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**“Dyeing Commodities whether in Roote or floure”:
Reconstructing Aboriginal Dye Techniques from Documentary and Museum Sources¹**

Résumé

Cet article examine les différences découvertes dans diverses sources documentaires décrivant les techniques autochtones de teinture de piquants de porc-épic. Leurs auteurs mentionnaient un certain nombre de recettes recueillies par des traiteurs de fourrures, des explorateurs et des ethnologues. Ils essayaient par la suite de reproduire ces recettes, d'agencer les piquants de porc-épic en motifs caractéristiques et de comparer leurs résultats aux artefacts présents dans les collections muséales. Les résultats de notre recherche montrent que les détails, l'exactitude et la reproductibilité des recettes variaient considérablement entre les différentes sources. Nous suggérons que c'est la diversité des raisons pour lesquelles les différents auteurs ont collecté ces recettes qui peut expliquer, du moins en partie, les différences entre ces dernières, mais qu'il faut également prendre en considération les liens avec les communautés et d'autres facteurs pour examiner la reproductibilité de ces recettes tinctoriales. Cette recherche n'en est qu'à ses débuts et d'autres pistes de recherche seront avancées ici

Abstract

This paper considers the differences found in various documentary sources purporting to describe Aboriginal quill dyeing techniques. The authors identified a number of recipes for quill dyeing that were collected by fur traders, explorers and ethnologists. They then attempted to reproduce the recipes. Finally, they worked the dyed quills into characteristic patterns and compared the results to existing artifacts from museum collections.

The results of this research suggest that the amount of detail, accuracy and reproducibility in recipes varied widely between sources. The authors suggest that the reasons why various authors collected these dye recipes may explain, at least in part, the differences in recipes, but that, also, connections to communities and other factors must be considered when discussing the reproducibility of dye recipes. This research is preliminary. Further avenues of research are suggested.

Aboriginal peoples of the North American Subarctic, Great Lakes region and the northern Plains have long used porcupine quills for embroidery and decoration. Although there is significant information on quillworking techniques employed by various Aboriginal peoples across northern North America, far less is known about the actual process of dyeing the originally white or ivory coloured quills. Fur traders, explorers, ethnographers

and anthropologists sometimes described various minerals and plant or animal parts that were used to colour quills, but their information is generally sketchy and vague.

Dyes and dyeing techniques had significance for both the Aboriginal and European people involved in the North American fur trade. Several European observers and writers from the late 17th to the 19th century showed persistent curiosity

about how the beautiful colours they saw on items of Aboriginal material culture were created. Later work by anthropologists and ethnographers did sometimes mention dye recipes, but these descriptions tended to be cursory and dismissive, and focused more on the artifacts themselves.

Much information, however, can be teased out of documentary descriptions of Aboriginal dyeing. For this study, the authors attempted to duplicate some of the dye recipes found in documentary sources, focusing especially on a Cree dye recipe collected by Hudson's Bay Company factor Andrew Graham. Then, by working the resulting dyed quills into finished pieces, we examined how the quills performed, and how their appearance was affected by being worked. We also compared Graham's detailed recipe with descriptions recorded by later non-Aboriginal observers to determine if one or the other set of directions were more useful or more complete. The results provide some answers, but also raise interesting questions that invite further research.

European Interest in Aboriginal Dyes

To better understand accounts of North American Aboriginal dyeing found in European documentary sources, it is important to examine the interests, motivations and world views of both European writers and their Aboriginal informants. A close consideration of what these recipes do and do not tell us offers insights into the complex cultures that came together during the 17th to 19th centuries and the interactions that resulted.

European motivations for recording dye recipes and dyeing techniques changed over time, reflecting their varied goals and changing perceptions of Native peoples and their technologies. A few early fur traders, such as Andrew Graham, recorded relatively detailed information on the specific plants used to obtain red or yellow dyes. Andrew Graham served at Prince of Wales Fort (Churchill) on Hudson Bay from 1749 to 1753 when he was transferred to York Factory, Manitoba. Due to an injury, he did not travel inland and worked largely at the bayside posts until his retirement in 1775. Graham had an Aboriginal daughter and a son who eventually joined him when he retired to Edinburgh. There is little information about their mother, but because Graham's association was primarily with Cree-speaking peoples near the coast of Hudson Bay, she was almost certainly Swampy-Cree (Williams 1969: 344-49).

In the 1700s, dyeing technology in Europe was quite similar to North American Aboriginal dyeing methods. Both employed dyestuffs obtained from plants, minerals, insects or other animals (Shriver 1956: 154-155). Until the early-to-mid-19th century, Europeans were especially interested in producing variations of a strong red colour, which was difficult to obtain and expensive to manufacture (Fairlie 1965: 489-492). They hoped to find more easily handled and conveniently gathered dyestuffs in the Americas. When industrial chemical-based colouring agents came into wide use in the late 1800s, the search for profitable natural dyestuffs from North America became less important. Thus, later explorers and travellers among North American Native peoples recorded information on Aboriginal dyeing technology not so much for possible commercial purposes, but to collect ethnographic information for their travel narratives, reflecting a view of Aboriginal people as an exotic Other.

In the early 19th century, North West Company clerk Daniel Williams Harmon, who had an Aboriginal wife and family, spent two decades in close contact with Aboriginal communities across the northern Plains and the central Subarctic. Harmon recorded some well-detailed dye recipes that he published in his account of Native people living east of the Rocky Mountains:

The women manifest much ingenuity and taste, in the work which they execute, with porcupine quills. The colour of these quills is various beautiful and durable; and the art of dyeing them, is practiced only by females. To colour black, they make use of a chocolate coloured stone, which they burn, and pound fine, and put into a vessel, with the bark of the hazel-nut tree. The vessel is then filled with water, and into it the quills are put, and the vessel is placed over a small fire, where the liquor in it is permitted to simmer, for two or three hours. The quills are then taken out, and put on a board, to dry, before a gentle fire. After they have been dried and rubbed over with bear's oil, they become a beautiful shining black, and are fit for use. To dye red or yellow, they make use of certain roots, and the moss, which they find on a species of fir tree. These are put, together with currants or gooseberries, &c., in it the vessel is then covered tight, and the liquid is made to simmer over the fire, for three or four hours, after which the quills are taken out and dried, and are fit for use. Feathers, they also dye in a similar manner, and these colours never fade. (Lamb 1957: 236)²

In the early 19th century Harmon's wife Lisette created a vibrantly coloured hunting bag—or shot

pouch (Lamb 1957: 2, 3, 186).³ The quills on this porcupine quill embroidered bag have retained their rich colouring to this day, especially the orange-reds and light and dark blues. The bag is currently housed at the Bennington Museum in Bennington, Vermont.

By the late 19th and early 20th centuries, anthropologists who recorded dye information were often motivated by a concern for “salvage anthropology.” Believing that the extinction of Native peoples, or at least the demise of Native traditional practices and technology was imminent under the onslaught of federally enforced assimilation policies and imposed social change, scholars such as Franz Boas, Edward Sapir and Alfred Kroeber attempted to record as much information as possible about traditional life and practices.

Meanwhile, as writers shifted their focus toward anthropological observation during the late 19th century, their main area of study was redirected from eastern North America to the northern Plains. Observers on the Plains during the period from the 1820s to the 1850s included naturalists and artists like Paul von Wuerttemberg, George Catlin, Prince Maximilian and Rudolf Friedrich Kurz.

