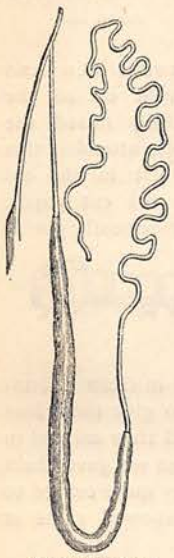
# OUR SILKWORMS, AND HOW WE TENDED THEM.



SILK-SECRETING APPARATUS.

IN the middle of our garden at Redland there were two trees, on the possession of which we plumed ourselves not a little, first because they were both useful and pleasant, and secondly because they were the only ones of the kind in the neighbourhood. One of them, a nice, round, flourishing specimen, apparently of no great age, standing in the middle of a grass plot, was a white mulberry-tree; and the other, near a wall which cut off a piece of ground formerly included in the garden of our house, was an old, gnarled, red mulberry, whose large limbs had many times been lopped, and round whose trunk was a wooden seat, which greatly facilitated our ascents among the branches in quest of either fruit or leaves.

We hardly knew the treasures and resources of our new home at first, but they came to light by degrees, and our attention was particularly drawn to the mulberry-trees during the first spring we were there by Tom's schoolfellows, among whom there was a tradition of their existence, as well as a current opinion that silkworms throve much better on mulberry than on lettuce-leaves.

"Do bring us a few, Sinclair, there's a good fellow," was the request of first one and then another boy, till father began to think his trees would be stripped bare; for it is a curious fact that where there are a number of boys together there is not much variety of taste, but whatever pursuit is taken up by one or two becomes a universal fashion for the time being. Tom naturally wanted to follow the lead of his friends, but father suggested that he should endeavour to learn wisdom from their experience that season, and that another year they would take up something else, and he might indulge in silkworm culture for himself under the most advantageous circumstances; and to this advice Tom, at that time pretty well occupied with the education of his bullfinch, lent a tolerably willing ear.

When the next spring arrived, father, who never forgot any of our little wishes, brought home half an ounce of silkworms' eggs as a small present for his eldest son on his return from a short absence in London; and as mother said she would rather not have them either in any of the rooms we occupied or in the greenhouse, she gave up a sort of closet, which had a very large window, but was not of sufficient size to be of any use as a bed-room, while, being next to the bath-room, it shared the benefits of the hot-water apparatus, and was always very warm. Tom really meant business with regard to his worms, and father and he did a good deal of carpentering in preparation for them, for they put up a great many shelves round the sides of the closet, one over the other, about twenty-three or twenty-four inches apart. They were rather to be called movable frames, though, than shelves, for they consisted of slips of wood, on which some very coarse net was stretched, and which slid into grooves, so that they were easily taken down and replaced. I think they were about two feet wide; and over the net sheets of thickish white paper were laid. A small thermometer was hung up on the wall, and the heat was 75° with the window closed, which father said would be just about right for hatching, though he lowered it by opening the window and drawing down the blind afterwards, and kept it at 67° and 68° as the worms advanced towards maturity. The next requirement was some shallow cardboard boxes, some few of which we found among mother's stores; but Jenny and I made the greater part of them, as most of the boxes we begged were too deep for the purpose. A few eggs were put into each receptacle, and we covered the tops with pieces of tarlatan and leno. This was all done just when the mulberry-buds were beginning to burst, and the young leaves in the most tender and juicy condition imaginable. Father told us the little worms would be hatched in a day or two in so high a temperature, and directed us to get a chopping-board and knife, with the aid of which we reduced a quantity of mulberry-leaves into a sort of green mincemeat, which was spread over the tarlatan.

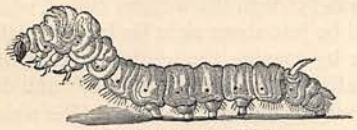
Tom was inclined to think that all this chopping was a work of supererogation, and that the silkworms would do very well without it. "Other fellows never take so much trouble," he said irritably.

"Other fellows' worms die of starvation; and the few they have to show are only examples of the survival of the strongest," replied father; "and if you keep living creatures at all, I like you to attend to their wants in the best possible way."

