S F
545

.D4

LIBRARY OF CONGRESS.

Chap. SF 545
Shelf D452

UNITED STATES OF AMERICA.

...arranged

...27th May, 1839.

04
839

JENNIS' SILK MANUAL.

no 698.

Deposited April 6. 1839 at the Library
Office of the Senate of New York

*J. Dennis, Jr.'s Patent Improved Method of
Preventing Canker Worms, or other In-
sects, from ascending Fruit or other Trees.*

This invention consists of a circular metallic trough, and roof, made of one piece of metal, and generally made of lead, and bent so as to conform to the shape of the tree, and the ends soldered together, so as to make a trough completely round the tree, with a roof over it, and made so large as to leave an inch between the trough and the tree, which will allow the tree to grow five or ten years; the space between the trough and the tree is filled with hay, straw, husks, tow, cotton waste, sea weed, or any substance that is easily compressed by the growth of the tree. These troughs should have a very little right whale oil, that costs about forty cents per gallon, put into them three times a year; five gallons of oil was found sufficient for one hundred and fifteen trees for a year, and some of the trees were very large, and it kept the worms down so completely, that it was difficult to find one upon the trees. This trough is put on at a small expense, and a very small crop of apples will pay the expense of putting them on: and they will last many

years without being made larger, and when the tree has grown so as to fill the space that is left, the trough can be cut open and a piece put in, so as to make it large enough for several years more, and when the lead is taken off, it will be worth two-thirds as much as it was when it was put on; the expense for fitting it around trees that are one foot through is about fifty or sixty cents.

Any person wishing to purchase for a single orchard, or State, County, or Town Rights, will please to address, post paid,
JONATHAN DENNIS, JR.,
PORTSMOUTH, RHODE ISLAND.

THE SUBSCRIBER, having had long experience in planning, building, and operating machinery;—also, in drawing plans for buildings, and for placing machinery in buildings, offers his services to those about to commence the manufacture of silk, either to furnish them with machinery, or plans for machinery, plans for the arrangement of machinery in the buildings, &c. &c. Those wishing to avail themselves of his services, will please to address, post paid,

JONATHAN DENNIS, JR.,
PORTSMOUTH, RHODE ISLAND.

DENNIS' SILK MANUAL:

CONTAINING

COMPLETE DIRECTIONS

FOR

CULTIVATING THE DIFFERENT KINDS OF MULBERRY TREES,
FEEDING SILK WORMS,
AND MANUFACTURING SILK TO PROFIT,

ADAPTED TO THE

WANTS OF THE AMERICAN CULTIVATOR,

AND BELIEVED TO CONTAIN MORE PRACTICAL INFORMATION
THAN ANY SIMILAR WORK NOW BEFORE THE PUBLIC.

WITH

A SUPPLEMENT OF EXTRACTS, FROM VARIOUS AUTHORS,

IN RELATION TO

THE PROFIT OF RAISING SILK.

BY JONATHAN DENNIS, JR.,

OF PORTSMOUTH, R. I.,

An experienced Silk Grower, and Inventor of the Patent Premium Silk Spinner and
Twister, and the Patent Contra Twist Silk Reel.

IN THREE PARTS.

PART FIRST.—Directions for raising the various kinds of Mulberry Trees.

PART SECOND.—Directions for hatching and feeding Silk Worms, and for
preserving the Eggs and Cocoons.

PART THIRD.—Directions for winding the silk from the Cocoons, and ma-
nufacturing Sewing Silk; accompanied with Cuts of the most approved Silk
Machines.

A SUPPLEMENT of Extracts from various Authors in relation to the Profit
of raising Silk.

NEW-YORK:

PRESS OF MAHLON DAY & CO.

NO. 374 PEARL-STREET,

AND FOR SALE AT THE BOOK AND SEED STORES IN NEW-YORK, AND
THROUGHOUT THE UNITED STATES GENERALLY.

JAMES EGBERT, PRINTER.

1839,

5-3-47

SF545

D4

Entered according to Act of Congress, in the year 1830,

BY JONATHAN DENNIS, Jr.,

In the Clerk's Office of the District Court for the Southern District of New-York.

3656

Section Fourteenth of the Patent Laws.

And be it further enacted, That whenever, in any action for damages for making, using, or selling the thing whereof the exclusive right is secured by any patent heretofore granted, or by any patent which may hereafter be granted, a verdict shall be rendered for the plaintiff in such action, it shall be in the power of the court to render judgment for any sum above the amount found by such verdict as the actual damages sustained by the plaintiff, not exceeding three times the amount thereof, according to the circumstances of the case, with costs; and such damages may be recovered by action on the case, in any court of competent jurisdiction, to be brought in the name or names of the person or persons interested, whether as patentee, assignees, or as grantees of the exclusive right within and throughout a specified part of the United States.

TWENTY-TWO REASONS,

WHY THE FARMERS IN THE UNITED STATES SHOULD RAISE MULBERRY TREES AND SILK.

1st. Because it is a very certain crop.

2d. Because silk is as easy raised as wheat, and much less laborious.

3d. Because raw silk or cocoons will command cash in the market, and at a handsome profit to the producer.

4th. Because a pound of silk can be raised to a much greater profit than a pound of wool.

5th. Because three pounds of silk can be produced from the same land that would produce one pound of wool.

6th. Because one pound of raw silk will sell for six dollars, and one pound of wool for fifty cents.

7th. Because the labor of raising silk is performed in six weeks, while the labor of taking care of sheep, and providing them with food lasts all the year.

8th. Because the labor may be performed by children or feeble persons, whose services would be worth but very little for any other purpose.

9th. Because there can be considerable quantities raised, without materially diminishing the other products of the farm.

10th. Because the climate and soil is as well, if not better, adapted to the growth of the mulberry, and the production of silk, than any part of Europe.

11th. Because there is no probability, and scarcely a possibility, of the business being overdone.

12th. Because mulberry trees are easier raised than almost any other tree.

13th. Because the timber of the mulberry tree is worth

as much as locust, for building ships, fences, or any other purpose.

14th. Because large mulberry trees injure the crop growing under them, less than almost any other tree.

15th. Because mulberry leaves, when green, are greedily eaten by cattle, sheep, and hogs ; when cured like grass, to make hay, are an excellent food for cattle and sheep.

16th. Because land cultivated with mulberry trees, and the litter from the worms spread upon it, would be impoverished less than if cultivated with almost any other crop.

17th. Because it will cost no more to transport a pound of silk to market, that will sell for six dollars, than it would to transport a pound of bread stuff, that would sell for six cents.

18th. Because the small sum of five dollars, or even one, expended in purchasing mulberry seed and cuttings, with a little care in cultivation for a few years, will enable a farmer to produce considerable quantities of silk.

19th. Because the eggs can be kept in an ice-house until the middle or last of the Seventh Month, (July,) and then the worms can be hatched and fed after the busy season of mowing or harvest is over.

20th. Because a man, with a little land, who has a family, can increase his mulberry trees and keep his family employed at home, without the risk of sending them abroad for employment, where they would be liable to have their morals corrupted.

21st. Because it would relieve the nation from paying millions of dollars annually, to other nations for silk.

22d. Because there are twenty or twenty-five silk manufactories already established, several of which have been stopped, waiting for the arrival of importations of raw silk.

P R E F A C E .

I HAVE been so often solicited by my friends, to write some plain, simple directions for raising mulberry trees, feeding silk worms, and winding silk, that I was induced to make an effort which has produced the following treatise. I have endeavored to confine myself to plain practical directions, that are absolutely necessary to be put in practice, in order to insure success. Also, to avoid any technical terms that would not be readily understood by every practical farmer, for whom this work is especially designed. I have had another object in view,—that was, to put all the directions necessary to be observed, in a small cheap form, that the price may be within the ability of any one who may wish to purchase. Having this object in view, induced me to have it printed with a small type, and put up in the cheapest manner possible. Also, by making it concise, to save my readers the trouble of reading a great deal of superfluous matter, in order to find the directions sought for, and thereby save his time ; by having less to read he might have more time to practice, which he must necessarily do, if he reaps the profit.

J. DENNIS, JR.

* * If the present edition meets with a ready sale, it is my intention to add Complete Directions for Manufacturing Silk ; that is, Directions for Winding, Cleaning, Spinning, Traming or Doubling, Throwsting or Twisting, the Silk, with Remarks upon Weaving, &c. &c. And, also, such other information as will be interesting to the Silk Manufacturer.

J. DENNIS, JR.

The Silk Worm's Will.

BY MISS H. F. GOULD.

On a plain rush hurdle a silk worm lay,
When a proud young princess came that way:
The haughty child of a human king,
Threw a sidelong glance at the humble thing,
That took, with a silent gratitude,
From the mulberry leaf, her simple food;
And shrunk, half scorn and half disgust,
Away from her sister child of dust—
Declaring she never yet could see
Why a reptile form like this should be,
And that she was not made with nerves so firm,
As calmly to stand by a "crawling worm!"

With mute forbearance the silk worm took
The taunting words, and the spurning look!
Alike a stranger to self and pride,
She'd no disquiet from aught beside—
And lived of a meekness and peace possessed,
Which these debar from the human breast,
She only wished, for the harsh abuse,
To find some way to become of use
To the haughty daughter of lordly man;
And thus did she lay a noble plan,
To teach her wisdom and make it plain,
That the humble worm was not made in vain;
A plan so generous, deep and high,
That to carry it out she must even die!

"No more," said she, "will I drink or eat!
I'll spin and weave me a winding sheet,
To wrap me up from the sun's clear light,
And hide my form from her wounded sight,
In secret then till my end draws nigh,
I'll toil for her; and when I die,
I'll leave behind, as a farewell boon,
To the proud young princess, my whole cocoon,
To be reeled and wove to a shining lace,
And hung in a veil o'er her scornful face!
And when she can calmly draw her breath
Through the very threads that have caused my death;
When she finds, at length, she has nerves so firm
As to wear the shroud of a crawling worm,
May she bear in mind, that she walks with pride
In the winding-sheet where the silk worm died!"

CONTENTS.

	Page.
Twenty-two reasons why the farmers in the United States should raise mulberry trees and silk,	7

PART I.

Climate of the United States,	11
Soil of the United States,	12
Mulberry Trees,	12
Of the different species and varieties of mulberry,	13
Directions for purchasing mulberry seed,	17
Of the different kinds of mulberry seed,	17
Directions for preserving mulberry seed,	18
“ planting mulberry seed,	19
“ transplanting seedling trees and others,	19
“ purchasing mulberry trees of various kinds,	20
“ purchasing multicaulis trees,	21
“ purchasing cuttings,	22
“ preserving multicaulis trees and seedling trees of various kinds, through the winter,	22
“ preserving cuttings during the winter,	23
“ planting multicaulis cuttings,	24
“ planting various kinds of cuttings,	25
“ planting multicaulis trees,	26
“ planting multicaulis roots,	27
“ grafting mulberry trees of any kind,	28
“ inoculating mulberry trees,	29
“ raising trees from suckers,	30
“ packing trees for transportation,	30
“ packing cuttings for transportation,	31

PART II.

Directions for purchasing eggs,	32
“ preserving eggs,	32
“ building cocoeneries,	34
“ preparing feeding shelves,	34
Space required for silk worms,	35
Directions for protecting silk worms from their enemies,	36
“ raising successive crops of silk worms,	37
Substituted feed for silk worms,	37
Directions for gathering leaves,	38
“ preserving leaves,	38
Remarks upon chopping leaves,	39
Directions for hatching the worms,	39
Observations upon the diseases of silk worms,	41
Directions for feeding worms,	42
Removing the litter, and remarks upon hurdles,	44
Directions for preparing the apparatus for the worms to wind their cocoons,	45
“ gathering the cocoons,	46
“ selecting cocoons to produce eggs,	47
“ the management of the moths,	47
“ picking the tow or floss from the cocoons,	49
“ destroying the moths to prevent their coming out of the cocoons,	49
“ preserving cocoons,	51
“ measuring cocoons to sell,	51
Transporting cocoons,	52

PART III.

Directions for sorting cocoons,	53
Hints to those that raise cocoons,	53
A description of the properties necessary for a machine to possess, to wind silk from the cocoons to advantage,	54
Directions for reeling or winding silk,	56
" manufacturing tow or floss,	57
" manufacturing the cocoons that are perforated by the moths, and that cannot be wound off,	57
" manufacturing the waste made in winding, or any other waste,	58
The patent spinner and twister, for making sewing silk and twist, and to prepare silk for weaving.—Invented by Jonathan Den- nis, Jr., Portsmouth, R. I.,	59
The patent contra twist silk reel.—Invented by Jonathan Dennis, Jr., Portsmouth, R. I.,	62
Directions for cleaning silk, or boiling out the gum,	66
" stretching silk to make it glossy,	67
" sizing silk,	68
A few dyes that are cheap, and may be used by any person that wishes to color small parcels,	69
A few short receipts,	73
Remarks upon adding weight to silk in dyeing,	73
Concluding observations, recommending the cultivation of the mul- berry and the growing of silk, to farmers, proprietors of board- ing schools, and town officers, generally,	74

APPENDIX.

J. Danforth's letter to the Committee on Silk, American Institute, ..	80
D. V. McLean's letter to the National Silk Convention,	83
Chauncey Stone's letter,	87
Timothy Smith's letter to the editor of the Yankee Farmer,	89
A proof of the short time required to realize the profit from plant- ing mulberry trees and feeding silk worms,	90
Silk for domestic purposes,	90
Harvey Clark's communication,	91
Interesting fact,	92
Bark Silk,	92
An error corrected,	93
Quality of American silk,	93
White mulberry,	94
To farmers,	94
Remarks on the culture of silk,	96
Letter from Europe, by Gen. James Tallmadge, President of the American Institute,	98
An act to encourage the culture of silk in the state of Maine,	101
An act for the encouragement of the culture of silk in the state of Massachusetts, passed 1836,	101
An act to encourage the culture of silk in the state of New Jersey, ..	103
An act to encourage the growth and manufacture of silk in the state of Connecticut, passed 1832,	103
Act of Vermont, passed 1835,	104
" Georgia,	105
" Pennsylvania,	105
" Delaware,	106

PART FIRST.

DIRECTIONS FOR RAISING THE VARIOUS KINDS OF MULBERRY TREES.

CLIMATE OF THE UNITED STATES.

That the climate of the United States is admirably adapted to the production of silk, does not admit of a doubt, since millions of silk worms have been raised without artificial heat, and the silk obtained from them has been acknowledged, by experienced manufacturers of Europe, to surpass, in strength and beauty, that of any other country, and to exceed in quantity by nearly one-half, from the same number of worms, that obtained in Europe: and a further proof that this climate, without the use of artificial heat, is superior to that of most parts of Europe is, that silk worms in America complete their labors in thirty-one days, which, in Europe, require forty-five, or even forty-seven days: and it is remarked by travellers, that there is more clear sunshine in America, in proportion to the cloudy or damp weather, than in Europe: and, it is presumed, there is no person that has raised silk worms, who is not aware that their health was improved, and growth hastened, by clear weather. In addition to this, although further proof seems unnecessary, it may be remarked, that Indian corn, which requires a warm and rather dry climate, is raised very successfully in all parts of the United States, while every attempt to raise it in Europe, except in the southern extremities, has failed. The superiority of the Chinese silk over the European, (which, with some exceptions, is, I believe, generally admitted,) has been attributed to the difference of climate in the two countries; and the situation of China, on the border of a vast ocean, and the climate of the country, strongly resemble our own. In Europe, moreover, expensive buildings are required

to shelter the worms, which are successfully raised, in America, in old buildings that are considered useless for almost any other purpose.

SOIL OF THE UNITED STATES.

The mulberry, like other trees, grows best upon the richest soils, and most rapidly upon wet soils ; but when the growth is very rapid, the wood does not ripen so well, and is more likely to be killed by the winter, than those upon dry highlands, where the growth is slow, and the wood well ripened ; and the leaves are considered better that are grown upon dry land, than those that are raised upon very wet, although the leaves from wet land may be used to as good advantage as any, if they are mixed with an equal or double the quantity of leaves, grown upon dry land. It is better, however, to plant them upon a rich soil, and if the soil is poor, manure it, as the growth will be so much larger, although there may be more killed by the winter, than where the growth is small. For instance, if a tree grows twelve inches in one season, and three inches of the top is killed by the winter, there will not be so much remaining as if it had grown twenty-four inches, and the winter had killed six : in the first instance, there would be but nine, and in the last eighteen, inches that has survived the winter ; but I do not suppose that a large growth is liable to be killed in the same proportion that a small one is. Any soil and cultivation that will produce a fair crop of Indian corn, will produce a large crop of mulberry leaves, and light, sandy soils can be cultivated for mulberry plantations to greater profit than for almost any thing else. If the litter from the silk worms is spread upon the land, it will be likely to become rich, faster than if cultivated in almost any other way, and land planted with mulberry trees, if very rich, will be impoverished less than if cultivated with any other crop.

MULBERRY TREES.

There are several species of the mulberry, as the black, white, white Italian, red, paper, Brussa, and

morus multicaulis, and from some of these there is a great number of varieties, which are sold by some cultivators under any name that they choose to give them, such as Chinese broad leaved, Chinese curled leaf, hybrid *morus multicaulis*, Florence, dandola, Morettiana, hybrid short jointed, *morus expansa*, rose of Lombardy, Asiatic seedling, Alpine, Canton, Tartarean, Perrottet, shining leaved.

The leaves of all the above named species and varieties will answer to feed silk worms, and it is very desirable that every cultivator should have as many varieties as he can conveniently obtain; for if he obtain but one tree of a kind, or one cutting or scion, and have plenty of stocks of the white mulberry, he can soon have a quantity by grafting, or raising them from cuttings.

Mulberry trees are more profitable for farmers to raise than any other kind of tree, except fruit trees, and they are raised and cultivated with greater facility than almost any other tree. They injure the crop that grows beneath them less than almost any other tree, either fruit or ornamental. When a farmer has more leaves than he wishes to use himself, there is generally an opportunity to dispose of them to his neighbors, and the price is half-a-cent per pound, if the purchaser picks the leaves himself; or, one cent per pound, if picked by the seller. The wood of mulberry trees is excellent for fuel, and is as valuable for building ships, fences, or for any other purpose, as locust; as a proof of which, contractors, who build vessels for the government, have the privilege of putting in either mulberry or locust timber. The leaves of most kinds of mulberry are eaten very greedily by cattle, sheep, and hogs; the leaves may be cured like hay, and fed during winter, when there is a scarcity of other provender.

Of the different Species and Varieties of Mulberry.

The *black mulberry* is one. The tree grows twenty-five or thirty-five feet high, and produces very good fruit, of which birds and fowls are very fond. The leaves are from three to four inches wide, and, when fed to worms, produce very strong, handsome silk, and the worms are

as healthy when fed upon these as upon any other kind. The leaves are so much larger than those of the white mulberry, that the same quantity may be gathered with half or one-third of the labor. It is a very hardy tree, capable of enduring our most severe winters, and is raised from the seed, or by cutting and grafting.

The *red mulberry tree* grows thirty or thirty-five feet high, bears most excellent fruit, and the tree is very hardy. The leaves will answer to feed silk worms, and should be given to the worms before they are wilted, for they are very porous, and wilt in a short time, and when wilted it is very difficult for the worm to eat them. This kind can be raised from the seed and cuttings.

The *paper mulberry tree* grows twenty-five or thirty feet high, is of a very rapid growth, bears berries that are not fit to eat, and is raised from suckers or cuttings. The leaves are from three to five inches wide, and very rough and porous, but will be eaten by silk worms, if given before they are wilted.

The *Brussa mulberry tree* is very beautiful. Its leaves are six inches wide, of a very bright glossy green, and an excellent kind for feeding worms. Every cultivator should have some of this kind, as they are very hardy, probably the most so of any, and may be raised either from seed, or from cuttings or layers; and they grow very fast in rich land. They are very fine ornamental trees. The leaves grow very near together upon the twigs, are very thick, and of a firm texture, and when raised from cuttings, the cuttings should have at least three buds.

The *white mulberry*, and the different varieties of it, has many names. White, Italian, Florence, and several other names, are given to what are believed, by some cultivators, to be varieties of this. It is raised with the greatest facility from the seed, and from cuttings and layers. The trees grow thirty-five or forty feet in height, and the fruit is eaten greedily by fowls, birds, and hogs. The leaves, in best soils, are seldom four inches wide, and in light soils, but few of the leaves grow more than two inches wide. This kind makes excellent hedges, and the leaves have been used more for feeding worms, in the United States, than all the other kinds put to-

gether—although it appears likely to be superseded by some of those kinds with a larger leaf, its leaf being smaller than that of any other kind. It may be cultivated to great advantage as an ornamental tree, for some are of the opinion, that pastures interspersed with these trees, would produce more grass than they would without them.

The *Alpine mulberry tree* is very much esteemed by Whitmarsh, who imported it. The leaves are four or five inches wide, and thicker than the leaves of the *multicaulis*, and grow nearer together upon the branches. It is raised from layers and cuttings, and is without doubt, a good variety for the production of silk, and is moreover very hardy.