At the same time, from the mid-to-late 19th century, traders and government agents increasingly distributed commercially produced dyestuffs to Aboriginal people, slowly replacing many locally produced dyestuffs. By the time anthropologists began their inquiries in Plains Aboriginal communities, it is likely that much knowledge about the use of plant-based dyestuffs was already lost or obscured. As well, traditional specialists may also have declined to share information with outsiders. Accordingly, observers’ descriptions of the process of colouring quills with natural dyes from this period are vague and imprecise in most cases.

Non-Aboriginal Descriptions of Aboriginal Dye Methods in the 19th and 20th centuries

In 1833-34, Prince Maximilian of Wied, a German naturalist travelling the Upper Missouri region documented the use of dyes by Blackfoot-speaking people. Thwaites (1966) quotes Wied:

To produce the beautiful yellow colour, they employ a lemon-coloured moss from the Rocky Mountains, which grows in the fir trees. ... A certain root furnishes a beautiful red dye, and they extract many other bright colours from the goods procured from the Whites. With them they dye the

porcupine quills and the feathers, with which they embroider very neatly. (103-04)

After meeting a group of Plains/Parkland Cree people led by Maskepetoon (Broken Arm) at Fort Union on the Upper Missouri on June 27, 1833, Maximilian further observed that “*in the north* [emphasis added], Cree women understand how to dye a beautiful red with the roots of *Galium tinctorum* and *boreale*, and black with the bark of the alder” (Thwaites 1966: 13; Arnett MacLeod 1947: 177, 178).⁴

In the early 1900s, anthropologist Alice Fletcher and her Omaha protege Francis La Flesche recorded Omaha techniques for dyeing quills red:

The red dye was made from the root of a small plant that grows in the marshes or lowlands. This root was boiled in water and the quills were boiled with it for a short time until all were colored a bright red. The Omaha called this dye “feather dye.” The plant has not been identified botanically. (1970 [1911]: 346)

In his 1916 work on porcupine quillwork, William Orchard described Sioux quill dying in terms that seem more detailed, yet lack precise botanical references:

The buffalo-berry and squaw-currant were used for producing a red dye, but the former was preferred because it is more succulent than the squaw-currant, which has a large seed with a thin skin and consequently required a greater quantity to produce the desired color. The operation of dyeing simply consisted of boiling the fruit and porcupine-quills together in water until the required color was obtained. Sometimes dock root was used in addition to the fruit, because it produced a brighter, stronger color. Care was exercised in collecting the root, as the “mother,” not the “father” plant must be used; the difference between the two plants was recognized by the flowers. (1984 [1916]: 11)

In 1919, the ethnobotanist Melvin R. Gilmore published more detailed descriptions in his *Uses of Plants by the Indians of the Missouri River Region*. Of beard moss (*Usnea barbata*), he wrote:

This lichen and the preceding one are by the Dakota used in the same way and given the same name. They were used to make a yellow dye for porcupine quills; for this purpose the lichens were boiled and the quills dipped in the resulting liquid. (17)

Referring to bloodroot (*Sanguinaria Canadensis*), Gilmore noted that “for the purpose of dyeing red the root of this plant was boiled with the materials to be dyed (44), while dodder (*Cuscuta paradoxa*)

“was said to be used as a dyestuff [by the Pawnee] to give an orange colour to feathers. For this purpose the vines were boiled and the materials to be dyed were dipped” (80-81).

While Gilmore identified certain plants, his descriptions of their use spoke only in general terms of either dipping quills into the dye, or simply boiling dyestuffs and quills together until the desired colour was achieved. Little practical detail was provided, and there is no evidence that the plants named were identified by a botanist.

The ornithologist and ethnographer George Bird Grinnell, who from the 1890s onward had a close association with Blackfeet and Cheyenne people in Montana, recorded somewhat more detailed and nuanced descriptions of the use of dyes, as noted:

This lichen (*Evernia vulpina*), when boiled in water, makes a deep yellow dye used in coloring porcupine quills. The water must be cool before the quills are put in, and then they should be left in the dye for at least a day.

From the roots and dried leaves of this dock [*Rumex venosus* Pursh.], yellow and red dye is made. The roots are cut in small pieces and boiled. After the infusion has cooled, the feathers, quills, or hair to be dyed are put in the water to be dyed yellow. If a deep color is desired, the materials are left all night in a covered vessel; immersion for a shorter time produces a paler color. If a red dye is required, ashes are put in the yellow dye liquid, which is boiled again and allowed to cool, when it becomes red. The strength of the color is varied by longer or shorter immersions. If a black dye is needed, the bark is taken from red-willow shoots, scorched and pounded fine, and put in the red or yellow dye and boiled again. (1972 [1923]: (2) 169, 172)

In *Indians of the Plains*, anthropologist Robert H. Lowie (1963) described dyes used by Omaha people: “For red dye the root of an unidentified plant was boiled, the quills being added for a short time. Yellow was obtained by boiling either early cottonwood buds or the roots of a vine” (70). In 1940, Carrie A. Lyford, then an associate supervisor of education for the Bureau of Indian Affairs, stated in her book, *Quill and Beadwork of the Western Sioux*, “Each areas [*sic*] had its local vegetable dyes. There remain no detailed descriptions of their use but old people state that quills and dye materials were simply boiled together until a good color resulted” (1940:42). Working with Ojibwe people at Lac du Flambeau in Wisconsin, Huron H. Smith (1932: 424) was more specific in one instance: “The

Flambeau Ojibwe use the inner bark and the central pith of the stem of the Smooth Sumac [*Rhus glabra* L.], mixed with Bloodroot to obtain an orange color. The material is boiled in the mixture.”

Information recorded before the confinement of Aboriginal peoples on reserves and reservations in the late 1800s likely came from people who had first-hand knowledge of these practices, rather than from people recalling childhood memories or second-hand information. However, even those observers who recorded first-hand information were not necessarily interested in duplicating what Aboriginal dyers were doing. And the people themselves may have been reluctant or unable to share this information for a number of reasons. The observers mentioned above evidently never tried to use the recipes themselves. In fact, it is not clear that they even witnessed the dyes being made. Their goals were to collect material culture articles and cultural information, and to record, preserve and publish their findings rather than to apply them.

Their descriptions also make the process of dyeing porcupine quills, feathers and other materials with plant-based dyes seem deceptively simple. However, contemporary quill workers such as Christy Ann Hensler have found the actual practice of dyeing with natural materials to be more challenging. Hensler writes:

Many excellent books exist on the use of natural dyes, so I will not expand on the subject here, except to say that after experimenting with several natural dyes (blackberry, blueberry, walnut hulls, wolf moss, etc.) I have resigned myself to the use of commercial dyes for the majority of my work.” (1989: 11)⁵

To learn more about the complexities and details of the use of plant-based dyes, we can, however, turn to a few especially valuable writings left by observant fur traders. Fur traders, sometimes prompted by their employers, occasionally recorded detailed descriptions of both product and process.

European Experiments with Aboriginal Dyes in the 1600s and 1700s

The Hudson’s Bay Company was well aware of the potentially lucrative economic aspects of discovering new dye materials and methods in North America. As early as 1683, the directors of the Company asked their bayside employees to “show your Diligence and skill to make new Discoveries of things that may turne to the advantage of the

Company besides what we already traffique in and we Doe assure you we shall not faile to *reward all such Discoveries*” (Rich 1948: 79). In February of that year, dyeing experiments may have already been under way at Company facilities in England as the London Committee minutes for February 1683 recorded: “Ordered that the warehouse keeper take 1 li [pound] of the Red weed in the warehouse and make tryall thereof and give reporte how he findes it to the Committee” (Rich 1946: 84).

