

DIRECTIONS FOR THE REARING OF SILK WORMS.

Procure eggs in February and March, and choose those of a pale slate or clay colour; avoid all which are yellow, as they are imperfect. Keep them in a cold dry place, (where water will, however, not freeze,) until the leaf buds of the mulberry begin to swell. If the eggs be soiled, dip the paper or cloth to which they adhere, in water once or twice, to wash off the coat with which they are covered, and which will impede the hatching of the worms. It is not necessary to scrape off the eggs from the paper or cloth on which they have been deposited. Dry them quickly in a draught of air, and put them in one or more shal-

low boxes, lined with paper; which place, if possible, in a small room, of the temperature of 64°, and keep it up to that degree for the two first days, by means of a fire in the chimney, or still better, in a brick, tile, or porcelain stove; or for want of these in an iron stove; and use tanners' waste-bark, turf, or charcoal for fuel, to promote and keep up a regular heat day and night. The third day increase the heat to 66°, the fourth to 68°, the fifth to 71°, the sixth to 73°, the seventh to 75°, the eighth to 77°, the ninth to 80°, the tenth, eleventh and twelfth to 82°. It is impossible to expect regularity in hatching, if reliance be placed upon our variable weather; and it is the regularity of the worms coming forth, which will ensure their uniform growth, save much trouble in feeding and attending those of various ages, and cause the whole, or the greater part, to form their cocoons at the same time, provided proper care be given during their progress.

When the eggs assume a whitish hue, the worm is formed: cover the eggs with white paper, (never use a newspaper) pierced full of holes, the size of a large knitting needle; the worms, when hatched, will creep through them; turn up the edges of the paper to prevent their crawling off. Lay twigs of the mulberry, having two or three dry and young leaves on the paper, to collect the worms, and more as they continue to mount. For want of mulberry leaves, feed for a short time upon lettuce leaves perfectly dry; if large, they should be cut in strips, and the mid-rib thrown away: or, still better, feed with the twigs of the white mulberry tree cut up fine. The worms first hatched are the strongest; nevertheless, if only a few come out on the first day, give them away, to save trouble, and depend upon those which appear on the second and third days. Give away also the produce of the fourth day, and then the whole stock will go on regularly. If it be wished to rear all that are hatched, endeavour to keep the produce of each day separate, by numbering the boxes and shelves. When the leaves on the twigs are loaded with worms, they are to be gently placed on clean stout white paper laid on frames with crossed rattans, giving them plenty of room. The shelves, over which these frames should slide, may be four feet square, and fixed to upright posts; they may be multiplied as required. Whether a distinct building or apartment in a dwelling-house be devoted to a large parcel, it is absolutely necessary to secure the command of a gentle circulation of air, by having ventilators in the windows, floors, and doors.

One or more tin circular ventilators in place of panes of glass, would always ensure a regular circulation in the apartment: they may be stopped when their motion is not required. Red ants are deadly enemies to silk worms; to prevent their attacks, the posts containing fixed shelves must not touch the ceiling, nor must the shelves reach the walls; the lower parts of the posts should be smeared with thick molasses. If the worms are fed on tables or moveable frames, their legs may also be smeared with molasses, or put in a dish of water; guard also against cockroaches, mice, and other vermin.

The worms being all hatched, whether they are to remain in the first apartment, or be removed to another room, or distinct building, the heat must be reduced to 75°; for, as the worms grow older, they require less heat.

It is impossible to insure the regular hatching of the worms without the use of a thermometer, which may be bought for \$2 50 at M^r Allister's Chesnut street. Philadelphia.

First age—that is, until the worms have passed their first moulting or changed their first skin.

The apartment must be light, but the sun must not shine on the worms in any stage.

Feed the worms with the most tender leaves, four times a day, allowing six hours between each meal; give the smallest quantity for the first feeding, and gradually increase it at each meal between the moultings.

In about an hour and a half, the silk worms devour their portion of leaves, and then remain more or less quiet. Whenever food is given, widen the spaces for them; scattered food may be swept into its place.