The *morus expansa* produces leaves four inches wide, very good for feeding silk worms. The tree is very hardy. All that I have seen, appear to have been grafted upon the stocks of the white mulberry, and all attempts to raise them by cuttings and layers, that have come to my knowledge, have failed.

The *Canton mulberry* is said to be hardy, and the tree of rapid growth; the leaf thicker than some other kinds. Also, short-jointed. It deserves the attention of cultivators. I have a few of this kind that I intend to increase by cuttings and layers.

The Chinese broad-leaved, Chinese curled-leaf, hybrid *morus multicaulis*, dandola, Morettiana, hybrid short-jointed, rose of Lombardy, Asiatic seedling, Tartarean, Perrottet, and shining-leaved mulberries, have been cultivated but little in this country, and what difference there is between them, if any, I have not been able to ascertain. They are undoubtedly worthy of the attention of silk growers, and are very proper subjects of investigation.

The *morus multicaulis* possesses very decided advantages over all other kinds of mulberry. It bears the largest leaf of any variety, some of which I have seen twelve inches wide, and it is said to have grown to fifteen or sixteen inches. They have been known to grow six feet high, in one season, from cuttings, and from layers, seven feet; and, where the roots have remained in the ground during the winter, the tops being cut off

in the fall, shoots have grown eight feet high in a single season, in New England. I have heard of much larger growth in the South. I have seen scions that were set in stocks of the white mulberry, that grew seven or eight feet in a single season. The genuine multicaulis leaf may be known by its being much rounded upon the upper surface, and when the leaf is pressed flat, it tears open the edge in several places, or doubles over, or makes folds in the middle. Silk worms will eat this kind greedily, and eat very nearly all of the leaf, so that but little litter remains. This kind has sold to so great profit, that few have been left standing through the winter without protection; but of those that I have left standing in dry land, the ends of the twigs have been killed, that were very green, and the entire top of a tree that stood in a wet place was killed, but the root survived and sent up astonishing shoots, several feet in height. They are more hardy when grafted upon the stocks of white mulberry, but there is no doubt with experienced cultivators, that the roots will live in the ground where they grow, if the tops are cut off two or three inches above the ground, and covered with a little earth. I have seen those that had been managed in this way three or four years, and, when I saw them, there were numerous thrifty shoots, one of which was seven feet high, and several more over six, besides a great many smaller ones. With the multicaulis, the silk grower can begin to make silk the same season that the trees are laid, or the cuttings planted; and if the roots remain in the ground during the winter, the crop of leaves will probably be double or treble what they were the first year.

I will here insert the reply received from John Macomber, an experienced nursery man of Westport, Mass., and his son, upon my enquiring of them how the multicaulis endured the winter, in comparison with other trees. They stated that they lost

37½ per cent. of their cherry trees,		
95	do.	peach do.,
75	do.	quince do.,
50	do.	multicaulis do.,
8	do.	multicaulis grafted upon white mulberry stocks.

The trees were all situated alike in rather a gravelly soil.

I think this is conclusive evidence that the multicaulis will endure the winter unprotected in highlands ; for the winter here spoken of, was that of 1835—6, which was allowed to be the coldest that had occurred for many years. Upon a lot of ground in Portsmouth, R. I., where trees grew in 1837, and were dug up and taken in before winter, in digging the trees many of the roots were broken off, and remained in the ground. The ensuing spring the ground was ploughed, and sown with oats, and the oats harrowed in ; and, notwithstanding the roots of the multicaulis trees were disturbed with the plough and harrow, a considerable number of multicaulis trees came up, and grew among the oats.

Directions for purchasing Mulberry Seed.

Mulberry seed is generally put up in small paper bags, so that the purchaser does not see it, but if there is any opportunity to see it, take a few grains and mash them between the thumb nails, and if they appear to be full of meat, and the meat fresh and oily, it is likely to be good seed ; although, I believe, there is no certain criterion whereby to ascertain whether it will grow or not, except by planting it. If you want to purchase a certain quantity, purchase it of as many different kinds as you can, and in as many different places, for you will thus be likely to get a greater variety of trees, and probably some good varieties ; and I consider it an advantage to have a variety, for my experience leads me to believe that worms do better fed upon a variety, than they do upon any one kind alone.

Of the different kinds of Mulberry Seed.

There is, generally, plenty of the seed of the common white or white Italian, (*morus alba*,) in the market, at a low price, and sometimes what is called Chinese mulberry seed, but it will not be likely to produce multicaulis trees. It may, however, produce a very valuable tree, with a leaf much larger than the common white

mulberry. I raised some from seed, called the Chinese, that grew more than three feet high the same season that they were planted, and produced leaves six inches wide. There is but little of the Brussa mulberry seed offered, but it should be purchased when it can be obtained. The genuine trees of this variety are very hardy, and the leaves larger than the common white. It is a most beautiful tree. Sometimes there is seed offered, called the rose of Lombardy, of which I have purchased some to plant next season. The three last named kinds of seed generally sell for a high price; a small quantity of each is not much to risk, and may prove very valuable. The black and red mulberry may be raised from the seed, but I have never seen any for sale. I have never known of any other kinds for sale, except some that were called multicaulis, besides those above mentioned, except Alpine seed.

Directions for Preserving Mulberry Seed.

When the mulberries are ripe enough to shake off easily, spread a cloth under the tree and shake them upon it, then spread them in the sun to dry. After they are quite dry, put them up and preserve them like any other seed, and take care that the mice and rats do not get to them. If it is desirable to have the seed clean, mash the berries within three or four days after they are gathered, and then pour in water and stir up the whole. If they are not mashed so that the seed separates from the pulp, mash them more, and the seed will settle to the bottom, and the pulp that is separated from the seed may be poured off with the water. The seed may then be spread upon a board or cloth, to dry, in the shade. Some prefer to rub them through a seive, to separate the seed from the pulp; then wash them afterwards, to clean the seed from the slime. After the seed is dry, it may be put up and preserved like other seed. As the mulberries ripen very irregularly, the trees should be shaken every other day, and the morning is the best time, before the birds pick off the ripest of them. Some are of the opinion, that the vitality of the seed is preserved to greater perfection, by mixing it

with sand after it is dry, and letting it remain until it is wanted for planting, but this is not absolutely necessary for its preservation.

Directions for planting Mulberry Seed.

Select a rich, mellow piece of ground, and have it prepared, as it is usually done, for planting beets, carrots, or other vegetables; and at the season that vegetables are usually planted. It should be furrowed in drills, in the same manner, ten or fifteen inches wide. The seed should be put in bloodwarm water, and suffered to stand in the sun, or upon the mantle, where there is a fire. After it has soaked thirty-six hours pour off the water, and add as much dry ashes as will soak up the moisture, and shake it to separate the seed so that they will not stick together in planting. Then drop the seeds, about one inch apart, in the drills above described, and cover them about one-third of an inch deep with earth. Then walk upon the rows, placing the heel of one shoe close to the toe of the other; or, if you have a roller, that will answer, if it is loaded with a weight heavy enough to press the earth hard round the seed. If the weather becomes very dry it should be watered. By soaking the seed it comes up sooner than the weeds, and gives the cultivator great advantage in hoeing, and it is very essential to the growth of the plants, that they should be kept free of weeds. Some prefer planting the mulberries as soon as they are gathered; when that is done, the plants must have some covering through the winter, or be preserved in the cellar, but it is better to plant in the spring. Just before hoeing them the second time, strew a little ashes by the side of the rows, and it will be likely to promote their growth.

Directions for transplanting Seedling Trees and others.

When the trees are one year old every other row should be taken up, and set out in rows two feet apart, the trees being placed six inches apart in the rows; and if there are any that have roots branching out from the

tap root, two-thirds of the tap root should be cut off; and, if there are no branching roots, one-third of the tap root should be cut off. The trees may be set out very expeditiously by making a furrow with a plough, and placing the plants against the upright part of the furrow, and putting the earth, turned out by the plough, back from whence it was taken, pressing it hard round the tree. At two years old, every other row should be again transplanted from the seed bed, and set in rows four feet apart, placing the trees one foot apart in the rows; and it would be as well to set those that are taken up at one year old, in rows four feet wide, and raise some kind of vegetables between the rows for one year. Trees that are raised from the seed, when taken from the seed bed, should always have part of the tap root cut off; and all trees that are set out should have a little hollow left round them, for the water to soak in, unless it is very wet land.

Bones put in with the earth, around the roots of large trees, facilitates the water soaking in, and also manures the tree. Care should always be taken to set the tree just as deep in the ground as it was before, and no deeper. and a little ashes strewed around trees just set out, is very beneficial in keeping the earth moist. No manure should be put under the roots of a tree, as it will be likely to die, if the weather was dry, and it would be much more beneficial mixed with the earth above the roots. When vegetables are raised between the rows of trees, care should be taken to manure the trees as well as vegetables, and, in hoeing, to give the trees their full share of earth, and not draw it from the trees to hill the vegetables.

Directions for purchasing Mulberry Trees of various kinds.

Seedling trees, of any kind, will not be likely to have many branches, if they are only one year old, and the size will depend upon the manner in which they were cultivated, and the distance between them. If they grew a proper distance apart, the wood will be likely to be ripened better, and the trees larger. Seed-

ling trees should be purchased in the fall and preserved through the winter, as will be hereafter directed. Trees that are several years old will be valuable on account of the branches they may have, and the size of the tree will depend upon the cultivation, and the distance at which they have stood apart. The larger and the more branches the better, as the branches may be trimmed off, and used for cuttings or scions to graft with; except the *morus expansa* which will not grow from layers or cuttings, but is cultivated only by grafting. The age of the tree should be ascertained, for if the size does not correspond with the age, it is an indication that the trees are old, and stunted from growing close together, and not being well cultivated. Trees that are old and small have many small branches, and the bark generally appears rough and old, and the bark of the roots is of a dark yellow, approaching a brown, and sometimes wrinkled; such trees should be avoided. But those—the bark of which appears smooth, and the trees thrifty—the bark of the roots of a bright yellow, and smooth—may be purchased with safety.

Directions for purchasing Multicaulis Trees.

It is not material whether the trees are raised from layers or cuttings, provided they have good roots and the wood is well ripened, but it is very important that they should have been raised a proper distance apart; for if they have not, they will not be likely to have many branches, neither will the wood be so well ripened. Unless the purchaser has an opportunity to see the trees, it is the best way to purchase by the foot, either with or without the branches: if without the branches, it should be stipulated that the branches be cut off, so as to leave three buds upon that part of the branch that remains upon the tree, for if it is cut very close it will be likely to kill the buds at that joint. It should also be agreed what part of the tree should be measured. The proper place to begin to measure, is where the

tree started from the old wood of the layer or cutting, to where it is ripe enough to keep all winter, or until it is time to plant it, or, if measured in the spring, all that is alive at the top may be measured, but it is much the best way to purchase and transport trees in the fall, when it can be done then.

Directions for purchasing Cuttings.

Cuttings are generally sold by the bud, and the purchaser should be careful to select those of which the wood is well ripened, and none less than one-eighth of an inch in diameter, nor any that are more than half an inch. It is not material whether they are taken from the tree in the fall or spring, if they have not been cut up into short pieces, and have been properly taken care of through the winter. If they have not been well preserved very few will be likely to grow. Cuttings are best taken from thrifty trees that have grown upon a rich soil, for the buds will be farther apart, and there will be a greater length of wood for each bud, which will be rather an advantage when they are planted. It is best to purchase cuttings in the fall, when it can be done, and preserve them as will be hereafter directed.

Directions for preserving Multicaulis Trees and Seedling Trees of various kinds, through the winter.

Upon the bottom of a dry cellar, or, if the cellar be wet, upon a floor supported by timber of some kind, so high that the water will not be likely to come up to it, spread some loose fine earth or sand, that is nearly dry and as free as possible from any vegetable matter. Then lay trees upon this loose earth. They will pack best to lay the tops together, and the roots at each end, and so far apart that the tops of the largest trees may reach nearly or quite to the roots of the opposite side, and the short trees may be laid in the middle. After the layer of trees is laid over, as close as it is convenient to lay them, scatter sufficient earth or sand over them to fill up all the spaces between the trees. It is important to

have all the spaces between the roots and tops completely filled, so as to prevent their moulding, for, if they should mould, it will be likely to kill the part that moulds. After this layer of trees is filled with earth, lay on more trees, in the same way, and continue to fill up the spaces with earth. They may be packed in this way as high as the cellar will admit. After the last layer of trees is put on, be careful to cover them entirely with earth or sand. Some prefer to bury them in the ground, which will answer very well, if the place is shaded or covered with loose straw or weeds, after the ground has been frozen, so that it does not freeze and thaw over them at every change of weather. The ground should be raised a little over them, so that the water will run off readily, and not settle near them. It will be safest to cover them twelve or fifteen inches deep with earth, although some are of the opinion that freezing does not hurt them, and accordingly bury them in a heap above the ground. The trees should be laid as above described, and then the second layer a little narrower than the first, and the third layer still narrower, filling all the spaces between the trees and their roots with earth, and bringing the heap to a peak, like the roof of a house. Cover the trees eight or ten inches deep with earth, making a drain for the water to run away from the heap, and shade the heap with boards. The top of the tree being buried in earth, the green and unripe wood is prevented from decaying, that otherwise would be lost ; for trees that have been put in the cellar, with earth put around the roots only, have been taken out in the spring very much withered, and not worth more than one-third as much as they would have been, if the tops and roots had been well packed in earth. Care must be taken that the rats and mice do not get to them, for they are very fond of them, and will injure them very much.

Directions for preservring Cuttings during the winter.

Cuttings should be packed in earth in a dry cellar. They may be packed upon the ground, (but, in a wet

one, upon a scaffold,) or in boxes. The earth or sand should be as free as possible from vegetable matter, almost or quite dry, and put in so as to leave no open spaces at all. They may also be packed in a heap above ground. When that is done, cover them well with earth, in such a manner that the water may not get to them; they should not be allowed to freeze, and the ground or heap should be shaded, or covered with straw; after it is partially frozen. If they are put up as above described, and the rats and mice kept from them, they will remain in good order, until they are wanted for planting in the spring.

Directions for planting Multicaulis Cuttings.

Land that has been cultivated for a number of years previous, will be likely to produce the largest growth of trees. The land should be ploughed a sufficient number of times to make it very mellow; and, if it is not rich, it should be made rich by spreading fine manure upon it after it has been ploughed the last time, and then harrowed well to mix the manure with the earth. Lay it off in rows three feet apart by drawing a stick of wood or wheelbarrow, or something of the kind over it, and it may be some advantage to have the rows to run north and south. Take your cuttings, and cut them apart about one-fourth of an inch above the bud, leaving one bud upon each piece, unless the buds are within one and a quarter inches of each other; but in this case, leave two buds upon one cutting, if the wood is large. Some experienced cultivators think there is an advantage in shaving off one side of the cutting, by beginning half way up to the bud and taking off a small chip, so as to cut off about one-third of the thickness at the lower end. Soak them in water that is about as warm as common spring water, for about twenty-four hours; place them a little aslant, with the bud upon the upper side, about one foot apart in the rows made as above described; push them into the ground so that the earth entirely covers them, then walk along the rows so as to put the ball of the foot directly upon each cutting, which will push the cutting down with the earth, and press the

earth hard around it, and will also make a little hollow to catch the rain, which will soak in around the cutting. If, however, the weather should continue very dry, it will be best to water them, a little after sunset, with water that has stood in the sun during the day. The best plan for applying ashes is, to put two-thirds or half a pint to each plant, after they are several inches high, and if the ground is inclined, put the ashes upon the upper side of the plant. Keep them well hoed, both on account of the weeds, and to keep the ground loose, until the first of the eighth month, (August.) But after that the ground should not be disturbed, except to pull, or cut up the weeds. Omitting to hoe them will have a tendency to check the growth, and allow the wood to ripen more fully before the frost kills the leaves. It is very important to soak the cuttings in water before planting, and to press the earth hard around them after they are planted. I have known cuttings planted as above described, of which ninety out of one hundred grew, while some that were dropped and covered with a hoe without being soaked, not ten out of a hundred grew.

Directions for planting various kinds of Cuttings.

All kinds of mulberry trees will grow from cuttings, except what is termed the *morus expansa*, which will, I believe, neither grow from cuttings or layers; and all the trees of that kind that I have known of, were grafted upon the stocks of some other kind.

The Black, White, Alpine, Chinese seedlings, Brussa and Paper mulberry will grow from cuttings and layers; but the cuttings of these kinds are generally so plenty, that it would be best to leave several buds upon each. The Alpine and Chinese seedlings, however, are said to grow from cuttings, of one bud, which should be planted like those of the multicaulis, as above described. The other kinds may be cut up with a hatchet, into pieces of about four inches in length, and soaked in water about twenty-four hours. Then plough a furrow in mellow land, five inches deep, and set them along against the perpendicular side of the furrow, with a hoe, put the

earth ploughed out into the furrow again, and tread along each side of the cuttings to press the earth hard around them. They should be covered to within one inch of the top, and if the land is dry leave a hollow around the tops of the cuttings, so as to catch the rain, and so that it may soak in around them. If the weather is dry they should be watered a little after sunset. If they are designed for a close hedge, the cuttings should be set near together, and the rows made three or four feet apart. They will grow fast in rich land, and some vegetables may be raised between the rows the first season. The second season, if the leaves are wanted to feed worms with, as the branches have spread each way, take a sharp knife and cut off the branches upon one side, about three inches from the ground; then let them remain until new branches start out, when the opposite side may be cut in the same manner. If the land is rich, they may be cut twice upon each side. If the season is dry they may want watering. This has a decided advantage over large trees, as the leaves may be gathered much faster without the risk of climbing, and all the trouble of moving ladders is saved, and they can begin to make silk much sooner. I think, however, that it is very desirable to raise as many large trees as can be set to advantage in pasture lands, and by the roads and fences, and by the time they are large enough to pick, the leaves from them will be wanted.

Directions for planting Multicaulis trees.

To increase the trees as fast as possible, take a rich piece of mellow land that is neither very wet nor very dry. A piece that has been cultivated two or three years is best, provided it is rich. Plough it twice or more, and if it is not rich, fine manure of any kind may be spread on it, and harrow it well to mix the manure with the earth. It may then be furrowed with a plough, four feet apart. It is best that the rows should run north and south, or nearly so. Then take the trees that are to be planted, and if they are small, cut off all the branches about half an inch from the main stalk, and cut off one-third from the top to make cuttings; or if

the trees are large, cut off one-half or two-thirds from the top. It will be likely to bring the trees forward sooner, if they are soaked two hours in water that has stood in the sun. Dig a hole in the furrow of the land prepared as above directed, for the root, and fill the furrow nearly full where the top is to lay. Put the roots in the hole, and separate them so that the earth will be between them as much as may be, for if the roots are crowded together, without much earth between them, they will be likely to mould and rot. The roots should be well covered, and the top covered about one inch deep, with fine earth, and the earth pressed down with a hoe; and the trees and their roots should be put so that the ground will be level, when the tree is covered a proper depth. After the trees have generally come up, ashes may be strewed by the side of the row, and they should be hoed five times, before the first of eighth month, (August.) and then let alone, except pulling or cutting the weeds, so that the wood may ripen before the frost kills the leaves. In planting, the top of one tree may reach nearly to the roots of the next in the rows. If the land is very wet the rows may be raised a little when the trees are planted; but there should never be any manure put in the row, neither under the tree nor its roots, for if there is, and the weather should become dry, it might prove fatal to the tree.

Directions for planting Multicaulis Roots.

If the root has one or more buds upon it, plant it so that it will lay nearly flat, and cover the bud half an inch deep with earth, pressing the earth down upon the roots. If there are no buds, put the end of the roots, from which the top was taken, at or a little above the top of the ground, or in other words, do not cover it entirely with earth. If the root is long, lay it nearly flat, covering all but half an inch of the end, and press the earth upon the roots. If the ground is dry, the roots should be put so deep, that when they are covered, the earth should be level; and, if very dry, put them so as to leave a hollow over them; if very wet, the earth should be raised a little.

Directions for grafting Mulberry trees of any kind.

Good thrifty stocks of white mulberry may be grafted to advantage, particularly with the multicaulis, if they are the size of a man's little finger or larger. One scion of multicaulis, set in a stock of the white, will be worth as much as two cuttings that are planted. Clear the earth from the stock to be grafted, about one and a half inches deep, then saw it off about where the top of the ground was, before the earth was cleared away; split the stock, and if it is large it may be split again crosswise, and if it is very large, it may be split three times or more. If it is small it will only take one scion, but if it is large it will take two in each split, provided the stock is more than twice as large as the scion. After the stock is split the scion must be cut like a wedge, and made a little thicker upon the side where the bud is, and the bud should always be put outside. The edge of the wood, next to the bark upon the scion, should be made to come as near as possible to the edge of the wood upon the stock, or in other words, the inside of the bark upon the scion, should be set so as to meet the inside of the bark upon the stock. After the scion is set, it should be covered with fine earth, about one inch above the top. This earth should be pressed down a little, taking care not to disturb the scion.