Relatively detailed information on the use of plant dyes can be found in reports by the Hudson’s Bay Company fur trader Andrew Graham, probably best known for his *Observations on Hudson’s Bay 1767-91* (Williams 1969). At the urging of his employers, the Hudson’s Bay Company, Graham, who worked largely from Fort Severn on Hudson Bay, sent various natural history specimens, including plants, animals and birds to England where they were collected and studied by members of the Royal Society.

In 1772, a fellow of the Royal Society, John R. Forster, attempted to dye wool using plants and quills that Graham had sent back from Hudson Bay. In a letter to William Watson, MD, published in the society’s *Philosophical Transactions*, Forster commented on his findings:

The wild inhabitants of North America are certainly poffessed of many important arts; which, when thoroughly known, would enable the Europeans to make a better, and more extenfive use of many unnoticed plants, and productions of this vast continent, both in phyfic, and in improving our manufactures, and erecting new branches of commerce.” (Forster 1772: 57, 58)

One plant that Forster was working with was almost certainly northern bedstraw (*Galium boreale* L.). But Forster’s experiments to produce red with this plant, although apparently highly motivated, were a decided failure, due, probably in large part to the minimal information he had at his disposal about how to handle and treat the materials.

As Forster’s comments show, there was a strong economic aspect to European interest in Aboriginal dyeing. He and other early writers were less interested in the ethnographic details of dyeing than in its chemistry, and had a particular interest in certain colours. In the 18th and 19th centuries, European dyeing technologies still depended heavily on natural materials. Some colours, notably red, were difficult to achieve and, even once accomplished, could be fugitive. Explorations by various European groups had already produced

some lucrative additions to the European dye pot, including cochineal, a red dye made from insects. By the early 1600s, Spanish cochineal shipments from Mexico were a major source of wealth, and other European colonial powers looked for similar success (Lee 1951: 205).

Despite the push to find new dyeing information, documentary accounts of dyestuffs are few. The sources provide only brief accounts of how to use plants known as *Galiums* (commonly referred to as bedstraws and cleavers). The roots of these plants can produce bright, strong reds, but those few observers who wrote about the dyeing process were not well informed about how it worked.⁶ John Forster noted his lack of success with the dye materials he had been sent. Forster reported that:

The flannel, boiled in falt of tartar and alum ... was ... immerfed and boiled ... in a decoction of the root of the Galium Tinctorium, but it would dye only a dull and faint red. A porcupine quill boiled with it became yellow, but by no means red. This operation convinced me, that the Indians muft certainly have fome method or other to extract the bright and lasting colour, which I could not perform. They use perhaps the root quite fresh, which circumstance probably makes them succeed in their dyeing procefs. If it could be brought about, to extract and afterwards to fix on wool the dye of this root, it would, no doubt, on account of its bright colour, be a valuable acquisition for our manufactures. (Forster 1772: 56-57)

Prompted by Forster’s interest, Graham subsequently produced a detailed explanation of the dye process, which he repeated (with a few small differences) in several of the copy versions of his *Observations on Hudson’s Bay*. Williams (1969) quotes Graham:

Sawyan, Dyers Lady’s bedstraw.... It grows only about four inches high, yielding a small narrow pointed leaf, something resembling rosemary. It has a fibrous root which branches horizontally in the ground. It dyes a beautiful red with the assistance of the Amiscuminick berry and poplar-ashes. There is another species of a yellow colour similar to the red kind, which dyes a beautiful yellow simply. The Mithco Sawyan (i.e., the Red Sawyan) is not capable to perform the dye simply, but requires the following composition and management.

Having provided a vessel with a close cover, and one quart of water English measure, they put into it 2 ¾ ounces of the root with half an ounce of the porcupine quills. Boil them over a slow fire until the liquor but just covers the contents; the quills have now received a red tincture. Secondly, they put the quills into three pints of liquor, the

infusion of the Amiscuminick berries, keeping it gently boiling as before, till the liquor is about half exhausted or so low that you can take a quill out without injuring the hand. Your quills now have received a red vermilion colour. Lastly put in a pint of Amiscuminick liquor boiling hot with $\frac{3}{4}$ ounces of the poplar ashes [The E.2/10 version called for the ashes to be from poplar bark, as do the instructions Graham included in his notes to the Edinburgh Royal Society E.2/15], take the whole off the fire, and keep stirring until it cools so as a person may put a finger into it without pain. Then set it by for a day, or a night, that the liquor may be quite cool; and when you take out the quills they will have received a beautiful durable red....

Amiscuminick. [*sic*] Is a plant growing in great plenty in Hudson's Bay, the berries of which are used by the Indian women for dyeing red, when infused in water; but without the sawyan and poplar ashes it soon fades. The infusion of the amiscuminick is made by boiling the berries, and squeezing them out among the decoction.

When I sent the red and yellow sawyan to the Royal Society I neglected sending the Indians' method, which prevented the learned Doctor Forster in succeeding with the red kind ... (Williams 1969: 135-36)⁷

Our Dye Experiments

From this description by Graham, we (Bohr and Lindsay) undertook an experiment to reproduce the dye process described, and to apply the dyed quills to items to see if the colour would remain fast and if the quills would be workable. The dyed quills were compared with the quill colours on images of museum pieces, and then worked into reproductions of artifacts to see how this process affected their appearance and performance.

Despite the detail Graham provided in his description, questions remain. How were the quills cleaned to remove their natural oils before dyeing? Any cleaning method could affect the dye results in a number of ways, as might the container used to soak or boil the quills. Were the roots dry or fresh? Were they pre-soaked? Was the water used hard or soft? Was it acid or base? How was the term "boil" understood? As for the berries, when they were picked, whether they were dried or frozen, or even whether they had begun to ferment and produce some alcohol could also be important. To try to resolve some of these questions, we consulted other dye recipes recorded by European observers in the James Bay/Hudson's Bay region at about the same

time as Graham was collecting his information. Dye notes by James Isham, Richard Staunton and others in 1739, and Joseph Isbister in 1740, from posts on Hudson Bay have provided additional details about timing, possible containers and plant identification, storage and harvesting (Davies 1965: 290, 304, 325).

In the end, for our experiment we decided to use an enamel pot of about 1.42 liters (1.5 quarts)⁸ capacity. Enamel, a non-reactive material, was chosen as it is possible to push the red pigments in bedstraw toward brown with copper, and the acid from the berries could pull copper out of a pot and into the dye liquor. It was decided to soak the quills overnight in a solution of 227.30 ml (1 cup) wood ash (poplar) with 0.47 litres (1 pint) of water, as this would both clean the quills (the potassium lye that leaches from the wood ash combines with the fat or grease on the quills to create soap, which is then soluble in water) and could add calcium, which could change the results by changing the pH. Although the root Graham described was probably northern bedstraw, the berry he required (amiscuminick) has been difficult to identify. Despite discussions with a number of Cree speakers and linguists and consultation with a number of ethnobotanical sources, efforts to identify the berries have been futile. The cranberries mentioned in other sources were likely "moss berries" or lingonberries, which also were unavailable. For practical reasons, commercial frozen cranberries and raspberries were used. To make the infusion, 1.42 liters (3 pints) of berries were stewed with 113.65 ml (1/2 cup) of water until they were very soft, and the liquor strained off and measured.

