sides and turned daily, and when packed should be embedded with the large end uppermost in bran or sawdust, and sent off by passenger train; the parcel post shakes them too much.

When eggs are very plentiful in the spring, as they should be, it is good to preserve them for the winter. If this be properly done they will be quite good for cooking, and even for poaching. They would not taste even if boiled, only that it is never quite safe to send one to table unopened in case of any accident.

A well known way, done much in Ireland, is to butter the eggs very slightly the day they are laid, and store them with the large end uppermost. Eggs packed in common salt also keep for a few months, and the salt can be used over and over again.

A still better way than either of these, where the eggs are to be kept for more than three months, is to "pot" them in lime. Get a stone or earthenware jar about one foot high and one foot in diameter, place in it about three lumps of unslaked quicklime about as big as your hands folded together. Fill the jar with water, and add a good handful of salt, and any time after the heat of the burning lime has abated the eggs can be put in. The lime should be well stirred up the day after it is put in, but finally it will sink to the bottom and form a soft mud. The first layer of eggs may be embedded in this, but afterwards just allowed to float as they will, until the jar is full. A little more water should be added from time to time as it evaporates. Great care must be taken that the eggs do not crack when put in, or they will not keep, and will spoil the others. It is wiser to preserve in a number of small jars rather than in one very large one, in order that the oldest eggs may be used first.

I must now broach the painful topic of how to kill a hen. Some people think it dreadful for a girl to even think of such a thing, and probably many of my readers think so too. But really, if the deed has to be done and there is no experienced person at hand to do it, it seems to me rather cowardly to shrink from the act. I often run away myself, I must confess, when I have given a plump little cockerel to an old man, who is very expeditious in this matter. With him, happily, it is a brief, rapid operation, and he is going on with his gardening a few minutes afterwards. The hen should be held securely and stunned with a heavy blow on the head, and then a sharp penknife should be run through the roof of its mouth into its brain. Another way is to cut the jugular vein in the throat right across with a very sharp knife. The muscular twitching of the hen afterwards is not caused by pain, and will soon cease.

The hen should be plucked immediately after it is killed, when the feathers of young birds will come out very easily, only be careful not to tear the skin. Old birds are not so easily managed, but if boiling water be poured over them, feathers and all, they can be plucked in a few minutes, and the feathers can be dried afterwards. I always find I can sell my chickens to my friends far more easily if I send them ready plucked.

Poulterers are always ready to buy really plump, well-fatted birds; in which case the feathers may stay on, but the price obtained will not be so great.

Before closing, a word is due about our illustration. Bantams are most charming little creatures to look at, and can be had in almost every "grown-up" variety, Bantams, Hamburghs (the black ones in the illustration), Cochins, Brahmas, Game, etc.

Some breeds lay very well, and the eggs are much advocated for children and invalids. Bantams take up much less room than hens, and of course eat less, but should be treated in the same way. Bantams and hens should not be kept in the same run together, the coc being very pugnacious and troublesome.

Where there is a very limited space a great deal of pleasure may be obtained by keeping a few of these pretty little creatures, and children enjoy them very much.

The profit from a utilitarian point of view may be small, and money is usually made out of them by breeding for show and fancy points.

I really must close now, so wish my readers every success in their undertaking, and as much pleasure as that success and their own industry will give them.

THE SILK INDUSTRY IN IRELAND AND AMERICA.

By DORA DE BLAQUIERE.

THE endeavour which is now in progress to found a silk industry in the South of Ireland will be looked upon with great interest by everyone. The poplin manufacture there dates from the revocation of the Edict of Nantes, and the enterprise of the skilful French artisans who settled in that part of the Irish capital called the "Liberties," and who carried with them the art of making poplin. The original invention of this material is claimed by Avignon, once the Papal City; on which account it was called "papaline," in compliment to the reigning Pope, in the fifteenth century. It seems to have been at that time specially made for church vestments, for which its firm texture admirably fitted it. The La Touche family established the first organised manufactory in Dublin, which opened in 1693, and by the end of the seventeenth century there were 2,500 workmen in Dublin, and as many more in Limerick, Cork, and other Irish cities. During the last few years fashion has dealt hardly with this handsome and well-wearing material, and in consequence the industry, once so flourishing, has greatly languished.

With regard to the establishment of the culture of the silkworm, called, properly speaking, "sericulture," the present attempt is not without a good foundation to support it; for Count Dandolo, the greatest authority on the subject, says that the soil and climate of Ireland are peculiarly favourable to the cultivation of silk. The late Lord Kingstown planted 30,000 mulberry trees on his estates, and sent to market raw silk of the best quality; but somehow the gallant enterprise did not pay, perhaps owing to the habits and character of the peasantry. The new "Association for the Promotion of Sericulture" was established in the South of Ireland in the year 1887, under the patronage of the Earl of Bandon, Lady Londonderry, Lady Bandon, Lady Bantry, Lady Kingstown, Lady Listowel, Lady Frederick Cavendish, and Lady Arnott; and an excellent committee, with Mr. M. H. Westropp as Hon. Secretary.

The first season closed in October last, and, in spite of great difficulties, the success has been very great and encouraging. About thirty persons undertook "educations," as the rearing of the silkworms are called, and, in spite of wet and cold weather, leaves sent long distances by post, and inexperience, the largest cocoons were produced, which spun as long a thread as the best French cocoons. The committee are now preparing for their second season, and, in addition to the first mulberry trees imported, have this year brought over 2,000 mulberry trees from France, and also new "grain," as the silkworms' eggs are called. It is to be hoped that this endeavour may be crowned with success; and lest our English girls should be overlooked, I will now try to give them some little account of the various attempts to establish the growing of silk in England, which began with the strenuous attempt of King James the First to establish it by Royal edict. The manufacture of silk really came over in an earlier reign, that of Henry VI., and we have always to thank the religious persecutions on the Continent for its progress. In 1585 the Duke of Alva drove the Flemings to our shores, and a century after the revocation of the Edict of Nantes sent us the Huguenots. No less than 72,000 of these came over, one of their largest settlements being at Spitalfields, where so many of their descendants still live.

