SOME QUEER SILK-SPINNERS.

SILKWORMS DO NOT HAVE A MONOPOLY ON THE BUSINESS.

Silk Spiders of Madagascar and America. —Remarkable Sea Shells that produce a beautiful silk.

Silkworms are not the only silk-spinners; for instance, there are certain seashells that are allied to the common mussel and which, extraordinarily as it may seem, produce a strong and beautiful quality of silk.

The pinnas (from a Latin word signifying a wing) as they are called because of their shape, possess the power of spinning, with what is called a foot, a large number of threads in the aggregate forming the cableor byssus by which they moor themselves to the particular spots under the water that they select to occupy. Gibbon the historian tells of a woman in ancient Rome who wore a magnificent dress woven of pinna silk. There is now in the British Museum a pair of gloves made of the byssus of the giant pinna, a species that sometimes attains the length of two feet, and gloves and purses of the same material may be bought at any time in the cities on the Mediterranean coasts.

The Queen of Bavaria is said to have once worn a dress of a still more remarkable fabric woven of silk actually spun by clothes-moths, whose specialty has always been supposed to have been to destroy, rather than to produce materials of which clothing is made.

A Mr. Habenstreet, it appears, having noticed that the larva, or grub, of a particular kind of clothes-moth called the Tinea padella spun an extremely delicate and fairy-like silk, set to work to make fabrics composed of this silk. An opportunity insurmountably difficult first encountered in carrying out his purpose was the fact that the flat patch of silk spun by each of these larvae measured only about half an inch square; but by placing the larvae and making them spin in close proximity to each other he discovered that the squares united at the edges and produced a continuous fabric. Mr. Habenstreet constructed a number of models of paper, oiling the parts not to be covered with silk, and by setting a great number of the clothes moth larvae at work on the surface of his models he succeeded in producing a balloon about four feet in diameter, two shawls literally as light as a feather, and a seamless dress with sleeves. This dress, presented to the Queen of Bavaria and worn by her over her court costume, a frock for which baby clothes-moths not only spun the material but made it up as well, is the most delicate thing imaginable. That which, in the well-known fairy tale, the King's son drew through a finger ring scarcely could have been finer or more compressible. It is, indeed, light to a fault—the merest zephyr is enough to carry the whole dress away.

In the first half of the eighteenth century an enterprising and enthusiastic little Frenchman, M. Bon, turned his attention to spider-webs, and discovered what to him was a new and interesting fact: that female spiders when they had laid their eggs, immediately proceeded to weave webs of strong silken threads, forming cocoons about them. He had conceived the idea that spiders might, to some extent at least, take the place of silkworms, and be made to furnish materials for silk and satin fabrics. It is true that the web used by spiders to capture unsuspecting flies proved on trial altogether too frail and flimsy to be woven into fabrics; but he believed that he had found what he really required in the silk of which spiders' cocoons are composed.

After a competitive contest in which Bon set all the different French species of web-spinners spinning cocoons to discover which was the most available for his purpose, he was led to adopt the "Thomisus" spider, or "short-legged silk-spider," as he called it, as the most productive. He collected all of these that he could, hiring a number of persons to go in search of them.

As soon as he had procured one he put it by itself in a little perforated paper box. After a protracted imprisonment in these miniature Bastiles, during which time Bon found his time principally occupied in catching flies and feeding them to his prisoners, he inspected his paper cells and found to his great delight that the majority of the spiders had beguiled the weary hours of their confinement by spinning cocoons. Bon removed the cocoons from the paper boxes, put them into warm water and washed them thoroughly. Next he boiled them for three hours in water in which was dissolved soap, saltpeter and gum Arabic. When taken out, and the soap rinsed from them, the cocoons were seen to be composed of fine, strong, ash-colored silk. They were carded after being dried thoroughly. The carding was an easy matter, and he affirmed that the threads he obtained were finer and stronger silk than those produced by the silkworms.

