

On the arrival of the first vessel laden with silk the companies were required to send in sealed tenders, and the price per hyo was fixed by striking the balance between the highest and lowest bid. But the quantity allowable for each company to purchase was not fixed, as in former days, and this soon led to practices which the authorities deemed undesirable, and hence the old restrictions as to the quantity to be purchased were, in 1685, again enforced. It must be understood that the quantities given above were only proportionate and relative to the total quantity of silk annually offered for sale. However large the purchases which in any one year a company desired to make, it had to maintain its ratio vis-a-vis other companies, unless in rare cases, where, for some reason, another company wished to forego its rights.

The same year in which the above restrictions were enforced witnessed the passing of regulations limiting the total value of silk purchasable annually from China to 8,000 kwamme of silver and that from Holland to 50,000 ryo. At this time two government officials were appointed to superintend the distribution of the silk which arrived year by year among the various companies. The companies seem to have increased their membership and to have elaborated large organizations as time went on.

To take one instance, the Sakai Company originally consisted of some four or five traders, but in 1757 we find it had a membership of 150, with six directors, called toshiyori, and that it purchased during the year 5,000 lbs. of raw silk. The officers of the company were remunerated as follows.—The six directors received annually fifty pounds of silk and seven kwamme of silver; two silk inspectors, three kwamme of silver, clerks, 500 me; assistant clerks, 500 me; one servant, 250 me. From 1764 onwards Japanese sericulture grew apace and the import of foreign silk decreased correspondingly. The purchasing companies, though gradually diminished in size, were not dissolved, however, until 1859.

LEATHER BELTS.

Leather, in the process of manufacture, previous to the application of grease, has little strength, and may be torn, according to thickness, much like brown paper. Grease causes such action of the fibers upon each other, that great strength comes back; in fact, the leather may be said to return to a condition akin to its original state as a hide. The ever-fertile mind of the American worker in belt leather has sought for new methods in the greasing process to gain in value of product, but to this day a universal method exists of using tallow and cod oil, these two are usually combined for the flesh side, while cod alone is used on the grain. They are allowed to slowly penetrate the leather which has first been thoroughly wet; the hides are hung in the open air, or in a drying-room, and as the water dries out, the grease penetrates, leaving, however, the stearine of the tallow, which latter is finally scraped off. The future manipulation consists in wetting and stretching, rubbing down, or stoning, finally, much working on the surfaces with a slicker and trimming. A just limit to the quantity of grease which belt leather shall have, has been well determined, to give to it a character of elasticity and toughness peculiar to no other material. It is an interesting fact that the best cod oil contains only a faint trace of an active acid. Also, in using tallow, the active acid principle, the stearine, is left upon the outside to be scraped off; thus, all which penetrates is of a neutral nature, and not injurious to the fiber. Belting is now made and carried in stock in large rolls, and by long standing it becomes dry. When a new belt is put to work upon pulleys there is a rigidity in its character not in keeping with our ideas of a minimum of power to be expended; ordinarily also, when a belt is put to its largest duty, there is more or less slipping. In the first making of iron-faced-pulleys, they were left rough, but pulleys were soon made as smooth as possible by finishing, a belief prevailing that a close contact between leather and iron gave the best adhesion, and then, too, if slipping occurred, less wear came to the surface of the leather. To provide for still better adhesion, pulleys are covered with leather, also with patent covering of paper. There have again come into use pulleys made with iron arms and wood rims, also all wood pulleys. To prevent the slipping of belts, or to make them more pliable and durable, various substances have been used; powdered resin to produce immediate

adhesion, or castor oil to give pliability and adhesion. The first is proved by all experience to be very injurious to leather, causing it to harden and crack. Castor oil has been much used, but never with entire satisfaction, where all conditions of a belt are considered. Castor oil has an active acid principle; also, it is drying in its nature; its continued use saturates a belt and changes its nature from its legitimate state of elasticity and toughness—a belt thoroughly filled with castor oil is in a poor condition, when it comes to repairs. The writer has given much close study to the care of leather belts, with respect to a proper dressing to apply to them, and after eight years' experience, has produced a neutral compound, which thoroughly prevents slipping, while still leaving the leather practically as it comes from the belt-makers' hands. Its endurance is very remarkable, and the quantity necessary to prevent it from slipping is surprisingly small, it leaves nothing further to be desired. The writer does not hesitate to say that, with a polished faced iron pulley, the full value can be had from a leather belt. Whatever the conditions of use for belting, it should be positively kept free from machinery oil, and free from dust, as far as possible. Run the grain side to the pulley. Belts should be run as slack as possible, without, however, so much slackness that a flapping motion can exist, this keeps the fibers from undue strain, saves the laced joints, saves the bearings from unnecessary wear, and, perhaps, above all, prevents the shafting from being pulled out of line. The inquiry is made as to the exact cause of the electricity developed by belts. As I have observed that, in the extreme case of a dynamo belt, running over two-thirds of a mile per minute, no electricity is developed in the belt when my belt dressing is used, the question seems legitimately asked, if the electricity in belts does not come only with slipping.—Fiber and Fabric.

THE BELGIAN SYSTEM OF CARDING.

Swire Smith, Keighley, England, who is considered a good authority on textile matters, recently referred to the competition of the Belgian yarn spinners, and to the 15,000,000 pounds of yarn they send annually to England. He and the late John Slagg, of Manchester, paid a visit to the town of Verviers, some years ago, in order to investigate personally this particular branch of competition. They were surprised with what they saw, the machinery being of the newest and most advanced types, and its adaptation most skilfully planned and arranged so as to turn out a maximum quantity of well spun yarn at a minimum of cost. This yarn was principally spun from the "burry" wools of the River Plate—a class of wool much rejected in England on account of excess of burrs.

They considered the Belgians much in advance in this particular line, and that this competition could not be despised, but was really serious, as the cost was so much less than their own yarns. There was great truth in that statement—a fact which compelled the writer to investigate the cost and system of production for himself, in order to combat this competition in the markets. Finding that he could use Belgian yarns to advantage, as the cost was 15 per cent. less than English, he became a customer and a buyer.

As it is our desire to explain the advantages and disadvantages of the various systems of carding wools, we will take the Belgian system first. The wool yarns are a specialty, and made chiefly from Buenos Ayres wools, or a mixture of those wools and noils, which means the short wools from combing. Buenos Ayres wools are more infested with burrs than any other class, and in the extracting of burrs by machines the staple gets broken, so that the wool is short in staple when ready for carding. Carbonizing the burrs is the most recent process, but both processes tend to shorten the staple, which is wiry and tough compared with any of the English colonial wools.

It is to suit this special class of wool the Belgian carding system has been devised, and it has certainly been developed to a success. The counts chiefly spun are 14's, 16's, 18's and 20's woolen counts, the 16's and 18's predominating. Many spinners limit themselves to two counts, and seldom change a method which avoids a good deal of lost time and keeps the cards in perfect condition. A set of carding machines comprises three single-cylinder machines, with eight rollers to each, and one doffer and one swift or fancy. This is the system of Celestin Martin, the leading machinist in Verviers, who