But King James had agitated about silkworms more than seventy years before, directly that he came to England as king; perhaps incited thereto by the difficulty of obtaining silk stockings for his own private use. One of the best known stories of him describes him as borrowing a pair of silken hose from the Earl of Mar, in order to make a brave show when receiving the English ambassador, when he was on the throne of Scotland. Perhaps the earl did not want to lend them, as we are told that the king entreated him much, saying, "Ye surely would not have it that your king should appear a scrub before strangers!" It was perhaps in memory of these difficulties, that when the throne of England became his by the death of Elizabeth, he tried his best to establish the culture of silk. He brought over thousands of mulberry trees from France, and had them planted throughout the country, and established a mulberry garden and silkworms near St. James's, in the county of Middlesex. To the care of this garden he appointed Walter, Lord Aston, in the year of grace 1629. The site of this mulberry garden is now occupied by Buckingham Palace. For a long time, no doubt, the silkworms were fed from the leaves of the mulberries; but the gardens became afterwards a very famous place of fashionable resort, and for at least three reigns and in the Commonwealth no place was better known nor more frequented.

Thus throughout England we find traces of King James's endeavour; and at Bisham Abbey, Berkshire, two mulberry trees are still to be seen that have lived ever since; and

there are many others also. A recent writer mentions Slough, Yately, and Nottingham as places where good silk has been produced, and one of the recent trials was made in 1846 at Knebworth, by the late Lord Lytton. The sad death of Lord Lytton's young daughter put an end to the experiment, which was begun for her special amusement, and was so associated with her memory that her bereaved father wrote to a friend to say "He had given it up as too painful, but he considered it a complete success." The silk was sent to Coventry, and was considered by the leading manufacturer there "better than any of the foreign silk he was able to obtain." These mulberry trees still remain at Knebworth, and constitute a large plantation or garden.

The most recent enthusiast on this subject was Mrs. Bladen Neill, who in 1876 hoped to establish the silk industry on a large scale in the Australian colonies, and to use England as a depôt, from whence the "grain" or silkworms' eggs might be drawn; thus supplying on both sides a new employment for educated women. Mrs. Neill spoke before large meetings at the Society of Arts, and explained that the mulberry flourishes in these colonies like a weed; and that there was every hope of founding a large silk industry in them. In January, 1878, Mr. B. F. Cobb, the former secretary of the Silk Supply Association, read a valuable paper before the Society of Arts on the rearing of "grain" or silkworms' eggs in this country. The writer of the paper showed that as an aid to thrift, and as a means of adding to small incomes, the pursuit in question was particularly suited for female work. Some practical calculations were also given, to show the highly profitable nature of the occupation, and its feasibility as an industry in this country on a large scale. Mr. Cobb's opinions were supported by Sir Antonio Brady, and other gentlemen, who had derived their knowledge from experience in the rearing of silkworms.

In 1876 several "educations" (as they are called) of various sizes took place during the summer, and up to October 21st the last worms were spinning their cocoons in London. The food for them was supplied from a magnificent old mulberry tree at Sion House, through the kindness of the Duchess of Northumberland. There was no doubt of the success of the trial made during this year. The eggs were healthy, the cocoons firm and well shaped, and the amount of mulberry leaves sent into the temporary depôt enough to feed any amount of worms, a fact showing the number of mulberry trees throughout the country, and the possibilities of the growth of the industry.

The chief difficulties that this enterprise has to contend with are very specifically stated in the American reports, and consist: 1st, in the impatience of the producers to realise profit before they have learned the art of making very good crops of cocoons, and in this way reducing the value of their industry; 2nd, the idea that it was not possible to train the English or Americans, as reelers, which is an art delicate and fine in its manipulation. The secretary of the American association quotes a specimen of the letters she has received, asking, "whether two elderly women—one nearly blind, the other with one arm and nearly helpless—could earn a living by raising silkworms?" And she pertinently inquires, "Could they do so at any industry?"

The silk industry to be properly fostered in any country needs, first, skilled culturists of silkworms; second, skilled reelers; third, cultivated groves of mulberry trees. The culture of these is a branch of horticulture little known out of silk-producing countries, but which is required as teaching how to bring the mulberry into the most perfect condition for full leaf, and keep it in that state of efficiency, also to facilitate, by proper pruning, the labour of leaf-picking for feeding the worms. The reel bears the same relation to silk culture that the cotton-gin does to cotton culture. It is the first process in preparing the cocoon for the loom; and if in America they have proved that this first cost can be reduced with good machinery and labour to a minimum, perhaps in time, here in England, we shall find the same results, and shall have discovered a work for our unemployed women, while founding a valuable industry. In the American section of my subject I shall, I hope, be able to go into this subject fully; as, thanks to the kindness of the Women's Silk Culture Association of Philadelphia, I have been supplied with information up to date of all their proceedings, struggles, anxieties, and successes, from 1880 to 1888.

The silk industry divides itself into three departments—the agricultural, which is the rearing of silkworms and curing the cocoons; the filature department, which is the reeling of silk and the preparation of commercial threads for the use of the third branch, which is the manufacturing into fabrics. The American Association—following wisely in the track of the Italian rules—does not recommend reeling at home. Thus the silk grower prepares his house and his trees for the season of growing silk, and the work of from thirty-five to forty days, during which time the worms are fed—a duty which must be attended to with the closest attention and care. When the silk crop is grown, it goes at once to the reeling establishment, and there the hands that grew the silk reel it for the manufacturer's use.

The cocoons are divided into two classes, *i.e.*, raw silk and waste silk. The raw silk is that in which the chrysalis has been stifled (in the cocoon) before eating his way out, and cutting the strands of silk inside. Thus it is called "unpierced cocoons." The "pierced cocoons" are waste silk—that is when the moth has escaped from the cocoon. The first are the most valuable, and in Italy the cocoons are taken at once to the reeling house, where they are reeled while fresh, thus avoiding the process of killing the chrysalis. The thread of a fine French cocoon will sometimes measure 1,350 yards.

Waste silk has, within the last few years, become an important article of commerce, as a use has been found for it; and it has taken root and prospered in Yorkshire, chiefly through the wonderful enterprise of Mr. C. L. Lester, the inventor of the utilisation of silk waste; and the founder of an entirely new branch of the silk trade, *i.e.* that of spun silk. The waste silk is that from the filature husks, or knubs, and the pierced cocoons, and it is manufactured and macerated in mills, much after the same processes as the woollen and cotton mills, into spun silk, train, organzine, and the various threads of commerce. This new industry is said by Mr. Thomas Wardle (the chairman of the silk section of the Manchester Exhibition) to be a happy illustration of the facetious Yorkshire saying—"that any fibre can be spun, if it only be long enough to have two ends."

