

produced is very desirable and pleasant, being almost in its softness and beauty equivalent to silk in its effectiveness, but it can only be employed in small quantities and with the most judicious care. Lard can never be used unless it is completely and thoroughly boiled in with the starch. The wax products always give a hard, glossy finish, and soap of various kinds generally produces a mild feel and a moderate degree of lustre. One of the peculiar materials for use in this connection is magnesium chloride, and like lard, it must be carefully used, since cloths that have been finished with it are very apt to get soft and flimsy and lose their finish entirely if they are exposed to moisture. It may be used in connection with China clay. But as hinted before, it must not be employed where the cloth is expected to retain all its stiffness and lustre for any great length of time, since it does not require very much exposure to the moisture of the atmosphere to rob the goods entirely of its effects.

In our study of the various agents employed in finishing we must mention a few that perhaps are of minor importance, and yet which occasionally come up for the finisher's attention, and call for some knowledge of their qualities and uses. There is, for example, the material which is known as senegaline. It is used in small quantities, and is added in this manner to the different finishing agents that are employed under certain peculiar circumstances. Senegaline is in fact a starch disintegrated by soda lye, and then subsequently neutralized by the use of hydrochloric acid. We understand that in Germany this material is used quite extensively. It has the faculty of dissolving quite thoroughly when it is boiled in water for about five minutes and is completely transparent. It also possesses the very necessary quality of combining quite readily with the other finishing agents, and of being free from any danger of attacking the colors that may be present in the goods. If it should happen that the material has been kept or stored for any length of time, or if it is maintained at a low temperature, it becomes harder, and is rendered somewhat opaque. Whenever these conditions do obtain, it is only necessary to boil the solution a little longer, and the result will be all that is required. The use of senegaline in textile fabrics produces a very pleasant, pliable, soft feel. It also has the advantage of giving a lustre, and if goods are to be finished with the calender, it will be found of considerable value by reason of its lustre producing quality, and because in addition to this, it always prevents cracking or breaking in the finish of cloths that have been very considerably weighted with china clay.

In the use of all the starches the question as to their preparation requires some attention and the mere item of the boiling of the starch is of more importance than would at first appear. Naturally there is a diversity of opinion. Some say that starch ought to be boiled quite a length of time, even though it is well thickened and apparently quite ready for use. Others say that the starch should not be boiled excepting long enough to have it begin to thicken in its consistence. Perhaps the best way to settle the matter is in the way of a kind of a compromise. If a cloth is to be very heavily calendered, and is not expected to be very flimsy, it will be well perhaps to boil the starch for some time longer than under other conditions would be required. On the other hand, if the cloth is to be weighted to any considerable extent in any way whatsoever, it is advisable perhaps to boil the starch paste or liquor a shorter time than we would in the case above referred to. The boiling of the starch paste is usually accomplished in a copper or wooden kettle by the use of direct or indirect steam. Suppose, for example, a finishing mixture something as follows: Fat, china clay, wax, etc. is to be boiled. The procedure will be something resembling this order. The china clay is first dissolved in lukewarm water, the wax, soap or fat is then

added to the solution, and the whole is poured into the boiling kettle. The liquor is then raised to the boiling point, and boiling is continued until it is evident to the observer that the different substances are entirely dissolved. To reduce the temperature of this mixture to about 120 degrees F., cold water is added. Now at this stage the starch which is to be employed is dissolved by mixing it in luke-warm water, and passing it through a sieve. This solution is then poured into the boiling kettle along with the material that is already there, and the whole is brought to a boiling point again, during which time the mass is carefully and constantly stirred. Another method that may be employed is to boil the china clay separately, and then add it to the starch mixture, heating the whole mass to 120 degrees F., and then afterwards adding the fat or other ingredients, and boiling the mixture until the proper degree of subsistence and clearness has been reached. When using starch in finishing operations, it is not always necessary that the very best quality should be employed. On certain grades of goods, such as black and gray lining, for example, where the weighting seems to be the principal factor, a starch of a second grade may be employed. If, however, a first grade starch is used, it may be mixed with a little china clay.

### THE TREATMENT OF KNITTED FABRICS.

After the fabrics have passed through the preliminary stages of manufacture, and finally assumed their form of stockings, pants, jackets, etc., they have to be treated in various ways, bleached, scoured, dyed or finished, before they acquire a salable form and are ready to be put before the buyer. Now, if there is one feature a knitted fabric should possess as perfectly as it is possible to possess it, it is elasticity, and every one concerned should use his best endeavors to secure this end. While the knitter may do much to promote the obtaining of the greatest amount of elasticity by attention to various little matters, we are concerned here only, says a writer in the *Dyer and Calico Printer*, with such operations as the fabric passes through after it has been knitted, and which, according to the care or carelessness with which they are carried out, may have a considerable influence on the degree of elasticity the finished fabric possesses. Now, these various processes are oftentimes but indifferently carried out, the operator either does not know, or does not trouble to know, in what manner the quality of the goods he is handling is affected by the manner in which he scours, dyes, or finishes them. He may, perhaps, have only regard to the appearance of them and neglect the real feature, elasticity, which they should possess, and which really has a very important bearing upon the wear and life of the goods.

The first treatment the goods undergo is that of cleansing or milling, and in this they may suffer greatly. Before the wool can be spun and knit, it must be oiled or lubricated, and while knitters are apt to regard the oiling as a secondary feature in the process, yet largely upon the care with which it is carried out, and the quality of the oil used, much depends. It has to be remembered that whatever oil is put in must be taken out again before the goods can be bleached, dyed or finished; now there are, roughly speaking, two kinds of oils, those like olive, cotton, lard are saponifiable, and hence are easily scoured out by means of soda, and those which, like the mineral oils derived from petroleum and paraffin, are not saponifiable, and are only with difficulty scoured out. In the saponifiable oils may be included oleic acid. Now, unfortunately, the mineral oils are very much cheaper than the saponifiable, and to those wool manufacturers who have an eye for cheapness there is a great temptation to use these oils, or mixtures of them, with the saponifiable oils. Oil merchants are constantly offering low grades of wool oils; now these contain very much mineral oil.