Northern bedstraw was gathered from a number of locations. Gathering the roots of this plant proved an education in itself, as the roots are fine and delicate and not plentiful. Older, more established plants in loose, sandy soil seem to give the best yield, and are easier to clean. The roots were gathered in September, as the plants matured seed and began to die back. The bedstraw roots were used fresh, frozen and dried. They were all carefully washed and soaked overnight in tap water. They all produced the same results, although they came from a number of different locations and were handled in a number of different ways.

Given the large quantities called for in Graham's description, we used twenty-five per cent of his recipe for our experiment. The dye process took several days to impart a strong colour. Before the final step of simmering in berry juice and poplar

ash, the quills were a bright, strong red-orange—attractive, but not strictly red. After the last step, they were a burnt red-orange; again, not red, but nice. Raspberries and cranberries produced indistinguishable results, so it is more likely it is the acid and sugar from the fruit than the colour they contributed that is more important in dyeing. A control batch of quills that were washed in dish liquid dyed the same as the ones soaked in wood ash, so it seems that the quills were adequately degreased by the wood ash, and the ash may not have contributed too much to the dye process at this point.

These experiments showed us that producing a beautiful red quill was a skilled process involving a great deal of planning, practice and experience. Far more is involved than merely boiling roots and quills together until the desired colour appears. Subtle differences in the mineral content of the water, acidity and dye bath temperature can shift colour. For Cree people, the short boreal summer season restricted the availability of dye plants. Collecting, cleaning and sorting quills also presented challenges. All these chores had to be coordinated to create the beautiful red dyes that Europeans admired, but could not consistently reproduce.

By comparison, our attempts to produce a red-dyed quill using William Orchard's description (quoted earlier) of simply boiling quills, buffalo berries and dock root to dye the quills red proved impossible. *Shepherdia*, or what are commonly known today as buffalo berries in Manitoba, the Dakotas and Montana, failed to produce any dye at all; the term "dock" is too vague to guess what plant is meant.⁹ Like many of his contemporaries, Orchard failed to give details about quantities, containers, times, preliminary preparation and when or where dyestuffs were gathered. In fact, he omitted all the practical details needed to successfully test the accuracy of his recipe. In contrast, the descriptions by Frances Densmore (1974), while far less detailed than Graham's, include more specific information and more sensitivity to context. It has not yet been possible to test many of her formulas, but one of her recipes for black produced an interesting deep blue. We found, however, on working with the quills dyed with this dye that the colour tended to rub off.

While European observers were certainly concerned with identifying Aboriginal dyeing techniques, Aboriginal dyers were less interested in European methods, resorting to them only in the absence of local materials. Johann Kohl's account

of dyeing in the 1850s in the Great Lakes region, speaks resoundingly to this fact:

After sorting they are dyed, and for this all sorts of colouring plants have been found in the forests. A very brilliant black is produced by the charcoal of a certain variety of willow, a bright yellow from the berry of a bush they call "bois de perdrix," and a pleasant red from the juice of the cranberry. To produce other colours, *when they have no better expedient*, [emphasis added] they pluck from old woollen rags dyed in Europe the threads which possess the colour they require, and boil them with the porcupine quills, to which their colour is transferred. (Kohl 1985: 316)

Social and Cultural Aspects of Dyeing and Quillwork

The preliminary results of our experiments with documented dye recipes raise some significant questions. Why were the fur traders' descriptions and recipes more detailed and apparently more likely to produce a practical recipe and a workable dyed quill than the descriptions of anthropologists; and what does this finding suggest about the cultures of both observers and informants and the interactions of these individuals and cultures? Several observations—and possible avenues for future research—come to mind.

The specialized knowledge of collecting, handling and using dye materials was likely not common knowledge available to every person in an Aboriginal community. For example, among the Omaha, "it is said that but few persons were competent to dye a good red" (Fletcher 1970 [1911]: 346). European explorers and fur traders were men, yet dyeing appears to have been women's work within the groups these observers were depending on for information (Atwater 1831: 137; Campbell and Ganong 1937: 23; Williams 1969: 135). Further, as earlier noted, both Harmon (Lamb 1957) and Weid (Thwaites 1966) write of the ingenuity and skill women brought to their dye and quillwork. Accordingly, one point of divergence between the information gathered by fur traders and that of anthropologists may have been a reflection of the role of gender.

Among the Cheyenne, knowledge of quillwork and the use of dye materials were restricted to certain organizations or societies to which women belonged. As Mennonite missionary, Rodolphe Pether observed among the Northern Cheyenne:

In former days the decorative art of the Cheyenne consisting of quillwork, feather ornamentation, drawing on skin and parfleches was the privilege of certain g[ui]lds of women, which required a ceremonial initiation. These women were called "The Selected Ones" or Moneneheo (from the verb namonen, I chose, select). . . . The Moneneheo had strict rules in their designs and they kept secret the meaning and arrangement of the colors as well as the relation of the designs to each other. (1915: 97, 98)

George Bird Grinnell emphasized the high social importance of women's quillwork among the Cheyenne and compared its significance to that of men's military achievements.

Of the women's associations [among the Northern Cheyenne] referred to the most important one was that devoted to the ceremonial decoration, by sewing on quills, of robes, lodge coverings, and other things made of the skins of animals. This work, women considered of high importance, and, when properly performed, quite as creditable as were bravery and success in war among the men. The guild of quillers included the best women in the camp. Its ceremony and ritual have been handed down from mythic times. (1972 [1923]: (1) 159, 160)

He added:

the quilling society is considered very old, and the knowledge of the use of quills in the ornamentation of robes and dresses is said to have been brought to the tribe by the [male] hero of a widely distributed story among the Plains tribes, which I have called The Buffalo Wife. (1972 [1923]: (1) 163; (2) 385)

Quillwork also held a prominent place in the material culture of the Dakota and Lakota. Among them, quillwork was clearly considered a woman's task and skill. The mythological character Double Woman figures prominently in discussions about the art of Sioux women, for she was the supernatural agent from whom the first woman learned to make designs and decoration. It was Double Woman who taught women the art of quillwork; it still remains an important art form among the Sioux (Berlo 1993: 33).

Frances Densmore provides one more indicator of the role of gender in the dyeing and quilling process. In the directions for making a red dye that she collected from Anishinabe people in the early 20th century, one set of instructions conclude: "Do not let a man or any outsider look into the dye," (Densmore 1974 [1926-27]: 370). If—as it appears—women held rights to the quills, dyes and processes, male

informants may have been restricted from imparting dye information to another party, leaving European male collectors with a distinct disadvantage at acquiring accurate data.

A second reason for the sparse and simplistic nature of the descriptions recorded by ethnographers and anthropologists, especially from the late 19th century onwards, might be the result of another cultural nuance that the Europeans did not understand or appreciate. It is possible that the brevity of some descriptions resulted from Aboriginal use of humour as a teaching tool to impart information or to foster humility and appropriate behaviour (Barsh and Marlor 2003: 571, 572). Humour was employed to evade answering too many questions. For example, bow maker Jim Hamm recounted that when talking to a group about the manufacture of Aboriginal bows, he told them, "with tongue firmly in cheek, . . . that bow-making was easy, just get a log and a hatchet and chop away everything that doesn't look like a bow" (Hamm 1992: 257).¹⁰ In this setting, Hamm chose not to reveal the complexities and detailed knowledge of the material, tools and procedures necessary to manufacture a functional bow. Aboriginal people speaking to zealous anthropologists may similarly have resorted to evasive or off-handed statements to deflect their questions.