And now what is the practical end of our story about the new Irish industry and our own attempts in England? And "what can I do?" asks some earnest one amongst our women and girls. You can, if you live near any mulberry trees, try a small experiment. Watch the habits of a few silkworms, to begin with. Once learned, by the care of a few of them, you can see whether you think you could manage more, so that failure would be impossible, unless heavy rain or chilly weather should interfere. Or else, if you have land, you could plant a few mulberry trees, and remembering that no process of nature can be hurried, you can occupy the three years they will require for growth in learning how to rear the silkworms to eat their leaves. In England the great majority of mulberry trees are those of the black mulberry, the leaves of which are coarser than the white mulberry, the latter being the true food of the silkworm. But the leaves of the black will do very well for us, in our experiments, and if we want to do more, we must plant the white mulberry to guarantee still greater success.

ANSWERS TO CORRESPONDENTS.

EDUCATIONAL.

WEE QUEENIE.—In face of the doctor's opinion that you are doing too much work, your parents should see that you leave off something, or shorten your hours. The most objectionable part of your whole day, to our mind, seeing that your heart is said to be weak, is the railway journey to and from school; that is enough to do you harm, by hurrying you, and probably injuriously affecting digestion in the morning. You had better try to take a long rest this summer.

F. M. W.—"Thou wilt not gash thy flesh for him," the line you quote from Tennyson's "Aylmer's Field," in Averill's sermon, has reference to the practice of the worshippers of Baal. See 1 Kings xviii. 28.

MAY DAY HILLS (Victoria).—The "Erl king," a spirit of mischief, is said to haunt the Black Forest of Thuringia. There are two ballads dealing with the subject, Goethe's "Erlkönig," and the Danish ballad of "Sir Olaf and the Erl King's Daughter," which was translated by Herder.

HOUSEKEEPING.

D. T. B.—The use of kerosene oil, or some description of oil from petroleum, is said to be destructive to insects in furniture, as well as to act as a preservative to the wood.

MARGARET.—To clean gilt frames take a gill of good vinegar in a pint of cold water, a large, soft, clean, old shaving brush, and clean soft cloths. Brush the dust from the frame, dip the brush in the liquid, squeeze it slightly, so that it may not be too wet, and brush the gilding, doing a small piece at a time, lightly up and down, till it be quite restored. The brush must be constantly washed and the liquid renewed when dirty.

SITTINGBOURNE and MADGE WILDFIRE.—An article on "laying the table" will be found at page 106, vol. vii., with full directions, and "Table Decorations," page 819, vol. viii. "How to Wait at Table," page 488, vol. viii. Now that flowers are so much used, very little fruit is put on the table for dessert; sometimes only the preserved fruits and bonbons.

COOKERY.

MAGGIE MAC had better buy the ginger preserved; it is very moderate in price. 2. White straw hats are bleached in sulphur fumes. Send to a proper cleaner.

C. A.—On page 383, vol. vii., is a recipe for making biscuits of all sorts, and you can purchase the charcoal ready prepared to add to them. 2. The foods to be avoided in case of flatulence are, potatoes, cabbage, and all that tribe—including cauliflowers; no pastry, and no recooked foods; little tea, only three meals a day—nothing between. Rest for half an hour after meals; take daily exercise, and keep early hours.

L. E. C., NAOMI, WISHEE, R. S. V. P. and PHILLIS.—You will find recipes how to make and ice cakes of all kinds in an article on the subject, vol. vi., page 716; also see "Iceing for Cakes," pages 174, 800, in the same volume.

M. J. D.—Many thanks for the "home-made wine" recipe. It is not full enough, however, for such a process.

head, ignoring Mr. Barton's hand, and took his departure.

What an interminable month it seemed to the young physician; and how fearfully hard to refrain from speaking!

Christmas had passed with its festive duties, and January was already on the wane.

Poor little Leslie! Patience and passion were having a hard time of it in the proud silence of her heart. She had to act her part of hostess, and smile serenely as if quite content; she had to bear her uncle's ill-humour, and Sir Philip's hated attentions; and to feel that every moment of the day she was watched and guarded like a prisoner.

What were they afraid of? she thought, scornfully. That she would beg for the friendship that was now a thing of the past? They did not know her if they thought that.

No wonder that anxiety and unrest were making the young face pathetic. Not a day passed but she met Dr. Owen, and yet she had never exchanged a word with him since Mrs. Wilson's evening. Only a hurried bow was all that passed between them now. Every day she had expected some explanation of what he had begun to say that evening, which seemed so long ago; but no word, no line came to lessen her impatience; no hope but the lingering pressure of his hand, the look in his eyes with which he had said, "I shall see you again."

"What makes you so quiet and white, Leslie?" asked Miss Cameron, kindly, as they sat together one morning.

"I am thinking that to-morrow will be my last day here," replied Leslie, in a low, dreamy tone.

"Nonsense, child! You do not mean to throw away your splendid fortune and Sir Philip Seymour for a mere struggling doctor!" exclaimed Miss Cameron, unguardedly.

"Minnie!" Leslie's eyes flashed ominously, "do not couple my name with anyone, if you please. I am going to the hospital to-morrow as a nurse there," with a proud little curtsey. "Miss Jacobs, the matron, has promised to take me for a year's trial, and I am going to tell uncle my decision now." And without listening to Miss Cameron's expostulations, Leslie walked straight into the library.

"Uncle, the month is up to-day, and I have come to tell you that nothing, nothing would ever induce me to be Sir Philip Seymour's wife. As you are going to disown me for this refusal, I only wish to say, before leaving Fern Tower, that I thank you from my heart for your goodness to me the last four years, and that I am very, very sorry to have to leave you in anger with me."

"A nice return you make me for the goodness you speak of! I like deeds, not words, miss; and as you've made your bed, so you shall lie on it. Not one penny of my money shall you ever see; no, not if you were to go down upon your knees and beg for it; there!" And the old man glared at her as he thundered out the words.