However, there happened to be a rival experimentalist in the field at the time—the celebrated Rene Antoine Ferchault de Reamur. As soon as the latter became aware that an obscure individual of the name of Bon was presuming to find out some things about spiders, he lost no time in having himself despatched by the Royal Academy of Paris, of which he was a prominent member, to investigate the matter. There could be only one result: All of Bon's statements were discredited and his claims incontinently dismissed. In vain the poor man wore gloves and stockings of spiders' silk and presented them to learned societies. After the expenditure of time, labor and money, he retired to hide his head in the obscurity from which he had temporarily emerged, while the nobly-born de Reamur wrote a paper on the possibility of spiders being used to produce silk—a famous paper, which became so widely known that the Chinese Emperor caused it to be translated into Chinese. But the noble French people never forgot good M. Bon and his spiders.

Pere Camboni, a French Roman Catholic missionary, when sent to a mission in Madagascar, noticed with surprise the enormous spiderwebs that spred networks of golden wire over the trees and bushes in the gardens of the quarters occupied by his fraternity. The threads composing these webs were so strong that, remembering Bon and what he had accomplished with French spiders, it occurred to him to try what could be done with the greatly superior silk of the Madagascar spiders.

He began by collecting the numerous webs, and with infinite patience he carded and spun them; but the fabric woven from this silk, though immensely strong, was commercially of no value, on account of the irregularity of the threads. Determined not to be beaten, however, he tried by every means in his power to obviate this difficulty, and at last managed to draw the silk directly from the abdomen of the spider, inclosing the insects in old match-boxes for the purpose. It is precisely this principle which is followed in the schools of Madagascar today, and the good father can honestly claim to be the inventor of the system.

The French have taken the subject seriously, and professional schools have been founded for the scientific propagation and the cultivation of the spiders and for the instruction of the natives in winding, spinning and weaving the silk. These schools are due to the initiative of General Gallieni, and are the most useful works instituted by that energetic officer, supplying as they do immediate employment for the natives, as well as forming a nucleus of an industry whose end in this age of progress it is impossible to foresee. The spider, which the natives call "Halabe," belongs to the Nephila, a genus of large spiders found in tropical and semi-tropical countries, and noted principally for the size and strength of the webs they spin. Captured in the mango groves and brought to the school in large, square baskets, they require immediate attention, or the opening of the baskets, sad to relate, will reveal in each a striking and undeniable instance of the "survival of the fittest" in perhaps one solitary survivor, who has eaten up all its fellow-prisoners.

Not only does my lady feed upon her companions, but when occasion offers has no hesitation in devouring her husband. Indeed, he is an insignificant, half-starved, dingy-looking mite, not more than a tenth the size of his mate, whom he fears and worships. When united to the spider of her choice, having incontinently eaten all her unsuccessful suitors, Madame Halabe begins to look about her for some locality where provisions for herself and her coming brood are likely to be found close at hand. Many of the spiders discover these in the immense mango groves of the Royal Gardens at Tananarivo, the Capital of Madagascar, and here the creatures are to be found in great numbers.

As soon as they are taken from the baskets they are placed in a case divided into pigeonholes or square cells like those in which letters are placed in country post-offices. A spider is placed in each cell, with the abdomen projecting on that side of the cell from which the silk is to be drawn. The body is caught and secured by a flat piece of wood in which a half-moon-shaped notch is cut. This piece slides up and down across the back of the cell, and is adjusted to catch the spider just in front of the abdomen and hold it motionless. The legs are brought forward, and they and the head and forward part of the body are in the cells, while the abdomen emerges beyond it on the farther side of the notched piece of wood. Great care is exercised in placing the spiders in their cells so as not to hurt them.

The threads are now drawn from the abdomen of the halabes. This is done by gently laying a finger on each spider in turn, and softly withdrawing the hand.

The native girls have a delicate touch and by light and skilful manipulation manage to draw the silken filaments from all the spiders in the case at one time. The thread thus extracted is led to a mechanical twister, which in turn sends it to a reel. The insects thus firmly held yield without resistance a goodly supply of filaments. Twelve thousand five hundred yards of silk can be taken in a month in four or five successive windings from a single specimen, after which, however, the particular spider operated on dies, a martyr to commercialism.

In general the spiders are not drawn upon to the extent of utter exhaustion; but when a certain amount of silk has been yielded they are sent to a place provided for them where they gradually regain their full vigor and spinning capacities.

