NATURE, COMPOSITION, AND TREATMENT OF ANIMAL AND VEGETABLE FABRICS.

THE inseparable duties of studying the composition of the various animal and vegetable fabrics, as also their nature—when in contact with the various mineral, vegetable, animal, and gaseous bodies applied in the individual industries—should not devolve upon the heads, chemists, or managers of firms alone. It is most important that every intelligent workman, whom we cannot expect to acquire a very extensive knowledge of chemistry and perfect acquaintance of the particular nature and component parts of fabrics, should at least be able to thwart the possibility of the majority of accidents brought about in regard to the quality and aspect of materials treated by them.

In the treatment of wool the first operations are of no mean importance, and the whole subsequent operations and final results, almost as a whole, depend on the manner in which the fleece washing had been effected. In presence of suintine, as also fatty matters, as well as the countless kinds of acids deposited on the wool through exudation from the body, etc., the various agents and materials cannot act and deposit as evenly as might be desired, and the complete obliteration of the former therefore becomes an absolute necessity.

For vegetable fabrics a great technical and practical knowledge is already requisite in their cultivation itself, and before any operations are necessary at all. One of the greatest points is the ripeness of the fibers. It is almost an impossibitity to produce delicate colors on vegetable fabrics which were gathered inopportunely. Numerous experiments have been made on cotton containing smaller or larger quantities of unripe fibers, and after the necessary preceding operations, have been dyed in the rose, purple and blue colors, and the beauty of the shades invariably differed in proportion to the greater or lesser quantities of unripe fibers contained in the samples, and by a careless admixture of unripe and unseasoned fibres the most brilliant colors have been completely spoiled in the presence of the former. These deficiencies of unripe vegetable fibres are so serious that the utmost precautions should be taken not only by planters to gather the fibres in a ripe state, but the natural aspect of ripe and unripe fibres and their respective differences should be known to the operators of the individual branches in the cotton industry themselves.

The newest vegetable fabrics, as *ma* (China grass), pina, *abaca* or Manilla hemp, *agave*, jute, and that obtained from the palm tree must be tended with equal care to that of cotton. The *ma* or China grass, is obtained from *Boehmeria nivea*, as also from the less known *Boehmeria puya*. The fibres of this stalk, after preparing and bleaching, have the whiteness of snow and the brilliancy of silk. By a special process—the description of which we must for the present leave in abeyance—the China grass can be transformed into a material greatly resembling the finest quality of wool. The greatest advantage afforded in the application of China grass is, moreover, that the tissues produced with this fiber are much more easily washed than silks, and in this operation they lose none of their beauty or their quality.

The *abaca* is produced from the fibrous parts of the bark of the wild banana tree found in the Philippines. Its botanical denomination is *Musa Troglodytarum*. The *abaca* fiber is not spun or wrung, but is jointed end to end. The threads are wound and subsequently beaten for softening, and finally bleached by plunging in lime water for twenty-four hours, and dried in the sun.

The *pina* is a fiber obtained from the leaf of the anana tree (*Bromelias ananas*), and is prepared in the same way as the *abaca*, but extreme care must in this case be observed in culling the fibers in order to sort in accordance with their degree of fineness.

The Arabs manufacture the stuff for their tents with a mixture of camel's hair, and the fibrous flocks (kind of wadding) obtained from the stalks of the wafer palm (the *chamœrops humilis*).

The tissues used by the Arabs are coarse and colored, but the palm fibers—when freed from gluten, which makes them adhere more strongly—are susceptible to divide in a most astonishing manner.

The *Agave Americana* is a coarse fiber, mostly used in France for the manufacture of gobelin carpets, and the production of ropes. Great efforts have been made to bleach it in a satisfactory manner, as is done with the *phormium tenax*, but the former kind of fiber resists the ordinary treatment with lyes, etc., and an appropriate bleaching process has only been discovered quite recently.

Jute, which by many is confounded with *phormium tenax*, or New Zealand lint, is a fiber which can be divided as finely as desired, and can be most beautifully bleached.

The jute or Indian *paat* is generally known as a fibrous and textile fabric, obtained chiefly from Calcutta, and is similar in nature to the *corchorus capsularies*, an Oriental species, known in Oriental India by the name of *hatta jute*, and *gheenatlapaat*. This fibrous plant has the property of dividing into the finest parallel fibers, which can be carded without difficulty, and may be said to have the excellent properties of linen, hemp, and cotton at once. When properly bleached, it has an aspect which is as beautiful as that of silk. A mixture of silk and jute can be easily worked together, and can also be mixed with such vegetable fibers as cotton and linen. An immense quantity of flannel and other stuffs are now manufactured and imitated with the different mixtures containing jute.

The *suun* is a fiber of a plant in the form of a cane (*crotalaria juncea*), and the paat or *suncheepaat* is the thread of a species of spiral (*corchorus olitarius*), sold under the name of jute tissues.

The cotton tissues lose about twenty-five per cent. of their weight in bleaching, five per cent. of the substances are dissolved through alkalies, and the other twenty per cent., which are not attacked directly through the alkalies, are removed through chlorine, acids and the water itself. The linen and hemp tissues contain eighteen per cent. of substances which are soluble in alkalies, and they lose from twenty-seven to thirty per cent. of their weight when taken through the consecutive bleaching operations.

The substances do not alone include the substances contained in the fabric originally, but also such as are deposited in the preliminary treatment of the fabrics, as dirt from the hands of the operator, and gluten soluble in warm water; as also glue or gelatine, potash or soda, starch, albumen, and sugar, used by weavers, etc., and which are all soluble in water; further, such as greasy matters, calcareous soap, coppery soap, resinous or gummo-resinous matters, and the yellow and green coloring matters contained in textile fabrics, which are soluble in caustic soda; and finally, the earthy constituents which are soluble in acids.

The nature and compositions of silk and wool is diametrically opposed to that of the former. The silk is more of a gummy nature, and is susceptible to decompose into a kind of gelatinous mass if specially treated.

The yellow coloring principle in silk was found only to be contained in a very small proportion, and consisting of several distinct bodies.

The wool contains, firstly, a fatty matter which is solid at an ordinary temperature, and perfectly liquid at 60° C.; secondly, a fatty matter which is liquid at 15° C.; thirdly, a fibrous substance which essentially constitutes the wool in the strict sense of the word.

The wool at least contains three important principles, as it will be known that the fibrous substance disengages sulplur and hydrosulphuric acid without losing its peculiar properties; and it therefore appears probable that the sulphur entered as an element in the composition of a body which is perfectly distinct from the fibrous substance aforementioned.

In treating wool with nitric acid, and taking all possible precautions to determine as accurately as possible the quantity of sulphuric acid produced by the contents of sulphur in the wool by the reaction with chloride of barium, it will be found to contain from 1·53 to 1·87 per cent. of sulphur.—*Wool and Textile Fabrics.*