"Good-bye, then, uncle," replied the girl, sadly. "I care nothing for your money, only you will not believe me."

With a heavy heart Leslie began to pack her things. She was half through with her work when the maid Ellen came in.

"If you please, miss," she said, with wide-opened eyes, "Dr. Owen is in the drawing-room, and wants to see you."

Leslie sprang to her feet, passing her hand across her throbbing brow, then slowly turned her steps towards the drawing-room.

The young man walked quickly forwards.

"Leslie!" he cried, with unspeakable longing in his voice, "Leslie! I promised your uncle not to speak until a month had passed; it is over now," with a sigh of relief, "and I have come to see if I can gain my heart's desire. You did care for me a little, did you not?" gazing anxiously at the white, still face, and taking her hands in his.

"Did care for you?" Leslie echoed under her breath, with a strange little laugh. "Ask me, rather, if I do care for you, and I will answer yes!"

* * * * *

In less than a month the old-fashioned house, with the vines creeping over the front, had gained a mistress; and Leslie's life blossomed with the happiness of a future that seemed to be overflowing with its golden promise.

Neither Doctor nor Mrs. Owen were much astonished when, a few weeks later, a grand and fashionable marriage took place in London, and Mr. Barton led Miss Cameron to the altar.

"It is not a case of 'Love *versus* Money' there, Leslie, is it?" said the doctor, laughingly, as he read out the announcement at breakfast. "But I think, my dear one, that we have the best of the bargain. A happy love is the greatest blessing we can know in this troublous life of ours, and I would not exchange it for the wealth of a Crœsus."

And Leslie quite agreed with him.

[THE END.]

THE CULTURE OF SILK IN IRELAND AND AMERICA.

By DORA DE BLAQUIERE.

HERE is no more interesting story in all the annals of women's labours for women than that of the organisation which was formed in 1880, in the City of Philadelphia, U.S.A. It was inaugurated by a noble band of devoted women, who adopted for it the name of the Woman's Silk Culture Association of America, and declared, in their constitution, that their object was "to establish industrial schools, for instruction in the art of silk culture and in the art of preparing silk for manufacturing uses. Also for the establishment of auxiliary associations for such instruction throughout the United States." These duties were at once entered upon with a membership of 150 persons, of whom 100 were ladies, and a revenue for the enterprise of $1,627 (not quite £400), nearly all of which was efficiently expended within the first year. To all these ladies the practical knowledge of silk culture was unknown; but they were all swayed by one purpose, *i.e.*, to help their own sex scattered over their country; to carry on an interesting, instructive, and moral, as well as a remunerative industry, easily made accessible to every household, to the thousands of small householders of the country, to whom the labour channels of cities and the liberal patronage of the rich never flow. Thus the poor of the country were the objects of this generous effort to introduce into a vast country the cottage culture of silk, as an auxiliary to slender incomes, and as a light and pleasant occupation for unemployed women and children. For in the beginning there was no thought of business profit to the association, only unselfish consideration and enlightened designs. After four years of work the association made an appeal to the National Government at Washington for its fostering care on behalf of the silk industry in the United States, with the result that in 1885 the "Agricultural Bureau" at Washington authorised the association to demonstrate the practicability of home-reeling, and to enlarge the other departments of their work, being aided by the Government in doing so with monthly appropriations for the covering of the expenses incurred. This was required to be under the direction of the department. Later on an appeal was made for a direct appropriation to the association, instead of leaving it in a dependent position, which was likely to hamper progress. This appeal was granted, and the American Government made a grant of 5,000 dollars, which has since been repeated yearly, and has now passed into a law.

This action of the United States Government enabled the Association of Women to ply their efforts to the furthering of the silk industry with redoubled strength and vigour, for they are not now dependent on private aid, nor compelled to make constant calls on the public for support. In the year 1885 the association started the first reeling station in America, by opening rooms with steam power and all requisite appliances in Arch Street, Philadelphia. Here a line of shafting was introduced, with arrangements for six reels, three American reels being placed there early in June. Shortly after this date the first market was opened for the sale of reeled silk, and also for "waste," by a liberal offer from two or three firms of silk manufacturers. In 1888 a bill was introduced into Congress, asking for an appropriation of 150,000 dollars to aid and foster the silk industry in America. This seems to set the seal of success on the efforts that have been made by women, and shows that they have not been exerted in vain. There are at this date three stations of silk culture, independently of what the National Bureau at Washington is doing; and theirs is no mean work, having introduced the "Serrell reeling" system, and a Bureau of Information as well, for the distribution of seed and the purchase of cocoons. The Bureau of Agriculture at Washington set up a plant of the new "Serrell automatic reels" imported from France by the Ladies' Association for them in the year 1886. So it will be seen what really has been, in a period of about eight years, the work of a few energetic and devoted women in America, *i.e.*, the introduction of the culture of silk, the instruction of the people, the acquirement of a good American reel, the instruction of American girls in reeling, the testing of the French

steam reel—now in use in all the foreign filatures—and finally, the placing of the first flags of American-grown silk in the Senate Chamber and in the House of Representatives. There was an exhibition of American-grown silk and cocoons at the American Exhibition in London in 1887, which was well worth attention. The association has received several silver medals from various exhibitions, and fifteen certificates and diplomas from different States in the Union.

The question of the reel is one of enormous importance, and the association seems to have come to the conclusion that the small American hand-reel—when adjusted for steam power—is better than any of those at present in use on the Continent. They have carefully and patiently tested the Berthaud French steam-reel, as well as others, before coming to this conclusion. In the reeling department in Philadelphia they have American girls at work under the instruction of an Italian, and they have six reels running, the filature turning off twenty-four skeins of raw silk daily. In the future, when the cocoons are improved, it is hoped that they will succeed in throwing out from good products at least one pound daily in this reeling department, and thus must be answered the oft-repeated questions, "Will it pay? and can the reeling be performed so as to compete with foreign labour?" In the report of the association for 1888 they seem to consider these questions answered in the affirmative, and if answered for America it must be the same thing for both England and Ireland, where an exactly corresponding expense for labour is incurred. In 1888 the report says, "This superior reel of American make was invented by one of Philadelphia's skilled mechanics, assisted by one of America's scientific scholars, and is superior to all other reels, having a capacity double that of any other one in existence. The president of the association, who is now travelling in Europe, reports that she has seen none to equal it, and it must be remembered in dealing with the question that the silk reel bears the same relation to silk culture as the cotton gin does to cotton culture; it is the very first process in preparing the silk for the loom. . . . It has been said by many that silk culture was not possible in this country, because American girls could not be trained to the delicate art of reeling. This has been thoroughly refuted by trials, as quite a number have already been taught in its school to be expert reelers, and are now employed at good wages in the rooms of the association, where six steam reels are in operation."