Experiments may be made as to the comparative advantages of using chopped or whole young leaves. If chopped, a sharp knife must be used, to prevent the leaves from being bruised, and thereby causing the exudation of water from them, which would prove injurious. On the fourth day the skin becomes of a hazel colour and looks shining, their heads enlarge and assume a silvery bright appearance; these are marks of their approaching first change. Their food on this day, therefore, may be diminished, or, when these appearances take place, but not before. Enlarge the spaces as the worms increase in size. The leaves ought to be gathered a few hours before they are used, that they may lose their sharpness: they keep very well in a cool cellar three days; the leaves ought to be gathered over night, for the morning's meal, to prevent the danger of collecting them in rainy weather. The leaves must be pulled carefully, and not bruised. On the fourth day the appetites of the worms begin to decrease, preparatory to their first moulting, and their food must be diminished in proportion as the previous meal has not been completely eaten. If the precarious heat of the weather has been depended upon, the first change may not appear until the sixth or seventh day.

In the course of the fifth day all the worms become torpid; during this period, and in the subsequent moultings, they must on no account be disturbed. A few begin to revive at the close of the fifth day; some leaves may be then given. After the first moulting, the worms are of a dark ash colour.

Second age.

As the worms are fond of the young twigs, some of these should be spread over them with the leaves attached, upon which the worms will immediately fasten, and they may then be removed to a clean paper; or lay a strip of chopped leaves near the worms, and they will leave the old food.

The litter is to be taken away; but as some of the worms often remain among the old leaves, they ought to be examined. To this end, the litter should be removed to another room, spread out on a table, and a few twigs placed over it, on which the worms, if any, will mount, when they may be added to the others; this rule must be attended to after every moulting. Ten per cent. is generally allowed for loss of young worms. The two first meals of the first day should be less plentiful than the two last, and must consist of the most tender leaves; these must be continued for food until after the third moulting.

If between the moultings any worms should appear sick, and cease to eat, they must be removed to another room, where the air is pure and a little warmer than that they have left, put on clean paper, and some fresh leaves, chopped fine, given to them; they will soon recover, and then may be added to the others.

On the third day, the appetite of many worms will be visibly diminished; and, in the course of it, many will become torpid—the next day all are

torpid; on the fifth day they will all have changed their skins and will be roused.

The colour of the worms in the second age becomes a light grey, the muzzle is white, and the hair hardly to be seen.

It must never be forgotten, that, during the time the worms are occupied in moulting, the food should be greatly diminished, and no more given, than will satisfy those which have not yet become torpid on the first day, or those which have changed their skins before the others.

Third age.

During this age the thermometer must range between 71° and 73°. The revived worms are easily known by their new aspect. The latest worms should be placed apart, as their next moulting will be a day later also, or they may be put in the hottest part of the room to hasten their growth. This rule must be observed in the next moulting—increase the spaces.

The second day, the two first meals are to be the least copious, the two last the greatest, because, towards the close of the day, the worms grow very hungry. The third day will require about the same quantity as the preceding last meals; but on the fourth day, as the appetites of the worms sensibly diminish, not more than half the former feed will be required. The first meal is to be the largest: feed those that will eat at any time of the day. The fifth day, still less will suffice, as the greatest part are moulting; the sixth day they begin to rouse. Remove the litter, or even before they have moulted, if the worms are numerous.

Fourth age.

The thermometer should range between 68° and 71°. If the weather be warm, and the glass rise several degrees higher, open the ventilators, exclude the sun, and make a slight blaze in the chimney, to cause a circulation of the air. Widen the spaces for the worms. The leaves must now be regularly chopped in a straw-cutting box, or with a chopping-knife. The food is to be greatly increased on the second, third, and fourth days. On the fifth, less will be required, as in the course of this day many become torpid; the first meal on this day should therefore be the largest. On the sixth, they will want still less, as nearly the whole will be occupied in effecting their last change of skin. Renew the air in the apartment by burning straw or shavings in the chimney, and open the ventilators. If the evenings be cool, after a hot day, admit the external air for an hour. None but full grown leaves should be hereafter given to the worms, and they must be all chopped; avoid the fruit, as they would prove injurious, and add greatly to the litter. On the seventh day, all the worms will have roused, and thus finish their fourth age. The litter must be again removed.

Fifth age, or until the worms prepare to mount.