Trees that are transplanted, may be grafted before they are set out, and then the root and scion may both be soaked in water two or three hours after they are grafted, before they are set in the ground. But there will be a much larger growth upon trees that are grafted, where they have stood one year or more, and it would be likely to produce a larger growth, if the trees that are transplanted were transplanted very early in the spring—a part of the top being cut off, so that the tree may not be so much affected by the wind: and when the buds of the tree have started a little, saw them off, and graft them as above directed. If grafted trees are well hilled up with earth, then a sufficient number of roots will grow out of the scion, and then, in the fall, the roots

grafted may be sawed off just below where the graft was set. The root should be covered again with earth, during the winter, and grafted again the next spring. The wood of grafted trees is always better ripened than the wood of trees from cuttings, and, generally, the tree is twice or three times as large ; which, I suppose to happen from the old roots furnishing more, or perhaps a more mature sap, and consequently producing more and riper wood.

Directions for inoculating Mulberry Trees.

Trees that are intended for inoculation should have the sprouts all trimmed off from the ground upwards six inches or a foot according to the size of the tree, soon after they start out. The trees should stand one foot apart in the rows. The success depends much upon the condition of the trees, that is, they should be thrifty and have a full flow of sap, and the operation should be performed after the middle of seventh month, (July,) and before the first of ninth month, (September.) Select buds from small size twigs of ripe wood, of the same years growth, and cut off the leaves near the bud. Look out a smooth place in the bark of the stock, make a perpendicular slit half an inch in length across it, with a cut at the top, and be careful not to cut the wood. Then take off a bud by entering the knife half an inch above it, and, and taking it out with a shallow scollop, extending to a quarter of an inch below ; then, with the knife, raise the corners of the bark, taking care not to scrape or mutilate the wood of the stock, insert the bud and press it down two-thirds the length of the slit : then cut off the top of the inoculate, so that it will exactly reach the cross-cut, and bind down the bark upon it with woollen yarn ; the whole operation should be performed with expedition, so as to have the wounds exposed as little as possible. The woollen yarn should be cut off, as soon as it becomes so tight as to make a crease in the bark of the tree. Some inoculators recommend picking the wood out of the inoculates ; but, as the most experienced are divided, it will be best for cultivators to try some both ways ; as the inoculates

seldom adhere, except around the edge, therefore, the smaller the better, provided the organs of the bud are preserved, and also for the benefit of the stocks, as the smaller the wound the quicker it will heal, and if the piece of bark put in is large, so as to leave a hollow under it, the bud will be more likely to wither. The buds should be set upon the north side of the stocks, as they will be less likely to be injured by the sun. The stocks should not be cut off until the following spring. Some cultivators have been very successful in propagating by inoculation, but I think trees grafted, as directed in the foregoing chapter, will be most likely to succeed.

Directions for Raising Trees from Suckers.

Suckers should be separated from the trees early in the spring, taking as many roots attached to the sucker as can conveniently be obtained, and planted out in the nursery, observing the rules already laid down for transplanting trees. Suckers should be well trimmed when planted out, so that the wind may have less effect upon them. Trees or suckers when transplanted, if the weather continues dry, may be watered after sunset, with water that has stood in the sun during the day.

Directions for Packing Trees for Transportation.

In packing trees for transportation, regard should be had to the conveyance and the time likely to be occupied in the journey. If they are transported in the fall, and are not more than ten or fifteen days on their journey, they may be put in boxes, or mats, or if put in crates, a little straw should be put between the crate and the trees, and moss put between the roots. If put in boxes or mats, there will be no need of any straw, if there is moss put about the roots. If moss cannot be obtained, put in a little hay or straw between the roots. There should not be any straw put between the tops, if packed in boxes or crates, if there is, the tops will be likely to mould. If put up in mats, straw may be useful about the tops. If the trees are to take long journeys in the fall or spring, the roots should be puddled in the following man-

ner: Mix some fine clayey earth with water, about as thick as cream, then dip in the roots of the trees and take them out; let them dry, then pack as above directed. If very small plants are to be sent to a distance, they should be packed in boxes and a mixture of saw-dust and earth, nearly dry, and all the spaces between the roots, and between the trees and the sides of the box, should be completely filled with the saw-dust and earth. I have seen trees that were brought from Alabama, that were not packed with anything between them, but were simply put in the hold of the vessel, and they were in very good condition. I have also seen trees from France, that the roots were put in moss and the tops covered with straw, put up in bundles of one or two hundred each, that were in the best condition of any French trees that I have seen, if the roots had been puddled, I think it would have been an advantage. I have been informed that there has been trees brought from France, that were packed in earth, that was very wet and were packed in the hold of the vessel, and when they arrived were nearly all rotten; if the earth had been dry, and free from vegetable matter, I have not the least doubt they would have kept as well as if they had been packed in a cellar, if no water had got to them during the passage. When trees are put in boxes, there should be holes left in the box, that the trees may have air if they are put in the hold of a vessel.

Directions for packing Cuttings for Transportation.

If the distance is short, so that they may reach their destination in a few days, pack them in a little moss. If they are to be long on the journey, they should be put in boxes and packed in earth or sand, that is nearly or quite dry, or in a mixture of earth and saw-dust, as directed for small trees. The buds may be counted upon the twigs, but they should not be cut apart until they are wanted to plant.

PART SECOND.

DIRECTIONS FOR HATCHING AND FEEDING SILK- WORMS, AND FOR PRESERVING THE EGGS AND COCOONS.

Directions for purchasing eggs.

In purchasing eggs, be careful to obtain those raised from the best single cocoons, for in one instance where the double cocoons were saved for the production of eggs, the worms from these eggs produced such imperfect cocoons, that none of them were fit for seed, and but few could be reeled, and the owner thought best to purchase a new supply of eggs. Hence the propriety of having eggs from the best cocoons only, is evident. As there are several varieties of worms, it is best to obtain a few of each kind, and eggs that are well impregnated are of a slate colour: Those that are yellow, are not impregnated, and will not hatch unless they were laid so late in the season that the weather was not warm enough for them to change color, then they will change color and hatch in the spring. It will be well to enquire if the moths were allowed to separate themselves, for if they were separated by force, there will be likely to be more imperfect eggs than if they were left to separate themselves, unless they were put together and separated at proper intervals. In some parts of Europe, the eggs are wet with dark colored wines, so that they may all look like good eggs, but the bad eggs may be detected by putting them in water, when they will float, while the good eggs will sink.

Directions for Preserving Eggs.

If the eggs are intended to be hatched as soon as the leaves are large enough to feed the worms, the eggs may be put up in paper and may be kept in a cool part of the house, until the last of the second month, when

they should be put in a tin box or glass jar, (as they are liable to mould in stone or earthenware;) if put in a tin box, they should be set upon the ground in a cool cellar, if in a glass jar, it should be set into the ground two-thirds of its height, and so kept until they are wanted to hatch in the spring. The box or jar must be covered so as to keep the rats or mice from them, but not entirely air tight, or otherwise they will require to be frequently opened. If they are kept from the air entirely, they will probably lose their vitality.

But when eggs that are kept through the winter are wanted to produce successive crops of worms in the course of the season, they should be taken sometime in the second month, (February,) and put in glass jars or tin vessels, that is not air tight, but covered. These jars should be put in a box; there should be holes bored in the bottom of the box and the box put in an ice house upon the ice and covered with straw, so that as the ice melts and settles, the box may settle with it, or if there is no ice house at hand, bury the jars without the box, three feet deep in the bottom of the cellar and put some straw over the ground after the hole is filled with earth, then the eggs may be taken out and hatched as they are wanted. I should prefer an ice house if it was convenient, if not, I would put some ice in the bottom of the hole where the jars are buried to cool the ground. Eggs that were laid in an office that had a south-eastern exposure, were put upon the top of a secretary and remained there until they were wanted the next summer, although the office was warmed during the winter with a stove heated with anthracite coal. And when they were wanted to hatch, they were exposed in the room in order to hatch, but they did not hatch until the middle, or late in the summer; when the eggs were laid in the sun and a paper laid over them to prevent the sun from shining direct upon them, when they soon hatched and produced fine healthy worms. It would seem to follow from this, that eggs kept in a room as warm as an ordinary sitting-room or office, will not hatch until very late in summer, if they do at all, unless they are placed in an elevated temperature, which might be done whenever the eggs were wanted to produce worms. By the ac-

counts from Europe, it appears that eggs have been kept in an ice house twenty-two months and hatched well, by being hatched in a moist atmosphere.

Directions for Building Cocooneries.

If a building be erected seventeen feet wide and seven feet high, and made as long as the quantity of worms may require, the width will allow two frames to run lengthwise, each four feet wide, and leave an alley between them and one on each side three feet wide. There should be a door in the middle of each end, a window over it, and upon each side one window four and a half feet high and two feet wide, for every ten feet of the length of the building. This window should have a venetian blind with wide strips, and so constructed that it may be opened to admit the light, or closed to keep out the rain. Those windows over the door should be provided with the same kind also. The roof should be shingled, and the sides may be made of rough boards and white-washed. If it is built upon dry ground, it will do without any floor, if there is a little sand or gravel spread upon the ground to make it a little higher than the ground around the building. Farmers generally need have no cocooneries, except their barns, cribs, grain-houses, or other out-buildings, which they might happen to have, that could be spared during the season of feeding worms. I have fed them and seen them fed in stables where the cattle stood in the winter, and in the hay-lofts of barns and lofts of grain-houses, upon shelves like those described in the next chapter. If a large cocoonery is wanted, it can be made two stories high, or the width increased seven feet, to allow three rows of shelves. Where it is convenient, I should rather increase the length of the building. There should be several holes left for ventilation, near the ground, with sliding doors to them and some kind of grating or netting.

Directions for Preparing Feeding Shelves.

If there is no floor, there should be some stakes driven into the ground to support the frames for the shelves ;

these stakes should be sawed off above the ground and should be set four feet apart, that being the width of the shelves, and about eight feet the other way. Some small pans made of sheet zink or lead, should be set upon these stakes, or upon the floor, if there is a floor, for the feet of the frames to stand in; a little oil put into these pans would prevent ants from ascending the frames. Where there is no floor, if the stakes are six inches high and the pans made to project over the stakes, it would prevent mice from getting up. In the country where saw-mills are near by, it is customary to take two slabs and bore holes, if they are to stand upon the floor, one foot from the lower end and one foot apart, and make six or seven holes, then put some pieces across between the two slabs like the rounds of a ladder, so that the two slabs will stand four feet apart; take two of these ladders and stand them six or eight feet apart and lay common rough boards upon the rounds for shelves, it is no consequence what kind of wood. Shelves can be made in this way any length, by increasing the number of ladders; these shelves can be easily removed if the building is wanted for any other purpose, when it is not wanted to feed worms in: the worms when small may be fed upon paper upon these shelves, and after they are two weeks old, they will need no paper if the shelves are so tight that the worms do not fall through the cracks between the boards. Those who cannot conveniently get slabs, can substitute strips of boards or plank, or whatever is convenient, and nail the slats upon the posts of their ladders or frames: these frames may be prevented from falling down, by nailing a strip of board from the top of one of the ladders to the bottom of the next. Shelves made as above described are cheaper than if made in almost any other way.

Space Required for Silk Worms.

A common sized full grown silk worm, is about three inches long, and half an inch thick, consequently covers an area of one and a half square inches. Now the least space allowed to a worm should not be much less than three square inches, that is, to allow fifty worms to a

square foot. Taking that for a basis, we make the following calculation: a cocoonery forty feet long and seventeen feet wide, will admit of two rows of shelves each thirty-six feet long and four feet wide, and six shelves, one above the other. Each shelf contains one-hundred and forty-four square feet, sufficient for seven thousand two hundred worms, and the twelve shelves contain one thousand seven hundred and twenty-eight square feet, sufficient room for eighty-six thousand four hundred full grown worms at one time. There might be seven shelves, one above the other, then there would be room for one hundred thousand eight hundred worms. I have allowed the worms more space than any other writer whose calculations I have seen, except one, because I believe that diseases among worms oftener arise from the worms being too much crowded than from all other causes put together, and it is a great deal less trouble to feed the worms when they are allowed ample room, and each one has a better chance of getting his share of the food, and the litter has a better opportunity to dry, and does not need removing so often as if the worms were more crowded. If two crops are fed in the season, of course these shelves will be sufficient for feeding double the number of worms above mentioned.

Directions for Protecting Silk Worms from their Enemies.

Care must be taken to protect silk worms from their enemies, which are fowls, birds, cats, rats, mice, weazles, ants, black-bugs, spiders and flies. Some of these must be kept from the worms by shutting them out of the building with netting or grating to the apertures left open for ventilation. The shelf frames should touch nothing but the floor or ground, and if the posts of the frames do not stand in oil or water, they should have a little tar made soft by mixing oil with it, or molasses rubbed upon them three inches from the floor and some tar and molasses both put on, one a little above the other, will do no hurt and will prevent the ants from getting upon the frames. Spider-webs must be removed, and spiders and black-bugs killed whenever they are found

in the cocoonery. If ants should by any means get upon the shelves, put some lemon juice about the shelves, and rub the cracks where they come out. The ants are very destructive to the millers, as well as worms, due care must be taken to guard them both from the ants.

Directions for Raising Successive Crops of Silk Worms.

If it is intended to raise several crops in a season, the eggs must be put in a cold cellar or ice-house, as directed in the chapter upon preserving eggs. They may be taken out and hatched in such parcels as are wanted. There is a kind called the two-crop worm, that if they are hatched as soon as the leaves are large enough to feed them upon, will come to maturity and wind their cocoons, and produce eggs in season for a second crop, and it would enable a person to feed more worms from the same trees by having a second crop. The cocoons of the two-crop worm are lighter and smaller than the other kinds, and they eat from three to four weeks; the one-crop kind, from five to six. Farmers that would like to attend their worms after the busy season of mowing or harvest is over, can raise a few of the two-crop kind early, to produce eggs for a second crop, which might be fed during the eighth month, (August,) or if they prefer to raise the one-crop worm, they can hatch their worms the fifteenth or twentieth of seventh month, (July,) and they will want but few leaves for the first two weeks and will wind about the first of the ninth month, (September.) Care should be taken in the Northern States, not to hatch worms so late but that they will wind by the first of ninth month, (September,) or by the tenth at the latest, unless the room where they are to be fed, is to be warmed by artificial heat.

Substituted Feed for Silk Worms.

If you are so unfortunate as to have some worms hatched before the mulberry leaves are large enough to feed them, you may feed them with lettuce, rose, bramble, hop, hemp, fig, black-berry, elm, sweet-cowslip, prim-

rose, dandelion, scrozonora, [viper grass or vegetable oyster, salsifie,] jujube of China, alder, chestnut, currant or pear leaves, and when starving, indian corn; and there are some accounts of their being fed upon dried mulberry leaves, but if possible, take care to have no worms to feed until the mulberry leaves are large enough to feed them upon.

I am satisfied that silk worms cannot be raised upon any thing to advantage, except mulberry leaves, the Chinese plan of feeding them upon rice flour, to the contrary notwithstanding, and I believe it is folly to attempt to make silk by feeding them upon anything else: but every new cultivator may try a few for an experiment and he will probably get his labor for his pains.

Directions for Gathering Leaves.

Leaves should not be gathered until the dew is off in the morning, nor when they are wet with rain, if it can be avoided, but in case of necessity, leaves wet with the rain may be gathered and partially dried, by being spread upon the floor and stirred until the water is mostly shaken off, or the leaves may be taken between two cloths and shaken to get the water off, but it is better to gather some in advance, if it looks like being foul weather. One or two leaves should be left on the ends of the twigs, so as to keep up a brisk circulation of the sap, and in picking leaves from the multicaulis, it will be likely to injure the buds less if they are broken or cut off so as to leave part of the stem upon the twig. I think it is better to feed with leaves partially wet, if they are not wet with dew, than to let the worms remain long without being fed. A gentleman informed me, that he raised a few worms and dipped the leaves in water always before feeding, and gave them to the worms wet, and the worms were as healthy for aught he could discover, and made as good cocoons as those fed upon dry leaves.

Directions for Preserving Leaves.

Leaves after they are gathered, if they are not wanted immediately, may be preserved by putting them in

barrels and boxes, in a cool cellar and covering them from the air. They will be less likely to ferment if they are not crowded in, and if they are to remain some time, they should be sprinkled a little with water, as they are put in. Leaves picked towards evening, will keep longer without wilting, than those picked in the middle of the day: those picked in the fore part and middle of the day, should therefore be used first. Where leaves are gathered upon the twigs, the leaves will keep sometime on the twigs without wilting.

Remarks upon Chopping Leaves.

Some writers recommend feeding worms with chopped leaves, particularly foreign writers, but I believe there is no necessity for it, and it would seem to be very unnatural. As this work was not intended to recommend any superfluous labor, but for a guide to raise silk to profit, I shall offer some reasons why they should not be chopped. In the first place, the leaves wilt sooner than if they are not chopped, and the juice from the edges of the leaves being rubbed upon the worms, will be injurious. Some are of opinion that bruised leaves are injurious; and it will be very difficult to chop leaves without bruising them, and I have not heard of any experienced silk growers feeding their worms with chopped leaves. I believe it is only practiced by beginners.

Directions for Hatching the Worms.

In this very congenial climate, all that seems necessary, in order to hatch the worms, is to expose the papers containing the eggs, in a room that has a Southern exposure, where the sun shines most of the day, but not upon the eggs. The papers should be rolled up and hung up until the eggs begin to hatch, then taken down and spread. By keeping the papers rolled up until the worms begin to hatch, they hatch nearly all at the same time, or much more nearly together than if spread when first exposed.

If it is intended that the eggs from the first crop, should be hatched for a second crop, the eggs for the

REPRESENTATION OF THE SILK WORMS EGGS, AND THE WORM
IN ITS DIFFERENT STAGES, ALSO THE COCOON AND MOTH.

first crop should be exposed, as above directed, as soon as the mulberry leaves are one-fourth of an inch wide. Care must be taken that the mice do not get at the eggs, or young worms. After the eggs have been thus expo-

sed eight or ten days, if the weather is warm the worms will begin to come forth. If they do not hatch in twelve days, the eggs should then be laid in the sun and a paper laid over them so that the sun does not shine upon the eggs; and if the nights are cool, there should be a woollen cloth laid upon the paper during the night. When the worms begin to hatch, there should be some young mulberry leaves laid upon the paper, so that as the worms come out, they may crawl to them and begin to eat. These leaves, with the young worms adhering to them, should be taken and laid in a row upon paper towards evening every day, and a new supply of leaves put upon the eggs. Care should be taken to keep the worms hatched each day, by themselves, so that they may all change their skins about the same time and all wind their cocoons at nearly the same time. The worms for the first week, require feeding with young tender leaves, several times a day, as it is the most critical period of their existence, and if the weather is very dry some think it best to give them an occasional meal of wet leaves.

Observations upon the Diseases of Silk Worms.

Most writers have enumerated a number of diseases that silk worms are liable to, and have also recommended some remedies. But I believe the diseases are commonly generated by the worms being too much crowded upon the shelves; and the apartments not being properly ventilated. Some authors recommend sundry fumigations with chloride of lime, vitriol and some other articles. But it appears to me, that no air, however fumigated, is equal to the pure atmosphere: and the fumigated air must be very unnatural. I shall therefore, recommend to ventilate freely; let the pure air in and the impure air out and dispense with all fumigations, and save both the trouble and expense. Keep your worms healthy by giving them ample room and plenty of pure air by ventilating freely.

But if the worms should become diseased, they should be put upon a separate shelf, and all the dead worms should be thrown away, and not allowed to remain to the injury of the others.

Some inexperienced silk growers have mistaken the stupidity of the worms, when about to change their skins, for sickness, and in endeavoring to remove them, have destroyed nearly all they removed. Be careful not to commit the like error.

Directions for Feeding Worms.

The leaves that were taken from the eggs with the young worms adhering to them and laid in a row, should have some fresh leaves laid upon one side of the row, with the points of the new leaves laid between the stems of the old ones, when the worms will crawl upon them and begin to eat. The worms should be fed five times each day, for the first week, and four times a day for the second week, and afterwards three times; and the points of the leaves given them should be laid between the stems of the leaves they have eaten, for when the worms have eaten all they will of a leaf, they crawl upon the stem in search of another. By laying the points of the new leaves between the stems of the old ones, the worms may be led as far as you please and leave their litter behind them. As the worms increase in size, or appear to be crowded, every other leaf should be taken out and laid at the end of the same, or in another row, taking care to keep each day's hatching by themselves. The worms require so little space for the first week or two, that they may be kept in any vacant room in the dwelling-house, and when they are carried to the cocoonery, the oldest worms should be put upon the upper shelves and the rest below in the order they were hatched. After the worms have been hatched five or six days, they will appear dormant and eat but little, until they shed their old skins, which has become too small, and then they will soon eat enough to make up the lost time. They will change their skins once in from five to seven days. If they are the two-crop worm, they will change their skins three times, and wind their cocoons in about three weeks; if they are the one crop, they will change their skins four times, and wind their cocoons in five or six weeks from the time they were hatched. Great care is necessary not to disturb the worms. When they are

about to change their skins they attach the skin of the hinder part to whatever they happen to be upon, and crawl away, slipping their skins off and leaving them where they were fastened. If they are disturbed or routed up after they have fastened themselves down before they get their skins off, they will be likely to die, for it is extremely doubtful whether they have power to fasten themselves down a second time. If they have not, of course they cannot get their skins off and therefore must die. The best rule for feeding, is to give them as much as they will eat and no more. When they are two weeks or ten days old, they may be spread upon the shelves and the leaves may be strewed over and laid upon them. Some cultivators think it is useful to give the worms an occasional feeding of leaves sprinkled with a weak solution of salt and water. Care must be taken that no litter of snuff or tobacco be made around the worms; and the smoke of tobacco is very destructive to the worms that are within its influence. Care must also be taken, that the cocoonery be well ventilated and that the worms have fresh air, also that the sun does not shine upon them, for the worms appear to shun the light by crawling from it; and they also crawl from the wind where it blows right upon them. I have frequently been told by persons who had fed a few worms, that they did not succeed. When I enquired how and where they kept their worms? one says, "I fed them in the basement of some building, partly underground, and kept the air from them." Another, "I fed them in a chamber and was careful to keep the windows and doors shut."