Some of the States of the Union, especially Kansas, have offered a bounty of 50 cents (2s.) for the best quality of cocoons, and a descending scale for those not so good. Kansas has also established a silk station, and advertises to pay the highest market price for premium crops; and it also pays cash for all cocoons sent to the station, according to their value when tested, the price paid being in all cases strictly foreign market value.

In Mexico the raising of silk has been commenced. The Consul-General of the U.S.A. reports in 1887 that within five years more silk will be manufactured in Mexico than can be consumed by her own people. The factory started has machinery imported from France, and is in the hands of competent men. The silk worm cultivators in the vicinity of the factory will, it is expected, be able to supply all the demands.

In thirty-two of the States 6,673 mulberry trees and cuttings have been distributed, and in the Southern States it will be possible to raise two crops in the year. The best quality of silk has hitherto been mixed by Ohio, and the American Association says it is a question for the people themselves to decide whether New York shall become the silk mart of the world, as she is already of foreign raw silk. In America there are at present 385 silk factories and 30,000 *employées*, and 20,000,000 dollars of raw material of foreign production is used. The imports of waste silk, pierced cocoons, at the ports of New York and San Francisco are valued at £185,838, and of raw silk at £4,425,378. The Americans have paid great attention to the improvement of machinery for throwing and manufacturing silk, and with so much success that some English firms are rehabilitating their mills with machinery from Connecticut, and discarding their more old-fashioned and cumbrous methods.

No wonder that these patriotic American women in Philadelphia see that in the face of an immense consumption like this it would be worse than a sin to allow the silk industry to be practically in the hands of foreigners, when the native American, especially women and children, could earn the money as well. The foreign fields of silk culture fall far behind in furnishing the increased demand, especially that of the American market, which is a comparatively new one. The tariff on manufactured silk goods has resulted in the establishment of several hundred silk mills of the most superior class, which consume an immense amount of material.

King James, who endeavoured to found and foster the silk industry in England, also did his very best for it in the then American colonies of England; years after so far had it advanced that a Court robe was made for the queen from silk raised in Pennsylvania, while the king wore garments made from silk grown in Virginia. The report of the association also gives us the copy of a letter from Washington, dated Philadelphia, July 29th, 1794, to Mrs. Anderson, of Gloucester County, Virginia, thanking her for a piece of silk of her own manufacture, grown in Virginia, which "the father of his country" promises to wear "as an evidence of what our climate, aided by industry, is capable of yielding, although it is an established maxim of mine not to accept a present from anyone." In the same way the Silk Association of the day has presented Mrs. Garfield with a dress pattern of black silk, which was purely American, from the worms who spun the cocoons, to the weaving, the pattern being a particularly fine design.

Have I interested you, my dear readers, in this story of women's efforts, patience, and victory? And do you long already to do something of the sort, and strive to found an industry in England, as well as Ireland, which shall in the course of years bring increased means of livelihood to women and children? Remember that the business man and the capitalist cannot try social experiments, and the banker has no room in his ledgers for motives of sympathy and beneficence. Therefore this new property, this new opening for labour and profit, must be created by women and girls, and they must begin without the idea of payment, only with the firm conviction that there is an ultimate success for them if they will begin to study the habits of the silkworm and to find a plot of ground where a few mulberry trees can take root and prosper. One benefit seems to be more clear than another, and that is, the small capital needed to set up the silk grower. An acre or two of land of ordinary fertility and a few pounds for the purchase of mulberry trees and plants will enable anyone who is anxious to become a silk grower to lay the foundation for a plantation on an extensive scale. The way in which the mulberry may be multiplied by means of cuttings and layers is wonderful. It is said that they may be quadrupled every year. The white mulberry, or *Morus alba*, is that generally cultivated as the best species for the use of the silkworm; but in China, Spain, and Persia they are said to prefer the *Morus nigra*, or black mulberry, of which we have so many trees in this country. The *Morus alba* has been known to attain the age of 400 years; it has leaves earlier in the year than any other species, and is more rapid in growth than the black mulberry, while it contains more of the glutinous substance, like *caoutchouc*, which gives tenacity to the silk produced by the worms fed on its leaves. One acre of mulberries should feed from 80,000 to 100,000 worms, or from 300 to 500 lbs. of cocoons; but much depends on care, climate and soil. Hillsides, land sloping towards the east, south-east or south; and protected on the north and north-west by plantations or buildings, consisting of a dry, sandy loam, are the conditions suitable for the mulberry; a cold, damp, or heavy soil will not answer.

The Americans advise that hedges of mulberry should be planted round the grounds of farms, as in this case children could reach up and gather the leaves.

The temperature needed for raising silkworms is not less than 75° Fahrenheit. Where that cannot be obtained special means for raising the thermometer up to that degree are needful, and one of the foundations of the art of rearing silkworms is to know the various degrees of heat in which the silkworms should live. It is not heat apparently that affects them, but sudden changes from one degree of temperature to another. It is necessary that the growth of the worms should follow that of the mulberry leaves in such a manner that at the fourth age the leaves should have attained their full growth. If the first ages of the worms be prolonged, the leaf will grow and harden and become unfit for their use.

The last subject to be touched upon is in reference to the eggs of the silkworm (or "grain," as it is properly called). The various epidemics in Europe have rendered it needful to look to Eastern countries for it, and Japan alone supplies Europe and the United States with great quantities of eggs, no less than six million dollars' worth being exported from Yokohama to San Francisco alone. They perform the long voyage in the winter, and are purchased in Japan in September, having been laid in August. Great pains are taken to shelter them from heat, but they can stand any amount of cold, and in travelling they can be kept on ice without damage; but they must also be kept dry, and a cold, dry cellar is the best place for them in winter. They may be kept in linen bags, hung up to the ceiling in a cool place, or else in tin boxes with perforations in the sides. The eggs are sold by weight, their value being about 25s. per ounce; each ounce may contain 40,000 eggs; and so you may guess from this how much you will require when you begin your work as an "educator" of silkworms; and you can also make calculations about the leaves you are likely to have with which to feed them. An ounce of eggs will produce about 100 to 120 lbs. of cocoons.

