The Identification of Textile Fibers

By Dr. Louis J. Matos

Animal Fibers.

Textile fibres belonging to this group are obtained chiefly from the sheep, goat, cow, and other hair-bearing animals. This broad grouping may also be extended to include those fibers that are not directly included in the particular division of "spinning fibers"—textile fibers proper, which comprise the various kinds of fur fibers, many of which are made use of in the manufacture of hats of various kinds.

The most common animal fiber is *wool*, a product of the sheep, and is microscopically distinguished from all other fibers described in the preceding articles, by certain characteristics illustrated at Fig. 21.

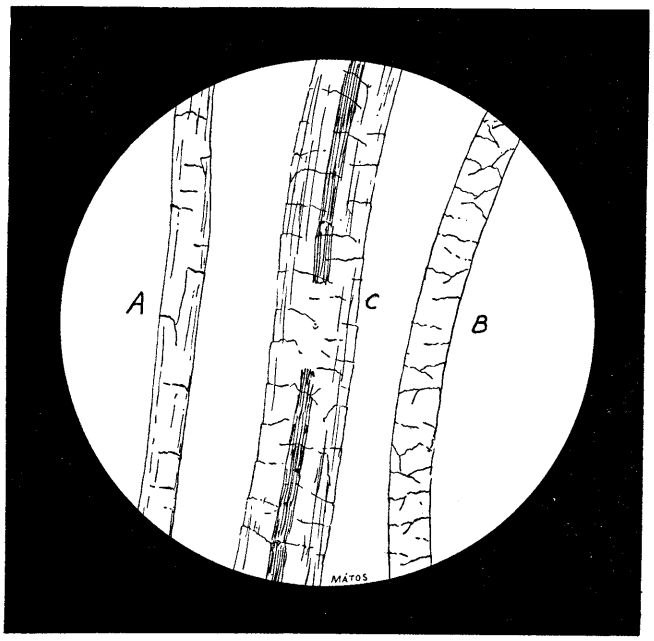

Fig. 21. Typical Wool Fibres. A, Immature or under developed wool fibre. B, Normal wool fibre of good quality. C, Coarse wool fibre, showing the central core.

Viewed under a microscope of moderate power, normal fibers of sheep's wool are seen to be more or less round in cross-section, and when viewed longitudinally appear somewhat wavy. On the surface certain markings are noticed, which under a high magnification are seen to be scales overlapping each other like roof shingles. The ends of normal wool fibers are characteristic. The end nearest the back of the animal may be either cut sharp, as though by a knife, indicative of wool shorn from the animal, or it may be broken or have a sack hanging to it, indicative of being pulled wool, that is, wool pulled from the dead animal, Figs. 22 and 23.

The tips of wool fibers are either sharp pointed or nearly so. Wool of the higher and finer grades are very uniform and regular in appearance, but as the quality of the wool decreases, that is, as the breed of the sheep is lower, the coarseness of the wool fiber increases, with certain characteristics showing more and more distinctly.

Comparing high and low quality wools, the latter gradually shows distinct indications of longitudinal striae running for the full length of the fiber, while there are more and more distinct markings of a central core, not lumen or bore, as in vegetable fibers, which is often pigmented as in gray or darker colored wool. Frequently this central core is continuous; in other fibers it is found to be disconnected; the more distinct it appears, the lower is the grade of wool.

In examining wool microscopically, it should be clearly remembered that neither one nor even ten individual fibers taken from one lot of wool supply sufficient evidence to pass judgment upon the grade under test. Many fibers should be taken and tested with painstaking care.

As the grade of wool becomes lower as the coarseness increases, the distinct characteristics of the wool fibre diminish, the fiber gradually assumes the distinguishing marks of hair, which are more or less smoothness, with a less distinct appearance of the external scales, Fig. 24.