Silk worms to be healthy, must be kept above ground and well supplied with fresh air. All noise and jarring of the building, while the worms are in it, should be avoided. Some recommend sprinkling the floor with water, in very dry hot weather, which has a tendency to purify the air. When it rains, or when the wind blows hard, the doors and other apertures upon the side towards the wind should be closed; those upon the opposite side should be left open during the night as well as the day. The worms that die, should be all taken from among the others and thrown away. Sometimes there will be a few worms that have done eating

and appear swollen and refuse to wind ; these should be separated from the rest, and sprinkled with vinegar in which wormwood has been soaked. This has a tendency to enliven them, and sometimes stimulates them to wind their cocoons.

Removing the Litter, and Remarks upon Hurdles.

If the silk worms are fed as above directed, they will be clear of their litter for the first ten days or two weeks, but after they are fed by scattering the leaves over them, the litter will accumulate under them and if the weather is very dry and the worms well supplied with fresh air, it might lay some time without injury. It is the practice in some parts of Europe, not to remove the litter during the life of the worm, but I think it must be injurious to the worm ; for in this climate moist or rainy weather would produce fermentation among the litter, which would have a tendency to create disease among the worms. The practice of experienced cultivators, is to remove the litter just after the worms have changed their skins, when they eat most voraciously. A branch of the white mulberry, or a leaf of the multicaulis may then be laid upon them and they will immediately begin to eat, when the branch or leaf should be taken up with the worms adhering to it and laid upon a clean part of the same, or another shelf: the litter should then be cleared off and no more dust made than can possibly be avoided ; and this will leave room for the next parcel of worms, and thus the litter may be removed by successive portions very fast, without handling the worms much, if at all. Some cultivators recommend rubbing the shelves with wormwood after removing the litter : it may be useful, but is not absolutely necessary. There will be no occasion to remove the litter from under the worms oftener than they change their skins, unless the weather should continue wet for several days in succession, and the litter should begin to mould or ferment. If it should, it ought to be removed immediately, for if it is allowed to remain it will be likely to produce distempers among the worms. Many beginners contrive some kind of hurdles made of lattice or netting,

and use them one or two years and then I think, commonly lay them aside. If they are made of twine, they will rot very fast, unless they are changed very often, which increases the labor of attending the worms very much, and when the worms are about to change their skins they must remain sometime without being changed, and when the bushes are put up for the worms to wind their cocoons, the litter must accumulate so as to make the twine very tender if not ruin it entirely; and to make them of wire or rattan, they would be very expensive. Moreover, to change them often and get them away from the worms just before the bushes are put up, would be more trouble than to feed the worms without them, as it is practiced by the most experienced cultivators. There is a certain degree of discretion required in taking care of silk worms, that is, to do no more to them than what is necessary, as I have known a great many worms killed by having too much done to them.

*Directions for Preparing the Apparatus for the
Worms to Wind their Cocoons.*

When some of the worms crawl to the edges of the shelves, and if fresh leaves are given them, crawl over them refusing to eat, and appear to be wandering about and raising up their heads, swinging them about as if trying to reach something, and when holding one up to the light and looking through it, it has the appearance of being filled with a clear yellowish oil, it is time to procure something for them to wind upon. Branches of oak, buttonwood, whortleberry, chestnut, white-oak, or some kind of bushes of which the leaves are tough when dried, and will not crumble and mix with the floss when the cocoons are picked off, are best. Ash and black-oak are so smooth that the worms slip off from them and are therefore unfit for the purpose. The bushes should be green, with the leaves on and cut just long enough to stand upright between the shelves when sprung in between the shelves, in rows about nine inches wide, across the shelves, the bushy ends up. There will then be room left to put a handful of leaves in between the rows of bushes and scatter the leaves without disturbing

the bushes. After the worms begin to spin, there should be as little noise and jar, in and around the building, as possible, and be careful not to touch the bushes when feeding. After the bushes have been standing seven days, the worms that have not crawled upon them nor began to wind, should be all taken away and put upon another shelf and well fed and more bushes put up, so that they may spin. In four days after the worms are taken from between the bushes, the bushes may be taken down and the cocoons picked off, taking due care not to dent or mash them, and are to be disposed of as will be hereafter directed. The bushes should never be used a second time, for the worms will not mount old dry bushes so readily as they will fresh green ones; and some of the floss or tow of the cocoons will stick to the bushes, and if the worms were to attempt to mount and spin upon them, the tow or floss, that remains upon the bushes, will catch and entangle the worms, so that they will hang until they die, and, when the bushes are taken down, more or less of them will be found hanging upon the bushes, dead, without having made any silk.

I am aware that there have been a great variety of apparatus invented, for worms to spin their cocoons in, and almost every new cultivator has added the fruits of his genius to the number; but I have not seen nor heard of any thing so good, or so cheap, or so easily obtained, as green bushes. Nothing that the worms have spun in once, should be used the second time, unless the tow or floss can be completely cleaned off, for the reason already given; and no one that has had a little experience will fail to see, at once, that it would cost more to clean the floss from any apparatus, however simple, than it would to procure a new supply of bushes. The interest of what any other apparatus for the worms to wind in, would cost, would probably pay for double the amount of bushes required.

Directions for gathering the Cocoons.

In four days after the worms that have not wound are taken from between the bushes, the bushes should

be taken down and the cocoons picked off; taking care not to injure the cocoons, nor mash or dent them, or break up the leaves of the bushes among the floss, as it occasions a great deal of trouble to pick out the pieces afterwards. The cocoons should not be put into very large parcels, nor crowded together so as to become moist, or to sweat, to their injury.

Directions for selecting Cocoons to produce Eggs.

Select, for the production of eggs, the largest and finest cocoons, and those that contain but one moth, have a shining appearance, and feel firm and stiff. Take an equal number of males and females. The male cocoons appear rather sharp at one end, and more pointed at both, and rather less than the females. The female cocoons are, therefore, rounder at the ends, and rather larger, and sometimes they are a little depressed in the middle. The floss should be stripped off, and they may be strung upon threads with a needle, taking a very light stitch upon the side of the cocoons; if taken at one end, the thread might prevent the moth from getting out easily. They may then be hung up in a warm airy room. If a large quantity are to be saved to produce eggs, they may be spread in thin layers of not more than two or three deep, where the rats, mice, or ants, cannot get to them, for, if they do, they will bite holes in them, and eat out the moths, in preference to almost any thing else. The sun must not shine upon the cocoons, as that would destroy the moths in a few days. Fourteen ounces of cocoons, or one hundred pair of moths, are allowed to produce one ounce of eggs. Some authors think that one-sixtieth of the produce should be saved for seed; I should think that it was double what is necessary.

Directions for the management of the Moths.

If the weather is warm and damp, the moths will come out sooner than if it is cool and dry; but generally in from twelve to twenty days, from the time the worms begin to wind, the moths will discharge some liquid,

which will soften the gum of the cocoon, and then, working his head one way and the other, crowding the fibres of silk to either side, he will come out, and generally in the morning. When the moth comes out, the male may be known by his creeping about, and keeping his wings in constant motion, and by his being smaller than the female. The female may be known by being larger, and by her keeping quiet until attacked by the male. As soon as the male gets out he seeks the female, and, when he finds her, they unite. Some time in the morning, before nine o'clock each day, the moths should be collected, and an equal number of males and females should be put upon cloth or paper. If the eggs are intended for sale, they may be layed upon cloth, and the cloth moistened and the eggs scraped off. After the moths are put upon the cloth or paper, there should be a pasteboard box, or a vessel of some kind, turned over them. In three or four hours, or between twelve and one o'clock, the box that is put over them should be taken off, and the moths separated. Take them by the wings and separate them, gently putting the males in a box, and the females upon cloth or paper, for them to lay their eggs upon, covering them with a dish as before. At night the moths should be put together again, and allowed to remain until morning, when they should be again separated; which practice of separating them in the morning, and putting them together at night, should be continued until the female stops laying eggs. If the moths are managed as above directed, they will produce the greatest amount of good eggs; but those who wish to dispense with part of the labor, and are willing to take up with a less quantity of good eggs, may manage them as follows.—After putting them together, as above directed, and covering them with a dish, let them remain twenty-four hours; then all the males that have separated from the females, should be taken away, and the others allowed to remain twenty-four hours more,—when the males should all be taken away. If there are more moths of one sex than the other, they should be put into a box, where it is dark; and, if they are females, the males that are taken from the other females may be put with them; but if they are males, they should

be saved, until there is an excess of females over the males that come out, to put with them, but care should be taken, that two males do not get to one female; for, if they do, she will be likely to die before she has laid all her eggs. I am aware that some recommend separating the male from the female in six hours, and not putting them together again; but the consequence is, that a part of the eggs will not be impregnated, and, of course, will be good for nothing: but the most experienced silk growers recommend the method first described, and, next to that, to leave them to separate themselves, taking care that the males do not get to the females afterwards. If the males are left with the females, the females die before they have laid all their eggs. The moths never eat any thing, but simply come out of the cocoons, and lay their eggs and die. The eggs, when first laid, are of a light yellow, and those that will not hatch remain so; those that are impregnated, and will hatch, turn slate color and remain so, until just before they hatch, when they will appear almost black. The eggs may be preserved as directed in a former chapter.

*Directions for picking the tow or floss from the
Cocoons.*

Begin by picking the tow open at the pointed end, and pull it away a little, round the end; then with the finger applied to the other end, push the cocoon out of the tow; gather what little tow remains with the thumb and fingers, and it is finished. Cocoons that have the floss well picked off, are easier to commence reeling.

*Directions for destroying the Moths to prevent their
coming out of the Cocoons.*

Cocoons that cannot be wound off, within eight or ten days after they are taken from the bushes, the moths must be destroyed, or they will perforate the cocoons and come out, which will prevent the cocoon from being reeled. But it is best, if it can be done, to have a machine and wind them off, so as to save the trouble of destroying the moths, for the cocoons wind off much easier

than they do after the moths are destroyed. The moths may be prevented from coming out for some time, by keeping the cocoons cool and dry ; if they are put in an ice-house, they may be kept almost any length of time, if it is not so damp as to make them mould. If they should mould it would diminish the value of them very materially, if it did not ruin them altogether.

The moths should be destroyed by that method that will make them the least difficult to wind. The cocoons wind off better, when the moths are destroyed, by steaming in the following manner, than if destroyed in any other way. Choose a fair day, on account of drying the cocoons in the sun, after they are steamed ; take a large kettle, and put a little water in the bottom ; make a hoop that will go down to within three inches of the water, and fasten a net over it, to prevent the cocoons from touching the water, and make another hoop that will just lay upon the top of the kettle ; fasten the hoops together, by putting a piece of cloth round inside of the kettle, just wide enough to reach from one hoop to the other ; fasten it securely to each hoop. Make the water boil, so that it makes steam freely ; then fill the hoops with cocoons, and set them into the kettle ; cover the cocoons close, with a thick cloth, and keep the water boiling for five minutes, which is long enough to heat the cocoons sufficiently to kill the moth. The cocoons should not be steamed any longer than it is necessary to kill the moth, as over steaming would make them very soft, so that they would be liable to be dented or flattened. When emptied out they should be dried, which they will soon do, if spread in the sun. When one parcel is steamed and taken out, another parcel may be put in, and steamed the same length of time. In this way a large quantity can be done in a short time, without any risk of damaging the cocoons ; and, it is also less trouble and more expeditious than any other way. The moths may also be destroyed by drying the cocoons in an oven, that is as hot as ovens are usually left, after the bread is taken out. The cocoons should be put in shallow pans or trays, and if they are not more than six inches deep in the trays, they may be taken out of the oven in half an hour.

The moths may also be destroyed by exposing the cocoons to the sun, for two or three days, spread in layers of not more than two or three deep, and stirred, in the middle of the day, upon boards or cloths, out of the reach of ants. If put out of doors they should be taken in at night; and, if in doors, they must be kept from the rats and mice. Cocoons, of which the moths were destroyed by drying in the sun, or baking, are more difficult to reel, than if destroyed by steam.

Directions for preserving Cocoons.

After the moths are destroyed the cocoons may be spread, with the floss upon them, in an airy room, in layers not more than three inches thick. They may remain here five or six weeks, unless they are wanted to wind off. If the floss is taken off, or if the layers are thicker, they will require stirring occasionally, to prevent their moulding. They should be examined often, and if they smell offensively, they must be stirred and aired, and those that are stained by the moth, should be wound immediately. If the cocoons are kept for a long time, in a close room, they are liable to be attacked by a kind of moth, which perforate them so as to render them unfit for reeling, and are only fit for floss silk, and sometimes are worth but very little for that.

Directions for measuring Cocoons to sell.

The prevailing custom, in measuring cocoons, is to measure them in a half bushel measure, and if the floss is picked off, the measure is filled level full; if the floss is on them, the measure is rounded. The highest price that I have heard of being paid, was six dollars per bushel; the price, two or three years since, was three dollars per bushel,—and, of course, it has increased about one hundred per cent. Some measure them differently, that is, they add two quarts to a level half bushel; but the manner of measuring, either with the floss on or taken off, should be agreed upon, between the buyer and seller, as carefully as the price.

Transporting Cocoons.

Cocoons, when sent to market, or to a distance to be reeled, may be packed in dry boxes or barrels, and pressed so as to prevent their rubbing against the sides of the boxes or barrels, but not so as to alter their form. If they are kept perfectly dry, they may be transported almost any distance, by land or water. If they are to be transported only a short distance, bags will do, if care be taken not to mash them. Great care must also be taken, in handling cocoons for any purpose, not to mash or even dent them.

To Farmers.

If ye aspire to wealth and ease,
 Stock well your farms with mulberry trees ;
 The silk worms will their wealth unfold,
 And coin their foliage into gold.

Suppose that you have never known,
 And are not curious to be shown ;
 Your neighbors may the thing perform,
 And then the leaves which you produce,
 In skilful hands become of use.

The farmer who would make pretence
 To taste should, have a hedge-row fence ;
 No tree that's known, so quickly grows,
 Or looks so uniform in rows.

It springs from cuttings or from seeds,
 And overcomes poor soil and weeds ;
 And in four years will make a fence,
 With of all things the least expense.

And when, instead of walls and rails,
 The mulberry hedge around prevails,
 The lands produce a mine of wealth,
 Employment happiness and health.

The mulberry grows on every soil,
 Requires but little aid or toil,
 And the best silk is always found
 Produced from leaves off sandy ground :

While a rich soil will leaves produce
 Abounding in a watery juice,
 And on which if worms be fed,
 They make a coarse and brittle thread.

PART THIRD.

DIRECTIONS FOR WINDING THE SILK FROM THE
COCOONS, AND MANUFACTURING SEWING SILK,
TWIST, &C., ACCOMPANIED WITH CUTS OF THE
MOST APPROVED SILK MACHINES.

Directions for sorting Cocoons.

The cocoons should be carefully sorted into several parcels, making one parcel of the firmest and most perfect cocoons,—a second of all the double ones,—a third of those that appear to be of a loose texture,—and a fourth of those that are spotted by the moths. Some are careful to separate the different colors, which may be useful. Cocoons should be kept quite dry, and those that wish to wind in damp weather, should dry their cocoons, and put them in a thick cloth bag, to be kept until they are wanted to put into the water, and should be careful not to take them out of the bag, any faster than they are wanted to put in the water.

Hints to those that raise Cocoons.

Every person who raises cocoons, should convert them into sewing silk, or twist, or reel them into raw silk, as that will materially enhance the value of the product. After silk is taken from the cocoons, it occupies much less space than it did when in the cocoon. And there is very little risk of its being injured, which it is extremely liable to, when in the cocoon. Whenever it is practicable, the cocoons should be wound off, in a few days after the worms have finished spinning, because the silk will wind off much easier then than ever afterwards,—but that cannot always be done. When it is not done,

the cocoons should be wound off as soon as circumstances will admit, and they never should be kept over the winter, if it can be avoided.

A description of the properties necessary for a Machine to possess, to wind Silk from the Cocoons to advantage.

Any machine for winding silk from the cocoons to advantage, must be so constructed as to twist the fibres of silk as soon as they pass the first guide, after leaving the cocoons, in the water. This first guide should be made of wire, bent in the form of the letter M. As the fibres are wound off, they should be twisted as soon as they pass this guide, so that the person tending can join the fibres from new cocoons without any difficulty,—so that as part of the cocoons are wound off, the fibres that are added from new cocoons may keep the thread of a uniform size. The twist unites the fibres that are added, so that the thread does not show where they are joined. In the old fashion reels, this twist was produced by running one thread round the other, which made it very inconvenient and difficult to commence winding; and, after it is begun, one of the threads is liable to be broken, or become disarranged, which will break or disarrange the other,—and, when broken, it is a great deal of trouble to find the end, and mend it ready to run again. When winding imperfect cocoons, one thread must be wound at a time, and, on the old plan, no twist could be given it, which made it extremely difficult to join the fibres. But some recent inventions have obviated it entirely, and now, one thread, or any number desired, can be wound and run entirely free, independent of each other,—and have the twist put in, and remain in the thread, or it may be allowed to escape, so that there will no twist remain in the thread. This new plan has many advantages, for if one thread should break, it does not disarrange nor break the other, and it may be mended again without any difficulty. When silk winders come to understand the difference in machines, in respect to the twist, I think those machines that will put in any required degree of twist, and have

it remain in, or let it escape, will supersede those that do not.

It is very important in machines that wind more than one thread at once, to have some apparatus to prevent the cocoons from rising up to the guide, where the thread is twisted; for if the cocoons should rise up to the guide, where the twist is, it would be very likely to break the thread of silk. The cocoons are prevented from rising up to the guide, in some machines, by a set of pointed wires or fingers, made in the shape of a man's hand open, with the fingers slightly bent. This hand of pointed wires is placed below the guide, and the wires set so near together, as to prevent the cocoons from passing between them, but allows the fibres of silk to pass freely. The pointed wires relieve the winder from much labor in piecing the threads, that would be so liable to be broken by the cocoons rising up to the guides.

It is also important to procure machines that can be operated by one person, and turned with the foot of the tender, so that their hands may be entirely at liberty to tend the cocoons; and if the machine is operated by steam or water power, there should be an apparatus so arranged, that with a slight motion of the foot, the machine can be stopped or started at the will of the operator. It is a very great advantage, in winding silk, to have the machine entirely under the control of the tender, that she may stop it instantly, if any disorder occurs among the cocoons. The water used in winding silk should be pure and soft, and entirely free from dirt or sand. It is very convenient to have partitions in the boiler, to keep the cocoons for each thread wound separated from the others. A strainer to fit into the boiler, is very useful, to remove the cocoons from the water, when the winding is stopped, and to take up the cocoons, and pick out the moths that the silk is wound off of, to prevent them from making the water foul. When a strainer is used, the partitions to keep the cocoons separate, should be in the strainer. The water should be changed at morning and noon, or oftener, if it appears dirty or dark colored. All machines for winding should be so constructed as to lay the wet threads across the dry ones, so that if the thread breaks the end may

be readily found ; this crossing prevents the silk from sticking together, as there is always sufficient gum to stick the threads together. If they were wound round one thread, directly upon the other, and allowed to dry, it would adhere firmly, so that it would not separate without much trouble, and consequently be very difficult to manufacture, if it could be manufactured at all—hence the propriety of laying the wet threads across the dry ones.

The weather has a great effect upon winding silk, and the clearest and dryest atmosphere is the best. The cocoons should be always perfectly dry when they are put into the water, and if the reeling is to be continued in moist or wet weather, the cocoons should be previously dried, and put in bags made of thick cloth, and not taken out any faster than they are wanted to put in the water. The winding will not succeed in a strong current or draught of air, as the wind has a tendency to blow off or break down the fibres, as they run from the cocoons ; there should be a little whisp of broom corn procured, if it can be obtained ; if that is not convenient, a whisp made of some fine small brushwood will answer.

Directions for reeling or winding Silk.

To commence winding, fill the boiler with clean soft water ; heat it to near the boiling point ; then put in the cocoons, in quantities according to the size of the thread desired ; press them under water with the whisp, so as to wet them all over alike. After they have soaked a few minutes, put the whisp in the water, and move it round among them, and as the fibres adhere to it, raise it out and take them off with the hand ; then put the whisp in again, and take out more.

