skein weighs, is the count (or denier) of the yarn. (This is the denier system approved by the Paris Conference and the one used in the United States.)

"International Denier" Raw or Thrown Silk Count.

The skein is 500 meters (546.81 yards) and the number of 5 centigrams (0.05 grams) that such a skein weighs, is the count (or denier) of the yarn.

"Turin Denier" Raw or Thrown Silk Count.

The skein is 476 meters (520.56 yards) and the number of 0.05336 grams that such a skein weighs, is the count (or denier) of the yarn.

"Milan Denier" Raw or Thrown Silk Count.

The skein is 476 meters (520.56 yards) and the number of 0.0511 grams that such a skein weighs, is the count (or denier) of the yarn.

"Old Lyonese" Raw or Thrown Silk Count.

The skein is 476 meters (520.56 yards) and the number of 0.05311 grams that such a skein weighs, is the count (or denier) of the yarn.

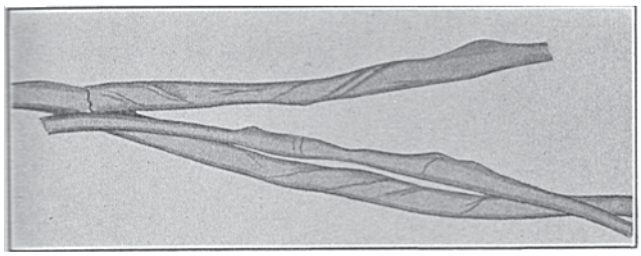


Fig. 28

"New Lyonese" Raw or Thrown Silk Count.

The skein is 500 meters (546.81 yards) and the number of 0.05311 grams that such a skein weighs, is the count (or denier) of the yarn.

American and Manchester "Dram" Raw or Thrown Silk Count.

The hank is 1,000 yards, and the number of drams that such a hank weighs, is the count (or dram) of the yarn. Fractions of $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ drams are used with the fuller sizes.

FABRIC ANALYSIS

ASCERTAINING RAW MATERIALS USED IN THE CONSTRUCTION OF FABRICS.

(Continued from page 9.)

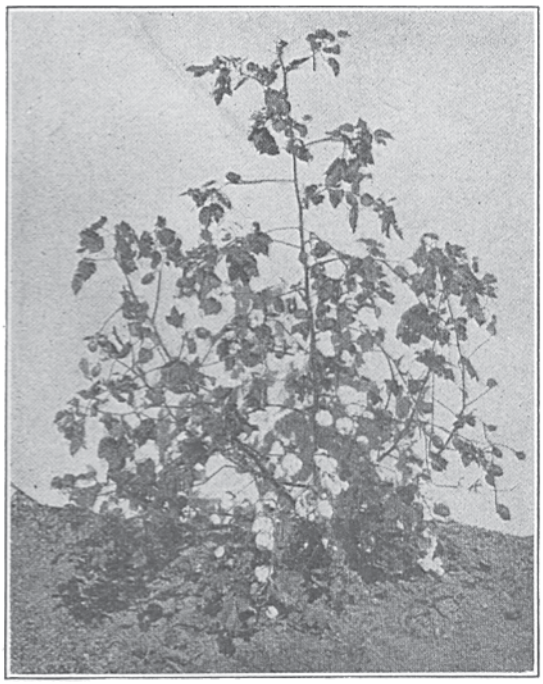
SILK. Cultivated, *i. e.*, true silk or wild silk is met with either as thrown or spun silk. The latter is readily distinguished by its broken up lengths of fibres composing the thread, as compared to the endless fibre of thrown silk.

True Silk, when in its natural or gum condition, consists of a double fibre, and viewed under the microscope (see Fig. 26) has the appearance of two fibres cemented together at intervals as it emerges from the silk worm. When scoured, degummed, or boiled-off, the two individual fibres are separated, as shown in Fig. 27, which in its right hand illustration also shows cross sections of fibres. From this illustration it is seen that the surface of the fibre is smooth, transparent and structureless, with occasional little nodules in the side of the fibre. It resembles a cylindrical glass

Fig. 29

rod, in some portions uniform in thickness, while at others of somewhat irregular diameter.

Wild Silk differs from true silk in being much coarser in diameter. Under the microscope the fibres show numerous longitudinal striations. Occasionally, characteristic broad diagonal markings across the surface are seen and which are due to the impression left by another thread upon the fibre. Fig. 28 shows Tussah silk boiled-off, clearly revealing those diagonal markings previously mentioned. Wild silk has a dark color, which cannot be removed except by means of a powerful bleaching agent; its lustre, softness and elasticity is inferior to those of true silk.



COTTON PLANT AT FULL MATURITY
Showing Bolls Open or Ready to Open.