THE CULTURE OF SILK IN IRELAND AND AMERICA.

By DORA DE BLAQUIERE.

FIG. 1.—(A) THE MOTH LAYING EGGS—LIFE SIZE.

AND now I must try to give such practical hints to my readers as will enable them to carry out small "educations" without much trouble. One of these, consisting of three hundred silkworms, I found was, for myself, a world of experience; and as it was my first, and ended in every way most successfully, though I was obliged to travel by railroad in search of food during the course of it, I must be thought to have won my experience somewhat dearly. The grain used was grown in Australia, the worms were larger than any I have ever seen, and the cocoons fine and well shaped.

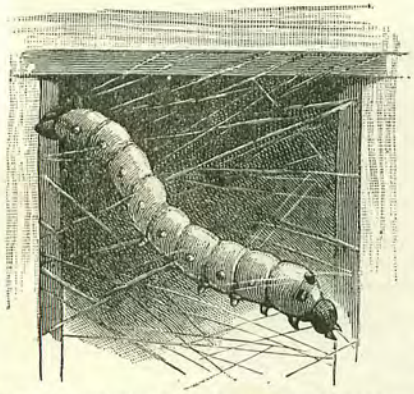

FIG. 2.—SILKWORM SPINNING A COCOON—LIFE SIZE.

This experiment took place in June and July, 1877—a fine hot summer—and the leaves mostly used were from the black mulberry. The worms were kept in the large dress boxes of cardboard sent out by drapers with dresses, and I see, by some recent American reports, that these are considered as very suitable, the high sides of the boxes protecting the silkworms from draughts. From the first few days, for two weeks or more, these paper boxes may be kept in the sitting-room, where they give no trouble, and where they are sure of receiving attention, and will be free from bad smells and cold; though at the same time they need plenty of air. The temperature of the room should not fall below 68° Fahr.; but it has been found that silkworms are far more often injured by extreme hot weather than by cold, for if properly fed they can stand very severe cold weather—just as we can ourselves under the same circumstances—though not damp. When it is cold, however, the silkworm has less appetite, and even two meals a day will be sufficient; but the "education" will last ever so much longer. It should take about forty days for silkworms that are fed four times a day, at four hours' intervals, and at an average temperature, to be ready to spin their cocoons; but it will take less time if the worms be fed day and night. Thus it will be seen that the silkworm has to absorb—from the date of his hatching to that of his spinning his cocoon—a certain quantity of leaves, and it is immaterial whether he be thirty-two days or fifty days in doing it; excepting for the rearer, who of course is saved the fatigue, trouble, and danger of accidents, and of disease likewise, if the "education" be as curtailed as it may possibly be. Four meals a day, beginning at 7 o'clock in the morning, will not prove a difficulty to anyone to supply; the hours of feeding being 7 a.m., 11 a.m., 3 p.m., and 7 p.m. Cleanliness, regularity in feeding, and evenness in the quantity are the most important essentials in an "education." No wet or damp leaves must be given to the worms. If raining, leaves must be gathered early in the morning and put to dry, for if not dry they must be wiped with a dry cloth.

FIG. 4.—CHRYSALIS—NATURAL SIZE.

In the first place, we will suppose the beginner has to procure his seed or grain, as the silkworms' eggs are indifferently called. It can be purchased at a very small price in Covent Garden, and also through the *Exchange and Mart*. If it be the first trial, I should advise you to lay out only a shilling on it. Before, however, you come to this part of the business you must consider the subject of leaves, and to get them you must discover a mulberry tree within a walk of your residence, from whence you can obtain leaves. The time for beginning the hatching is when the leaves are bursting out, which is at the latter end of April, or first part of May, in England. The eggs should be kept in a dry place, where the temperature never rises above fifty degrees. When the room is heated above this you must remove the eggs to a cellar. They are not affected (as I observed) by cold; on the contrary, it improves the grain greatly to expose it during the winter to the cold of the outer atmosphere. If the cellar be damp, the eggs will have to be removed every few days, and exposed to the dry outer air for an hour or two. When they are to be hatched, they must be taken from the cellar and placed in any of the warmer rooms of the house, and finally to the kitchen. Spread them on clean white paper, and put them in a warm closet, of which the temperature should be about 70°, a heat which may be gradually increased to about 80°. The worms will hatch out in about five days, but the warmer the place the sooner the hatching will take place.

FIG. 3.—COCOONS—NATURAL SIZE.

The colour of the egg changes, two days before the hatching, from light yellow to an ashen grey. The box in which the eggs are kept

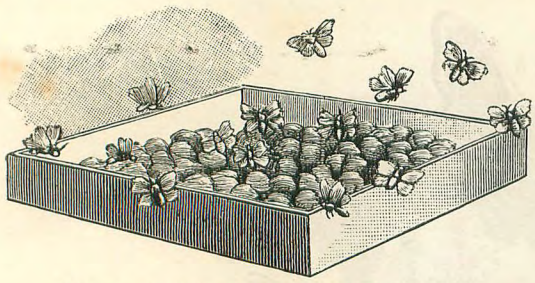

FIG. 5.—MOTHS EMERGING FROM COCOONS.

should be covered with a coarse net or muslin, so that the worms may crawl up through the holes. Perforated paper—a stiff brown or yellow wrapping-paper, with holes made in it about half an inch apart—will answer as well. On the paper or the net some young mulberry leaves must be placed for the young worms to feed upon. Another method of collecting the young worms is to place very tender leaves about the eggs, and the hatched worms will soon crawl on them. When the leaves are well covered with the baby-worms, they may be carefully transferred to papers or boxes marked "first day's hatching," "second day's hatching," and so on, for each day, for the various days' hatchings must be kept carefully apart throughout the whole time of the "education."