When a sufficient number are collected, pull them off and wind them round the hand, until they run free from tow ; then take them through the guides, and fasten them to the arms of the reel. Turn the reel, and see that the cocoons are all in proper order. The proper degree of heat for the water cannot be ascertained until the winding is begun, as different parcels of cocoons

require different degrees of heat in winding. Silk reeled for the American market, should be reeled from about twenty-five or thirty cocoons to a thread. As the fibres from the cocoons are much the largest, when the cocoon first begins to unwind, and diminish in size until it is all unwound, consequently, if the thread is kept even, or of a uniform size, there must be fibres from new cocoons added very often. If the machine is so constructed as to give the thread a twist, as soon as it passes the first guide above the water, the fibres from new cocoons may be joined to the thread with very little trouble, and if properly joined, the thread will be so smooth that it will not show where they are joined. Any tow that may adhere to the fibres should be pulled off as it rises, or it will injure the quality of the silk, and hurt the sale of it. Reeled silk, or raw silk, as it is termed, should always be allowed to dry upon the reel, and every machine should have two reels, so as to use one while the silk is drying upon the other. There should be a mark of some kind tied to the end, when the silk is taken from the reel, so that it may be readily found. When the silk is taken from the reel, it may be doubled twice, and a string of the refuse silk tied round, near each end of the skein, after it is doubled.

Directions for manufacturing Tow or Floss.

The tow or floss should be carded, just as the tow of flax is carded, and made into rolls, just as the tow of flax is made; then they should be spun upon a large spinning wheel, such as is used for spinning wool. Care should be taken to begin at the right end of the roll, for if the right end is begun at, there will be no difficulty in spinning a fine even thread, and spun as fine as may be desirable. After it is spun it must be boiled in soap-suds, to take out the gum, as will be hereafter directed for sewing silk.

Directions for manufacturing the Cocoons that are perforated by the Moths, and that cannot be wound off.

They should be put into a bag and boiled, or rather simmered, in strong soap-suds, putting about one-tenth

or one-eighth of the weight of cocoons in soap, and water sufficient to cover them completely, and simmer them an hour, turning the bag over occasionally. They may be allowed to cool, then open the bag and take out one or two of the largest cocoons, (leaving the bag in the water;) rinse and dry them. After they are dry, pick them to pieces, and if the gum appears to be entirely boiled out, so that when they are picked, they appear quite clear of gum, and as soft as raw cotton, the others may be rinsed and dried. But if they are not clear of gum, there must be more soap and water added, and simmered or boiled more. Take care not to boil the cocoons too much, for if they are boiled too much, it will make them tender. The cocoons must not be dried until they are boiled sufficiently, for if they are dried when partially boiled, it will harden the gum, so as to make them very difficult to boil soft ever afterwards. After they are boiled, dried, and picked, so as to appear like raw cotton, they may be spun, like flax, upon a small foot wheel; it may be spun very fine, and make very handsome stuff, suitable for gloves or stockings. Some say that silk should never be boiled, either to take out the gum or in dying, but simmered,—as boiling has a tendency to make the silk flossy or raw.

Directions for manufacturing the Waste made in winding, or any other Waste.

The waste is generally in strings, and it should be taken and cut into pieces about two inches long, then put into a bag and simmered or boiled in soap-suds,—about one-eighth or tenth of the weight of silk in soap; boil it, so as to take out all the gum, and be careful not to dry it until the gum is all out;—to determine when the gum is all out, manage it as directed in boiling cocoons;—then it may be rinsed, dried, carded, and spun, like the tow of flax, but should never be mixed with the tow or floss silk. Those that want to make fine stuff of the waste, can make it into coils by winding it round their fingers; then boil it in soap-suds; after it is boiled pick it open, and spin it upon a linen wheel, like flax; or cut the coils, and card it like tow, to spin upon the large wheel.

*The patent Spinner and Twister, for making sewing-silk and twist, and to prepare silk for weaving.—
Invented by Jonathan Dennis, Jr. Portsmouth, R. I.*

This machine is so constructed that one person can tend and operate it, and make sewing silk or twist directly from the cocoons, and spin and double, and twist it at the same time, or prepare silk for weaving, so that after it comes from this machine it is ready to be cleaned, and after it is cleaned it will be fit to put into skeins of white silk, or sticks of twist. The person who tends it, can turn it with their feet, while they tend the cocoons, and add fibres from new cocoons to the threads, so as to make them of a uniform size through their whole length with their hands. There is a fast and loose pulley for a belt, to carry it by steam, water, or any other power that may be applied. There is a copper boiler furnished with this machine, made with a cavity under it for a fire, so that the water is over and upon each side of the fire, consequently takes very little fuel ; this boiler has a zink strainer that will not rust, that fits into it to keep the moths from sinking, and to remove the cocoons from the water when the reeling is stopped, and to take up the cocoons and pick out the moths, to prevent their making the water foul, this strainer has partitions in it to keep the cocoons for each of the three threads spun by themselves. These partitions may be taken out when it is time to finish off spinning, and as the threads become too small, one thread should be stopped, and added to the other two, and when the two becomes too small, one should be stopped and added to the other ; when those that are stopped are added to the others they should be added a small part at a time, so as not to make the thread uneven, when this becomes too small it must be stopped, and the remaining cocoons taken out of the water and dried ; they may be put in again and finished off when you have nearly done spinning the next time. To commence spinning, fill the boiler with soft clean water, and make a fire under it, when the water is near boiling, put in the cocoons, press them under water to soak a little, then gather the

fibres or ends, and take them up between the pointed wires and guide ; then take a small wire hook and draw them through the end of the spindle, take them along the tin cylinder and wind the end of the thread round the bobbin a few times, then drop it into a notch in the end of the cylinder, the two outside spindles and the middle one must be served in the same way. Then turn the crank up a little past the centre to the right hand if making sewing silk, and to the left if making twist, then press it down with your foot, and when it comes round and begins to descend press it down again, at the same time taking care of the cocoons with the hands, and as they wind off and the thread begins to grow smaller, new fibres should be added to keep the thread of a uniform size, which may readily be done by taking hold with both hands, and as the thread is twisted, as soon as it passes the first guide, put the right hand above the guide holding the left hand below, and breaking the fibres by raising up the right hand, at the same time pressing the thumb down against the thread, and that will unite the fibres thus broken to the thread, so that it will not show where they are joined. The pointed wires below the guides prevent the cocoons that get tangled, from being drawn up to the guide and the tangled fibres being twisted in with the others would break the end or thread of silk, sometimes the cocoons will rise up and unwind and then fall down again, but sometimes they must be taken away with the fingers. The wires, to prevent cocoons from rising up to the guide and the thread being twisted as soon as it passes the guide, which enables the tender to join the fibres from new cocoons with the greatest facility, are two very important advantages that this machine possesses over all other silk spinning machines. When the bobbins become full, the bands are slipped off and the spindles taken out, and the bobbin taken off and an empty one put in its place. A little of the silk should be unwound from the bobbin that is taken off, and wound upon the empty one put in its place to commence again. The bobbins filled with spun silk, are put upon scewers, and set under the spindle box, and the threads from two, if making sewing silk, and from three if making twist, are

put through the guide together, and pass over the top and round under the pulley, to make them both draw uniformly, then up over the glass rod into the end of the spindle and on to the bobbin the same as when it is spun, except it is twisted the other way. The little copper basin under the pulley, that the thread passes round, should be kept full of water, to wet the threads as they are doubled and twisted. When the bobbins are filled with silk that is doubled and twisted, then they are taken off and there is a small reel furnished with the machine that winds skeins of a proper size to sell. There is a small machine for making sticks of twist, that the purchaser can have if he wishes. When it is taken from the reel it may be cleaned and knotted into skeins or colored. There is attached to the machine a belt guide, that is operated by the foot of the tender, when the machine is driven by steam or water power, so that a slight motion of the foot will stop and start the machine at pleasure. Any person can learn to tend this machine in one or two days; it is very simple and not liable to get out of order in a great while with good usage, and any person with a little experience in tending it would be able to manage it themselves. The machine is 52 inches high, 26 inches wide, and 31 inches long, and weighs when completed 100 lbs. Boiler and stove included. When turned by the foot will make 200 skeins of sewing silk per day, and if turned by water or steam power, they might make three hundred skeins of sewing silk per day, ready for cleaning.

There was a gold medal awarded to the inventor for this machine, by the American Institute of New-York, in 1838.

The patent Contra Twist Silk Reel, Invented by Jonathan Dennis, Jr. of Portsmouth, R. I.

This Reel possesses many advantages over the reels heretofore used, some of which are the following: it is turned by the feet of the tender, thus saving the labor of an additional person, and consequently leaves the hands at liberty to tend the cocoons; it also enables the

tender to reel two threads at once. And if any disorder occurs, he can stop it instantly, by removing the foot from the treadle to a lever by the side of it, also the persons tending the cocoons, turning the reel himself, has it more completely under his own control, than if it was turned by another person. There is a twist given to the thread of silk reeled by two revolving tubes as soon as it passes the first guide ; this twist enables the tender to join fibres from new cocoons with the greatest facility, and thus keeps the thread of a uniform size, and the place where they are joined does not show in the thread reeled ; this twist escapes before the threads are wound upon the reel. The advantage of twisting the threads reeled, by running them through a revolving tube, is very great ; it saves much trouble and time when the reeling is commenced. And the threads are not half so likely to break in reeling ; if one thread breaks, it does not break the others, and should the thread break, it is not half the trouble to mend it that it would be, if the twist was given in the old way by running one thread round the other. There is a set of pointed wires, that prevents the cocoons that do not unwind freely, from rising up to the guide and breaking the thread. There is a copper boiler to this machine, with a cavity under it for the fire, so that the water is over and upon each side of the fire, consequently it takes very little fuel. This boiler has a zink strainer fitted into it, to prevent the moths from sinking, and to remove the cocoons from the water when the reeling is stopped, and to take up the cocoons occasionally and pick out the moths to prevent the water from becoming foul and making the silk dark colored. To commence reeling, fill the boiler with clean soft water, and make a fire, heat the water to near the boiling point, then put the cocoons into it, press them under the water and let them soak a few minutes, then gather the ends from as many cocoons as will make the thread, of the size desired ; draw it up between the pointed wires and guide, and with a small wire hook, draw it through the tube, then through one of the guides in the traversing rail, and make it fast to the arm of the reel ; then with the foot turn the reel, and as the thread becomes smaller,

add to it, by gathering ends from new cocoons and joining them to the thread that is running. While it is in motion, take the fibres in the right hand and draw them up; then take hold with the left hand, five or six inches below and break them, holding that part of the fibres between the guide, and breaking it by raising up the right hand, and pressing the part broken off down to the thread that is running with the thumb, and that will join

them, so that the place where they are joined will not show in the thread. When it is time to finish off reeling as the threads become too small, one must be broken off, and the partition taken out of the strainer, and the fibres added to the other a little at a time, so as not to make the thread uneven. When this thread becomes too small, it should be stopped and the cocoons taken out and dried, they may be put in again and finished off when you have nearly done reeling the next time.— One person can reel more silk upon this reel, than two can upon any other reel heretofore used, and reel it as well in the same time. This reel is four feet high, two feet wide, and five feet long, and weighs about a hundred pounds, with the boiler, stove and all the apparatus complete, ready for reeling. This reel is very simple in its construction and not liable to get out of order with good usage.

This reel is considered by those who have examined it, vastly superior to any reel heretofore used. One gentleman examined it last autumn, and has since been to France, and examined the French reel, and has recently returned, and told me he considered mine superior to the French. From the description he gave of the French reel, I should judge there must be a vast difference between the French and the Piedmontese reel that was recommended by the National Silk Convention.— One of the committee of that convention, which was appointed to recommend a reel, and recommended the Piedmontese reel, has since applied to me for one of my reels ; and also for a spinner and twister.

My reel does not make skeins of the same circumference that the Piedmontese reel does, but about 2 feet 6 inches smaller ; some think that silk should be reeled so as to make the skeins of the same size of the Piedmontese reel, so that the silk may suit the European market. It appears to me idle, to talk of sending silk to the European market when we have upwards of 20 silk manufacturing establishments at home, most of which are stopped, waiting for raw silk some part of the year. I have made my reels of a size that is best adapted to the American market ; and it is less labor to reel silk in skeins 4 feet and 5 inches, than it is to make the skeins

6 feet 11 inches, for a reel to wind a small skein turns much easier than a reel to wind a large one, and it is also stopped much quicker when any disorder occurs.—I have inquired of the American silk manufacturers, and they prefer silk reeled of the same size that my reel makes to larger, as it makes less waste in manufacturing; and I have no doubt but that the European manufacturers would prefer it for the same reason. And as the threads cross shorter upon small reels than upon large. One silk manufacturer “said that he should rather manufacture such silk as I showed him that was reeled upon my reel, for one dollar per pound, than to manufacture the imported for three dollars per pound upon a contract.” Silk reeled upon one of these machines has been shown to some of the first manufacturers in this country, who pronounced it superior to the imported silk, and one of them sent a sample of it to Calcutta to see if any could be procured equal to it.

It is my intention to put one of each of these machines in some one of the seed stores, in the principal cities in the United States. The demand for these machines is so great, that I do not expect to be able to supply the whole of this great nation. I am therefore very desirous to sell State, County, and Town Rights. And all orders for the above machines, answered in the same rotation in which they are received, all applicants will please to address the subscriber, postage paid.

JONATHAN DENNIS, Jr.

Portsmouth, Rhode Island.

Directions for cleaning Silk, or boiling out the Gum.

The skeins of silk should be tied in parcels of about half-a-pound each, except three small parcels, each of which should contain two of the coarsest skeins. The strings with which the parcels are tied, should be left very loose. Several of these parcels may be put in a bag, and the bag tied or sewed, so as to leave the silk very loose in the bag. Take one-tenth of the weight of silk, of white bar soap, (the rosin in brown soap is said to injure the lustre of the silk,) cut in thin slices; take as much water as will cover the silk two inches deep;

put the soap into the water, and heat it, but not so as to boil. When the soap is dissolved put in the bags of silk; heat it so as to simmer, but not to boil, violently, for one hour, turning the bag over once in ten or fifteen minutes. Some say silk should never be boiled to take out the gum, nor in dyeing, as it has a tendency to make it fuzzy or raw, but simmered. After it has simmered one hour take out the bag, open it, take out one of the small parcels of two skeins; then put the bag into the kettle again. Cool the skeins taken out, rinse and dry it. After it is dry, if it appears perfectly free from gum and soft, the remainder may be taken out, cooled, and rinsed, in the same manner. But if the skein of silk dried is stiff and hard, and appears to have some of the gum remaining in it, it must be simmered again for half an hour; then try it again, with one of the small parcels; if the gum is not all out after the second trial, dissolve some more soap in water, and add to it, and heat it for half an hour more. If the silk is dried when part of the gum is boiled out, it will harden the gum, and render it very difficult to boil out ever afterwards. Most writers recommend using one-fourth of the weight of silk in soap, but it is more than is necessary. Some boil the silk without putting it in bags, and use soft soap, but I should recommend putting it in bags, particularly if soft soap is used. Old soap should always be preferred to new.

Directions for stretching Silk to make it glossy.

When the silk is nearly dry, after the gum is boiled out, it should be stretched. Make two round, smooth sticks of hard wood, twenty inches long, and two inches through. Bore a hole in a post, three feet from the floor; put the end of one stick into it. Put about one-third of a pound of silk upon this, then put the other stick through, and twist as hard as the silk will anyways bear, and pull at the same time. Then loosen, and turn the silk one fourth of the way round, and twist as before, so as to twist the parts that were upon the sticks when it was first twisted. These sticks will be very useful in coloring, to wring out the dyestuff. After the silk is stretched, it is ready to knot into skeins, or to color.

Directions for Sizing Silk.

Take a small piece of Isinglass, as big as half a dollar, and as thick as a ten cent piece, and dissolve it in a pint of water; dip the silk into this, and wet it thoroughly; then dry and stretch it as before directed, and it is ready to knot into skeins. If you want the silk of a pearl, or bluish white, add a little indigo bluing to the size. As the difference in isinglass is great, it is difficult to direct minutely, how much should be put to a pint of water. But every one can mix, and try a skein, until he gets it right. If the silk is a little stiff after it, dry stretching will limber or soften it. Sizing is a great advantage to silk in using it, and it also adds to its weight, and improves its appearance, and should be applied to colored as well as white silk. I suspect the difference between American and imported silk, is, in great measure, owing to the want of sizing, on the part of the American; for the Americans put the best of stock into their sewing silk, which is considered an abominable waste by foreigners, who only put stock of an inferior quality, that is not fit to weave, into their sewing silk. The want of sizing upon American silk makes it appear fuzzy, and when touched sticks to your fingers; and, in working, it becomes more and more fuzzy, which is the principal complaint against it, for it is allowed to be the strongest silk in the world, and sizing remedies the fuzzing in great measure, if not entirely.

Lace dyers make a sizing of gum Arabic, instead of isinglass, as the isinglass is very expensive; or of isinglass and gum Arabic together, and sometimes add loaf sugar, or sugar of lead, which adds to the weight, and, I should think, a small piece of tallow should be put in, for the same reason it is put into starch for lace caps. When the sugar of lead is put upon black, it is said to make it turn rusty, after being exposed to the air. I should recommend to silk manufacturers, to try experiments in sizing silk, as it is of great importance to them.

As the next pages contain receipts for coloring. I should recommend to inexperienced persons, who begin

to color, to experiment with small parcels first, and increase as their skill increases. I am aware that almost every family possesses receipts, and are in the habit of coloring, but I thought the following would be acceptable. I have put several receipts for one color, so that the dyer might use the one, the materials of which could be most conveniently obtained.

A few Dyes that are cheap, and may be used by any person that wishes to color Small Parcels.

One rule that should always be observed in dyeing is, the article to be dyed should be perfectly clean, and if washed with soap, it must be rinsed in soft water afterwards. Every article dyed should be thoroughly wet, before it is put into the dyestuff, to prevent its spotting. Always dry silk in the shade.

Steep light colors in earthen, tin, or brass vessels, and set them with alum, if it is necessary to set at all. Steep dark colors in iron, set the colors with copperas; use it sparingly, as too much rots the silk. Hatters and apothecaries keep a compound of indigo and vitriol, known as blue composition. An ounce vial full costs 12½ cents. It colors a rich blue. Ten or fifteen drops of the blue composition put into a quart of warm soft water, stir it, and strain it, if any settlings are perceptible—this will color a small quantity. If you wish a deep blue, put in more of the blue composition, (cotton colored in this would be ruined by the vitriol.) When the silk is perfectly dry, wash it in cool soap-suds, and dry again to prevent the vitriol from doing any injury. If kept close from the air, without being washed, it would most likely be injured.

To color green, color it, in the first place, a deep yellow; boil fustic in soft water, and it will make a bright yellow dye, but onion skins, barberry bush, saffron, or peach leaves, will do very well. Then take a quantity of strong yellow dye; pour in a large spoonful of blue composition; stir it with a clean stick, and dip the silk that is already colored yellow, into it. This will make a lively grass green.

The blossoms of balm, steeped in water, make a rose

color, but it is liable to fade ; if alum were put in, it might set the color, if done in tin or earthen.

For straw color, steep saffron in earthen, and strain it ; this will make a deep or a delicate shade, according to the strength of the dye. Yellow may be colored as directed for green, by setting the color with alum, and leaving out the blue composition.

To color purple, take the purple paper from loaf sugar ; put it in cider or vinegar ; boil it in iron ; add a small piece of alum ; this will make a fine slate or purple.

A light-brown slate color—boil white maple bark in brass, and set it with alum.

For Nankin, take a pailful of lyè ; put in a piece of copperas, half the size of a hen's egg. This will make a fast color.

A fine Nankin—boil birch bark in brass or tin ; set it with alum. To make slate color, use copperas instead of alum. To make a slate color, boil tea grounds in alum ; set with copperas.

For black, put logwood in cider ; boil it in iron ; set with copperas. Another way,—boil rusty irons in vinegar ; set with copperas ; or, substitute black ink powder instead of the rusty irons.

To color black, dissolve a large table spoonful of copperas in two gallons water ; dip the silk in this solution ; stir it to prevent its spotting ; raise the silk out with a stick ; drain it a little, then put it in again ; this prevents it from being rotted. Continue this for half an hour, then take it out ; hang it to drain half an hour, then wash in soap-suds, and rinse in clean water. Take half a pound of logwood, tie it in a cloth or bag ; boil it in a gallon of water an hour and a half ; take out the logwood, and when the dye is near boiling hot, wet the silk and put it into the dyestuff. Stir it ; raise the silk out of the dyestuff often, let it drain a little, then put it in again ; continue this one hour, then boil it five minutes, take it out, hang it to dry ; when nearly dry, rinse it in cold water, wring it and dry it. Washing in soap-suds, after it has been in the copperas water, prevents it from smutting.

To color purple, use alum instead of copperas, and make the rest the same as the last mentioned, except washing in soap-suds.

Logwood alone will color a light brown.

To color scarlet.—For one pound of silk, take two gallons of water, make it boil; add half an ounce of cream tartar, and half an ounce of cochineal; boil it fifteen minutes, then dip your silk, until the color rises to your wish.

