. (Page 62.)



3. NAVAJO INDIAN WRINGING THE WATER FROM A DEERSKIN. (Page 63.)

cision were likewise folded in; and in turn the skin of the hind legs, but this latter had, of course, to be thrown in, in the direction of the tree, so as to include them. The borders of the hinder parts were thrown over a stick in such a way as to form a loop, like the one around the limb of the tree. During all this operation the hide was being twisted from left to right, and at its completion looked like a wet hide rope, fast, as we have described, to the tree at one end, and looped over a stick about 2 feet long at its middle, at the other. This latter was used as a twister by the tanner, for now he proceeded to wring the hide thoroughly by twisting it over in one direction, causing the water to be rapidly squeezed out of it. While he was in this position I obtained an excellent picture of him, which is shown in fig. 4 (see plate).

By the continuance of this twisting the skin was finally brought up close to the limb of the tree in a hard coil, where, by hooking the turning stick under the limb, it was held in that position, and allowed to drip for nearly an hour. If any of my readers should ever chance to see a deer hide thus coiled up in a tree, glistening and wet, I am quite sure they will agree with me in saying, that for all the world it looks like a few knuckles of small intestines of a man immediately after removal.

At the end of the above-mentioned time the Indian unhooked the stick, untwisted the hide, and took it down. It had apparently shrunk two-thirds of its size, and looked like a damp, semi-tanned dog-skin more than anything else I can compare it to; and the tanner immediately set to work to pull it into shape, as he walked in the direction of his camp-fire.

Spreading out a small buffalo-robe he sat down upon it, and proceeded to pull the hide vigorously with his hands in every direction. Catching hold with his fingers of the extreme edges, he tugged away at it until it was nearly its original size. I noticed, however, that he only employed his hands in this part of the operation, and never once resorted to his feet for assistance in the stretching. After he was satisfied that the entire surface of the hide was opened and exposed again, he carefully spread it out perfectly flat, with hair side up, upon the buffalo-robe on which he had been sitting.

Then taking his basinful of dissolved deer brains, he commenced applying it with his hand to the surface from which the hair had been removed. It is never put on the opposite side of the skin. In doing this he frequently rubbed the solution well in, using his open hand for the purpose, and as he came to the head, ears, and legs he worked the stuff in with his fingers, and occasionally kneaded it with his knuckles, going over the entire skin on the side referred to, until his basin of brains was expended, and the whole had been worked in as described.

Upon asking him why he only put it on the hair side, he gave me to understand that the pores were on that side and consequently the brains could get into the skin more effectually; and upon inquiring why

he put them on at all, he said "to make it soft." Buckskin that is tanned without using brains is harsh and stiff afterwards, and still worse in these particulars if it happens to get wet at any time.

The Navajoes often use beef brains too for this purpose, especially when their game is taken far from camp, and they do not care to pack the deer skulls home on their ponies. In early days they employed deer brains as a rule, but in some cases the brains of the buffalo, when that animal existed in their country.

While he was in the midst of the process of applying the brains to the hide, with an August sun of no mean power streaming down upon us, I made an instantaneous exposure of him with my camera, and succeeded in obtaining an excellent picture showing this stage of the tanning process, which picture is reproduced for the present paper.

Finally, as the last step of the process, he commenced by folding in the edges of the skin all round continuously, to make it up into an ellipsoidal ball, quite firm, though not tightly rolled. He then wrapped it up in the buffalo robe, and allowed it to remain out in the sun for about fifteen minutes for the purpose, he said, of letting "the brains go well into him."

Once more in its wet and limp condition it is thoroughly opened, and this time spread out over the top of a sage-bush near by with the outer surface exposed to the sun, and sufficiently high from the ground to prevent the dogs from getting at it, or its being soiled through accident. It was now about 3 o'clock in the afternoon, and very warm, the semi-tropical sun doing its full duty, and the skin at once commenced to show the effects of it as the first stages of drying set in. Nevertheless I was informed that the hide would now be allowed to remain there and dry until dark, when it would be placed upon top of the "hogan" for the night, or in the event it rained, be taken in and hung up inside.

Next morning I was on the ground at 9 o'clock, and was thoroughly surprised at the appearance of the hide when it was brought out and shown me. Although I was familiar with the making of buckskin, not only as practiced by the Navajoes, but by the Sioux and other North American Indians, I never happened to have seen it in this particular stage, that is, right after the drying on the second day.

I found that it had again shrunken so as to be not more than one-third of its original size, or just after it had been removed from the animal. It was hard, and appeared almost brittle, as though it might be broken in two; moreover it was semi-transparent, and easily transmitted the light through it, or even prominent objects might be outlined through it in favorable lights. In color it was of a deep, muddy amber, or a semi-translucent Roman ocher, and one would never have suspected in the world that it was either a deer hide, or much less that in a few short hours it could be converted into the softest and most durable fabric in the country—a tanned buckskin.



