twist and well defined wall. Fig. 51 shows a structureless fibre. As unripe or structureless fibre does not take dye well, its prerence injures the quality of the stock.

In its natural state silk is a double fibre (see Fig. 52), being two threads glued together. In the process of "scouring" or "boiling off" these two threads are separated, and under the microscope appear as structureless, transparent, cylindrical little glass rods. There is no spiral character and some are straight and of uniform thickness, while others are irregular and bent. (See Fig. 53).

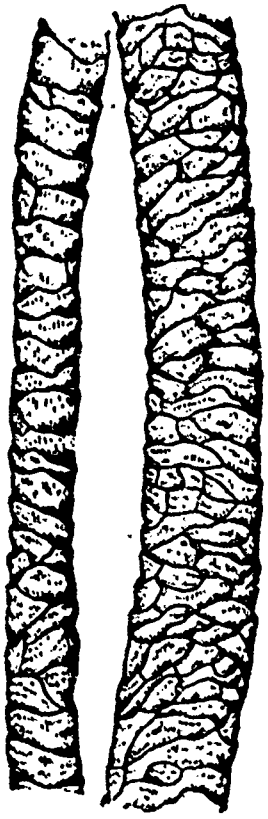

FIG. 56.

FIG. 57

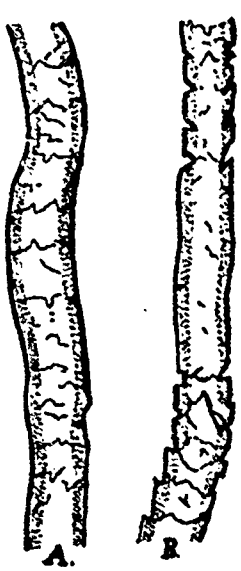

FIG. 58.

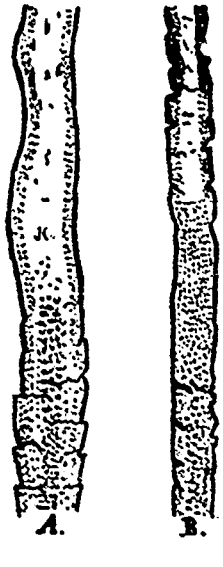

FIG. 59.

The most important wild silk is Tussah (Fig. 54); it requires bleaching for bright colors.

Weighted silk is readily distinguished by means of the microscope, the accompanying illustration, Fig. 55, representing weighted silk waste as appearing when viewed with the microscope.

Wool is readily distinguished from other fibres by means of the microscope, being built up of an immense number of epithelial cells, scales or serrations, as shown in the accompanying illustration, Fig. 56, representing a typical wool fibre under the microscope. The amount of these scales found per inch varies with reference to quality—the finer grades having more, and the coarser less. If these scales cannot be readily seen, treat the fibres in question with *ammoniac copper*, and the scales will become distinctly visible to the eye during the swelling up of the fibres.

Another feature of wool is its *wave of the crimp*, which agains varies with reference to the different grades of wool found in the market. The more scales per inch and the more wavy in construction the fibre, the more its felting capacity.

Untrue fibres (caused by neglected or sick sheep), now and then found in wool, are readily ascertained by means of the microscope, as seen by the accompanying illustration, Fig. 57, representing two such fibres as termed untrue, and which will readily show that where these abnormal forms occur there are changes in the form and size of the epithelial scales of the outer layer, as well as in the diameter of the fibre, consequently the internal structure of the fibre must be equally affected, thus reducing the strength and elasticity on such fibres, and consequently decreasing the value of such lots of wool, as well as fabrics, in which these fibres are found. Kemp wool fibres are hairs of dead silvery white, thicker and shorter than the regular wool. They do not seem to differ in their chemical composition from the good or true wool fibres, but they present different mechanical arrangement, and possess no absorbent power, thus resisting either entirely or partly the entrance of dye-stuffs, and in the latter case even producing a different shade from the good fibres of the same lot, hence they will be readily detected.

Figs. 58 and 59 are given to illustrate the various degrees of these kempy fibres. Fig. 58, *A*, is a fibre where the kempy structure continues throughout the entire fibre, which looks like a glass rod, yet has short and faint transverse lines which indicate the margins of the scales. When the change is complete, even the application of caustic alkali fails to bring out the lamination of the scales distinctly, and they seem to be completely attached to the body of the fibre up to the top of the scale. In some instances even the margins of the scales are quite obliterated, and the entire surface of the fibre has an appearance resembling frosted silver. In Fig. 58, *B*, a fibre is shown where