Tom knew very well in his heart that father's way always was the best, and we heard no more grumbling about the extra trouble, which after all did not fall very heavily, since it was gladly shared by the rest of us. The reason for chopping the leaves so finely was to present the greatest possible number of fresh-cut edges to the baby-worms, which, as soon as they emerged from the eggs, crawled through the tarlatan and began to feed. As fast as the inmates of each box were hatched we transferred them to the frames prepared for them, using the tips of paper-knives to move them and the bits of leaves to which they had attached themselves. Father told us on no account to touch them with our fingers, as it would be nearly impossible to avoid injuring them by even the slightest pressure; and I cannot say that I ever had any desire to handle them, for I was possessed with an idea that I should inevitably "squash" their very soft-looking bodies.

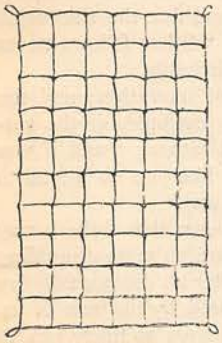
We provided a fresh supply of food and scattered it among them every six hours, unless we saw that they had not finished the previous meal, in which case they had to wait a little longer. When there had been any rain we dried the mulberry-leaves carefully before chopping them, and found that the best way of doing it was by tossing them about in a clean cloth, an operation in which baby considered that he rendered the greatest possible assistance to his brother and sisters. We were rather alarmed when the worms were a few days old by observing that they looked like rusty-brown scraps of string or wire, and appeared perfectly torpid; but father told us that they were only preparing to cast off

EGG AND FIRST AGE.

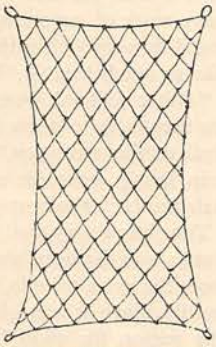


POSITION WHILE MOULTING.

their first skins, which they soon did, recovering their appetites immediately afterwards, and being removed as before to fresh clean frames, while those on which they had passed their first stage of existence were repapered and prepared for those which would "slough," or moult, next; and as they had originally been put into their trays in the order in which they had been hatched, we had relays of them at each successive change instead of all casting their skins at once, or those which had and those which had not reached that epoch being mixed up together. Father was by no means satisfied with our method of moving the worms, and busied himself during one or two evenings in cutting some stiff sheets of paper for us, in imitation of some he had once seen in the south of France, where the rearing of silkworms is carried on upon a large scale. There were a great many spaces, so that when completed it looked something like a paper-net, and on these he directed us to lay our leaves, no longer chopped, but cut in good-sized pieces. When this



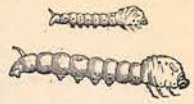
SQUARE NET.



LOZENGE-SHAPED NET.

SECOND AGE.

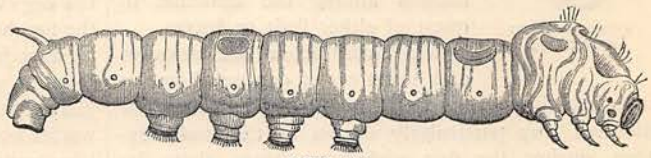
was done, we laid the new contrivance gently down on the tray we wished to change, both for cleanliness and for the purpose of giving fresh food. The worms showed themselves to be very much alive to the difference between new and withered leaves, and speedily crawled on to the fresh ones, so that when we carefully raised the corners to see what measure of success attended this experiment, there was hardly one left in the old place, so we were able to lift up the cut paper, throw away the dried-up dirty litter beneath, put in



THIRD AGE.

FOURTH AGE.

fresh sheets, and deposit our charges in clean habitations. It was now only necessary to give them four meals a day; and all went merrily till they seemed to grow sleepy and inactive again, when we gave them fewer leaves at a time, and, when they quite ceased to eat, left them unmolested till they showed signs of

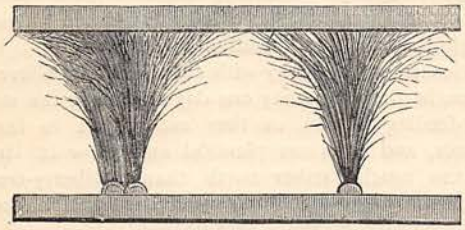


FIFTH AGE.

