CARIBOU HAIR AND THE CREATION OF A NEW FABRIC
Robin Goodfellow

The research and development of a new fabric made from caribou hair and wool is an unfinished puzzle: the unusual factors of its development may fit together to make a complex, satisfying picture – then again, they may not!

The characteristics of caribou hair

Caribou hair is known to be unique; although reputed to be hollow, the hair is actually constructed of air-filled cells. This construction, plus a diameter of at least four times that of wool causes it to be an insulating hair. It is similar in structure to the hair of other antler-bearing animals of the Cervidae family, such as moose, but caribou hair is lighter and softer than moose hair. Unlike the seal, the caribou does not have fat under its skin to protect it from the cold, and relies solely on the density and insulating qualities of its hair. Although caribou wool does exist with the hair, it is very fine and difficult to see with the naked eye (but under specific conditions, the fine wool will felt and hold the hair).

The uses of caribou hair

The people of the north have always known about the warmth of caribou hair, and today they still use caribou hides with the hair intact as sleeping mats; as part of the hide, caribou hair makes the warmest clothes in the world.

Separated from the skin, the hair has been stuffed into pockets in clothing [1]; however, with the availability of commercially-made down garments, this use was replaced. The hair has been used in home-made life jackets and boat bumpers [2]. Its use in decorative tufting was introduced by the missionaries [3].

The occurrence of caribou hair

There are about one million caribou in North America, and two to three million in the rest of the circumpolar north [2].
Photo 1. Caribou, by Dr. Rick Riewe
Photo 2. A scanning electron micrograph of a caribou hair cross-section, magnification 200x. Prepared and photographed by Carolyn J. Emerson

Photo 3. A scanning electron micrograph of caribou hair, magnification 50x. Prepared and photographed by Carolyn J. Emerson
Photo 4. Map showing distribution of the two main “types” of wild caribou, from Dr. William O. Pruitt's article, *Caribou, Reindeer and Snow*, The Explorer's Journal, Volume 63, No. 1, March 1985, pp. 30-35
In North America, where the populations are increasing, a ‘safe take’ of seven percent yields approximately seventy tons of hair annually. At present, the hair is discarded.

My experience

I lived for eight years in North West River in the centre of Labrador. The herd with which I am most familiar is the George River herd – the largest caribou herd in the world (600,000 animals) [4], and it ranges the Ungava peninsula between Labrador and Quebec. Labrador is, for the most part, a land of small isolated coastal communities and very few roads. There are Inuit, Naskapi-Montagnais Innu (Algonquian Cree) and settlers living in the area. Hunting is still an important way of life for all groups.

I worked as craft-coordinator with the Naskapi-Montagnais people. Their way of living had, until recently, been based on caribou hunting, as they were nomadic hunters until the 1950s. From them I learned about the products of caribou and the management of hides.

As a weaver, I experimented with the hair and fur available in Labrador, and, spinning them with sheep's wool when necessary, I made a jacket from the hair of rabbit, bear, seal, fox and caribou. When weaving the jacket, I noticed that the ball of caribou hair and wool mixture was remarkably greater in volume and lighter than that of wool or the other hair. I pursued my curious find, and discovered that the caribou hair could be combined with wool in the proportion of one part caribou hair to two parts wool by weight – this combination was over half caribou hair by volume. I made up samples and had them tested by Dr. Keith Slater [5], and, at his suggestion, produced felt samples as well.
Photo 5. Three generations of Naskapi-Montagnais women,
by Val Hearder
Photo 6. Southern technology in the north, by Mary Attard
Photo 7. A jacket made from fox, rabbit, bear, seal and caribou hair, handspun with wool, by Bruce Boles
Photo 8. Two balls of yarn, made with identical length (66 yd.), weight (3 oz.), and spinning technique, show how much lighter and more bulky the blend is than an all-wool yarn, by Robin Goodfellow
Findings of Dr. Keith Slater [6]

“In order to assess its potential usefulness, we prepared and tested, under identical conditions, samples of 100% wool and of a 2-to-1 wool/caribou blend. Strengths were compared first, since a weak fabric is of no use, however good its other properties are. The blend had a strength of 16.8 kg. in the laboratory test, compared with 18.6 kg for the wool sample. This difference wouldn’t be noticed in normal wear. Tear strengths too were not seriously different, values of 5.3 and 6.0 kg being found. The blend is less elastic than the wool, only stretching by 24.7% (compared with 44.8%) before breaking. Still, this is enough for all but the most severe uses. As long as the material is not stretched tightly over the body (as in ski wear, for example), this amount of give is adequate.