The thread drawn from this spider is really marvelous in color, as well as in quality and quantity. We are accustomed to think of spider webs as white, and so they are in most instances. Sometimes, however, the web is a steely blue and often, says Professor McCook, "with a luster like spun glass." In the silk used by spiders in making their cocoons there also are a variety of hues—yellow, green, brown, and even various shades of red. The thread drawn from the halabes has a decided color. No gold was ever more brilliant, no yellow ever more pure in tint, writes Whitley. "Its extreme fineness, its elasticity and tenacity, in which it far excels ordinary silk, allow it to be woven into tissues of fairy-like fineness, of exquisite suppleness and substantial enough to stand the wear of ages." Those who visited the colonial section of the Paris Exposition perhaps will remember of seeing a specimen of the tissue into which this beautiful spider-silk can be woven, made into a complete set of bed hangings, while halabe spiders were exhibited at work. But we have in our own country a near relative of this French-African spider, and one apparently just as capable of being made of value. Like the halabe, it spins a great quantity of strong, beautiful, golden silk, and like the halabe yields thread that can be spun and woven into lustrous and substantial fabrics. This is the Nephila Wilderi, named after its discoverer, Dr. B. G. Wilder.

"I found in a tree on a desolate island a little south from the narbor of Charlestown, South Carolina," he says, "a very large and handsome spider whose web was at least three feet in diameter. I entangled her in her web, and carried her to my tent. The creature was very quiet and did not attempt to escape; but presently after crawling slowly along my sleeve she let herself down to the floor, taking first the precaution, after the prudent fashion of most spiders, to attach to the point she left a silken line which, as she descended, came from her body. Rather than seize the spider herself, I caught the thread and pulled. The spider was not moved, but the line readily drew out and, being wound upon my hands, it seemed so strong that I attached its end to a little quill, and having placed the spider upon the side of the tent, lay down upon my couch and turned the quill between my fingers at such a rate that in one minute six feet of silk was wound upon it. At the end of an hour and a half I had four hundred fifty yards of the most brilliant and beautiful golden silk I ever had seen."

Much greater quantities of silk afterward were wound up with rude appliances constructed for the purpose. The doctor tested the strength of the line spun by this spider by attaching a single silken filament, one four-thousandth of an inch in diameter, to a fixed point and tying the other end of the spider thread to the arm of an accurate balance. He found that it would sustain fifty-four grains before reaching the breaking point. By a simple calculation from this, Dr. Wilder found that a solid rope of spiders' silk one inch in diameter "would sustain a weight of more than seventy tons, while a bar of steel of similar dimensions will sustain a weight of fifty-six, and one of iron twenty-eight tons."

It seems strange that this discovery of Dr. Wilder's, of which a complete and most interesting account was given in "The Atlantic Monthly" for August, 1866, has not been made of some practical use. It seems plain that the particular spider noticed is in every way the equal if not the superior of its conqueror in Madagascar. It is easily kept and fed on soft meat, such as the liver of chickens, where insects are not to be had; it is not venomous, and does not require a plantation in which to recuperate, as do the Madagascar spiders. Moreover, it spins two kinds of silk—a beautiful golden sort that is elastic, and another, an inelastic variety, that has the color and the luster of silver.

The subject is one of really more than ordinary interest. It has been proved over and over again that the silk of certain species of spiders is stronger and more lustrous than that of the silkworm, that spiders of this silk-producing sort are not difficult to keep when their nature and wants are properly understood and attended to, and that they are not so difficult to breed or keep in good health or supply with their proper food as the delicate and pampered worm.—Jas. Carter Beard in Chicago Sunday Magazine.

THE WINE-MAKING INDUSTRY OF NEW YORK STATE.

By John S. Steele.

The wine-making industry in New York State is now in full swing. It began during the first week in September and will continue till late in the fall, or rather the preliminary process of pressing the grapes will continue until then. The other processes of wine-making continue over the entire year, and in the case of champagne, at least, which is the most important part of the New York State industry, the process of manufacture is not complete for three years. The making of still wines is completed as far as the active work of the wine maker is concerned when the fermentation is finished in the fall, but of course Nature's part, that of maturing the wine by age, may be extended indefinitely.

