

SERICULTURE—A GLANCE AT THE HISTORY OF SILK.

BY LOUIS A. BERTRAND.

To the Jacquard loom, a valuable machine invented by Mr. Jacquard, of Lyons, has been mainly attributed the sudden extension of silk manufacture in Europe. This loom is now universally in use, but the magnificent effects it can produce have been nowhere pushed to so great an extent as in France, and particularly in Lyons. The same may be said of Calais in its application of the Jacquard loom to hosiery, or figured silk laces.

The city of Lyons, three hundred and fourteen miles south of Paris, and two hundred and eighty miles north of Marseilles, is the great silk mart of the world. It has a population of two hundred and ninety thousand inhabitants, of whom, one hundred and ten thousand, more than one third of the whole, are engaged in some way in silk manufacture. Of this number only one thousand three hundred are women, and about four or five hundred children. There are over sixty thousand silk weavers. There are nearly six hundred silk merchants; these buy the raw silk from all parts of the world, and with its surplus, they cater to master weavers, who generally have from three to eight looms in their dwellings, and employ weavers to execute the work. In Lyons alone they use, annually, about six million pounds of raw silk, valued before working at about thirty-six million dollars.

Saint-Etienne is for the speciality of silk ribbons what Lyons is for manufacturing the most splendid silk tissues in the world. Saint-Etienne contains ninety thousand inhabitants, and with its suburbs gives employment to twenty-three thousand six hundred and twenty-two persons, of which the greater part are women and girls. It has fifteen thousand looms. According to the Chamber of Commerce, the value of its productions for the year 1885, was sixty million francs (twelve million dollars), five sixths of which were disposed of to the United States, England, and the city of Paris.

Before dropping the present subject, I will say that several of the above historical facts were extracted from the report of Mr. Elliot C. Cowdin, United States Commissioner to the Paris Exposition. Whoever desires to read a more extended account of the silk business in Europe and America, is referred to this able report.

THE BEST MANAGEMENT OF THE SILK-WORMS FOR UTAH.

The annual silkworm (*Bombix Mori*), which produces by far the best silk in Europe, is born in the spring, ordinarily about the middle of May. It feeds on the leaves of the mulberry tree and attains its full growth in about six weeks. During that period it changes its skin four times, and according to Mr. de Quatrefages, of the French Institute, increases its weight seventy-two thousand times. Early in July, having reached its full development, it establishes the workshop of its wonderful manufacture. Placed in a comfortable and secure cocoon, it proceeds to "envelop" itself in a cocoon formed by a filament of exceedingly fine silk, emitted from the stomach of the insect. It soon disappears in the centre of the cocoon or silken envelop, and after about seventy-two hours of unremittent labor, produces a thread ordinarily not less than sixteen hundred yards in length. In that chosen retreat the silkworm again changes its skin, for the fifth time, but the insect which comes out is no longer a silkworm, but a chrysalis—bearing but a slight resemblance to the worm. After two weeks or more, according to the temperature, the skin of the chrysalis cracks, and changing for the last time, it becomes a butterfly, lays some hundreds of eggs, and dies.

Now, without enumerating here the peculiar modes of raising silk in different countries, I will merely say that a successful cocoonery in Europe is, at this time, a very costly concern. The largest in the world is located at Hyeres, a fine town, thirty-six miles west of Marseilles. It is the warmest locality in France. The form of the building is circular; it belongs to the Count de Beauregard, a distinguished sericulturist. Such is the magnitude of this nursery that eleven pounds of eggs, that is to say about eight millions of worms can be hatched and simultaneously fed within its walls. Beginners will be tricked by the name of full nomenclature of apparatus, of tools and scientific implements invented by modern sericulturists or borrowed by them of the "Celestial" breeders. For instance, not only the leaves are carefully selected and cut from their standard and best, but they are cut in the nurseries before feeding the worms, but they are cut with a peculiar knife and distributed with a Chinese sieve. Fortunately, our dry climate is so well adapted to the branch of industry, that we are exempt from all these minute and trifling practices.

I will do my best to simplify, in the full sense of that word, the process of raising these precious insects in Utah. To arrive at that end, the most natural mode ought to be adopted by our breeders. "Give the silk worms air, feed and pure; let them become comfortably warm and dry, and clean; and with sufficient space to prevent them from coming in contact with superfluous supplies of healthy food; these direct instructions, given by Mr. Louis Bertrand to the sericulturists, are sufficient to insure the most perfect success to our infant cocooneries.

**HATCHING THE EGGS.**

The eggs are generally laid on paper or cloth, and must be kept in a cool, dry place in the cellar, where, to prevent them from hatching, the thermometer never rises above fifty degrees. In Europe they have to use artificial heat for their hatching. A special room is used in large cocooneries, and a very ingenious hatching-box (see cut) in small ones. But here in Utah, we have no need of artificial heat. The eggs should be taken out when desired to be hatched, and gradually exposed to the heat of the outside air. A sudden change from a cool to a very warm atmosphere is considered detrimental. The right time for hatching can not be accurately ascertained. But as soon as your mulberries begin to shoot their leaves, you may gradually expose your eggs to a natural heat.

After remaining in a warm atmosphere from five to eight days, the eggs will assume a whitish color, a sure symptom of the formation of the worms inside. They will soon begin to show themselves, and the moment they make their appearance, they begin to look for food. Place some tender leaves from your mulberries on the paper, and they will at once begin their occupation for life—eating.

At the end of the first day, after they begin to hatch, take all the worms off the paper containing eggs and place them on separate papers. This can be done by removing the mulberry leaves upon which they are feeding. Do the same thing for about three days. By this time all the eggs that are good and strong will most likely be hatched. The balance may be thrown away. All hatched the first, second and third days must be kept separate, and for this purpose may be marked first, second and third, by a pencil, on the paper containing them. The object of this division is that you may feed and treat those of the same age exactly alike. One day's difference in the age of an insect that has only from thirty to forty days to live, it must be remembered, is a good deal. And especially is this the case with the silkworm, which in that short period of time goes through five different periods of existence. The transformation from one of these periods to another consists

in shedding the skin, or, in other words, laying off the old garment. These changes are called moultings. While undergoing any one of these five changes, each of which occupies from twenty to twenty-four hours, dependent on the health and vigor of the worms, they will not eat, nor must they be fed, or on any account disturbed. In this fact will be seen the reason for keeping each day's hatching separate; for when the first day's hatching is five days old they begin their first moulting, and if the second day's hatching are mixed with them the latter are not ready to moult, and require feeding. To do this disturbs the former and endangers their lives. The same difficulty and danger will occur at each of the several moultings. Hence the great necessity of keeping them separate; and precaution must be observed or failure, during the hatching period, is certain.

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