COTTON. When viewed under the microscope, fully matured or ripe cotton fibres have the appearance of spirally twisted bands or ribbons, with finely-

granulated markings. A grooved appearance will be also noticed, on account of the cell walls being thicker at the edges than in the centre. Fig. 29 illustrates cotton fibres, of which *A* shows two unripe or dead fibres, by which is understood that such fibres have not attained full maturity. Their detection is very important, since their presence is very detrimental to yarn and fabric. They are recognizable by the very thin transparent filaments, which, though ribbon shaped, are not twisted, and do not exhibit the slight-

Fig. 30

est trace of lumen in the cell. *B* shows us a specimen of a half ripe fibre, and which is a medium between ripe and dead fibres, and in conjunction with the latter, according to amount present in a lot of cotton, depreciate its value to the manufacturer, such fibres being the result of the cotton being removed from the pod before fully matured. *C* shows us two specimens of matured or fully ripe fibres. These are hollow nearly throughout their entire length, with the exception of

Fig. 31

the end which had not been attached to the seed. This hollowness of the ripe fibre allows the dyestuffs to penetrate, and produce evenly dyed yarns or fabrics, whereas unripe or dead cotton, which practically has no central cavity, is very difficult to dye, and frequently appears as white specks on dyed pieces, particularly in such as are dyed indigo blue or turkey red.

FLAX, when viewed under the microscope, see Fig. 30, has the appearance of long grasses or reeds, with bamboo-like joints or nodes, arranged at regular intervals. The cell wall is regular in thickness and

FLAX PLANT.

HEMP PLANT.

RAMIE PLANT.

JUTE PLANT.

leaves a narrow internal channel, which, if visible, appears as a fine dark line. When bleached, the flax, *i. e.*, linen fibre, becomes snowy white and lustrous.

JUTE, if viewed under the microscope, is shown to consist of stiff lustrous and cylindrical fibrils, the walls being irregular in thickness, with a comparatively large central opening. Fig. 31 shows specimens of jute fibres magnified.

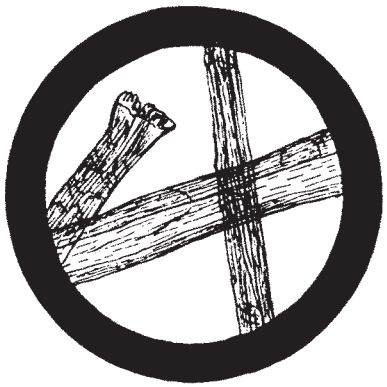


Fig. 32

RAMIE. These fibres are about twice the breadth of that of cotton, and appear under the microscope as a broad flat ribbon. Ramie fibres in the raw state have a soft, silky feel, but by pulling the staple, this quality becomes reduced and gives way to more or less harshness in the feel. Fig. 32 shows specimens of the fibre.

Fig. 33

HEMP. A view of this fibre is given in Fig. 33. It somewhat resembles that of flax, being however coarser and consequently stronger.

(*To be continued.*)

The supply of cotton in the United States for the year ended August 31, 1911, according to census returns, was 13,873,423 bales, consisting of 1,040,040 bales of stocks carried over from the previous year, 12,384,248 bales of cotton ginned during the year, 231,191 bales imported and a remainder to balance distribution. In 1910 the supply was 12,188,021 bales, and in 1909, 15,312,885 bales. The exports in 1911 were 56.1 per cent.; home consumption, 34 per cent.; while 9.9 per cent remained in the country at the close of the year.

GAUZE OR LENO WEAVING.

(*Continued from page 6.*)

Another step for constructing fancy gauze fabrics is to use two doups in connection with four or more ground-harnesses.

Figs. 20 and 21 are given to illustrate subject, Fig. 20 represents the drawing-in of the ground-harness set and the threading of the doups. In the same, we find two sections, *viz.:* ground-harnesses 1 and 2, with doup 1′, forming section 1; and ground-harnesses 3 and 4, with doup 2′, forming section 2.

In drawing-in and threading doups, we arranged two repeats for each section, thus 8 warp-threads in repeat of arrangement of pattern. This method of drawing-in the ground-harness set as well as threading of doups will, as shown in fabric Fig. 21, allow us to operate each section independent of the other at

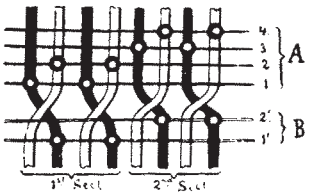


Fig. 20

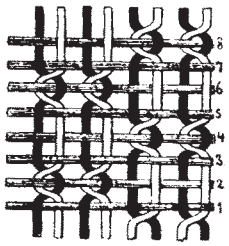


Fig. 21

different picks, providing means for thus forming additional figure effects in the fabric.

Fig. 22 shows the plan of another fancy gauze fabric produced with two doups. Fig. 23 illustrates the method of drawing-in the ground-harness set and the threading of the doups, which in the present ex-

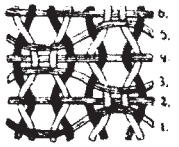


Fig. 22

ample is a right-handed and a left-handed doup for each set. Four ground-harnesses are used in connection with the two doups. Ground-harnesses 1 and 2

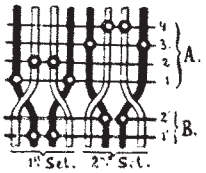


Fig. 23

(*A*) and doup 1′ (*B*) comprise the first set; ground-harnesses 3 and 4 (*A*) and doup 2′ (*B*) comprise the second set.

Fig. 24 illustrates another fancy gauze fabric, produced with two sets of doups.