It is a fact not generally known that in some respects the wine industry of New York is the most important in the United States. The output of California is greater in quantity, and in value it exceeds that of New York. It is estimated that the average annual production of wine in California is between twenty and thirty millions of gallons, while that of New York is only from five to seven millions of gallons. In value, however, that of California is only about $5,000,000, while the wine output of New York is valued at about $3,000,000. This is explained by the fact that the California product is made up largely of clarets and Sauternes, whereas New York is the greatest producer of champagne in America, and champagne runs into value quicker than other wines. Absolutely, however, New York is second both in quantity and value in the United States, with Ohio third.

New York possesses the largest champagne plant in the country, and one that compares favorably with some of the famous European plants. There are regularly carried in storage there and in the process of maturing 1,500,000 bottles of champagne, and the regular annual output is about 250,000 bottles. All this wine is made from grapes grown in the neighborhood of Washingtonville and at Hammondsport, N. Y. About 400 tons of grapes are annually crushed to make champagne at this plant and an equal quantity for the manufacture of still wines. In the Hudson Valley alone there are 10,000 acres devoted to the growing of grapes for wine-making, and in the Lake Keuka district about 15,000 acres. In the whole of New York State there are about 50,000 acres under wine grapes. New York ports and sherries have taken their place in the market with the European wines. New York claret and Sauterne types are rapidly taking the place of the higher grade imported wines, and her champagnes, while handicapped by the popular prejudice against a native wine, are rapidly forging to the front.

The process of making champagne is an exceedingly intricate one, and one requiring a long training. A successful champagne maker must not only be an expert viticulturist, but he must also be a competent chemist. Champagne is not the product of any one grape. It is a blend of the juice of several varieties, and as the constituents of these grapes vary in different years, they must be combined each year to produce a uniform and perfect wine. The grapes used for champagne making in New York are the Elivira and White Diamond, which are white grapes, the Duchess, a black grape, the familiar red Delaware, and the Emelon, which is a dark grape. The juice of these is expressed separately in the fall, allowed to undergo the first fermentation naturally, and then allowed to rest in immense casks until spring. Then the juice of each is analyzed, in order to determine the proportions of each needed to produce the perfect blend. In their separate state they are known to the wine makers as champagne wines. A perfect champagne should contain about ten per cent of alcohol, seven-tenths of one per cent of tartaric acid, two or three per cent of sugar, and the rest the water derived from the natural juice of the grape. In seasons like the present when, owing to a cool and wet summer, the grapes are watery and deficient in natural sugar, it is sometimes necessary to add a little pure cane syrup to the wine to bring up the percentage of sugar. In all cases the sweet wines are produced by the addition of sugar. The dry wine is a natural champagne. When the right proportions have been determined by a chemical analysis of the champagne wines in the spring, the blend is made and the wine bottled. It then enters upon the process of fermentation in the bottle, which is the distinguishing character of true champagne. Many cheap sparkling wines are made sparkling by charging them with gas. The gas in champagne is developed by the fermentation in the bottle. This process takes about three years. The bottles, tightly corked and secured with thick wires, are piled one on top of the other in stacks containing thousands of bottles, in a moderately warm cellar. There they remain undisturbed until the fermentation is complete. The only means that the maker has to know when this is so is by the breaking of the bottles on account of the enormous pressure of the gas developed in the fermentation. About five per cent of all champagne made is lost by this breakage, and often whole stacks of bottles are shivered before the process can be checked. When the breakage becomes so great that it is evident that the fermentation is complete, the bottles are removed to a cooler cellar and there set out neck down in slotted tables for the final process of clearing. The object of this is to allow the sediment in the bottles to settle on the corks, and to facilitate this settling each bottle must be shaken twice a day for a period ranging from fourteen days to a month. A force of forty men is employed at shaking bottles during the season at Washingtonville.

When the settling process is complete that of disgorging follows. The wire is removed and the cork with the sediment resting on it is expelled by the pressure of the gas. If the wine is to be dry the bottle is then filled with a little old champagne, and if it is to be sweet a dosage of cane sugar is added. The bottles are then finally corked and labeled and are ready for the market. At this stage the wine is in fair condition. It improves for about two years after bottling, when the improvement ceases and it is liable to deterioration.