The thermometer should be about 68°. The constitution of the worms being now formed, they begin to elaborate the silk-vessels, and fill them with the silky material, which they decompose, and form from the mulberry leaves. Give abundance of room: do not let the worms lie so close as to touch one another, for their respiration will be thereby impeded: continue to feed regularly and fully, as the appetite of the worms now becomes voracious: give food rather five times a day than four; even six meals will not be too many. The last meal should be late at night, and the first the next day in the morning, at an early hour. The worms are not again to be moved, and the hurdles, or feeding frames, must be cleaned. On the seventh day of the fifth age, they have attained their largest size, viz. three inches long, and begin to grow

shining and yellow. The appetites of some diminish, but that of others continues, and must be supplied, to hasten their maturity. The litter must be removed every two days, during the fifth age, but not when the worms are moulting, unless it can be done without disturbing them.

The preservation of the proper temperature of the apartment at this stage, cannot be too seriously impressed upon the cultivator. If sudden and great heat in the weather should take place, as often happens at this time, serious loss may be suffered, without proper precautions. The increased heat to which the worms are exposed, causes them to cease eating, to leave their feeding shelves, and to wander about the room, in order to find corners and places to form their cocoons in before the silk fluid has been fully elaborated, or matured; thus defeating, in a great measure, all the care previously bestowed upon them. In the summer of the year 1825, vast numbers of worms were killed by hot weather, in Mansfield, Connecticut. To guard against sudden heat in the weather, close the window shutters while the sun is beating on them, and keep the ventilators in the ceiling or other parts of the room open; and, if possible, tubs of ice should be brought into the apartment, until the thermometer shows a diminution of temperature to the proper degree. The windows must also be kept open every evening, and until sunrise next morning, and water sprinkled on the floor, to promote evaporation, and consequently a freshness in the air. If the worms should become diseased during the fourth or fifth ages, oak leaves may be given to them. These were stated to have been found very beneficial in the year 1772, in Bucks county; but the species of oak was not mentioned. The white oak may be tried.

Of the rearing of silk worms in the last period of the fifth age, that is, until the cocoon is perfected.

The fifth age can only be looked on as terminated, when the cocoon is perfect.

The cleanliness of the feeding frames in these last days of the fifth age, requires great attention, to preserve the health of the silk worms.

About the tenth day of the fifth age, the worms attain perfection, which may be ascertained by the following indications.

1st. When on putting some leaves on the wickers, the insects get upon the leaves without eating them, and rear their heads as if in search of something else.

2d. When looking at them horizontally, the light shines through them, and they appear of a whitish-yellow transparent colour.

3d. When numbers of the worms which were fastened to the inside of the edges of the wickers, and straightened, now get upon the edges and move slowly along, instinct urging them to seek change of place.

4th. When numbers of worms leave the centre of the wickers, and try to reach the edges and crawl upon them.

5th. When their rings draw in, and their greenish colour changes to a deep golden hue.

6th. When their skins become wrinkled about the neck, and their bodies have more softness to the touch than heretofore, and feel like soft dough.

7th. When in taking a silk worm in the hand, and looking through it, the whole body has assumed the transparency of a ripe yellow plum. When these signs appear in any of the insects, every thing should be prepared for their rising, that those worms which are ready to rise may not lose their strength and silk in seeking for the support they require. Handle the worms at this stage with the greatest gentleness, as the slightest pressure injures

them. When moved, they should be left on the twigs or leaves to which they are fastened, to prevent their being hurt by tearing them off. A blunt hook should be used to take up those not adhering to leaves or twigs.

Preparation of the hedge.

A week or ten days before the worms are ready to mount, bundles of twigs of chesnut, hickory, oak, or of the birch of which stable brooms are made, must be procured, prepared, and arranged in bunches, so that the worms may easily climb up them, to work their cocoons. As soon as it is observed that the worms want to rise, the bundles of twigs must be arranged on the feeding trays, leaving fifteen inches between them. The top branches should touch the lower part of the tray above that on which they are placed, so as to form an arch—and be placed a little aslant, that the worms, when climbing, may not fall off. The branches should be spread out like fans, that the air may penetrate through all parts, and the worms work with ease. When the worms are too near one another, they do not work so well, and form double cocoons, which are only worth half a single round cocoon. Leave openings at the tops of the curves, for the worms to form their cocoons in.