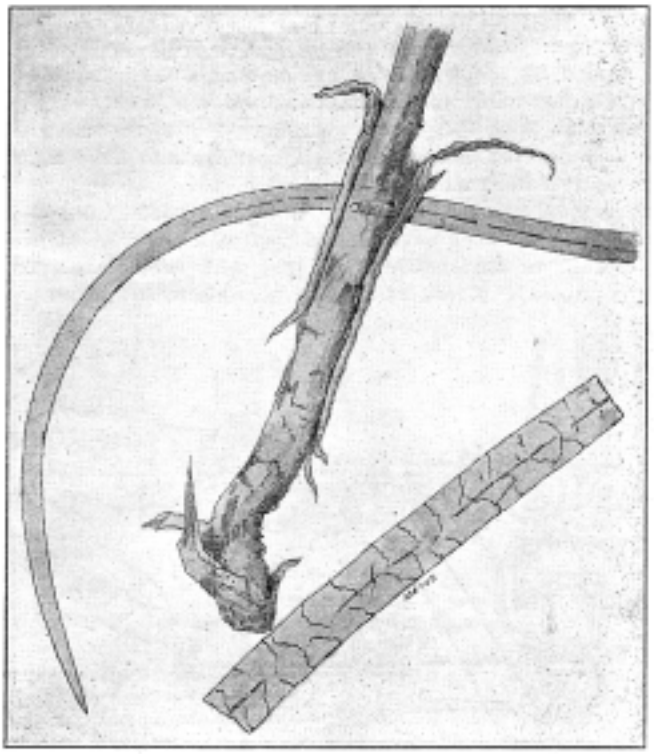

Fig. 22. Typical wool follicle, or root sac. Drawing also shows extremely sharp pointed tip of the wool fibre, and a portion of the middle part of the fibre.

The central core also has in most instances greatly increased in diameter, so that the outer wall of the fiber becomes correspondingly thinner.

These *wool* and *hair* characteristics should be constantly kept in mind as showing that there is no sharp line of demarcation separating wool from hair, and that it would be extremely unsafe to state that a given fiber of unknown origin, having all the microscopic characteristics of sheep wool actually came from a sheep, unless the chemist himself drew the sample from the animal. The writer was a witness in an important lawsuit involving duties on imported wools, in which the origin of a sample of wool figured. A number of wool experts testified that a certain sample in evidence was sheep's wool, when, as a matter of fact, the sample was taken from the carcass of a mountain goat.

Sheep's wool, as well as all other fibers of animal origin, including silk, has the property of dissolving in a solution of caustic potash or caustic soda, and this property seems to distinguish it from all vegetable fibers. This reaction is made use of to determine the amount of vegetable fiber and wool contained in a given sample of cloth.

Another characteristic of sheep's wool is the property it possesses of turning black or brown when boiled with a solution of plumbate of soda. The coloration is due to the forma-

tion of sulphide of lead, owing to the presence of sulphur in the wool.

To make the test, a small portion of the sample is thoroughly cleaned by repeated washing with distilled water in a test tube. After the final washing with distilled water, pour about one inch of water into the test tube, then add a few drops of the solution of plumbate of soda, and heat to boiling. Note the gradual discoloration of the fibers.

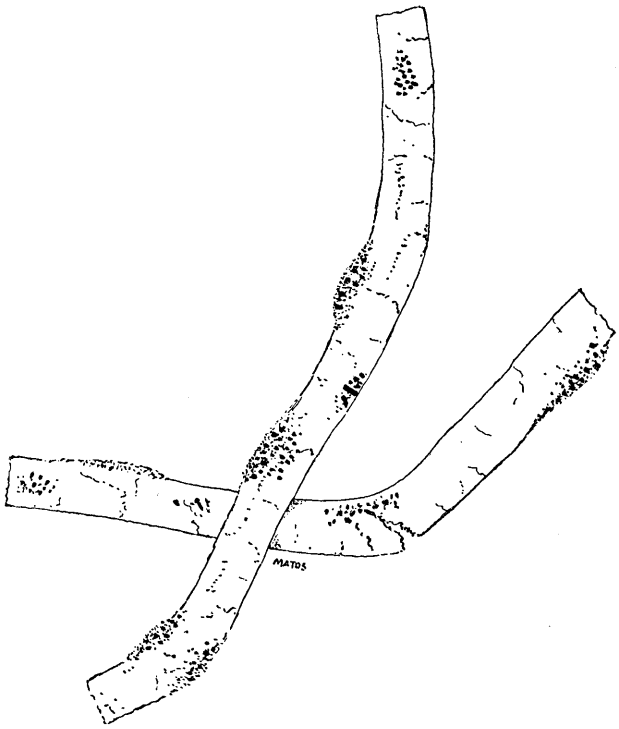

Fig. 23. Typical wool fibre in the grease.