awakening, when we shifted them, or rather allowed and encouraged them to shift themselves, as on the last occasion. This time we saw there were a good many remaining on the old food, which looked larger than those that had changed their quarters, and were shiny. Father told us to make haste and throw them away, for they would soon die, and cause a smell which would be unpleasant for us and unhealthy for the other worms. I believe these are called *luisettes*, from the shiny appearance I have mentioned, and they are the unfortunate individuals which have not the strength to moult. We still gave the others four meals a day, the first being as soon as we were up in the morning, and the fourth the last thing before going to bed at night. We changed them daily, but, though father called this a little excess of zeal, we had learned to cut our own papers, mulberry-leaves were plentiful, and it was better to err on the side of too much than of too little cleanliness. We continued to find more *luisettes*, and the number of our worms sensibly decreased, till we saw the fifth change approaching, which father said was the most critical of all. The worms seemed as though they were dead, and continued in that state for nearly or quite forty-eight hours, emitting a sickly, disagreeable odour. When they awoke from this last moult, father looked them very carefully over, and picked out a good many

HEAD OF SILKWORM DURING MOULTING.

which were so exhausted by the change in their systems that they had not even strength to eat; some yellowish fat ones, which he said would not live long; and some idle corpulent creatures, which appeared to have over-eaten themselves so much during the previous stage of existence, that even their long fast had been ineffectual in counteracting the evil effects produced by gourmandising. Tom looked blank at this wholesale thinning of the ranks, but father told him it was necessary for the well-being of the rest of the community. The healthy survivors had the most prodigious appetites, and we could almost see them grow, and on the fifth or sixth day they had got so large that we had gently to remove them to a respectful distance from each other. It was no longer needful to cut up the leaves for them; but at last they ceased to eat, had a white, pearly appearance, and kept on crawling to the sides of the frames and there raising their heads and the upper parts of their bodies, as if they wished to climb or rise up on something. Father said they wanted to spin, and got some dry heather, which he set up, with the aid of a little wire and a few tin-tacks, in the shape of a sort of arbour over

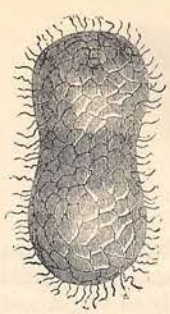


SPRIGS OF HEATHER FOR SILKWORMS TO MOULT IN.

each frame, not bunching it together, but spreading it out so that the air might circulate freely among it, saying that the cocoons would be of little worth unless they had plenty of air.

This was evidently what the silkworms had been in search of, and most of them soon crawled up into the heather and selected the most convenient corners wherein to spin their cocoons. Some, however, though of the same size and colour, and apparently in the best of health, showed no disposition to avail themselves of the branches arranged for their accommodation; and father set us to work to remove these singular individuals into trays by themselves, and lay some pieces of heather across them. This suited them better, and underneath or upon the twigs so placed they spun just as good cocoons as their more ambitious relatives.

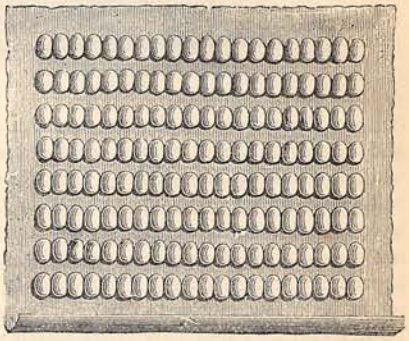
We reckoned that the half-ounce of eggs had produced nineteen or twenty thousand worms; but though a great many of these had come to an untimely end, we still had plenty of cocoons, and could not have wound off all the silk before the insect within had eaten its way through, however much we had tried. So father told us to make some coarse flannel bags in which to put them, and we coaxed cook for the loan of her potato-steamer over a saucepan of boiling water, where they steamed for half an hour; and



COCOON.

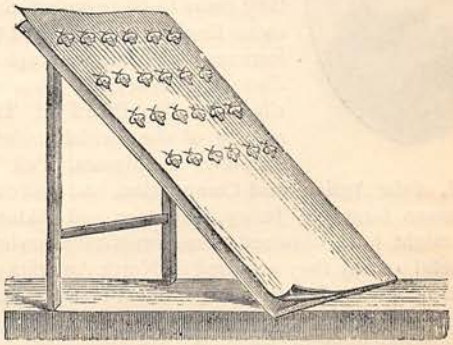
SPHERICAL COCOON.

while this was being done, Tom cleared out some of the empty frames on which the worms had been fed, taking away the paper, and we put the cocoons carefully on the net to dry. Father said we must turn and move them occasionally, as we had seen mother do with the eggs she saved for winter use, and that we must not pile too many of them on a single frame, for fear they should ferment and the silk be spoiled. Then came the winding, for which Tom made a little wheel, after one lent him by a schoolfellow; and one day he took his silk down to the city, found that it weighed two or three ounces, and made what he thought a famous bargain in selling it. I do not remember now how much he was paid for it, but I do not forget that he brought each of his sisters home a little present as an acknowledgment of their help. Mine was a small pincushion made to fit into a mussel-shell; and though long years have passed since then, it still has a place in my work-box.