A third reason for the more detailed instructions obtained by the fur traders versus the sketchy descriptions that anthropologists and ethnographers collected from Aboriginal people may be related to matters of the supernatural. In her studies about Chippewa medicines, Frances Densmore (1974 [1926-27]) notes that a medicine man's knowledge of the curative power of plants came from the spirits and the information was not readily shared (322). She wrote:

In the old days a person would not transmit any facts concerning medicines to even a member of his or her own family without compensation, one reason for this restriction seeming to be a fear that the information would not be treated with proper respect. (324)

Might dye information have been similarly protected? Might it be that what came from the spirits called for a sense of reverence and respect that outsiders could not be entrusted to uphold? If information was transmitted indiscriminately and inappropriately, would the power of the dye, the colour or object be compromised, and even, might the power of the dyer be jeopardized?

Clearly, interactions in the Hudson Bay region between Aboriginal and non-Aboriginal traders and explorers during the fur trade were complicated—if for no other reason, because of cultural differences. As early as the 1600s, Nicolas Denys experienced a hesitation on the part of the Mi'kmaq to share the very information the Europeans wanted when he complained:

They have some very beautiful colours, especially their flame-colour, which surpasses all that we see in this country of this nature. It is made from a little root as thick as a thread. As for the leaf, they are not willing to show it, something which is unusual with them.” (Denys and Ganong 1908:413)

Meanwhile, records indicate that in 1689, the Hudson's Bay Company were directing its employees to “seeke for ... any Druggs or Dyeing ware Upon your Promise to Trade” (Leecham 1974: 51). This suggests that for the Company the process of trade was a basic economic transaction lacking any appreciation that for Aboriginal people trading was a complex phenomenon that included cultural aspects of gender, trust, respect and spirituality. If they wanted to trade, Europeans, however, had to be part of this sophisticated set of relationships with Aboriginal people. Fur traders like Daniel Williams Harmon and Andrew Graham had strong ties to Indigenous communities; they had Aboriginal wives, from whom they may have obtained dyeing information. It is also possible that they collected information through their wives from other relatives in the Aboriginal communities with which they had contact. Graham's ability to negotiate the Aboriginal/European relationship structure was perhaps further enhanced by his knowledge of Aboriginal languages and the length of time he remained in Hudson Bay—facts which likely contributed to his being able to gather detailed information about dyeing, whereas other observers might not have had the time or ability to develop the necessary trust and to learn the protocols that might have fostered that trust.

The Tradition of Plant Identification

If social and cultural considerations factored into the differences between the information gathered by the fur traders versus that of other European collectors, the inconsistency of plant-naming practices among Aboriginal people, non-Aboriginal traders, anthropologists and botanists also complicated matters. With respect to medicinal cures there was such secrecy surrounding remedies that names were

seldom given to plants; rather, the person imparting the information would simply show the fresh plant to the student, as opposed to naming it (Ewers 1971 [1958]: 119; Gilman 1987: 116-121).¹¹ The same reluctance to disclose too much information to an outsider may also account for the variance in information given to and received by the fur traders and anthropologists about the dyeing process.

William Orchard noted that Sioux people used “Buffalo Berries” to produce a red dye (11). As previously noted, however, the buffalo berries we picked did not produce red dye, or in fact, any colour at all. Important information about the use of this plant may have been missing, or it may have been a different plant than the one identified with the scientific name *Shepherdia*. In contemporary common usage, people often use the same term to describe different plants. For example, a single term, such as “cedar” or “juniper” as used by different people may refer to different plants. In contrast, modern ethnobotanists try to find an actual specimen of a plant to confirm its scientific identity. For our experiment, we worked both with Andrew Graham's Cree, and with older English usages to find scientific names that seem reliable, but which may mask all the uncertainty of identification that language can engender.

In contrast to the somewhat soft use of common names by some anthropologists, prompted by their employers, fur traders in the 18th and early 19th centuries could be meticulous in their efforts to clearly identify certain plants. Davies and Johnson (1965) also point out that Andrew Graham and others collected samples and sent them back to Britain for identification by botanists. They write that in 1739, Hudson's Bay Company trader Rowland Waggoner (and others) at Albany Fort observed:

As to the Tysowian [fn1] sent by Captain Middleton last year, it was very good and gathered in a proper season. It has a stem about eighteen inches from the ground with a small white flower about the latter end of July; it bears no berries but a small seed. The method the Indians use to dye their quills with the root is they first boil it gently for four hours, then they put their quills among it, which they let stew over the fire till they are aware of a sufficient colour. (290)

However, the Hudson's Bay Company's London Committee questioned whether the Tysowian was the right material or gathered in the proper way, because they could “find no Colour” (304) in it, indicating that practical tests had been conducted on the dye plants. Davies and Johnson (1965) call attention to a letter to the London Committee, from

Richard Staunton of the Hudson's Bay Company, who was stationed at Moose Fort (Moose Factory) in 1739 and who wrote:

I am very certain that the Tissaweean with root, stalk and flowers, also a book of cartridge paper made in quarto or 152 pages all numbered with different sorts of plants, flowers and leaves, was sent home last fall by Captain Middleton tied up in a bundle, which I delivered into the said captain's custody with my own hands when I delivered your honour's packet to him, all of which he carried out of my room with his own hands. The Indians dry it in the sun, and using it they put it into a kettle with water and the quills or any other thing to dye, and put it over a gentle fire, well covered with a stone, and lets it stew for about twelve hours or longer till the quills or other things is coloured enough for their use, then they take it out and dries it moderately in the sun so keeps it for use. The best time for getting the root is in the fall after the stalk is decayed. As for the ground it grows in, it is here and at Albany and undoubtedly at other places; it rises up with a stalk about a foot high with a white flower, the root running upon the ground in sundry small strings or fibres. (304)

Other Hudson's Bay Company officers, such as Joseph Isbister at Albany sent samples back to headquarters as well (Davies and Johnson 1965: 326).

Clearly, the Hudson's Bay traders were encouraged to provide descriptions and samples that could lead to the practical production of a recipe that could be replicated. By contrast, later ethnographers appear not to have attempted to test the veracity of their transcribed information, seldom collected plants that were positively identified as the right ones and rarely had the plants' scientific names confirmed by botanists.

Quillwork Experiments

Taking the dyed quills and working them into finished reproductions of museum pieces can offer insights into the lives, cultures and values of both the makers and collectors of these articles. To this end, and on the basis of Graham's instructions for dyeing I (Roland Bohr) worked dyed quills into finished pieces. This allowed Anne and I to compare the colours of the quills in finished pieces—not just as separate quills—and to assess the effects of handling on texture and how this might affect perceptions of colour, sheen and so forth. A description of the process is outlined below.

When I examined northern Plains bows at the Pitt Rivers Museum in Oxford, England, in 2003, I noticed exquisite quillwork decorations on some

of the sinew-backed bows, especially those made of horn or antler. Standard sources on quillwork described this technique as “plaited” or “braided” quillwork. It is found wrapped around pipe stems, bows and other oblong objects. In this technique, quills are passed back and forth between two taut parallel strings, often of sinew, and sometimes of commercial plant fibre, which would have been available to Aboriginal people from fur traders at least from the early 19th century on. This technique produces a striking “braid” effect.