4. NAVAJO INDIAN PULLING DEERSKIN INTO SHAPE AFTER WRINGING. (Page 63.)

By the exercise of considerable ingenuity and careful bending he now forced the skin into a large camp-kettle containing clear water, from which the chill had been taken off by the addition of a very little warm water, and in this it was allowed to soak well for the next three hours, standing during all this time out in the morning sun.

Some of the Indians insist that this soaking should be done in absolutely cold water (spring water), and a New Mexican guide who has been among the Navajoes for many years, being an excellent tanner himself, claims that it is almost the universal practice, *i. e.*, to soak it in cold water on the morning of the third day instead of in tepid water. However, there was but little difference, for on the present occasion the water was almost cold from the start, and quite so after the skin had been in it twenty minutes. This washing the Indians tell me is to remove all traces of the brains which were rubbed into the skin the day before.

He next gives it three or four thorough rinsings in clear, cold water, and takes it over to the tree to wring it. This is done precisely in the manner already described above and shown in fig. 4. Likewise it is curled once more, made into a coil, twisted and retwisted upon itself, and allowed to drip in this condition for nearly half an hour. It is then once more undone and drawn out into shape, as on a previous occasion, after wringing.

He is very careful now in exposing the entire surface; pulling out the edges, stretching the skin of the ears, flattening out the skin that covered the legs, and paying similar attention even to the little tail.

In the mean time he had brought a large, square piece of canvas and spread it out upon the ground near where he was at work. It is upon this that the last stages of the operation will be performed. Bringing next a sharp knife, it takes him but a moment to whittle out from a piece of soft pine an instrument that resembled a large wooden awl. This with the knife he threw upon the canvas sheet, where they may distinctly be seen in fig. 6. To return to our hide; how different it looks after this second wringing than it did after the first one it received. Now it looks as though he might make something out of it, but he still persists in pulling away at the edges all round, over and over again, until the whole is manipulated into a shape to suit him. Even this primary handling now has its effect, and in some places the skin begins to grow like buckskin. At last he sits down on the middle of the canvas sheet, having first thrown aside his hat and removed his moccasins. He wears nothing but his thin Navajo shirt and trousers, while beside him is his wooden awl and sharp knife.

The picture is by no means an unpleasing one, for throughout the entire piece of work this Indian has been tidy to a degree most scrupulous, and as he sat in the broiling sun upon the broad sheet of canvas he formed an excellent subject for the artist. All I could do was with the camera just then, and in a twinkling it was transferred to a plate. (See fig. 6.)

Soon I found myself stretched out upon the hot and naked turf of the prairie near him, and then a long-practiced habit of his ancestors showed itself, for as he proceeded with his work one might hear him humming in a low tone to himself one of the songs of his native tongue. He threw the now limp skin lengthwise over his naked feet and pulled it with both hands in the direction of his body. Rapidly repeating this operation, he turned it and tugged at it the other way. But it was most often thrown over his feet and vigorously pulled towards him. Then he stretched it out with his hands, pulled it this way and then pulled it that, worked at the edges to get them limp and pliant, manipulated the ears and the skin of the legs. But during all this an interesting change was coming over it, the heat of an August sun was rapidly drying it, it was fast coming to be of a velvet-like softness throughout, and, attaining its original size, it was changing to a uniform pale clay color. The hair side was smooth, while the inside was roughish. Indeed, in a few moments more, it was buckskin.

Picking up next his wooden awl he commenced far forward on the extreme edge of the skin of the neck of the right side, and by successively stretching it over the handle of the awl, cut upon this edge some dozen or thirteen holes with his knife. Then beginning in front, he put the awl in every hole, and by holding on to the edge of the opposite side with his left hand he was enabled to powerfully stretch the skin of the neck transversely. This operation is shown in fig. 7. His mark must go on next, so turning the skin of the head over he cut on either side just below the ear on the body or inner surface of the skin a leaf-like figure with the apex pointing forwards and outwards.

This was the last touch of all, and the now finished fabric, if we may call it a fabric, so pliant, so soft, and withal so very useful, was spread out on the canvas for an hour in the sun to receive its final drying, after which it passed into my possession, or rather into the possession of the National Museum to which it really belonged. One of these finished skins retains much the same form as the hide had when first removed, though it may be rather larger from the stretching. The backs of the ears are always black; the edges all around are uneven and harder than the rest of the skin; the hair remains upon the distal moieties of the skin of the legs; bullet holes of entrance and exit will usually be seen, or they may be an accidental rent or two of small size.

The Navajoes value these hides at a price varying from \$1.50 to \$2, depending upon the size, and the need they stand in of the money. Squaws, I am told, never engage in manufacturing them, while the Indian boys learn the art at a very early age.