After the worms are all hatched, the "education" may be considered as fairly started. The first age of the worms lasts five days, and during that time they must be fed with the young leaves which are found in the spring (the older leaves would be too hard for them); at the early periods of life any variety of mulberry leaf will answer for feeding them. The leaves for the young worms should always be cut up with a sharp clean knife, and cut quite finely during the first ages, but after the fourth and down to spinning-time they may be given entire. There are two objects in cutting the leaves: one being to give the young worms more edges on which to feed, and the other being to enable the educator to scatter the leaves more evenly, so that each worm may have its fair proportion of food, that they may grow equally, and accomplish their moultings at one and the same time. This is a very important point, saving a great deal of labour, which all beginners must remember.

The life of the worm is divided into five ages and four intervening moultings. On the fifth day of its life the young worms must be carefully watched. When they are ready for

FIG. 6.—GLASS JARS OF COCOONS.

the moulting-sleep they cease eating, remain still, and on the tiny black head a spot appears like a half moon—the new head of the worm. While in the moulting-sleep the worms are not fed at all, and when they are preparing for it they must not be cleaned, nor the litter

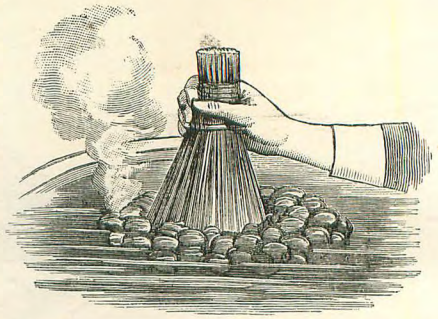

FIG. 8.—LOOSENING THE OUTER FIBRE OF THE COCOONS.

thrown out; nor must they be disturbed until the day after the moulting. Again the newly-moulted worms must not be fed until all of them have moulted and shed their skins. This treatment will apply to all the moultings, *i.e.*, at the other four ages.

After about three weeks the silkworms begin to change colour, refuse their food, and wander about the box or shelf, holding up their heads to look about for the resting-place which their instinct bids them seek. When they have attained their full growth they are probably an inch and a half long. If the educator be only a beginner, it is well she should be prepared for this state of things. Sheaves of straw, boughs of willow, bunches of dried twigs tied together, dry bracken, leaves, or something of that kind will answer for the spinning of the cocoons. It takes four

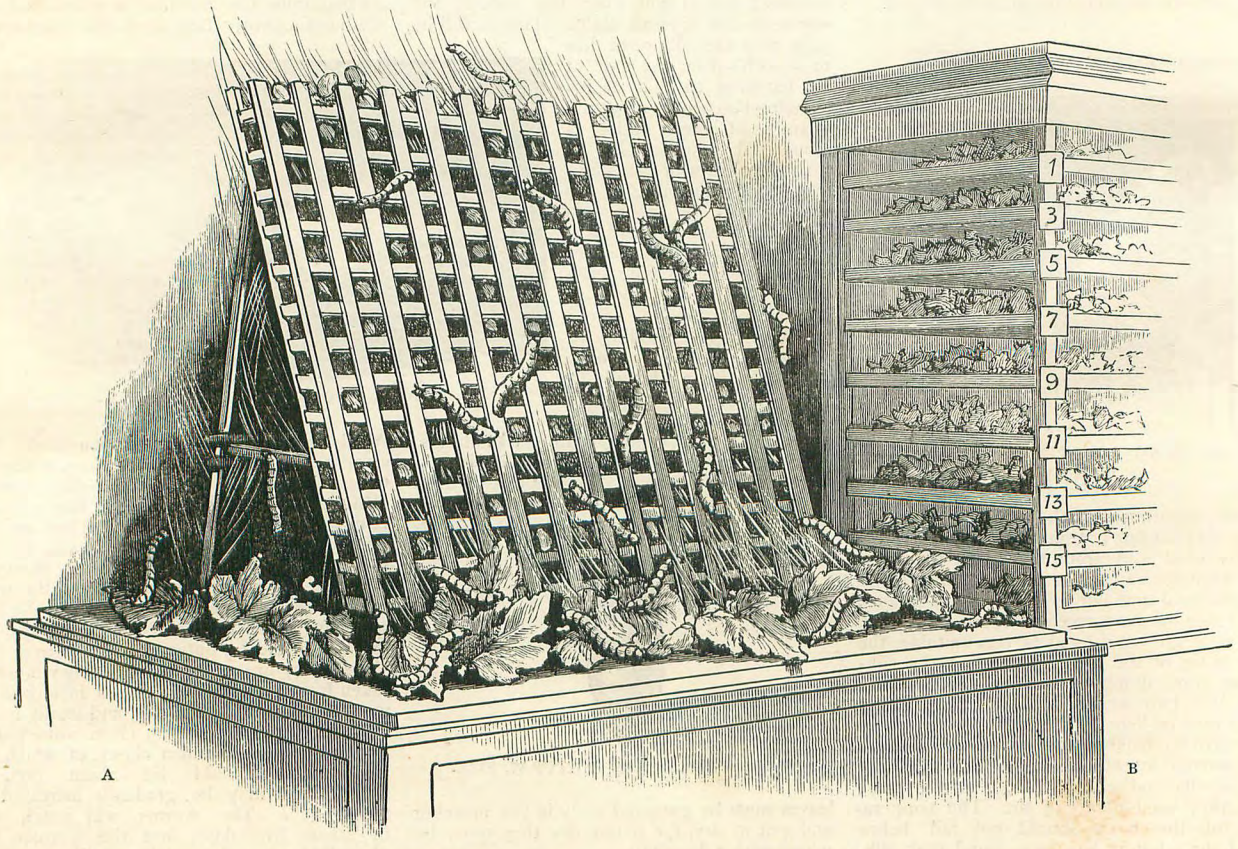

FIG. 7.—(A) LATTICED FRAME FOR WORMS TO SPIN UPON. (B) TRAYS FOR THE WORMS, SHOWING AGES AND GROWTH.

FIG. 9.—REMOVING THE OUTER FIBRE.

days for a silkworm to finish its cocoon, and another three days to pass into the chrysalis state. After the spinning is over, those cocoons which are to be reeled for silk are to be gathered on the ninth day after being spun; and in order to kill the moths, they must be laid in the oven in boxes on wooden slabs, being careful to avoid scorching the cocoon. In about twenty minutes all motion and sound will have ceased, and the moth will be dead. The cocoons must then be spread out to dry in a warm room.

