Musk-Ox Wool and Its Possibilities As a New Textile Fiber

By WERNER VON BERGEN*

(*Continued from Nov. issue, p.* 648)

Workability

The only humans so far, who have made use of the wonderful wool, are the Eskimos and Indians in Greenland and Canada. It is used as fur robes and for bedding, but no spinning nor weaving is done. The opinion regarding the wool for manufacturing purposes is divided. V. Stefansson, the father of the domestication idea, stated that the development of musk-ox herds will represent not only an addition to the meat industry but also to the wool production.

From *ovibos*** (Latin name for musk-ox) skins which were brought south by Stefansson's Canadian Arctic Expedition 1913-18 and from a trading station in northern Baffin Island, Stefansson had fifty to sixty pounds of wool. Some was worked by hand into socks and mittens in the ordinary old-fashioned way. About 40 pounds were handed over to Prof. Aldred F. Barker head of the Textile Department of Leeds University who made the following tentative statement:

"The heat-retaining qualities of *ovibos* wool seem to be at least as good as the best domestic sheep product. The wool will take dye readily. Its soft, native brown is at present a very fashionable color and seems, therefore, suitable, but it can be bleached a pure white inexpensively by processes already in use. The cloth can be woven by machinery used for ordinary wool; no special machinery or invention is necessary for separating the long hairs from the wool when such separation is desired. For certain purposes it is an advantage to have the hair mix with the wool. The hair if separated from the wool will be of some value as a by-product. The pure wool fabric will have approximately the softness of cashmere, and, what many will consider important, the cloth will not shrink even when washed in hot water and rubbed."

The report of the Royal Commission is less optimistic:

"The value of the wool which constitutes the inner coat of the musk-ox is, as yet, problematical. In itself the wool is of fair quality, but though experiments to that end are now in progress, no machinery has so far been perfected which will successfully separate it from the coarse hair of the outer coat, with which it becomes mixed when being shed. The shedding is a gradual process, the new wool taking the place of the old as this is shed, and there is, therefore, grave doubt as to the practicability of removing the latter until it has been properly replaced by the fresh growth."

In the same report we find a statement from Prof. W. T. Hornaday, Curator, New York Zoological Society, as follows:

"I do not believe that musk-ox wool ever can become a valuable commercial product. I think there is no practical way in which the wool can be made available in commercial quantities. We once combed the wool completely out of a two-year-old musk-ox at a time when it had been shed and was ready to work out through the long hair. It is a long and tedious operation, and about one month later that particular musk-ox died of pneumonia. We never again attempted an experiment of that kind."

The decision whether or not a wool fiber or hair is suitable for the manufacturing cannot be made only on the foundation of such insufficient facts. As manufacturing requirements, the British Research Association for the Woolen and Worsted Industries has suggested as preliminary for such investigations the following factors:

1. Staple length
2. Suitable weight of fleece for each particular breed of sheep
3. Crimp
4. Diameter of fiber from specified portions of fleece
5. Evenness
6. Suitable contour of cross section
7. Probable limits of spinning count
8. Texture
9. Color
10. Luster
11. Soundness
12. Suitability for combing or carding
13. Felting and milling properties
14. Average yield of clean wool from the greasy fleece
15. Amount of grease in the fleece
16. Noil yield

* Chief Chemist, Forstmann & Huffman Co., Passaic, N. J.

** Name preferred by Stefansson **ovis** = sheep, **bos** = cattle, **ovibos** = sheep cattle.

17. Chemical constitution, for example, sulphur content, etc.

18. Physical characteristics, elasticity, etc.

19. Dyeing and finishing properties

20. Probable uses to which each type of wool could best be put.

It is obvious that all these characteristics will, if comparison is to be effected, necessarily have to be defined in very precise terms, and suitable standard tests devised so that they may be compared in a proper manner. Coupled with this investigation, information should be secured regarding the various contributive factors during the wool growth, as for example:

1. Geographical location
2. Height above sea level
3. Atmospheric conditions
4. Drought and rainfall, etc.
5. Pasturage, method of feeding, etc.
6. Soil.

Any other factors concerned with purely local conditions of production should be included.

There is another side, namely, the biological factor, which has to be considered, and the conditions under which breeding takes place should be investigated. A note on the biological aspects of wool research will serve to illustrate the vast field of investigation to be covered before the results of the survey can be considered as complete, or have any semblance of finality.