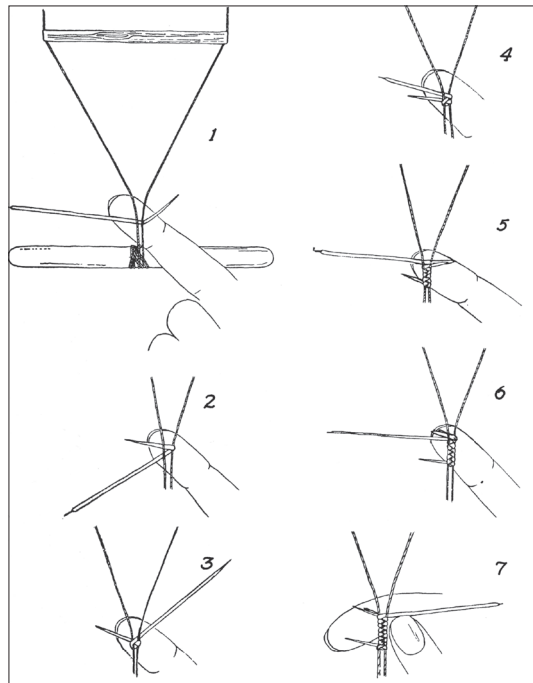


Fig. 1
Plaited quillwork. From: Carrie Lyford. Quill and Beadwork of the Western Sioux. Bureau of Indian Affairs-Division of Education, 1940, 47.

Lacking prior experience in quillwork, I assumed that this technique would be difficult to master because of its intricate look. I decided to try it out on a sinew-backed snakeskin-covered ash bow I had manufactured earlier. Before working on the bow, however, a “test run,” was undertaken. I wrapped the handle of a three-pronged table fork, because I knew of similar pieces having been wrapped with beads collected from Lakota communities in the late 19th and early 20th centuries.

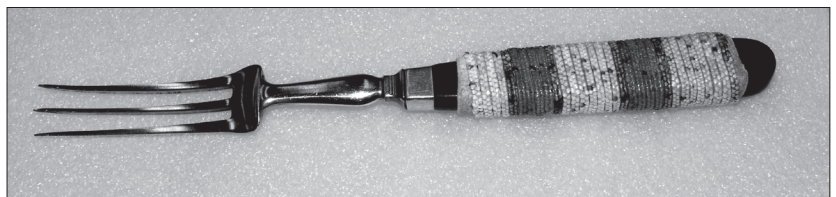


Fig. 2
Fork with plaited quillwork on handle. Photo by Roland Bohr.

As a first step, I sewed a piece of Native-tanned caribou skin (tanned by Thelma Bird of Peawanuck, Ontario) around the handle of the fork to prevent the quillwork from slipping off the handle. Then I fastened two pieces of fine linen string to one edge of the leather, tying them together in a knot. To measure the length of cord needed, I wrapped both cords parallel to each other around the handle until the entire area to be covered in quillwork was wrapped. It is necessary to make an allowance for knots to finish the project.

With these preliminary tasks accomplished, I began to “weave” the first quills back and forth tightly between the two cords. To make the quills pliable, I held them in my mouth for approximately a minute.¹² The quills can be softened in cold water, but they seem not to become as pliable as when are softened in the mouth. If softened in the mouth, it is important to them wash thoroughly. Thus, the dye has to be strong and stable enough not to be washed off during this process. Furthermore, it is paramount to make sure that the substances used in the dying process are not toxic.

Before each quill was applied, I clipped off the sharp point and back end. In order to save material, I often used the full length of the quills, including the dark area at the tip. This led to dark brown or black spots appearing in the finished quillwork, creating a “salt-and-pepper” pattern. To the best of my knowledge, such spots do not appear in old original quillwork. Several Aboriginal quill workers I consulted later pointed this out as well.

Contrary to my expectations, the application of the quills turned out to be fairly easy and uncomplicated. It is important, however, to sort and use quills of approximately the same diameter to achieve an even and uniform appearance. Because I did not know how many quills I would need, and because we had dyed only a small number, I used all the quills I had, regardless of size, with only minimal attempts at sorting. The colours used were a red-orange, an ivory or peach colour, and a light to medium blue. This last colour had the tendency to come off when the wet quills were handled.

Pleased with my success on the fork handle, I applied the same quillwork pattern to the limbs of my bow in much the same way as I described for the

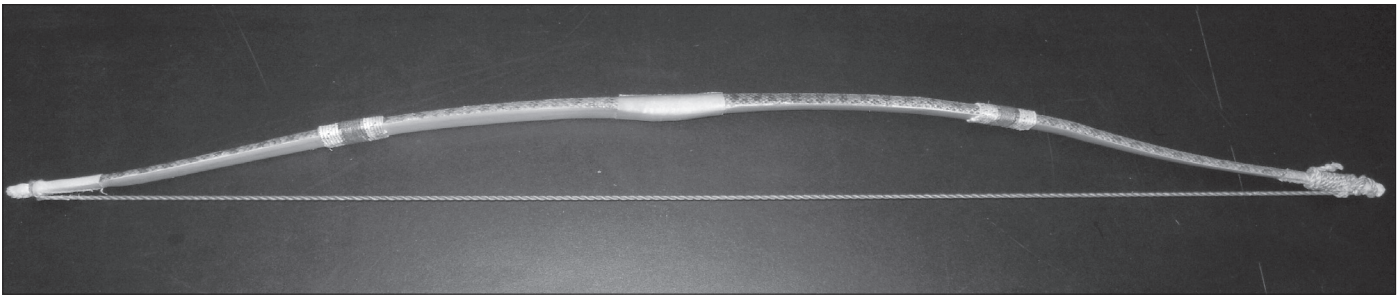
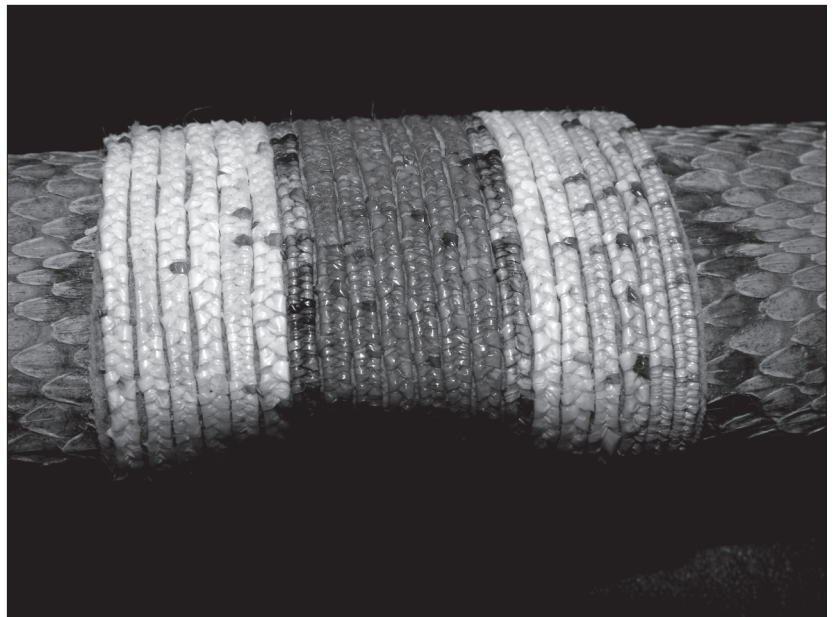


Fig. 3
Sinew-backed, snakeskin covered ash Plains bow with plaited quillwork and rawhide handle. Photo by Roland Bohr.