As soon as the worms are prepared to rise, the feeding frames should be cleaned thoroughly, and the apartment well ventilated. Put the worms which are ready to rise near the hedges, and give a few leaves to those that are still inclined to eat. After they have begun to rise, those that are weak and lazy do not eat, do not seem to be inclined to rise, and remain motionless on the leaves. These should be taken away, and put in a clean dry room, of at least 75° of heat, where there are hurdles covered with paper, and the hedge prepared for them. The increased heat will cause them to rise directly. All the silk worms being off the hurdles, they should be immediately cleaned. The temperature of the room should be between 68° and 71°. When the worms are forming their cocoons, the utmost silence must be preserved in the room, as they are very sensible to noise, and, if disturbed, will for a moment cease to spin; thus the continuity of the thread will be interrupted, and the value of the cocoon diminished. When the cocoons have attained a certain consistency, the apartment may be left quite open.

Sixth age, beginning in the chrysalis state, and ending when the moths appear.

The following are the necessary things to be done:

- I. To gather the cocoons.
- II. To choose the cocoons which are to be preserved for the eggs.
- III. Preservation of cocoons until the appearance of the moth.

I. Gathering of the cocoons.

Strong, healthy, and well managed silk worms, will complete their cocoons in three days and a half at farthest, reckoning from the moment when they first begin casting the floss. This period will be shorter, if the silk worms spin the silk in a higher temperature than that which has been indicated, and in very dry air.

It will be better not to take off the cocoon before the eighth or ninth day, reckoning from the time when the silk worm first rose. They may be taken off on the seventh, if the laboratories have been conducted with such regularity, that the time may be known with certainty, when this may be done.

Begin on the lower tier of hurdles, and take the cabins down gently, giving them to those who are to gather the cocoons; place a basket between two of the gatherers to receive the cocoons; another person should receive the stripped bushes, which may be laid by for another year. All the cocoons

that want a certain consistency, and feel soft, should be laid aside, that they may not be mixed with the better. Empty the baskets upon hurdles or trays placed in rows, and spread the cocoons about four fingers deep, or nearly to the top of the feeding frame. When the cocoons are detached, the down or floss in which the silk worms have formed the cocoon, should be taken off. If the cocoons are for sale, weigh them, and send them to the purchaser. The baskets, the floor and all things used, should be cleaned.

When gathering the cocoons, make four assortments:—1st. Those designed for breed. 2d. The dupions, or double ones. 3d. The firmest of those which are to be reeled. 4th. Those of a looser texture.

II. *Choosing the cocoons for the production of eggs.*

About two ounces of eggs may be saved out of one pound and a half of male and female cocoons.

The small cocoons of a straw colour, with hard ends, and fine webs, and which are a little depressed in the middle, as if tightened by a ring or circle, are to be preferred. There are no certain signs to distinguish the male from the female cocoons: the best known are the following.

The small cocoons sharper at one, or both ends, and depressed in the middle, generally produce the male. The round full cocoons without ring or depression in the middle, usually contain the female.

These may be distinguished from the dupions by the extra size, the clumsy shape, rather round than oval, of the latter. As however, all marks may fail, an extra number may be kept, of the best of those which are spun double; and when the moths come out, the males and females being easily distinguished, an addition can be made from them to the defective side.

By shaking the cocoon close to the ear, we may generally ascertain whether the chrysalis be alive. If it be dead, and loosened from the cocoon, it yields a sharp sound. When dead, it yields a muffled sound, and is more confined in the cocoon.

III. *Preservation of cocoons intended for seed, or until the appearance of the moth.*

Experience shows that where the temperature of the room is above 73 deg. the transition of the chrysalis to the moth state would be too rapid, and the coupling will not be productive; if below 66 deg. the development of the moth is tardy, which is also injurious. Damp air will change it into a weak and sickly moth; the apartment should therefore be kept in an even dry temperature, between 66 deg. and 73 deg. When collected, spread the cocoons on a dry floor, or on tables, and strip them clean of down or floss, to prevent the feet of the moth from being entangled in it when coming out. While cleaning them, all those that appear to have any defect should be laid aside; this is the time, also, to separate the male and female cocoons, as far as we can distinguish them.