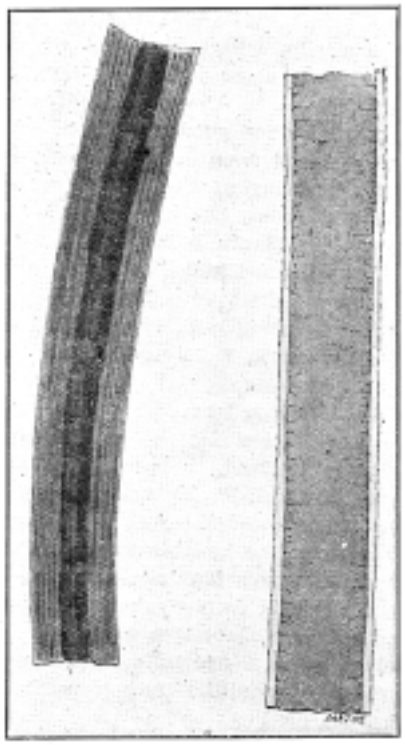

Fig. 24. Typical Cattle Hairs. Hairs showing the characteristics illustrated are common in many of the coarser wool fabrics, notably carpets and rugs.
A. Red Cow Hair.
B. White Hair.

ORDER BLANK.

The form showed this month is used by the superintendent of a cotton weaving mill for giving orders for goods to be woven. In addition to the number of pieces, this order gives particulars as to the construction of the cloth, take-up, loom efficiency required, speed of looms, tailings, length of woven cut, delivery of goods, number of looms to be put on this order, and number looms run by one weaver. Four copies of the order are made out, one for the slasher room, one for the weave room, one for the cloth room, and the fourth to be kept on file in the superintendent's office. In this way full particulars of the construction of the goods, number of pieces to be made, and dates of delivery are on file in the different departments having the work in charge.

Mill ORDER 1473

May 8 _19

SAMPLE NO. 1473

Pcs. 500
Tailings 5%
Length 60 yds.
Delivery 10% weekly Begin July 6
Looms 40
Looms per set 8

Width 40
Count 88×80
Weight 8.50
Warp 60s Ends 3552
" "
8% Take-up
Filling 105s 80%
8% take-up 160 per min.
Weaving 80% Efficiency
Price

Henry Jones, Supt.

REMARKS:
Start 8 looms soon as possible.

THIRD INTERNATIONAL COTTON CONFERENCE.

The most important result at the Third International Cotton Conference, held at New Orleans, Oct. 13, 1916, was the forming of a permanent organization, which will enable all branches of the world's cotton trade to get together from time to time and confer on the trade questions that call for attention. The officers at the Conference are: President, Sir A. Herbert Dixon, England; general secretary, Rufus R. Wilson, United States; assistant secretary for Europe, Frank Nasmith, England; joint treasurers, Sir James Hope Simpson, England; W. Irving Bullard, United States; vice-presidents, United States, Fuller E. Callaway and Russell B. Lowe; England, Edward B. Orme and John Smethurst; France, G. Baden; Belgium, Jean deHemptine; Switzerland, John Syz; Italy Giorgio Mylius. The next conference will be held in England in 1921.

The resolutions adopted at New Orleans with the approval of the eleven classes of representatives endorsed the plan for cotton warehouses to issue negotiable receipts, uniform classification of cotton, research work in cotton growing and a scheme under which the War Finance Corporation would buy foreign promises to pay for the purpose of enabling foreigners to buy American products.