Fig. 4
Detail from quillwork on bow. Note the differences in colour between the un-dyed quills on the left side and the ivory/peach coloured quills on the right. Photo by Roland Bohr.



fork. As I ran out of peach/ivory coloured quills, I used some un-dyed quills. The colour difference is visible on the lower (left) limb of the bow.

Next I attempted to do flat quillwork. The design was inspired by the tail flap of an otter skin pouch, collected from an Algonquian community on the Great Lakes (Schulze-Thulin 1987: 112).¹³ Similar flaps are also found on belt pouches and fur quivers from the Upper Missouri and the Plateau area. My plan was to sew the quills onto a piece of caribou hide and then back it with blue wool cloth to protect the stitching on the reverse side. I initially attempted what appears to be one of the most common and widespread quillwork techniques in the Great Lakes region and especially on the Great Plains. Quillwork artist Christy Ann Hensler refers to it as “straight quilling” (1989: 14, 15).

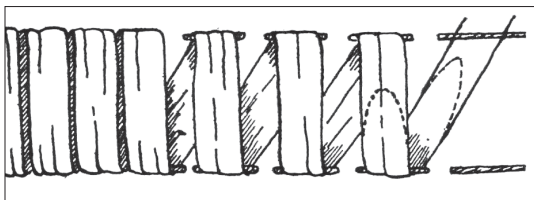


Fig. 5
Straight quilling. From: Carrie Lyford. Quill and Beadwork of the Western Sioux. Bureau of Indian Affairs-Division of Education, 1940, diagram C, p. 50. Note that on the right side of this drawing the quills are shown stretched apart for clarity. In the finished work, however, they are supposed to be spaced tightly without gaps in between quills.

Surprisingly, this seemingly simple technique proved to be extremely difficult to execute. Attaching the quills to the leather, even though I was using a beading needle and waxed nylon thread instead of sinew, was sufficiently problematic; keeping the individual rows straight and of an even width further complicated the process.

After this frustrating beginning, I switched to a different technique (Lyford 1940: diagram B) that produces a straight line of quillwork and a textured pattern within each quill, because the quills are folded over as they are sewn down to the leather, resulting in a pattern of triangles or “saw teeth.” My assumption had been that this would be more difficult than the first method (“straight quilling,” diagram C *ibid.*), but the opposite was the case.

After completing the three straight lines of the main design, I decided to try method “C” again to fill in the bottom of the rounded end of the flap. This time it worked better, but it took much patience and dexterity to accomplish. Even so, my individual

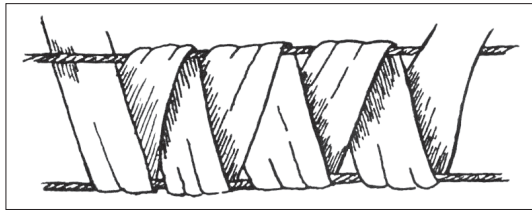


Fig. 6
“Saw teeth” quill pattern. From: Carrie Lyford. Quill and Beadwork of the Western Sioux. Bureau of Indian Affairs-Division of Education, 1940, diagram B, p. 50.

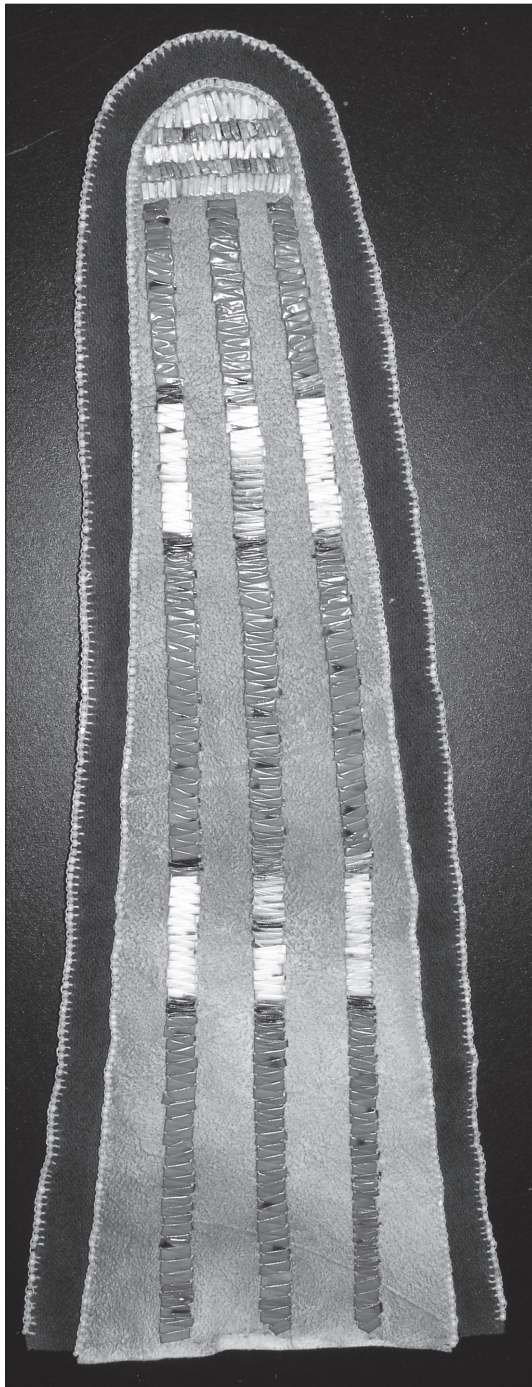


Fig. 7
Flat quill work on leather flap, backed with blue wool cloth. This piece incorporates quillwork techniques “B” and “C”. Photo by Roland Bohr.

rows varied greatly in width and did not achieve the neat and uniform appearance of original quillwork of this type.

Finally, I attempted to make a small knife sheath to be worn on a leather cord or strap around the neck, customary in Great Lakes Aboriginal cultures. The core of the knife sheath was made from deer rawhide. Then the quillwork was applied to caribou hide. When the quill design was finished, the piece of caribou hide was sewn over the rawhide core. With this piece I used technique “B” again, supplemented by what Christy Ann Hensler (1989: 30, 31) calls “rick rack.” In this piece I used quills dyed by Anne Lindsay, along with commercially dyed quills. These included the colours purple, red and yellow. The black is the natural colour of the ends of the original quills.