Select an equal number of males and females, and keep the cocoons of the same day's mounting separate, that the moths may pierce them at the same time. If the good cocoons taken from the whole parcel, are all first mixed, and the selection for those intended for breeding be made from this general heap, many will be set aside, which were formed by worms that had mounted upon different days, and which will be pierced by the moths unequally, and hence there will not be an equal number of males and females produced at the same time; this irregular appearance may cause the loss of a great many moths, or of several thousand eggs.

When the selection has been made, the sorted

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cocoons must be put on tables, in layers of about two inches, allowing the air to pass freely through them, that it may not be necessary to stir them frequently; but it is beneficial to stir them round once a day, if the air be moist. When the seed cocoons are not very numerous, they may be strung upon threads, and hung against a wall, or suspended from a beam. Just so much of the middle of the cocoon is to be pierced with a needle as is sufficient to attach it to the thread. The middle is chosen, because it cannot be ascertained at which end the moth will pierce the cocoon. Place a male and female cocoon alternately upon the thread, that they may be near each other when they come out.

If the heat of the apartment is above 73°, every method of diminishing the heat should be tried: such as keeping all the apertures to the sunny side carefully closed, to cause thorough drafts of air to dry the humidity that exhales from the chrysalides. Should the temperature rise to 78° or 82°, the cocoons must be put in a cooler place, as a dry cellar.

Seventh age of the silk worm.

The seventh, and the last age of the silk worm, comprises the entire life of the moth.

The formation of the moth, and its disposition to issue from the cocoon, may be ascertained when one of its extremities is perceived to be wet, which is the part occupied by the head of the moth. A few hours after, and sometimes in one hour after, the moth will pierce the cocoon and come out; occasionally the cocoon is so hard, and so wound in silk, that the moth in vain strives to come forth, and dies in the cocoon. Sometimes the female deposits some eggs in the cocoon before she can get out, and often perishes in it; this circumstance has induced some to extract the chrysalis from the cocoon by cutting it, that the moth may have only to pierce its thin envelope; but the experienced Dandolo disapproves of the practice (although he has performed the operation with success) because it is tedious; and should the moth be put on a plain surface, five in a hundred will not be able to get out, but will drag the envelope along, and at last die, not being able to disencumber themselves. If the surface be not smooth, the moths will issue with greater ease; it is very favourable to the moths when they put forth their head and first legs, to find some substance to which they may fasten, and thus facilitate clearing out of the cocoon by the support. For this reason, they should be spread out very thin on tables covered with a muslin or linen cloth. The life of the moth lasts, in Italy, ten, eleven, or twelve days, according to the strength of its constitution, and the mildness of the atmosphere. With Mr Dusar, of Philadelphia, the moths lived from five to eight days; a hot temperature accelerates their operations and the drying which precedes their death.

Hatching of the moths, and their preservation.

Cocoons kept in a temperature of 66 degrees begin to be hatched after fifteen days; those kept in a heat between 71 and 73 degrees, begin to come forth after eleven or twelve days. The room in which the moths are produced should be dark, or at least there should be only sufficient light to distinguish objects. This is an important rule, and must be carefully attended to. The moths do not come forth in great numbers the first or the second day, but are chiefly hatched on the fourth, fifth, sixth, and seventh days, according to the degree of heat in which the cocoons have been kept. The hours when the moths burst the cocoons in the greatest numbers, are the three and four hours after sunrise, if the temperature is from 64 to 66 degrees. The male moths, the very moment they come out, go eagerly in quest of the female; when they are united, they must be placed on frames

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covered with linen, and made in such a manner as to allow the linen to be changed when soiled. Much care must be taken in raising the united moths; they must be held by the wings in order not to separate them. When one small table is filled with moths in a state of union, they are to be carried into a small room, sufficiently airy and fresh, and which can be made very dark. Having employed the first hours of the day in selecting and carrying the united moths, the males and females which are found separate on the tables, are to be brought into contact, put on frames and carried into the dark room. It is easy to ascertain if there are more females than males. The body of the female is nearly double the size of that of the male; besides, the male which is single, beats about its wings at the least approach of light; the hour must be noted at which the tables containing the united moths are placed in the dark room.

If, after this operation is over, there still remain some moths of each sex, they are to be placed in a small box with a perforated cover, until the moment favourable for their union arrives. From time to time, they must be looked at, to see if they separate, in order that they may be brought anew into contact.