To color black.—For one pound of silk, take four quarts of yellow oak bark, boil it for three hours; there should be two gallons of dyestuff after it is strained; add four ounces copperas, and two ounces nutgalls, pulverized; boil half an hour, check it with one pint cold water; put in the silk, keep the dye one degree below the boiling heat; stir the silk in the dye five or six hours, that the color may be uniform. Take it up, cool, dry it in the shade; the silk will then present you the color of dark olive. For the next, make a decoction of one pound of logwood, and dip your silk until it receives the color you desire; the shade the dyer may ascertain, by drying a few threads; when of the shade desired, rinse, wring, but moderately, and dry it. Make of loaf sugar, in two quarts of water, brought half way to a boiling heat; then dry, and it will be a shining jet black, that is permanent.

For cinnamon.—For one pound of silk, boil half a pound of camwood that is ground, with two gallons of water, for fifteen minutes, in a brass or pewter vessel; then dip, and carefully attend, that the silk may equally receive the color desired. After the cinnamon is obtained, a number of shades may be produced by adding copperas in small quantities, and dipping a number of times.

Saxon blue.—For one pound of silk, take two gallons of boiling water, add half a table spoonfull of the compound oil and indigo, stir them well, dip the silk and keep it moving for a few minutes; take up, and if it is not sufficiently colored, add a little more of the compound, and so continue until the color suits your taste.

Green.—Put two ounces of pulverized temerech, boil a few minutes; add four ounces alum, after it is dissolved, add half a table spoonfull of the compound of oil and indigo, stir it, then dip for fifteen minutes, take up and cool, and thus proceed until the color suits. If it

require more yellow add temerech, if more blue increase the compound. The quantity of dyestuff used in coloring green, must be governed by the discretion of the dyer. By the various proportions of the two materials, a variety of shades may be obtained. No good green can be obtained on silk without temerech.

Olive brown.—Boil walnut, or yellow oak bark or fustic; after the liquor has received the strength of the dyestuff, strain it, make it boil, then dip the silk, from time to time, adding a little copperas, or Roman vitriol; for a light color make short dips. A variety of shades can be produced in this dye.

Light browns.—Four quarts water, two ounces pulverized nutgalls, boil it fifteen minutes, add a piece of alum, half as big as a walnut, let it dissolve, dip the silk fifteen minutes, add a little copperas, dip as before, and so continue until you get the color sought.

Navy blue.—First dip for one hour one pound of silk, in a solution of four ounces of copperas to two gallons of water; when dipping, have the dye hot. Then rinse and dip, in a decoction of logwood, until the color is to your wishes.

Yellow.—For one pound of silk put four ounces of alum to two gallons of water, heat it till it nearly boils, dip the silk for one hour, take up, rinse clean, dip in a temerech liquor; the quantity of dyestuffs must be in proportion to the shades required. By adding temerech and dipping, any variety of shade may be produced, from the straw color to the full yellow.

Violet and orange.—One pound silk put into a preparation of alum, same as for yellow; then make a dye of one pound redwood, or Brazil wood, boil it half a day. There should be two gallons of dyestuff, after it is strained; make it nearly boil, put in the silk; for a light color dip a short time, or longer, if for a full color; stir the silk briskly when in the dye, that the color may be uniform. For violets, prepare half a pound of logwood, boil well, strain and cool; dip the silk when the dyestuff is cool. At last, dip, in a weak solution of pearlash, while it is hot, to heighten the color; rinse and dry. For orange.—After the silk has been dyed in the redwood dye, make a new dye of two ounces pulverized

temerech; boil a few minutes, dip the silk shorter or longer, to produce the shade sought for.

To render hard water soft, enclose a pint of wheat bran in a bag, tie close, put it into ten or twelve gallons of water, boil it, take off the scum as it rises; in this way water that is clean may be softened for washing or coloring.

A few short Receipts.

Black.—3 oz. copperas, 1 qt. yellow oak bark, 1 qt. alder bark, half a pound logwood, 3 galls. water.

Navy blue.—For one pound silk, 2 oz. copperas, 6 oz. logwood, 3 galls. water; cinnamon and London brown, half a pound camwood, 1 teaspoonful oil vitriol, 3 galls. water, add copperas to make the shade required.

Saxon green.—12 oz. fustic, 3 oz. alum, 3 galls. water, then add in very small quantities the compound oil and indigo, until the color rises to your wish.

Scarlet.—2½ oz. aquafortis, 1 oz. cochineal, ½ oz. granulated tin, 2 drachms sal ammoniac, 1 drachm salt-petre, 1 teaspoonful of temerech, ½ lb. wheat bran, 3 galls. water, 6 drachms cream tartar.

Crimson.—3 oz. alum, 1 oz. 1 dr. cochineal, ½ lb. wheat bran, 3 galls. water, 6 drachms cream tartar.

Purple.—First make crimson, then dip in a good urine vat.

Yellow.—3 oz. alum, 3 galls. water, then dip in temerech liquor, until the shade you wish for is obtained.

Remarks upon adding weight to Silk in Dyeing.

As I have heard much complaint about American silk, on account of its being lighter than the foreign, I will here add a few receipts for adding weight to silk in dyeing.

To add weight to silk that is to be dyed Black. Take three fourths of the weight of silk in nutgalls, boil them to make a strong decoction, boil the silk in this decoction, and let it remain in it thirty-six hours, then wash and wring it. It is now so saturated with tannin, that it will be one quarter heavier than it was before.

Another method.—Boil four pounds of sumach ; strain out the clear liquor in a copper kettle ; steep the silk in this ten hours ; heat it as hot as you can bear your hand in it. By so doing it will add one fifth to the weight.

Browns, Olives, Greens, Yellows, and Drabs, may all be steeped in the same manner, but died different ways.

For Brown.—Dye it first a buff, with annatto, with a moderate heat, then put the silk in sumach, and steep as above ; sadden with copperas, and use luke warm water ; dry it where it is warm.

For Olive.—Use the sumach, as above directed ; after that use logwood, fustic, and refined sulphate of indigo. If you wish to give the olive a brownish cast, add some archil ; dry it where it is warm.

For Green.—Make use of alum, temerech, and sulphate of indigo, at a moderate heat, and dry as above.

For Yellow.—Use alum, and temerech, at a moderate heat.

For Drabs.—Most shades are made yellow with temerech ; red, with archil ; blue, with refined sulphate of indigo, and dried where it is warm.

For Slate.—Use sumach as heretofore, after that, archil, and a small quantity of alum, at a moderate heat ; dry as heretofore.

To make silk glossy wring it very hard several times, changing the position of the silk upon the sticks every time. After it is dry, some stretch it upon a frame made so that the silk will go on loose ; then put in a stick and take a twist in the middle of the silk, just as the twist is taken in the cord, that tightens a saw frame ; after twisting it once, slip it part round, and twist it again, so as to be sure to twist it all.

Concluding observations, recommending the cultivation of the Mulberry and the growing of silk, to Farmers, Proprietors of Boarding Schools, and Town Officers generally.

I think I have given sufficient reasons, in the forepart of this treatise, to induce every cultivator of the

soil, that can command the means, to begin the cultivation of Mulberry trees, and the feeding of silk worms, if they have time to spare, aside from their other avocations. For if they begin with a few cuttings, or a little seed, they can, in a few years, raise sufficient to stock a plantation. Some will say "that the business will be overdone," but it appears to me impossible for the present generation to overdo it ; for from present appearances, the silk manufactories in this country are likely to stop for the want of raw silk—and, in fact, several of them are now partially stopped for the want of raw silk. I saw the agent of a silk factory from Massachusetts, a few days since, who told me that he was going to New-York and Philadelphia to buy raw silk. In a day or two afterwards I saw a silk manufacturer from Connecticut in New-York ; he said he had been to Philadelphia to buy raw silk, but could find none ; and, further, said there was none in the country for sale, and that he could not learn that there was any expected from abroad : and there is every reason to expect, that the manufactories will increase faster than the production of raw silk, so that for many years, the consumption of raw silk will exceed the production. And when the home market is supplied, the American silk will undoubtedly take the preference in foreign markets, particularly the English market ; for owing to the peculiarly moist climate of England, all attempts to raise silk to any extent, have been unavailing. During the year 1830, England imported 4,693,517 pounds of raw silk, which, at six dollars per pound, amounts to \$28,161,102, and the value of the articles manufactured from silk was \$62,000,000. Although France is a silk growing country, she does not produce sufficient to supply her own manufactories ; but, it is well ascertained, that she pays \$20,000,000 for imported raw silk ; and in 1824, exported \$18,000,000 worth of manufactured silk. J. D. Homergue, a French silk manufacturer, says, "I should suppose that assorted qualities of fine American silk, (meaning raw silk,) well prepared, would bring on an average, in the European market, seven dollars a pound." He further says, "while in France I have seen letters from silk merchants, in which they said to

their correspondents in Piedmont, 'send us fine (raw) silk ; never mind five francs (one dollar) per pound, more or less ; but send us *fine* silk.' I think, (says J. D. Homergue,) I am not too sanguine, when I give it as my opinion, that the beautiful silk of the United States, when properly prepared, will be sought for with avidity, by the merchants and manufacturers of Europe, and that America will sell, at her own prices, as much of it as she can make."

It appears, by the accounts that I have, that raw silk from China has been exported from this country to Mexico, and sold there at a great profit ; that is, it brought eight dollars per pound, although it is much inferior to the raw silk of this country.

If the United States has not imported raw silk to a large amount, they have imported manufactured silk to a very large amount ; the importation in the year 1836, was \$22,980,212 ; only \$762,730 were exported.

I think that it will appear obvious, from the above, that it is very desirable that the middle and northern states should produce some article that can be exported to advantage, that will pay for part, if not for the whole of this immense amount of manufactured silk : and I believe that nothing else can be produced and exported to so great profit as raw silk, for almost every farmer can make twenty, thirty, or one hundred pounds of raw silk, without materially diminishing the other products of the farm.

I am firm in the belief that the time is fast approaching, when a few acres of mulberry trees will be considered as important an appendage to a farm, as an orchard of fruit trees. And I will here suggest to landholders who let farms, the propriety of their giving this subject the attention that it merits, as it will be likely to materially enhance the value of their farms, and increase the rents in the same ratio. I am aware that many farmers look upon the raising of mulberry trees, and feeding silk worms, as a mystery, but I believe the foregoing pages dispels the mist that has heretofore enveloped the subject ; and shows every thing necessary to be done, in a broad light, so that any person, who can procure seed or cuttings, and silk worm's eggs, suf-

ficient for experiment, will need no other directions but what can be found in the foregoing pages.

The Count Dondola says, he does not hesitate to affirm, that the value of silk in Italy, considered, as an article of exportation to foreign countries, is double that of all the other products taken together, and that there is no production of the earth, in the markets of Europe, in which of course he includes sugar, coffee, cotton, and all the rich productions of both hemispheres, which compared to its natural value or prime cost, offers to the producer a greater net profit than the article of silk. If then in Italy, the land of corn, wine and oil, the profits on exported raw silk (for I am not speaking of it in its manufactured state) are equal to double the amount of all the other productions of the Italian soil taken together, it is evident that the same, if not greater advantages, must result to this country.

In France, the current price of raw silk, whether made at home or imported from foreign countries, is from four to eight dollars per pound, according to the quality. Farmers need not hesitate for a moment, about the propriety of their stocking a few acres with mulberry trees, for if they have neither females nor children to pick the leaves and feed the worms, there will undoubtedly be numerous females, who will be glad to pick the leaves, and attend the worms, for a part of the product. In Connecticut the usual practice has been, for farmers who have trees, to give the girl one-half or one-third who picked the leaves, fed the worms, and reeled the silk, performing all the labor from hatching the worms to making raw silk, (that is, reeled silk,) and this too, when the worms were fed upon the white mulberry. The quantity of silk usually produced by the labor of one girl in six weeks, was about ten or twelve pounds, worth sixty or seventy dollars, which would leave the farmer, if he gave the girl one-third and boarded her, forty dollars or more; or if he gave her one-half, and she boarded herself, thirty dollars. If the leaves were to be gathered from the *Multicaulis*, instead of the white mulberry, the same amount of labor would produce double or treble the quantity of silk, and consequently would take only one-fourth, or one-sixth, to pay

the female employed to perform the labor, and of course would leave the farmer one hundred dollars. As the season for feeding silk worms only occupies a few weeks in the hottest part of summer, I have no doubt that a great many children, between the ages of eight and sixteen years, that live in cities, or large towns, would be happy to go into the country for a few weeks, to pick leaves, and feed silk worms for their board. It would afford them a very pleasing variety, and be likely to improve their health, and promote their growth. And when they returned to their homes, they would be prepared to renew their studies with a renewed vigor, that would more than compensate for the time spent in the country. Farmers who have children of their own, can make their services very valuable by employing them in picking leaves, and feeding silk worms, and it will be much more profitable than braiding straw (for bonnets,) or palm-leaf hats, and much more conducive to their health, than employment in cotton, woollen, or paper manufactories, as the largest portion of their labor would be in the open air.

As the advantages of manual labor schools are becoming more and more apparent, and their superiority over others begins to be appreciated, I will here respectfully request the proprietors of boarding schools, and the trustees of literary institutions, to consider the propriety of adding a mulberry plantation and cocoonery to their respective establishments; as I consider it would be at once a source of profit and instruction, and would tend to disseminate a practical knowledge of the business, and give it an impulse, that would be felt to the very extremities of this great nation. And I hope [the time is not far distant when such an addition, will be deemed necessary, as a certain amount of exercise, in the open air, is essentially necessary, for the health of the scholars, whether male or female. And it appears to me, that there cannot be any exercise more appropriate and useful, than picking leaves, and feeding silk worms. I will conclude these remarks, by suggesting to town officers, keepers of parish poor houses, and other establishments where poor people are maintained, that the labor of picking leaves and feeding silk worms is admir-

ably adapted as an employment, for a large portion of the people usually put under their charge, and the products of their labor, if employed to the best advantage, would nearly, if not quite, pay the expense of their support.

The Worm and the Flower.

BY J. MONTGOMERY.

You're spinning for my lady, Worm,
 Silk garments for the fair ;
 You're spinning rainbows for a form
 More beautiful than air ;
 When air is bright with sunbeams,
 And morning mists arise
 From woody vales and mountain streams,
 To blue autumnal skies.

You're training for my lady, Flower !
 You're opening for my love
 The glory of her summer bower,
 While sky-larks soar above.
 Go, twine her locks with rose-buds,
 Or breathe upon her breast ;
 While zephyrs curl the water floods,
 The rock the halcyon's nest.

But Oh ! there is another worm
 Ere long will visit her,
 And revel on her lovely form
 In the dark sepulchre :
 Yet from that sepulchre shall spring
 A flower as sweet as this :
 Hard by the nightingale shall sing,
 Soft winds its petals kiss.

Frail emblems of frail beauty, ye,
 In beauty who would trust ;
 Since all that charms the eye must be
 Consigned to worms and dust.
 Yet like the flower that decks her tomb,
 Her soul shall quit the clod,
 And shine in Amaranthine bloom
 Fast by the throne of God !

AN APPENDIX

OF EXTRACTS FROM VARIOUS SOURCES IN RELATION TO THE PROFIT OF RAISING SILK.

J. Danforth's Letter to the Committee on Silk, American Institute.

GENTLEMEN :—

The vast importance of the silk culture to our country, and the eagerness of the public to obtain information respecting it, make it the duty of every one engaged in producing a "silk crop," to furnish his quota of knowledge, that thus a mass of practical information may be collected, from which we may go forward with confidence, and gather in the rich harvest which is before us.

With these views, and in compliance with the solicitation of my fellow-citizens, I give you the result of my experience during the past summer. I would first premise, that in making a trial of the silk culture, it was my desire to adopt a mode which could be followed by our agriculturists at large, rather than to show the greatest possible quantity of silk that could be produced from a given portion of land. Such an experiment, made under peculiar advantages of soil and culture, yielding a large product, might be viewed with admiration, but the means being beyond the reach of the mass of our citizens, the same results could not be attained.

The field from which the experiment was made, was situated in East Hartford—the soil of a light sandy nature, of a quality termed, in that quarter, good corn land. It was ploughed about the middle of May, and harrowed and furrowed in the usual manner. The roots and trees (*Morus Multicaulis*) were now laid down, and covered from two to four inches, the tops having a slight upward inclination; they were placed about twelve inches apart in the row, the rows three and a half feet apart, having been previously moderately manured.

After the field was planted, a section comprising one-eighth of an acre was marked off, to be subjected to a more particular experiment. It was stocked with 780 roots and trees, all of

one year's growth, having had their tops partially or wholly killed by the severity of the past season. One-third were two feet high, one-third one foot, stripped of their limbs, and the remainder were roots without tops. By the 1st of June the new shoots began to show themselves, and by the 1st of July, they numbered 4,800, and had attained the height of twelve to eighteen inches.

A family of 4,000 worms was now started which wound up on the 23d July, having consumed 131 lbs. leaves. Three other lots, amounting in all to 28,000, were now put out at intervals of several days, in order to favor the increasing growth of the leaves. By the 10th of September, the last had finished their labors. Weight of leaves consumed in August, 701 lbs., and in Sept. 332 lbs.

Total weight of leaves gathered, 1,164 lbs.

Total number of worms fed, 32,000

Producing nine bushels cocoons.

Yielding (so far as reeled) 1 lb. of silk per bushel.

Weight of cocoons, 95 lbs.

Waste silk and floss, 1 lb.

Twenty-seven thousand of the worms were of the two crop kind, requiring 4,000 to make a pound of silk, and consuming 144 lbs. of leaves. The remaining 5,000 were of the long crop, six weeks worms, 2,500 of which produced a pound of silk, and consumed 90 lbs. leaves. It was my intention to have fed the long crop worms entirely, as they are known to be much the most productive of any other kind, but they could not be procured.

Business now calling me away, the feeding was discontinued, and the trees were immediately removed from the ground, having attained an average height of four and a half feet, well rooted, and with heavy limbs.

The produce of the one-eighth of an acre, as above, it appears is 9 bushels cocoons, or 9 lbs. silk; being at the rate of 72 lbs. per acre, from the feeding between the 1st July and the 10th September. It is easy to see, that had the 1,164 lbs. leaves been fed to worms of the six weeks kind, the yield would have been 13 lbs. of silk, or nearly—and from the rapidity with which the new leaves were developing when the trees were removed, it is presumed that had they remained during September, enough more might have been added, to have swelled the product, so as to have made the crop at the rate of 125 lbs. per acre.

During the period of feeding, the safety and even advantage to the tree of frequent defoliation was fully proved. The trees from which this experiment was made, were stripped of

their leaves four different times, yet at no time were they inferior to others that were untouched; on the contrary, it was remarked that where the leaves were removed the limbs shot forth with greater vigor—care being taken to leave the tender leaves at the ends of the branches.

The very great advantage of this species of mulberry over standard trees, was manifest; while such trees are difficult of access, and from the small size of the leaves, requiring much labor to gather any quantity, it was easy for a child to take from the *Morus Multicaulis* 15 to 20 lbs. in an hour.

The plan of retarding the hatching of the eggs by keeping them in an ice house was found perfectly successful; the worms which wound the finest cocoons were thus kept back until the 2d of August.

It may be useful to new beginners to know, that the large six weeks worm, either white or sulphur colored, is altogether preferable to the two crop; for, not only are they more productive of silk, but from their superior length of thread the reeler is able to produce silk of better quality, and with less labor.

The convenience of a shrub tree, where the farmer wishes to change his crop, may be seen from the fact, that with the use of a plough, the trees on this section of land, 4,800 in number, were turned out of the ground in 30 minutes. An hour more was sufficient to cart them from the field.

Every one who takes up the culture of silk, is surprised at the ease and certainty with which it is produced; and of this experiment it may be observed, that none of the persons who took care of the trees, gathered the leaves, or fed the worms, had ever seen a tree or silk worm before.

I am not acquainted with the comparative merits of the *Morus Multicaulis*, and other kinds of the mulberry; but large as has been the estimate of some cultivators, of the produce and value of the former, I believe its astonishing power of reproducing foliage, its tenacity of life, and the great ease with which it is multiplied, have never been overrated. A friend informs me that a field of roots, deprived of their tops last fall, remained in the ground during winter, and that from the new shoots, which started as early as any other vegetation, he was able to feed from one to two months earlier than from others planted the following May. From these collected facts, we may form an idea of the quantity of leaves, and the consequent weight of silk that may be obtained from the *Morus Multicaulis*, when it shall have attained greater age, even in this latitude.

I am not able to name the cost of raising silk; but an intelligent culturist of my acquaintance, from a proof of three

successive years, rates it at \$2 per lb. exclusive of the cost of trees and the tillage ; respecting the latter, I am of opinion the labor bestowed on a field of mulberry, need not be more than on a field of Indian corn.

It appears, therefore, that nearly all the labor of raising silk, viz: plucking the leaves, feeding the worms, and reeling it into sewings, may be performed by the females of a family, and thus the product be considered a clear gain, like that of any other collateral branch of farming. The growing of silk needs but to be looked into, to be appreciated ; and if 100 lbs. can be produced the first year of planting, worth \$5 the pound in raw silk, or \$9, when in sewings, what other crop, it may be asked, can be named coming near it for profit ?