SHEET OF PAPER WITH ROWS OF COCOONS.

Next year the silkworm experiment was renewed, and, in fact, continued as long as we lived in that house. On one occasion we were persuaded to bake,



SHEETS OF PAPER STUCK INTO SCREENS FOR THE RECEPTION OF MOTHS.

SILKWORM MOTH (MALE).

instead of steaming, our cocoons; but that process could hardly be considered a success, as the silk did not wind so easily and was not nearly so bright and soft as under the original method of treatment. I

SILKWORM MOTH (FEMALE).

believe the reason of this is, that the steam softens and dissolves the glutinous matter among the silk, while the baking hardens it. Our silk was of a pale yellow colour, and the cocoons of middling size. I have seen larger as well as smaller ones in my time, but they are all the produce of different races. We kept half a dozen cocoons unsteamed, so that there might be a few moths to lay eggs for the next year. Father said we could only judge which were the male and which were the female ones by weight, as the latter were the heaviest, and fetched a tiny pair of scales out of the family medicine chest, so as to make sure about it. We saved three of each, and he told us to fix the three heavy ones on one sheet of brown paper with a little paste, and the others on another sheet in the same manner. The moths were hatched about twenty days after the full-grown caterpillars had first mounted into the heather to spin; and in due time plenty of eggs were laid on sheets of paper placed ready for their accommodation. These sheets were hung over a thin line of fine string up in a dry attic till spring came round again.

In after-years, when we no longer had a garden containing a mulberry-tree, baby, who had grown into big boyhood, kept a few silkworms for his own pleasure, which, not knowing the taste of mulberry-leaves, grew up on a diet of lettuce; but a great many of them died, and their silk appeared to me far from superior in quality.

Tom once had some eggs of a Japanese silkworm sent him, with directions to feed the larvæ on oak-leaves. They were much larger than the ordinary kind, but healthy and hardy, and of a green colour. The cocoon was also of a brightish green outside, though the silk was beautifully white within. We experienced no difficulty with them, and I believe it is thought that they may one day supersede the mulberry-feeding worms, as they are subject to fewer diseases, and oaks are plentiful and grow in large numbers much farther north than mulberry-trees, though the latter are hardy when once acclimatised, as may be seen by those that flourish in the gardens of old-fashioned houses in the East-end of London, where they were planted long years ago by the French families who found refuge on British soil after the repeal of the Edict of Nantes.

## RECENT PROGRESS IN THE CHANNEL ISLANDS.

IF this interesting group of islands were a thousand miles distant we should perhaps hear more about them than we do, but as they are so close to England they come to be regarded almost as an English county. Yet their fortunes and conditions are very distinct, and we find them classified by the Board of Trade as one of the British colonies. Possibly, if Messrs. Pell and Read, of the Agricultural Commission, had visited the miniature farms of Jersey, Guernsey, and Alderney, they might have obtained some practical knowledge, as useful as any they acquired in North America; for it is a significant fact that the farmers of the Channel Islands are prosperous, while paying five times the rent usually paid in England. Another remarkable fact is this, that the population has slightly declined (being now lower than in 1860), and yet the value of exported products has risen 72 per cent. in ten years. Meantime the number of visitors every year increases, not even the oldest inhabitant remembering such an influx as there was in the last season, Jersey alone counting 33,000 arrivals in two months.

The whole group of islands has an area of only 48,300 acres, or half the extent of the Isle of Wight, yet it supports a population of 90,000 souls, showing a ratio three or four times denser than Belgium or China. Still, the population is relatively but a handful, and it seems incredible, but is nevertheless shown by official returns, that Great Britain carries on a trade of £1,500,000 annually with the islands, which exceeds our commerce with Mexico, Venezuela, Ecuador, or Uruguay. Such economists as believe implicitly in the "balance of trade" would argue that these islands are hastening to bankruptcy, since the aggregate of ten years' imports has been 33 per cent. over the exports, viz.: imports, £8,429,000; exports, £6,351,000;