When any thing is to be done in the dark chamber, as little light as possible must be admitted; only sufficient to distinguish objects. The more light there is, the more the moths are disturbed and troubled in their operations, as light is too stimulating for them. The boxes are very convenient to keep quiet the males which remain, and thus prevent the fine powder adhering to their wings from flying about, and the destruction of their wings, and consequently their vital power. The cocoons must be removed as fast as they are pierced by the moth, for being moist, they communicate their humidity to those which are still entire. The paper, also, on the trays, when soiled, is to be removed, and fresh supplied. Constant attention is required during the whole day, as there is a succession in the process of hatching, and union of the moths, which occasionally vary in relative proportion to one another. Instead of a frame, paper may be used for receiving the eggs. A few good cocoons will not produce a moth, owing to their hardness, which prevents the moth from making a hole by which to come forth.

Separation of the moth, and laying the eggs.

If there be an excess of males, they must be thrown away; if of females, males must be allotted to them, which have already been in a state of union. Great care must be taken, when the couples are separated, not to injure the males. The male ought not to remain united more than six hours; after the lapse of that time, take the moths by the wings and body, and separate them gently. All the males which are no longer in union, must be placed upon a frame; the most vigorous afterwards selected, and united with those females which have not yet had a mate. Other vigorous males must be preserved in a separate box, and kept in darkness. When there is a want of males, let them remain united to the female the first time only five hours instead of six; the females are not injured by waiting for the male even many hours; the only loss sustained is that of some eggs, which are not impregnated. Before separating the two sexes, prepare, in a cool, dry, airy chamber, the linen on which the moth is to deposit its eggs.

Six hours, as just said, is the usual time for the moths to remain united, for in that time the eggs of the female will be fully impregnated. It is also the general practice not to use the male for another female; but Mr Delonchamps assures us, that in the event of having more female than male

moths, the latter may be again used to profit. In the year 1824, he raised many worms from eggs, the produce of a sixth coupling, which were fully equal to those produced from eggs at the first; the union continued never less than from 20 to 24 hours; the male after a sixth union appeared as lively and brisk as at first, but he had no more females. The eggs from even a thirteenth union of the same male with different females, had all the characters of those of the best quality. In these cases, the disunion of the pair was, moreover, never spontaneous, but always required to be effected by the hands.

The following is the manner in which the cloth must be arranged:—

At the bottom of a tressel or frame, which must be proportioned to the number of moths, place horizontally, on each side of the length, two boards, so arranged, that one of their sides may be nailed to the tressel, about five inches and a half high above the ground, and that the other side of the board shall be a little higher, and project outwards. Upon the tressel lay a cloth, so that it may hang equally on each side. The ends of the cloth must cover the boards below; the more perpendicular the lateral parts of the tressel are, the less soiled will be the cloth by the evacuation of the liquid from the moths. The moths which have been united six hours are then to be gently separated, the females placed on the frame, and carried to the tressel and placed on the cloth, one over another, beginning at the top and going downwards. Note the time at which the moths are placed on the cloth, and keep those which are placed afterwards separate, to avoid confusion.

The females that have had a virgin mate must be treated in the same manner as those which have been united with one that had been coupled previously five hours. The females should be left on the cloth 36 or 40 hours, without being touched; at this time, if it be observed that the linen has not been well stocked with eggs, other females must be placed upon it, in order that the eggs may be equally distributed. When the heat of the room is 77 or 79 degrees, or when at 63 or 65 degrees, the eggs will be yellow, that is unimpregnated; or of a reddish colour, that is imperfectly impregnated, and will not produce worms: the temperature of the room must therefore be kept between these extremes. Sometimes a female moth will escape from its mate before impregnation, and produce many useless eggs.

The female cocoons, as before noted, are generally larger than the males, and not so much pointed as these are, and are without the ring or depression in the middle, which commonly distinguishes the cocoons containing the latter.

Eight or ten days after the deposition of the eggs, the jonquil colour peculiar to them will change to a reddish gray, and afterwards into a pale clay hue; they are of a lenticular form, and on both surfaces there is a slight depression.

Preservation of the eggs.