I will only add, gentlemen, that it is cheering to see the interest the American Institute has taken in this all important subject, and to express the hope, that the coming Exhibition, from our silk growers, and the increased patronage of the Institute, may give to it a fresh interest.

Yours, respectfully,

J. DANFORTH.

HARTFORD, Sept. 19th, 1838.

To the Committee on Silk, American Institute.

GENTLEMEN :—

The accompanying sewing silk, three and a half lbs., is offered for exhibition at the coming Fair ; and you may consider me a competitor for the premium offered through the Institute in April. This silk was produced from 1-16th of an acre of land, being one half the section named in the statement annexed. It should be remarked, that the cocoons (4 1-2 bushels) from which it was produced, were sent some 40 miles to be reeled, and consequently were much injured so as to produce less silk ; and from haste in reeling (to prevent *all* the millers from eating out) is inferior in quality to what it would otherwise have been. Weight of waste silk and floss, 1 lb.

Yours, respectfully,

J. DANFORTH.

D. V. McLean's Letter to the National Silk Convention.

DECEMBER 13, 1838.

Much doubt having been entertained by our farmers and others, whether the production of silk could be made profitable in this country, the Monmouth County Silk Manufacturing

Company, of New Jersey, last spring offered a premium of eighty dollars to the person who would produce the greatest number of pounds of cocoons from the sixteenth of an acre.

In order in some measure to test the matter of profit, with reference to this premium, and anxious myself to see what could be done the first season, even by the most inexperienced. I measured and planted with the *morus multicaulis* the sixteenth of an acre.

The ground was laid off in a parallelogram form, about thirty by ninety feet. The soil was not rich; and not more than two ordinary loads of manure, worth one dollar each, was put on the lot. I planted roots the growth of the previous season, in an upright form, in rows eighteen inches apart, and the trees about ten inches apart in the rows—twenty-three hundred and twenty roots in all. The ground was by no means suitable for trees, being a cold, heavy clay. They were accordingly small, not having attained an average of more than three feet the whole season. The roots were planted the 20th of April. In order to have the full advantage of the growth of the leaves, I intended to feed but few worms at a time, and have successive crops.

On the 19th of June, when my trees were about eighteen inches high, my first eggs hatched; the next hatched June 26th, sooner than I expected or intended. Fearing I might get no more eggs to hatch, I fed about twelve thousand worms on the sixteenth. The trees being small, and the season exceedingly dry, the leaves grew very slow. About a week before the worms spun, I took from the worms I was feeding on the leaves produced on the sixteenth of an acre, about five thousand, and borrowed and weighed the leaves to carry these through. To do this, required one hundred and forty-three pounds of leaves. The worms thus fed, together with a few hundred of the two crop variety fed late in the season, produced *thirty-eight pounds and eleven ounces of cocoons*. After deducting the proper amount for leaves borrowed, which, according to Count Dondola, is twenty-one pounds of leaves for each pound of cocoons, six pounds and thirteen ounces being deducted, I had from the sixteenth of an acre *thirty-one pounds and fourteen ounces of cocoons*. About nine pounds of these cocoons were the mammoth white, the balance were the common sulphur, except about two pounds of the two-crop variety. I was entirely ignorant of the process of feeding when I commenced, and indeed of the necessary fixtures and accommodations for feeding to advantage. I fed them as much as they would eat, kept the hurdles clean, and the room well ventilated. The weather was exceedingly

warm during the whole time of feeding, but the worms were remarkably healthy, and all wound in about thirty to thirty-four days.

Now as to the matter of profit : if thirty-one pounds fourteen ounces is produced from the sixteenth of an acre, then *five hundred and ten pounds* is produced from the acre.

If the cocoons are worth forty cents per pound, which I presume is a low estimate, and if they are sold to the manufacturers, then the proceeds of an acre will be \$204. In regard to the expenses of feeding, I do not deem it necessary to enter into particulars; these, indeed, it is difficult accurately to estimate. They consist in interest on investment for trees, rent of land, and of cocoonery, and the wages of persons employed in feeding. In very many cases the whole expense to the farmer will be merely nominal; the work will be done by children, or persons who perhaps would do but little else, and the rent of cocoonery would be nothing, for a barn, a shed, or a garret may be used, where little or no expense will be incurred. But in any event, I regard it as certain that the expense could not exceed at the rate of \$100 per acre, which would leave a net profit of \$104 per acre. Now I would ask, can our farmers *desire* a better return than this? Do they realise the one-half of this, as net profit per acre, from their *very best lands*, in any other agricultural pursuits? And here let it be observed, the above is the result of *actual experiment*, and not merely *calculation*. It is a calculation founded on what I have actually done, and that others may do the same or even far more I have no manner of doubt, for there is no mystery whatever in feeding the worms; the whole art consists in keeping each day's hatching by themselves, in feeding as much as they will eat, in keeping them clean and well ventilated, and with a good crop of eggs success is absolutely certain.

But I am persuaded the net profits per acre may be safely put at *double* the above amount, viz: \$208. For, owing to the impossibility of procuring eggs, and to the fact that my worms were all fed before my trees had attained much more than half their growth, I did not feed half the worms which I had leaves to feed. In this opinion every judicious silk-grower who has seen my trees concur. *But even if only \$104*, net profit, can be obtained from the acre the *first* year, the amount in proportion which I *actually produced*, what may be reasonably expected the *second*, the *third*, the *fourth*, and the *fifth* years? So far as I am informed, it is allowed that the amount of foliage each succeeding year, while the trees are comparatively young, will be so much greater, that the

grower can feed at least one third more each year than were fed on the same trees the preceding year. The net profit then will be, after a very large allowance for expenses, *first year*, \$104; *second year*, \$138 66; *third year*, \$184 88; *fourth year*, \$246 50; and the *fifth year* \$328 56.

But another view of the subject may be taken, when the net profit per acre will be much larger than the above. Every grower ought, and undoubtedly will, ultimately reel his own cocoons, instead of taking them to the manufacturer to be reeled. My own experience in reeling, convinces me that there is really no great difficulty in reeling the cocoons. A little experience will enable any one to do it with ease and facility; and if the grower reels his own cocoons, his profits per acre will be at least one-fourth more than the above estimate or calculation. That is, the net profit per acre will be, *the first year*, \$130; *the second year*, \$173 32; *the third year* \$231 10; *the fourth year*, \$308 12; and *the fifth year*, \$410 70.

The above estimates, I know, are much *below* the estimates of many writers on this subject; but I am aware that even these will appear large to those whose minds have been but little turned to the production of silk; and the *very fact* that the profits are represented as being *so large* may make many persons incredulous. But why should it have such an effect? A new road to wealth is just opening. It is as yet, indeed, in a great measure untried, but "hope dawns auspicious, and promises that the day and its brightness shall be ours." I would not endeavor to persuade a single individual in the community to engage in this enterprise, if I did not believe he would reap a most liberal reward for his expenditure and labor. With a climate and soil as congenial to the mulberry and the silk worm as any on the globe; with an annual consumption of not far from \$25,000,000, and this constantly increasing, and with a population as enterprising and ingenious as any on earth, how can we fail of success? Less than fifty years since we were just commencing to grow and manufacture cotton. Now it has advanced from nothing to be a principal source of our national wealth, though confined to less than half the Union. And I appeal to the intelligence of every reflecting man, is it not more probable *now*, that in forty years to come silk will be a great national interest, than it was forty years since that cotton would be now such an interest?

No enterprise could ever be commenced under more favorable circumstances. The acts of Congress and of the Legislatures of many of the States show that they regard with interest and favor the introduction of this new branch of indus-

try. A few hundred dollars will furnish a sufficient stock of the *morus multicaulis* to make a beginning, and such is and will continue to be the demand for these trees, that a part may be sold the first season to defray the original cost, and if success should not equal expectation, nothing is lost. Because I wish my fellow-citizens more prosperous and happy, and because I believe the production of silk in this country is destined, at no distant day, to add more to individual and national wealth, and to the glory of the republic, than any enterprise in which, as a people, we have embarked for the last age, I commend to them this subject.

D. V. McLEAN.

FREEHOLD, N. J., December 8, 1838.

Chauncey Stone's Letter.

Burlington, Sept. 3d, 1838.

Messrs. Editors,—

My last hatching of silk worms for this season, the product from about three ounces of eggs, have now nearly finished their course of eating, and all beginning to spin their cocoons. As the present time appears to be a new era in the silk culture in this country, and the retarding the eggs from hatching to this late day in the season, being something new, and not even recorded in the histories of the oldest silk growing countries in the world, I will give a sketch of the manner I kept my eggs, and the management of the worms. During last winter my eggs were kept in a dry cellar, suspended to the timbers overhead, to secure them from the mice, and about the first of March I took them from the cellar to put in the ice house. I rolled up the cloths and papers on which the eggs were deposited, and put them into glass and stoneware jars and tied bladders over the tops. The jars I put in a wooden box, which was enclosed in another box, larger, leaving a space about three inches, which space I filled with pulverised charcoal, taking special care to put coal in the bottom between them. These boxes I placed in the ice house on the ice, and covered them over with straw. As often as once a week I took the eggs out of the jars to see how they were keeping, and of course aired them, and then placed them back as before. I regret I did not find the temperature the eggs were in, but I think it must have been about forty degrees, and perhaps a little above that. Several times during the summer I took out eggs to hatch, and found they were keeping well. The twentieth of July I took out the last of my eggs, about three ounces, and the weather being excessively warm, I first kept

them in my cellar four or five days, and then in a cool room in my house two or three days more, when I took them to the cocoonery, and on the 31st of July, and on the 1st and 2d of August, they hatched. The few that hatched on the fourth day I considered weakly, and did not save them. I took special care that each day's hatching were selected by themselves. I separated the young worms from the unhatched eggs by laying strips of leaves on them, on which they would immediately crawl to eat, when I moved them generally on newspapers, which I placed on the shelf. I fed them on the papers the first week with the leaves cut quite fine, which I sprinkled on the young worms, but they would soon get on top of them, and eat such parts as they liked. After the first week I changed them from their places by laying a net work frame gently on them, and sprinkled the leaves on the net work, when they would come up through the interstices to eat, and after being fed two or three days, there would be a kind of mat formed from the refuse part of the leaves, so the net work could be raised with the worms. The litter beneath was removed, and the frame again laid upon the shelf, and after that I continued to change them every two or three days, with the net work, until the present time. I cut the leaves during the whole time of feeding, but much the first, when the worms were small. I fed them every two hours during the day, first quite early in the morning, and the last time between sundown and dusk, and they would eat as well during the warm nights as in the day time. Silk worms eat about half an hour at a time, and then rest about as long, when they again commence eating; so, during such warm, dry weather as we have had the present summer, they should have fresh leaves often. When the weather was warmest I wet the floor of the cocoonery every day; kept the cocoonery clean from litter, and gave the worms all the fresh air I could, being careful to observe that the draught was not sufficient to blow them from the hurdles. And now I have the pleasure to say they have been, during their whole course, as active and healthful as any I ever saw. I have not seen a sickly worm, save by accident one happened to get hurt. I have fed them wholly on the leaf of the *Morus Multicaulis*, and am fully convinced we have no leaf better suited to the taste of the silk worm.

There may yet be a question whether the mulberry leaves are as nutritious for the silk worm at this time of year as earlier in the season. I think they are not.

Yours, respectfully,

CHAUNCEY STONE.

Timothy Smith's Letter to the Editor of the Yankee Farmer.

DEAR SIR:—

As I have been engaged for several years in the business of growing silk, I am of course particularly interested, and also feel interested for those who may be engaging in the same. I therefore offer for communication in your valuable paper, the following as the result of my experience:

I have fed worms to some extent for the seven past years; at the first the business was perfectly new, and therefore, I had everything to learn from experience; and I have ascertained to my own satisfaction, that being supplied with mulberry trees which will produce both early and late food, the time to commence hatching the eggs is the 1st of June. I commence, therefore, as soon as the leaf begins to unfold, which is generally the first week in June, by exposing a quantity of eggs to the air; and I continue to expose them for hatching, every ten days, until the first of August; in this way I have successive crops, which will take the feed as it grows, and also require about the same amount of labor through the season, which is far preferable to having a large crop of worms which at first will require but the help of one or two, and at the last age, require twenty or more. When the worms begin to appear, which is generally early in the morning, I place on them tender leaves, to which they will soon adhere; I then draw them off on a paper and keep each day's hatching by themselves, placing the day of the month upon the paper. For a cocoonery, almost any out-building will answer the purpose. I build my shelves in a simple manner, by making use of two inch scantling for posts; I nail on slats to receive the shelves, one foot apart, giving them four feet in width at the bottom, making each shelf two inches narrower as I ascend, that the worms falling from one shelf may lodge on the next below. We remove the worms from the litter immediately after the first, second, third and fourth moultings, and also when they are ready to wind their cocoons, we remove them to shelves prepared. After trying the various methods in use for the accommodation of the worm to wind, we experimented with straw in various ways, and as the result of our experience, found that the best method for using it, is, to cut rye straw one inch and a half longer than the distance between the shelves, tying it in bunches of some twenty in a bunch, from one to two inches from the bottom; placing them between the shelves and spreading them at the top. I have practised putting up straw in this way the two past seasons, and find the worms

will wind in them very readily, and the cocoons are gathered with the greatest ease and neatness. With regard to reeling, I consider it important that the cocoon should be reeled before it becomes necessary to stifle the chrysalis—for this reason: they will yield more silk, and it is stronger and more nice. I practiced reeling in this way the two past seasons, and therefore judge for myself.

I offer this for publication for the benefit of those who are going into the business of growing silk and who have had no experience.

Respectfully yours,

TIMOTHY SMITH.

AMHERST, (Mass.) Dec. 2d, 1838.

A proof of the short time required to realize the profit from planting Mulberry Trees and feeding Silk Worms.

A circumstance which shows the short space of time required to realize a crop of manufactured silk, from the Chinese, or *Morus Multicaulis* mulberry, came under my notice last season, viz: Messrs Cheney, of Manchester, Ct., raised silk at the rate of fifty pounds to the acre, from trees planted by layers, the same spring, say in the month of May, which produced silk at the above rate in October, and manufactured by me, made a beautiful article of soft, strong, even sewing silk, and put into the market a finished article, in the space of seven months from the time the trees were planted; thus proving that it is not necessary for the farmer to wait several years for his trees to grow, before he can realize any profits, as has been the general impression. This tree is cultivated annually, as we do a crop of corn, or by leaving the roots in the ground in the manner the sugar cane is cultivated.

New E. Farmer.

LEMUEL COBB.

From the Northampton Courier.

Silk for Domestic Purposes.

In many families there are individuals who are in feeble health, or who have had the misfortune of a dislocated or broken bone, who suffer more or less in variable weather, and by languor or pains, can anticipate the approaching storm with a degree of accuracy that cannot be mistaken. Physicians inform us, that this sensation is occasioned by the escape of that portion of electricity which is absolutely necessary for the

healthy condition of the body—and as silk is a non-conductor of electricity, medical writers recommend its use in every possible way, as an *over dress* to cotton or flannel shirts and drawers. In this way it may be made to prevent or alleviate pectoral or consumptive affections, rheumatism, inflammatory fevers, indirect debility, and that languor so oppressive to persons of feeble health. A coarse quality of silk, similar to the pongee silk, so called, will answer very well for such purposes, and being strong and stout, will do good service. Silk of such quality might be manufactured in the domestic household, and the culture of the mulberry and the manufacture of silk, may be attended to in almost any family, without interruption to other occupations, not only as a lucrative business, but also to prevent or alleviate a variety of pains which flesh is heir to. This subject is becoming so important to the community, and can be undertaken with so little expense, that it merits the attention of every family, to begin a nursery of mulberry trees without delay, and the first or second year may commence feeding the worms, and manufacturing silk, even upon our *common reels, wheels, and looms*. Because there are large establishments in contemplation and progress, for the manufacture of silk; some have thought these companies would discourage the domestic manufacture, but instead of discouragement, it ought to operate as a stimulus to family culture; because if families do not wish to manufacture their own silk, they can have a ready market for the cocoons. It is expected, and with a good degree of probability, that the time will come, when our families will not only manufacture, but that they will dress themselves with silk of their own make, with as little expense as they now clothe them in wool and flax.

Communicated by Mr. Harvey Clark, a respectable inhabitant of Mansfield, Conn.

Mr. Clark is the proprietor of two acres of land in Mansfield, of which, about half an acre is covered with mulberry trees. He has made annually from these trees, about 35 lbs. of raw silk, which for the last year or two, has been reeled in the improved method. The leaves have usually been gathered and the worms fed for the first three weeks by Mrs. Clark, and a young woman who lives in the family. After the first three weeks, Mr. Clark also devotes himself entirely to the business. The silk has been reeled exclusively by Mrs. Clark, and the young woman above alluded to, at the rate of about one pound and a half a day. During the whole of the silk season, they have also had the care of a family of eight small

children. Mr. Clark has sold his raw silk this year, at four dollars per lb., and has also received a premium of 50 cts. per lb. from the State Treasury. We have reason to believe that the same silk might have been sold at Lyons, or to silk merchants at New-York, for five dollars per lb. Mr. Clark's mulberry trees are forty or fifty years old, and of a large size. They have been manured and cultivated with great care for the last fifteen years. Mr. Clark thinks that an acre of land, covered with trees, equal to those on his land, will yield about 70 lbs. of silk a year. His silk house or cocoonery, is fifty feet long and sixteen feet wide, and one story or about eight or ten feet high, not lathed or plastered, and may have cost \$150 or \$200. He has never had occasion to warm his cocoonery, as is practiced in Italy and France; indeed, this has never been done by any of the silk growers at Mansfield. Mr. Clark informs us, that at the Silk Factory in Mansfield, reels are now propelled by water power. A very small amount of power answers the purpose. Improved reels are now made by several mechanics, who live either at Mansfield, or in the vicinity. Mr. Clark states, that his mulberry trees have been greatly improved by careful cultivation. We have shown Mr. Clark, a statement in the last number of the Cultivator, of the profits made by Mr. Carrier, of France, from an acre of mulberry trees. He thinks that the statement is probably not exaggerated, and that an acre of well cultivated mulberry trees, at Mansfield, would yield a larger amount of silk.

Interesting Fact.

A few years since, a farmer purchased a farm in the town of Mansfield, on which were standing twelve mulberry trees of full growth. Not being accustomed to the business of making silk, he supposed them to be of no more than the ordinary value of forest trees for fuel. A neighbor, however, soon called upon him, and agreed to pay him twelve dollars annually, for the privilege of picking the leaves. The farmer, to his astonishment, found that the twelve mulberry trees were as good to him as \$200, at six per cent interest.

Bark Silk.

The inquiry is often made how the silk worm can, by the same process, make and spin silk of a fabric almost too minute and delicate to be perceived by the natural eye, and a coarse hempen like thread, commonly called bark silk. The only true answer to this question is it cannot. The bark silk

is not the product of the worms but of the tree. It is the bark of the Italian mulberry which is composed of fibres like the coat of hemp, flax, &c. The discovery of this fact was the result of an accident, an account of which may be found in an old French book entitled "*Theatre d' Agriculture*," written by Oliver de Serves and published in 1600. It was previously known that the bark of the mulberry, peeled off when the tree is in sap, would make cords and ropes, like the bark of the linden or lime tree, but it was not known that the fibres were fine enough to be carded and spun into a thread suitable to be wove into a fabric.

The writer having separated some of the bark from the wood for this purpose, he laid them on the top of his house for the purpose of drying, from which they were blown off by the wind and lodged in a ditch. Some days after they were taken out, washed and wrung out, when he discovered it to be made up of fine fibres, like silk or fine flax. He then beat the barks with a club, to separate the upper part, which going off, in dust, left the stuff tractable and soft. It was afterwards carded, spun and woven into cloth. The manner of preparing it is similar to that of hemp or flax by rotting and dressing.

An Error Corrected.

I have often heard it asserted, that no other insect, except the silk worms, will eat mulberry leaves; this I know to be a mistake, for I have removed caterpillar's nests from mulberry trees and have also found span-worms upon them, and I have no doubt but that they are eaten by some other insects.

J. DENNIS, JR.

Quality of American Silk.

During a late interview with a very intelligent Riband weaver, from Coventry, England, we showed him a specimen of American raw silk, reeled by an experienced reeler, and he pronounced it, in respect to strength, altogether superior to any European or India silk he had ever woven in his native country. He remarked that he had never seen silk of equal strength of fibre, and had no doubt that he could weave from it double the quantity of ribands that he could from the silk ordinarily used by the riband manufacturers of Coventry. This speaks volumes in favor of the quality of American silk, especially such as is growed in the northern latitudes. The cocoons, from which the silk was reeled, were made on the cold mountains of Litchfield county, Conn.

White Mulberry.

Experience and observation have demonstrated that the shade of Mulberry trees is not injurious to the growth of grass, grain, or any other vegetable. This is an important discovery and argues powerfully in favor of the means of raising silk.