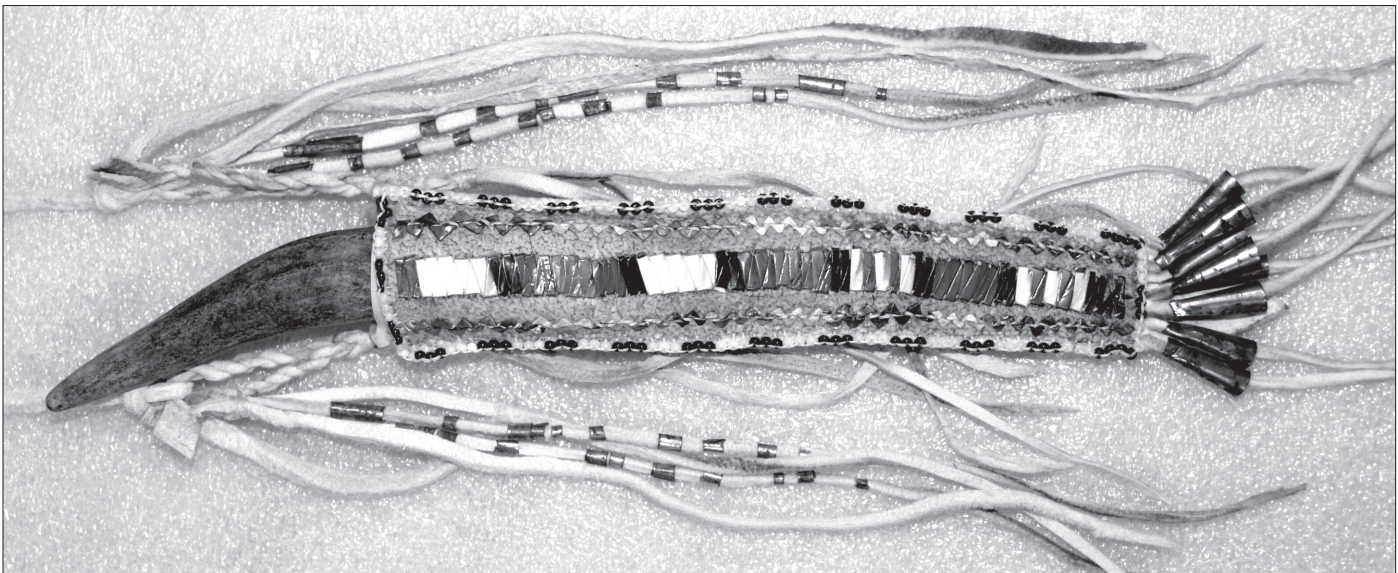
Conclusion

Our documentary, museum and practical research has had some success, but has also sparked a number of questions about the significance of dyeing and quilling to both Aboriginal and non-Aboriginal people. For all of its detail, the Graham dye recipe, like all the others consulted, was not complete. These deficiencies open interesting questions about Aboriginal and European interactions. While perhaps some of the Europeans were inattentive, or had no experience with recipes, it is possible that some Aboriginal people were reluctant or unable to part with all the information needed to produce a good dye. Although technically comparable, there the similarities between European and Aboriginal

dye techniques may have ended. European views of dyes as commodities appear to have differed significantly from Aboriginal perspectives, and this difference could have affected the entire process of collecting both dye plant specimens and descriptions of processes. Indeed, the whole performative context of gathering and preparing materials for dyeing may have been understood as imparting qualities that could not be completely reproduced by the act of extracting dyes from cloth or using packaged dyestuffs. By the same token, however, extracting dye from cloth may have its own significance, as cloth, especially red, held a special symbolic value (White 1994: 369-405).

The skill and experience needed to produce the beautiful objects now found in many museum collections have not been recognized or understood by most outside observers. Some of these observers may simply have been inattentive and uninterested in details, or they may have lacked close relationships with their Aboriginal informants. As well, the willingness or even ability of those informants to impart this type of information may have been mediated by important cultural practices and values. More research is called for and more dye descriptions need to be tested. The production of finished reproductions of original artifacts helps us to better understand quillwork and dyeing before and during the fur trade. Just as we need to read Aboriginal information with a culturally sensitive eye, so too is it necessary to examine the cultural context and content of works by anthropologists, explorers and fur traders, assessing both the content, the biases and limitations of the observations they have left us.

Fig. 8
Reproduction by Roland Bohr of a generic Great Lakes quilled knife sheath, made with commercially dyed and plant-based dyed quills. Photo by Roland Bohr.



Notes

An earlier version of this paper was presented at the Northern Plains Conference in Brandon in 2008. The authors would like to acknowledge the help of participants in this session for their input and ideas, and the kind help of Jennifer S. H. Brown, Chris Kotecki, Cath Oberholtzer and Laura Peers.

1. Quotation in title from E. E. Rich (1957: 115).
2. As Harmon's ethnographic observations in this section of his journal largely pertain to Subarctic people, it is likely that the information on the use of dye plants and dye procedures was in reference to Subarctic people, too. Harmon mentioned the use of crooked knives for woodworking, immediately before this passage, implying he was still referring to the same Aboriginal group. Crooked knives were not popular tools among Plains people. Thus, this would suggest that the colouring passage may have been in reference to Aboriginal people whose influences lay primarily outside the Plains region.
3. Lisette's family name is given as Duval, or Laval. According to Harmon, Lisette's father was a "Canadian," perhaps one of the metis-employees of the North West Company. On page 150 of his journal Harmon mentioned that her mother was a "Snare Indian" from "about the Rocky Mountains." It is not clear who the Snare were. They could have been an Athabaskan-speaking group, perhaps connected to Chipewyan or Shushwap peoples. However, other sources indicate that Lisette spoke Cree.
4. During Wied's stay in the Upper Missouri country, Kenneth McKenzie of the American Fur Company was his contact person and host at Fort Union. Likely, Maximilian obtained this ethnographic information on Cree people "in the north" from McKenzie, who also visited him later in Germany. According to information from the Hudson's Bay Company A Biography file "Kenneth McKenzie (1816-1834)," McKenzie had worked for the North West Company before their merger with the Hudson's Bay Company in 1821, and had a Native wife, who could have provided information. It is not clear how fur traders on the Upper Missouri, like McKenzie, interpreted the term "north." It could have been a reference to the plains of British North America, "north" of the boundary with the United States, or to the central Subarctic.
5. It should be noted that despite the growing popularity of beadwork and the increasing availability of packaged commercial dyestuffs, in many Aboriginal communities porcupine quillwork and the use of natural dyes persisted to some extent. Porcupine quillwork and the use of natural dyes have experienced a renaissance among Aboriginal artists, at least since the 1980s, as evidenced by the work of Alberta-Cree artist Yvonne Jobin and Mi'kmaq quillworker Patricia Dunnett. However, as the focus of this paper is on Aboriginal use of natural dyes for quillwork in the 18th and 19th century, and due to space constraints, this resurgence in Aboriginal quillwork cannot be discussed here.
6. For example, see: E. E. Rich (1949); John Richardson in John Franklin (1823); Johann Georg Kohl (1985 [1860]); Kalm and Larsen (1939).
7. Various copies of this were made in the E. 2 series Observations at the Hudson's Bay Company Archives.
8. Since the imperial unit of measure was used for our experiment instead of metric, those measures are indicated in parentheses.
9. See, for instance, the United States Department of Agriculture online plants database, available at <http://plants.usda.gov/> for a list of plants, many in the Rumex family, with the vernacular name "dock."
10. It should be noted that although he is an expert in the manufacture of Aboriginal archery equipment, Jim Hamm does not identify himself as Aboriginal.
11. There are potentially significant differences between the relationship of an experienced dyer transmitting information to a student, and an Aboriginal person speaking to an outsider as an "informant." For example, among some Plains cultures, especially those that had an age-graded society system, individuals who wanted to learn a specific craft or skill needed to approach a master craftsman and enter into a formal relationship as apprentices, who might eventually grow to replace their teacher and mentor. In regard to power relations, such a relationship could be vastly different from that of a non-Aboriginal researcher coming into the community to question Aboriginal people about their practices and customs.
12. Alice Fletcher and Francis La Flesche recorded in regard to treatment of quills among the Omaha: "They [the quills] were held in the mouth to make them pliable, as they needed both warmth and moisture to bring about that condition. Cold water would not serve the purpose" (1970 [1911]: 346).
13. A bag made from an otter pelt; tail flap embroidered with three lanes of quillwork, converging at the tip of the tail. Paul von Wuerttemberg collection: possible Ojibwa origin, early 19th century.

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