Collect the eggs which have fallen on the cloth covering the shelves of the tressel, when quite dry, put them in a box, and, if numerous, in layers not more than half the breadth of the finger. The cloths raised from the tressel when quite dry, are to be folded and placed in a dry room, the temperature of which does not exceed 65°, nor below the freezing point, 32°.

During the summer the cloths must be examined every month, to remove insects; and to preserve the cloths always in fresh air, if the quantity be large, place them on a frame of cord attached to the ceiling, or a rafter. A barrel-hoop, crossed with stout pack-thread, will make a good frame.

A small quantity may be kept in a tin case. If a board box be used, the joints and edges of the top should be pasted with paper to exclude ants.

There exists a notion that every two or three years the eggs should be changed. It requires little to be said on this egregious error. To suppose that the good cocoons of a cultivator, after a few years, are no longer fit to produce seed, and yet that these cocoons can give good seed for the use of another, would be to admit a superstitious contradiction, which reason, practice, and science, alike condemn. A change of seed can only be necessary, when from great neglect, for a series of years, of the worms, a diminutive race has been produced. Worms properly treated, will never degenerate. On the subject of the degeneracy of silk worms, in the United States, the most positive information can be given.

Mr Samuel Alexander, of Philadelphia, says, "I am convinced that silk worms, cultivated in Pennsylvania, instead of degenerating, improve; proof of which I possess, in comparing the cocoons of four years since, with those of the last year. I can say with truth, the worms hatched from the eggs I brought from the south of Europe, have produced annually better silk." The testimony of Mr Sharrod McCall, of Galaden county, Florida, is still more decisive.

A sample of beautiful sewing-silk, sent with his communication to the Secretary of the Treasury, was part of a parcel produced by worms, the stock of which he has had thirty years; and they were obtained from a maternal ancestor, who had possessed them many years before.

During all this long period, no degeneracy has been observed. Let proper care be taken of silk worms, and no deterioration will take place.

The time has passed when the idle reveries of Buffon, Robertson, De Pauw, and others, respecting the tendency of nature "to belittle" and degenerate every thing foreign in the new world, were received as truths. Facts, proud facts, demonstrate not only the absurdity of their positions, but the superiority of every American animal and vegetable, when compared with similar productions in the old world.

To bake cocoons.

Cocoons reel more readily, and yield silk of a superior quality, without killing the insect by either steam of hot water, or by baking them; but those who have not the means of reeling off their cocoons in two or three days after they are formed, or of selling them, must kill the insects they contain, or they will eat through, and spoil the cocoons by breaking the continuity of the thread. The easiest way to do this, is to bake them in an oven, which must be about as hot as when bread has been taken out of it. After picking out all the spotted cocoons, put the rest in flat baskets, filling them within an inch of the top: cover them with paper, and a wrapper over it: put these baskets in the oven, and after an hour, draw them out, and cover them with a woollen rug, leaving the wrapper as it was. Let them stand five or six hours, to keep in the heat and stifle the chrysalis. Then spread them in thin layers on shelves, and move them every day (to prevent their becoming mouldy) until perfectly dry. It may be important to state, that the birth of the moth may be prolonged a month by keeping the cocoons in a very cold dry cellar. If the cocoons are kept over summer, they must be protected from ants, mice, and cockroaches.

N. B. Mr D. Tees, No. 150, North Front street, and B. F. Pomeroy, corner of Walnut and Dock streets, Philadelphia, are recommended to those who wish to have silk-reels made.

On the culture of the white mulberry tree.

The proper soils for this tree are dry, sandy, or stony: the more stony the better, provided the roots can penetrate them. The situation should be high: low, rich, and moist lands never produce nourishing leaves, however vigorously the trees may grow. They are always found to be too watery. The same remark may be made upon the leaves of young seedling plants, which will not produce good or abundance of silk, and are only proper when the worms are young; say in their two first ages. It may be useful to have a parcel of these growing in a warm situation, that they may come forward before large trees, and serve for early food.

Mulberry trees may be propagated by—1st, seed; 2d, grafting; 3d, budding; 4th, layers; 5th, cuttings; 6th, suckers.