In my own investigations concerning musk-ox wool I was able to find out the greater part of the necessary characteristics. Notwithstanding, my research regarding this wool is far from complete, I still take the liberty to bring forth the following facts concerning the aforementioned matter:

I am completely in accord with Stefansson. In the example of the cashmere goat the opposition of the foregoing is made possible.

The cashmere goat (see picture Figure 20) has a similar outer coat of beard hairs which becomes mixed with the wool hair when being shed. The regular commercial cashmere wool contains about 30% beardhairs and they are successfully separated during carding and spinning, so that the amount in the finished goods is less than one-half per cent. I cannot see any reason why the same thing should not be possible with musk-ox wool. It will not be as easy because of the greater length of the musk-ox beard hairs but no doubt in the hands of a good spinner, the finished product will be nearly as good as cashmere.

The cashmere goat is subject to the same gradual shedding process. Most of the cashmere wool or pashm is secured by combing the animals, when it loosens from the skin. The time required for this collection is from 8 to 10 days. A considerable amount is picked from the bushes, where the animals have rubbed in an effort to remove the sloughing hair. For this reason I do not see any great disadvantage when the wool has to be collected over a certain length of time. The animal which died of pneumonia after being combed in the Zoological Park in New York is no proof at all that the same animal would have died in the sub-arctic zone. The climatic conditions and the weaker resistance of the animal living in captivity was, in my opinion, responsible for its death. In this connection we can say that the collecting of the wool parallel to the gradual shedding process will protect the animal from catching a cold.

I am convinced that the musk-ox wool will become a valuable commercial product after domestication. The amount of usable wool combed from a cashmere goat is 10-14 ozs. per year and it should be possible to get at least 2-3 lbs. from the musk-ox which is three to four times larger. A camel (China) gives about 8 lbs. As with the camel's hair it will be possible to place different qualities on the market according to the amount of beardhair present. By being fairly careful during the combing of the animals, it should be easy to secure from the shoulder parts, a product almost free from beardhairs, which could obtain a similar price on the market than cashmere or even vicuna.

We will be able to produce from this very fine soft down, goods which will be equal to the famous cashmere shawl made by the inhabitants of Kashmir, or the valuable blankets made from vicuna by the Indians of Peru. The finest quality of the finest dress goods will be manufactured by Americans from an American product.

In a letter of August, 1930, W. W. Cory, Deputy Minister of the Northwest Territories of Canada, informed me that the Textile department of the University of Leeds, England, conducted some experiments with musk-ox wool with satisfactory results. My inquiry of the University authorities of Leeds, has up to the present remained unanswered.

After the first part of this article was printed in September (Vol. III, p. 472) and through the courtesy of Dr. Schwarz, the Editor of the MELLIAND TEXTILE MONTHLY, presented to Mr. Vilhjalmur Stefansson, I had the privilege of meeting the great explorer personally, and through his kindness I secured all the missing information about the experiments of the University of Leeds and many more which enable me to place my judgment on a much wider basis.

Influenced through the discoveries of Mr. Stefans-

son regarding the possibilities inherent in the hair and wool of the musk-ox A. F. Barker and F. H. D. Atkinson carried out preliminary researches on these fibers in the University of Leeds during the summer of 1920. In 1921 and 1922 practical experiments were made with the 40 pounds of musk-ox hair received from Stefansson and the work made the basis of a thesis—"The Study of the Ovibos Fiber from a Textile Standpoint" by Frank H. D. Atkinson under the supervision of Prof. A. F. Barker. For this thesis Atkinson received the University of Leeds diploma in Textile Industries in June 1922. This thesis was never printed, but the hand-written original was sent, in September 1922, to Mr. Stefansson and from him it went to the Department of Marine in Ottawa, Canada. The Government of Canada intended to publish the entire thesis together with the report of the 1913-18 Arctic Expedition. This was never done and so one of the most important documents about the musk-ox was withheld for nine years in the archives of a government office. This fact was even unknown to the Department of the Interior in Ottawa, which is in charge of the conserving of Canadian musk-oxen. *(To be continued)*

Courtesy: J. E. Dollmann, British Museum Natural History, London.
Fig. 20. Cashmere or Shawl Goat