The other types of wine made in New York State are determined by the kind of grape used, and to some degree by the manipulation in making. Sherry is made from the Folle Blanche grape and is aged in a heated room. Tokay is made from the old raisin grape and is a perfectly natural wine. It improves indefinitely with age and does not acquire its best qualities until it is about twenty years old. Clarets and Sauternes are the simplest types of wine and are made from various types of grapes.

Nearly all the American types of wine grapes have been developed from the American wild grape. It is a fact well known to viticulturists that seedling grapes are seldom true to type. Half a dozen seeds from one berry will, if planted, produce probably as many different types of grape, and the chances are that they will all be worthless. The valuable types are all propagated by cuttings, which will always remain true to the parent type. Viticulturists are constantly experimenting with seedlings in search of new varieties, but if they obtain one of value from a thousand seedlings they consider themselves fortunate. Many of the most popular varieties have been discovered by accident.

CIRCUMSTANTIAL EVIDENCE.

Case Where Innocent Men Would Have Been Accused.

"Several years ago I took a late train from Boston to New York," said a man in business in Kansas City. "In the morning I was awakened earlier than usual by the porter, who said that a robbery had been committed on the sleeper during the night, and that all the passengers would have to get up. Some one had taken six $100 bills from the clothing of a gentleman who occupied a berth in the middle of the car.

"Every section had been taken before he left Boston, and as the train had been almost constantly in motion, it seemed certain that the person who had committed the theft was still on the car. The porter said no one had been aboard but the passengers, and that none of them had left. It was proposed to search everybody.

"A man who had a berth directly opposite from the one who had been robbed objected. He told his name and said any one might easily find that he was a man of good reputation. In the meantime some officers boarded the car, and after a little sweating got the money from the colored porter, who was the guilty one.

"Then the passenger who had refused to be searched asked the officers to examine his pockets. This seemed strange, but he insisted. In an inside pocket they found six $100 bills. It was merely a coincidence that he should have the same amount of money as the other passenger had lost, and in exactly the same denominations, but he knew that under the circumstances he could hardly establish his innocence. How was that for a case of circumstantial evidence?"—Ex.

GEN. MILES A PROMOTER.

Wants Government to Adopt Rice as Food for Army.

Gen. Nelson A. Miles, U. S. A., retired, has entered upon a business career. Largely through the efforts of the officials of the Sante Fe Road, he has become interested, with Burton D. Hurd, in the recently organized American Rice Cereal Company, which has undertaken to induce the government to adopt rice as a food staple for the army.

In a recent announcement by the Santa Fe regarding the project, it was stated that a former army officer had been investigating rice culture in Texas, with a view to trying to have that cereal adopted as an army food, but it was not publicly known until yesterday that the official referred to was the former Commander-in-chief.

It appears that the project which the railroad and cereal company have formed extends further than at first announced, and it is stated that Gen. Miles soon will make an extended tour of Europe, with a view to educating European governments regarding the value of rice as an army food, especially during campaign times. Gen. Miles, on account of several European trips, is well known in almost all foreign courts, and his ideas regarding army foods are more or less well known in Europe.—Chicago Record-Herald.

What Ailed Her Pulse.

Little Bessie was recovering from a "run of fever," and her appetite had begun to assert itself. "Can't I have more than this, mamma?" she asked, looking at the meager slice of toast and the "shadow tea" that had been brought to her bedside. "This isn't half enough."

"I am afraid to give you more just yet, dear," said her mother. "Your fever is not quite all gone. Your pulse is still too quick."

"But don't you see, mamma," urged Bessie, "that it's my excitement because I can't get enough to eat that makes my pulse so quick?"

Not His Fault.

Aunt Prisms—I am shocked at you, Maude. You permitted young Mr. Jones to kiss you.

Maude—He only touched me on the nose, auntie.

Aunt Prisms—It was quite out of place, dear.

Maude—He knew it was, auntie; but you came in so suddenly, you see.—Tit-Bits.

Here is a story we heard the other day that is good if it is old: "A man was to be operated on for appendicitis. When the doctors began the work he asked for a preacher. They enquired what he wanted of one and he said that he wished to be opened with prayer."