The ripe fruit may be sown in drills, in ground previously prepared; or the seeds may be washed out of the pulp, and mixed with an equal quantity of sand or fine mould, and then sown. They should be covered about a quarter of an inch deep. The seeds will soon vegetate if the ground be rich, and will live through the winter, unless the cold should be unusually severe. A quantity of plants from seeds thus treated, lived through the cold winter of 1825—6, in Philadelphia. In very cold weather, the young plants may be covered with straw, or long manure. The following spring, thin the plants so that they may stand one foot apart at least. Seeds intended to be sown in the spring, or to be kept, should be washed out, as they are apt to heat, or to mould, if permitted to remain in the fruit. Land destined for spring sowing should be dug or ploughed in the preceding autumn, left rough all winter, and be harrowed or raked fine, as soon as the season will permit, and the seed sown in drills. The young plants must be watered in dry weather, and weeds carefully kept down. Weeds will not only stunt the growth of the plants, but cause disease in them, which may affect the future vigour and health of the tree. In the second year transplant them to two feet distance from one another, to give room for cleansing and dressing the land. When transplanting, cut off some of the roots, especially those that are ragged or decayed, and the tap root, to force out lateral roots; and also the tops, at six or seven inches from the ground. When the plants in the nursery have sprung, strip off the side buds, and leave none but such as are necessary to form the head of the tree. The buds which are left should be opposite to one another. If the plants in the nursery do not shoot well the first year, in the month of March following cut them over, about seven inches from the ground, and they will grow briskly. They should be watered with diluted barn-yard water.

When the plants have grown to the size of one inch in diameter, plant them out in fields or places where they are to remain, and make the hole six feet square: trim the roots, and press the earth on the roots as the holes are filled. During the first year of planting out, leave all the buds which the young trees have pushed out on the top till the following spring, when none are to be left, but three or four branches to form the head of the tree. The buds on those branches should be on the outside of them, that the shoots may describe a circle round the stem, and that the interior of the tree may be kept open: and as the buds come out, rub off all those on the bodies of the trees. For several years after, every spring, open the heads of the trees when too thick of wood, and cut off any branch which crosses or takes the lead of the rest, leaving two buds on the outside of every trimmed branch. Count Verri, of Italy, an experienced cultivator of

the mulberry tree, recommends to leave only one bud at the end of every branch, preferring those which are outside, and opposite to each other; and when three buds appear together, to leave the middle one, which is always most vigorous, and to detach the two on each side of it. If the superior buds do not push well, the two next lower ones must be left. Every farmer knows the very great importance of dressing ground round young trees twice in the course of a year, and of securing them to stakes, to insure an upright straight growth, and to prevent their being shaken by winds, or levelled by storms. The trees may be planted at the usual distances of apple trees. The intervals may be cultivated in cabbages, turnips, or mangel wurtzel. The attendance necessary to Indian corn would endanger the young trees.

It is so much the practice in the United States to let trees take their chance for growing, after they have been planted, or sprung up from seeds or stones, that these particular directions may be disregarded. But let a comparative experiment be made with mulberry trees permitted to grow at will, and others treated as here directed, and the difference in their beauty and growth will be obvious. The advantage, in these respects, will be decidedly in favour of trees which have been attended to.

Without deciding upon the superiority of the various modes of propagating mulberry trees, it is

thought proper to mention the great advantage of the mode of budding. In the year 1826, Mr Millington, of Missouri, "budded the white mulberry on stocks of native trees; and such as were done before July, were forced out immediately by cutting off the stocks above the buds. Some of these buds made limbs more than two feet long by the 27th October. The buds put in after the middle of July, he did not intend to force out until the following spring. He thinks budding more expeditious and surer than engrafting, and when it fails, does not injure the stock so much as this mode. Native stocks, to engraft or bud on, can be procured with ease; and the trees thus raised would not be liable to disease in their roots, like foreign trees: and these engrafted or budded trees would grow much faster, and furnish leaves much sooner, and of a larger size, and better quality. This will not be doubted by those who have observed how much faster an engrafted tree grows, and how much larger its leaves are than those of a seedling tree."

Experience has fully shown that the leaves of the native mulberry tree produce good and strong silk, although not so fine as that from the white mulberry. Those, therefore, who have only the native tree, may begin their operations with it: and they will acquire a knowledge of the business of rearing silk worms, while the foreign species is growing.