If the cocoons be destined for seed or grain, you must select the finest of them, hard to the touch and smaller in the middle than at the ends; of a light yellow in colour. Strip the loose floss from them and place them in boxes to await the emergence of the moths, which will take place in about twenty days, according to the weather, after the cocoons have been commenced. They always come out very early in the morning, just after sunrise, between six and eight o'clock; when out they should be placed on sheets of paper, as they pair. When the females lay their eggs it is better to put them on a cloth nailed to the wall, where they soon deposit their eggs. During the moth-life they require no food, and must be kept in rather a dark room, as they are night-moths. They are very plain-looking indeed, and they die almost directly after laying their eggs. Another method is to put the moths on sheets of paper, which can then be put away in shallow boxes to keep them from the dust until the following year.

If the cocoons have to travel to any distance, they must be carefully packed so as to avoid flattening them; but they may be put into a dry box sufficiently close as not to alter their shape. Pierced cocoons, out of which the moths have come, may be closely packed, without any harm happening to them.

I have now, I think, given such a careful description of the whole process of the "education" of silkworms, that there will be no trouble in commencing one, and, on thinking the matter over, of going into the business of silk-growing. The great thing is to avoid hurry in the process. The trees, if newly planted, will take three years to grow, and during that time our girls can be looking about them to pick up new and approved ideas and further knowledge for their enterprise. From time to time the Editor, who wishes to encourage the growth of the industry amongst his girls, will admit an article on the subject, giving the latest information and teaching there is to be obtained.

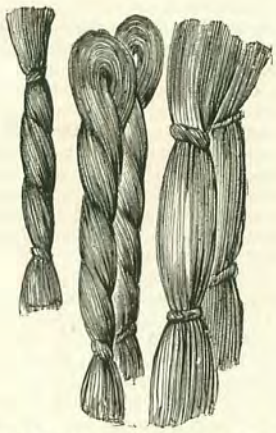

FIG 12.—HANKS OF RAW SILK.

The most valuable handbook on the subject is that issued by the "American Women's Silk Culture Association," 1222, Arch Street, Philadelphia, Pa., U.S. America; price one dollar. The reports also are most valuable, and should be obtained by anyone intending to go in for silk culture. The address of the new Irish industry is Miss H. H. Reeves, Tranmore, Douglas, Cork; or M. H. Westropp, Ravenswood, Carrigaline, and from them information and grain can be obtained. Any extra information will be gladly given by the author of this paper.

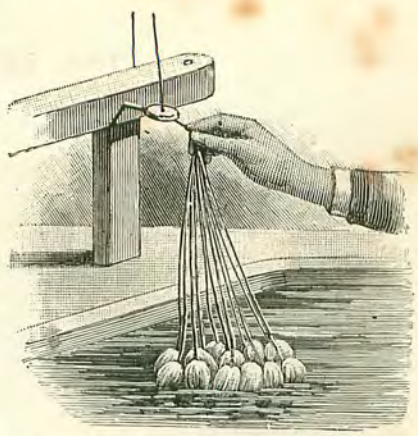

FIG. 10.—GATHERING FIBRES INTO THREADS.

An interesting book, recently published, "Pen and Pencil in Asia Minor," by Mr. William Cochran (Member of the Society of Arts), contains the fullest instructions possible in sericulture—the best method of growing the mulberry, all recent experiments and appliances, and the results of the celebrated Pasteur experiments in the diseases of the silkworm, as well as the best methods of prevention. Mr. Cochran went to Asia Minor for the purpose of seeing Mr. John Griffitt, who has been for the last thirty years U.S.A. Vice-Consul at Smyrna, and the means of reviving the almost dying silk industry near that city. A skilled silk farmer himself, he studied the discoveries of Pasteur, and reproduced a breed of healthy silkworms.

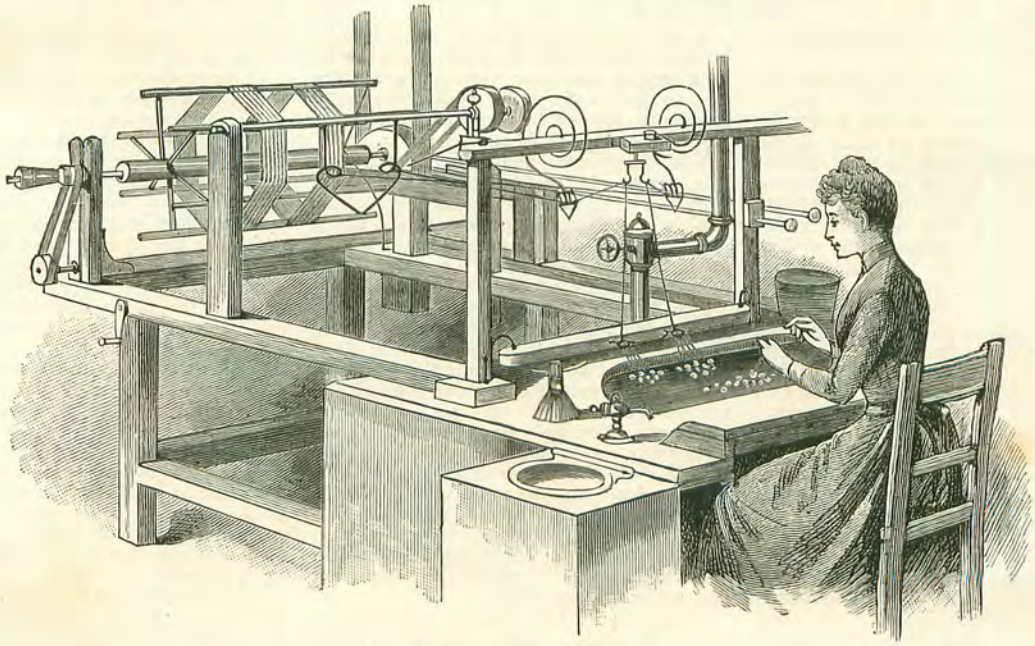

FIG. 11.—SPINNING SILK THREAD.