It is in the results of thickness and thermal insulation measurements, however, that the real value of the material becomes evident. The wool sample, with a thickness of about 0.6 cm, had a thermal insulation of 0.041 (in standard units of degrees Kelvin per square metre per watt), while a blended sample of about the same weight had a thickness of 1.6 cm, two and a half times as much, and a thermal resistance of 0.081 units, or nearly twice as much.

Not only is the caribou hair fibre warm, but it is light. Due to its low density (one-third that of wool), fabrics made from the hair, whether knitted, woven or felted, are very light, weighing about 60% of an all-wool product, and with a much more lofty structure. Thus, it ought to be ideally suited to the needs of winter clothing, in which a combination of low weight (and hence loading on the shoulders) with good thermal insulation properties is highly desirable.”

Caribou hair compared to sheep’s wool

In comparing caribou hair to wool:

a) Caribou hair, as a kemp fibre, has no crimp, and thus it depends largely on the sheep’s wool to hold it.

b) Caribou hair generally seems shorter than wool, yet caribou hair is from four to six times larger in diameter than wool.

c) Caribou hair is much lighter than wool, being one-third as dense.

d) Caribou hair is a primitive hair, and has no sweat glands accompanying it.
e) Caribou hair can be removed from the skin by soaking the skin in water for a week or so, at which point much of the hair will slide from the skin, with some encouragement.

f) The wool and luminiferous caribou hair accept fibre-reactive dyes differently, thus creating different tonal qualities with one dye [7]; this fact seems to only enhance the combination.

Caribou hair does have its limitations: it cannot be boiled or steamed, as this procedure causes the air cells to collapse, markedly decreasing the insulating and luminiferous qualities. Caribou hair is weak and has a noticeable electrostatic propensity, but when combined with wool, these properties are modified.

Product potential

Yarn made from caribou hair and wool is best used in woven products, for example, lined garments and window coverings. It is notable both for its texture and the rich dyeing effects. As well, caribou hair has been combined with mohair and silk (25% caribou hair, 50% mohair, 25% silk) and this too makes an interesting yarn.

Felt made from the combination of caribou hair and wool (33% caribou hair, 66% wool), although aesthetically pleasing, is more importantly a very light and warm fabric; ski-doo mitts lined with the felt are presently undergoing a field trial in northern Canada, and a very thick felt may well be incorporated into sleeping bags.

It is now known that both the yarn and felt can be produced with cottage industry equipment, but as some communities would have an annual excess of caribou hair, the next step in development is to see if there is any value in having the yarn and felt produced commercially, and if, indeed, the caribou hair could withstand such a process.

Northern development associations, such as the Labrador Inuit Development Association, wish to make use of as many products as possible from the harvest. Home-tanned caribou skins make a very fine, supple white leather; the potential of commercially-tanned ‘spring skins’ is yet to be determined.
Photo 9. The parts of a ski-doo mitt: cloth liner, caribou hair/ wool interlining, leather and canvas covering,
by Robin Goodfellow
The factors of economic development

Many northern communities (the population is generally between 350 and 1,200 people) could benefit from the development of this fabric, but there are still the inherent challenges of northern living to consider – the high cost of transportation, the isolation of the communities, both from each other and from the larger centres, the varying levels of craft development and the cross-cultural factor. Politically, as each group strives for self-government, there is no one over all body with which to work.

But, on second glance, perhaps these diverse factors may contribute positively – with the different cultures and distinctive communities, an interesting range of products could be produced, each product being ‘custom developed’ according to the resources of the community. With care, both northern and southern cultures could benefit; it is not unknown for northern communities to successfully adapt southern materials and techniques for northern interpretation, as evidenced in the work of the weavers of Pangnirtung, Northwest Territories. Also, southern people often appreciate the styles of the north.

The development of this fabric is, as yet, a puzzle. It is difficult to get specific information about equipment, techniques, markets, etc., when in the north, and often isolated communities are unnecessarily duplicating these efforts. This project is now ready for input from industry, related crafts and the arts. At this stage, I hope to be a central link and to continue the interesting venture of finding more pieces to the puzzle.

REFERENCES

1. Interview with August Andersen, Nain, Labrador.

2. Dr. William O. Pruitt, University of Manitoba, personal communication.


5. University of Guelph, Ontario.
Photo 10. Appliqued shroud, ulu design, from Spence Bay, Northwest Territories, by Judy McGrath.
Photo 11. Wool sweater design by Judy McGrath, influenced by northern styling, by Judy McGrath


8. Debbie Ott, Glenella, Manitoba, personal communication.

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