I would advise with humble deference, that every farmer procure mulberry seed from a nursery, transform all his fences into mulberry hedges, and plant standard mulberry trees along all those hedges, half a rod distant from each other. A farm of a hundred acres, fenced as above advised, would, in a few years, yield from the fences a crop worth several hundred dollars! These fences would be as cheap as any other a farmer could erect; would require no repairs, no renewal, so that all the produce arising from the leaves would be a clear profit. One hundred pounds of leaves would produce, in this country, one pound of reeled silk, if judiciously fed, worth from four to seven dollars, the price being governed by the good or bad reeling. A single tree, will produce from thirty to sixty pounds of leaves, depending on the growth of the tree, &c.

From the Farmer and News-Letter.

To Farmers.

Begin with the year, gentlemen, and take a paper devoted to agricultural improvement; let those be patronized who labor to promote your interest. It is too often the case that those journals which are of a peaceful nature, and well calculated to benefit the farmer and his family, by making their business more profitable and pleasant, are neglected by the very persons who should give them a cordial support, while other works are read with avidity which stir up strife, and keep the community and families in a turmoil. Your calling is peaceful, and you want peace in all your borders; you want useful journals which will enlighten you in your pursuits, and afford valuable instruction to your sons and daughters, that they may be contented and happy while with you, and their minds stored with that knowledge which shall render them useful members of society and a blessing to their parents.

Let farmers awake to their own interests and to the welfare of their families, and not be afraid to pay a few dollars a year for papers that will repay them tenfold, and beget in the minds of their children an interest in, and love for the most honorable, pleasant, and sure of all pursuits that ever engaged the attention of man.

Do not, like many fathers, fret before your children: always harping on your hard lot because you are farmers, and wish-

ing you had been a mechanic, a minister, a lawyer, a doctor, or a merchant. All these are well in their place, but they have troubles that ye know not of. I say do not by such an imprudent course induce your sons and daughters to rush to the cities of noise and bustle, to turn merchants and milliners. If you do, remember, in case they become miserable, degraded beings, as thousands have for want of experience when they exchange the country for the town, that your own repining has been a great cause of their ruin. Uneasiness and fretful complainings of this kind have been the means of ruining both the souls and bodies of some of the most lovely youth in our country.

Your daughters should be taught the pleasures of rural life, that show and fashion is not happiness, but the reverse—that there is no place of more happiness than the fireside of the farmer, that no employment is more pleasant, useful, or honorable than domestic industry. Here they can display their talents, ingenuity, and taste with pleasure and profit. Let them be encouraged in the cultivation of plants and flowers; this will be an innocent amusement that will tend to improve them in industry, economy, neatness, love of order and good taste. If they are enterprising and anxious to earn money, let them raise silk. In some parts of New England the females of a single family raise several hundred dollars worth annually, and it requires but a small part of the year.

Begin then with the year, and take a paper that is devoted to the science and practice of agriculture; take an increased interest in your business, and show your sons that there is no business more honorable, none more sure to afford a good living, and none more conducive to health, happiness, and independence. Show them that the business of farming is becoming more and more profitable, pleasant and easy, from the great improvements that are making in labor-saving machines, improved methods of culture, and new and valuable productions. If they have superior talents, here is a chance for exercising them to advantage.

I have much to say to you, and thought best to begin with the year, but I will close this number by telling you what a farmer said to me. "Sir, I was very unwilling to pay the usual price of a paper on farming, in advance, thinking it would be of little or no use; but the year is ended, and each number has been worth to me one dollar, in my farming affairs, besides that, my wife and children have received much useful information, and I would not stop it on any account."

A FARMER'S SON.

January 1, 1838.

From the Ladies Magazine.

Remarks on the Culture of Silk.

At a time when so many are complaining of their disappointments and troubles; when the depression in commerce, and total failure of domestic manufacturers, are felt so severely by all classes of community, duty, no less than inclination, should prompt every good citizen to point out such means of relieving existing inconveniences, as may offer themselves to his thoughts. Actuated by a desire to awaken an interest for a branch of industry, by which thousands around us might acquire, to say the least, a comfortable subsistence, we would call the attention of the readers of the Ladies' Magazine to a few observations on the culture of silk.

Our remarks are addressed particularly to the Ladies, not only because so much depends upon their influence in advancing an object of domestic employment, even if its usefulness be universally acknowledged, but because, by an hereditary sanction, they should be the promoters of this desirable object.

The best arguments which can be offered of the estimation with which the manufacture of silk was regarded centuries since, are the efforts that were made by several nations to render themselves acquainted with its culture, and the enormous sums expended for it when practicable to be procured; and also, the vigilance with which its cultivators, for so long a time, concealed the nature even of the material.

The first knowledge we have of the cultivation of the silk worm, and the manufacture of silk, was among the inhabitants of Serica, the northern part of China, from whence it derived its name.

As early as 2700 years before the Christian era, an empress of China, desirous of rendering silk worms more extensively useful than they had been, collected them from mulberry trees, and having them conveyed to her dwelling, not only with much assiduity, furnished them with their appropriate food, and regulated the temperature in which they were placed, but also directed her household in what manner to manufacture the material from the cocoon. This employment, although at first confined to ladies of the highest rank, gradually became general among females; and after a number of years all classes were clothed in silk. As the manufacture increased, it became an article of exportation to the neighboring countries.

And so great was the demand for this substance, that the merchants of Serica, instead of travelling into Persia, merely to traffic, journeyed even to Syria and Egypt; and although two-thirds of a year were often occupied in these expeditions, they found themselves amply repaid.

Persia, by prohibiting foreigners from passing to China, through her territories, was enabled for centuries to monopolize a great part of the silk trade. And it was not until this kingdom was overrun by the armies of Alexander, that the product

of the silk worm was carried as far west as Greece. From this last country, silk was sent to Rome; here it was worn for a long time by the most wealthy ladies only, but it was, however, combined with other materials. A Roman Emperor, in the year 218, is said to have been the first who wore a garment entirely of silk—and fifty years after, this article was of the same value as gold.

Although repeated attempts were made by succeeding emperors to form a more direct intercourse with China, than through Persia, and the different nations of Eastern Africa, were urged to distract the trade from Persia, by bringing silk themselves from China, and selling it to the Romans, all their endeavors to satisfy the demand for silk were unavailing.

At length, two monks, who had been travelling in China, made known to Justinian, at Constantinople, that this precious product was the secretion of a caterpillar—together with the means of rearing the worm, and manufacturing the silk. Persuaded by the offers of an immense reward, they returned to China, and by concealing the eggs of the worm in their hollow staves, returned in safety with them to Justinian. Thus, in the year 555, Europe became possessed of the means of raising silk.

It seems almost incredible, that the secret should have been so long a time kept inviolable by one people. This we conclude to have been the case; for although, by the conquest of Persia, silk was obtained, we do not learn that the *worm* was found. Had not the penalty of death been attached to its disclosure, a knowledge of it would undoubtedly have sooner been ascertained.

As in China, so also in Greece, ladies of the greatest distinction attended to the rearing of silk worms, at their introduction there. For upwards of four centuries, the cultivation of silk was confined to the countries of Greece; Sicily and Naples were ignorant of the art, until the conquest of Greece by Roger 1st; they also concealing their knowledge for a considerable length of time; its introduction into the rest of Italy, was extremely slow.

Although, for a great length of time, silk in its raw state had been imported into England, and even so early as 1661, upwards of 40,000 individuals were engaged in its manufacture in London—and many years since, English silk was considered in Italy, more valuable than the Italian; nothing of importance was done towards the introduction of the worm there, until about ten years since.

The cultivation of the silk worm, is a great source of revenue to France: from it 40,000,000 florins are calculated annually to be received.

In Germany, several previous attempts had failed to render the cultivation of the silk worm important, till during the past few years, great efforts have been made there, originating with the Agricultural Society of Bavaria. Prussia and Sweden, also, have not been idle.

In this country, the raising of the silk worm, occupied the attention of the first settlers of Virginia—rewards were offered to the successful cultivators, and fines demanded of all planters who should not raise a certain number of mulberry trees upon a given quantity of land. Thus was this rendered a source of considerable profit: and in 1664, we read of an individual having 70,000 mulberry trees growing upon his lands.

In the year 1735, the first silk was raised in Georgia: this was manufactured and sent to England as a present to the Queen.

The culture of silk, was for a long time attended to by the most distinguished ladies of South Carolina. Ramsey, in his history of that State, makes mention of a quantity of silk having been taken to England, by Mrs. Pinckney, manufactured by herself, of which dresses were made for the Princess Dowager of Wales, and Lord Chesterfield.

As early as the year 1771, Pennsylvania and New-Jersey, commenced the culture of silk: and although various causes for a time produced a suppression of this industry, a re-action has commenced and much will undoubtedly be done there.

The rearing of silk worms, and the manufacture of silk, has in a greater or less degree, claimed the attention of economists in New-Hampshire, Vermont, Massachusetts, and within a short time, in Maine.

But no one of the New-England States has been so successful in this employment, as Connecticut. In this last State, attention was first directed to the introduction of the silk worm in 1760. The town of Mansfield commenced the experiment; and although the Revolution suspended it for a time, two hundred pounds weight of raw silk were made there, 1769. But instead of tracing the progress of this industry minutely, as was our intention when this article was commenced, its importance will be shown with equal force by glancing at results in different periods. Thus, in 1827, Mansfield produced 2,430 pounds—and the County of Windham alone, in 1826, manufactured 54,000 dollars worth of silk—although the proceeds of three counties from this branch, in 1810, amounted to less than 29,000 dollars.

*Letter from Europe, by Gen. James Tallmadge,
President of the American Institute.*

NAPLES, March 5th, 1836.

Since I arrived in this land of fame and fable, I have not been unmindful of the culture of silk, so justly a subject of great and growing interest to our country. I have visited several manufactories of silk. It is not the season for seeing the silk worm, but most of its progress in other respects I have been able to see. I have made many inquiries in hopes of obtaining useful information. Finizio is an extensive manufacturer of sewing silk; he makes about 3000 lbs. a week, which is mostly sent to the New-York market. He is an intelligent man and I found him willing

to answer my inquiries; as also were several other establishments, and which mostly confirmed his statement. The sewing silks of Naples are mostly made from the silk grown in Calabria, where the worm is fed principally upon the *black mulberry*, and which makes the strongest and best for sewing silk. Finizio stated that the worm fed on the black mulberry made the strongest thread; that on the white mulberry, finer and better for fabrics; that on the Chinese mulberry still finer and more delicate. When asked if the cocoon from the Chinese mulberry required more skilful and delicate work to wind and work it, he said it did, and immediately produced two skeins, one of which he said was from the black mulberry, (from a bush, perhaps, eight or ten feet in circumference,) the other from a bush about four feet. The lesser bush, he said, was less liable to break the thread in winding from the cocoon, and was used in finer silks for fabrics. The black mulberry produced a stronger thread, and would bear the larger reel, and was principally used in that business. The silk here is mostly made in the country by families in detail, and much of it reeled there, and in this condition it is brought to market. For sewing silk it is doubled as often as required, and twisted as much. This process is wholly in a *dark room*. The silk is worked wet, and for this purpose, to preserve a uniformity, the atmosphere is kept damp, the day-light excluded, and the work carried on with small hand lamps. The machine was turned by men harnessed like mules. I have since been out about twenty miles to the silk factory of the king, which is worked by water power, and by which the cocoons are also reeled. I stated to Finizio, as well as at the king's factory, that the Italian sewing silk was sold in the American markets by its weight, while the American sewing silk was sold by the skein; and that one pound of the Italian would have perhaps two hundred and fifty skeins, while one of the American silk would have about three hundred and fifty skeins. The cause of this difference of weight, or why the American sewing silk has a tendency to curl or knot, they could not explain without a sample, but said the weight of sewing silk could be diminished or very considerably augmented in the *dyeing*, and that good dyeing required the silk to be well *boiled in soap*, after which, it was put into an acid, and was there prepared for the process of the dye, according to the color, as desired. The gloss, or dressing, seems to be produced by beating and twisting on a post, which, with the manual labor put upon its finish, it is supposed prevents its tendency to knot.

I asked if the color of the cocoon, yellow or white, gave any difference of value, or indicated a sickly worm, and the answer was, that the color was casual, and the value the same; that a selection from white or yellow cocoons from which to get eggs, would probably produce a like color; and Mr. Finizio said he had some customers who had so selected and brought him cocoons entirely *white*; and that for white ribbons or fabrics, they commanded a greater price of from three to five per cent, though otherwise of equal value.

I have made many other inquiries and observations on this subject, but which, in the limits of a letter, cannot be detailed. The eggs are here in market during most of the year, and by being kept in a grotto, or cold damp place, the worm can be produced as required. The sirocco, or hot south wind, is here the greatest enemy of the silk worm, and sometimes suddenly destroys so many of the worms, as to require the re-production of another class from eggs in reserve. They should be sheltered from this wind, and ventilation should be given them from above or by back windows. I think we have sometimes a little south, or southwest wind, which should be guarded against, and which our gardeners call a red wind, from a rust produced by it on peach and apricot trees, which curls up and burns the young leaves, and often kills the trees, and is said to affect the mulberry trees in like manner.

The black mulberry tree is a native of our country, and is common in Dutchess county, especially in Fishkill. It is, on my farm a common tree. It is as valuable for posts and timber as red cedar. If the suggestions of Mr Finizio, and others as to the black mulberry, are correct, as being better for sewing silk and more easily reeled, is not the matter worthy of attention? and especially in the first effort, and until skill and experience is obtained? The black mulberry can be immediately used, while a few years will be required to rear the Chinese, and obtain the silk for its more delicate work.

As a new staple for the country, and a new article of production in common families, the culture of silk will be an invaluable acquisition. I have made every observation in my power, and I am fully convinced that the culture of silk will be found suitable to our climate, and well adapted to our country and people. Calabria, though south of Naples, is mountainous, and a much colder climate than ours. The Milan and Piedmontese silk, is the best; and is much sought after in the London market. Those districts are in the north of Italy, and near the Alps. I think the production of the worm should be delayed until after the usual cold storm to be expected from the 15th to the 25th of May. Our month of June would be the most desirable as a first establishment for them. If families can be induced to the growing of the cocoon, the women and children will soon produce as much from the mulberry trees about the house along the fences, as the father can make on the clear profit of his farm. Thermometers or fires are not much used in Italy, the season giving the temperature required. The business must be simplified, and freed from too much instruction, to secure its success with us. The difficulty to extract reasons or information from the common people on the continent, is so evident, and they so essentially differ from our American people in their aptitude to give reasons and explanations, that I say—do not seek or receive too much European instruction, but rely on the producible common sense of our people; this fund will not fail or be insufficient, and, with a little experience, I am sure of success

in the culture of silk in our country. Induce to the growing of the cocoons and the object will be accomplished. It is a very simple business. I shall continue my observations on this important and interesting subject, to my tour through France; but if our American merchants and dealers in silks from Italy and France, could be induced to introduce the culture of silk, and obtain from time to time information from their correspondents, they would be a host of strength in the business. I have found the operatives here rather a prejudiced and uncertain source for information. They work, but cannot tell the why or wherefore.

An Act to Encourage the culture of Silk in the State of Maine, passed 1836.

SECT. 1. Be it enacted by the Senate and House of Representatives in Legislature assembled, That for every pound of cocoons which shall be raised within this State, the person who shall raise or cause to be raised said cocoons, shall receive a bounty of five cents from the Treasurer of the town or plantation, wherein said cocoons shall be raised; and for every pound of silk which shall be reeled from cocoons raised in this State, the person who shall reel or cause the same to be reeled, shall receive from the Treasurer of the town or plantation in which the same shall be reeled, fifty cents.

SECT. 2. Be it further enacted, That before any person shall be entitled to receive the bounties herein provided, he, she or they, shall prove to the satisfaction of the said Treasurer of the town or plantation in which such cocoons shall be raised, or silk reeled, that the same was raised or reeled by him, her or them, as the case may be, and the person so presenting the same to the said Treasurer for the purpose of receiving said bounty, shall make oath or affirmation, that no bounty had been received by any person for the cocoons or silk so presented for a bounty.

SECT. 3. Be it further enacted, That the Treasurer of the several towns and plantations may keep an account of the money by them paid out by virtue of this Act, and present the same, verified by their oath or affirmation, to the Legislature for allowance, and the Legislature after being satisfied of the correctness of such account, shall allow the same, and authorize the payment thereof from the Treasury of the State.

An Act for the encouragement of the culture of Silk in the State of Massachusetts, passed 1836.

Be it enacted, &c. as follows:—SECT. 1. There shall be allowed and paid out of the Treasury of the Commonwealth

for every ten pounds weight of cocoons of silk, the produce of silk worms raised within this Commonwealth, the sum of one dollar, and in the same proportion for any larger quantity of cocoons, to be paid to the owner of such worms, or his legal representatives.

SECT. 2. There shall be allowed and paid out of the Treasury of the Commonwealth, to every person who shall reel or cause to be reeled, and to every person who shall throw or cause to be thrown in this Commonwealth from cocoons, produced from silk worms raised in this Commonwealth, a merchantable silk, capable of being manufactured into various silk fabrics, or to the legal representatives of such person, one dollar for every pound of silk, reeled without being thrown.

SECT. 3. When satisfactory evidence by the oath of the party or otherwise, shall be exhibited to the Selectmen of any town in this Commonwealth, that any person being an inhabitant of such town, is entitled to claim the bounty or bounties provided for in the first and second sections of this act, they shall give a certificate thereof in writing under their hands, stating the quantity of cocoons produced, or of silk reeled or thrown, conformably to the provisions of said sections, and that such claimant is entitled to the bounty or bounties therein allowed, and when such certificates have been filed in the office of the Secretary of the Commonwealth, the Governor, with the advice of the Council, is hereby authorized to draw his warrant on the Treasurer therefor.

SECT. 4. If any person shall claim a bounty more than once for the same cocoons, or silk so reeled or thrown, or obtain any bounty under this act through fraud or deception, such person shall forfeit to the use of the Commonwealth, a sum not more than one hundred dollars, in addition to the amount of any bounty he may have received, to be recovered by indictment in any court proper to try the same.

SECT. 5. This act shall take effect in thirty days from the time of passing the same, and continue in force during the term of seven years from the time of its going into operation, and an act entitled "An Act to encourage the reeling and throwing of Silk," passed the seventh day of April, in the year one thousand eight hundred and thirty-five, be and the same hereby is repealed, but nothing herein contained shall affect the right of any person entitled to any premium under the said act.

SECT. 6. The provisions of this act shall not apply to bodies politic and corporate.

An Act to encourage the culture of Silk in the State of New-Jersey, passed 1836.

SECT. 1. Be it enacted by the Council and General Assembly of this State, and it is hereby enacted by the authority of the same, That for every ten pounds, or larger quantity, of cocoons of silk, the produce of worms raised in this State, during the term of five years from the passage of this act, there shall be paid out of the Treasury of the State, the sum of fifteen cents per pound.

SECT. 2. And be it enacted, That when satisfactory evidence, by the oath of the party or otherwise, shall be exhibited to the township committee of any township in this State, that any person or persons, being inhabitants of such township, are entitled to claim the premium provided for in the first section of this act, they shall give him, her, or them, a certificate thereof in writing, under their hands, stating the number of pounds of cocoons produced by such person or persons, and that he, or she, or they are entitled to receive the premium therein allowed; and when such certificate shall have been filed in the office of the Secretary of State, it is hereby made the duty of the Governor to draw his warrant on the Treasurer in favor of such claimant or claimants, or their legal representatives, for the amount of the premium due, according to the provisions of this act.

SECT. 3 And be it enacted, That if any person shall claim a premium more than once upon the same cocoons, or shall obtain any premium under this act by fraud or deception, such persons shall forfeit to the use of the State, the sum of one hundred dollars, to be sued for and recovered by action of debt, in the name of the State, in any court of competent jurisdiction.

SECT. 4. And be it enacted, That the provisions of this act shall not apply to bodies politic or corporate.

An Act to encourage the growth and manufacture of Silk in the State of Connecticut, passed 1832.

SECT. 1. Be it enacted, by the Senate and House of Representatives, in General Assembly convened, That whoever shall transplant one hundred white mulberry trees or the Chinese mulberry, or *morus multicaulis*, of three or more years' growth, on his, her, or their land, within this State, adapted to the growth and cultivation of the same, at such distances from each other as will best favor their full growth, and the collection of their leaves, shall receive at the end of two years

next after said trees shall have been transplanted as aforesaid, one dollar, and in the same proportion for a greater number transplanted as aforesaid, upon proof and certificate thereof, and that such trees were, at the end of said two years after transplanting as aforesaid, in a healthy and growing condition.

SECT. 2. That whoever shall reel, or cause to be reeled, in this State, in the present improved method of reeling silk, from the cocoons, merchantable silk, capable of being manufactured into the various silk fabrics, shall have and receive, upon proof and certificate, fifty cents for every pound of silk so reeled as aforesaid.

Act of Vermont, passed 1835.

It is hereby enacted, &c., That the Treasurer of this State be, as he hereby is, authorized and directed to pay out of the Treasury of the State, the sum of ten cents for each pound of cocoons hereafter raised or grown within this State, as a bonus or premium to the person or persons raising the same.

SECT. 2. That before any person shall be entitled to receive the bounty as provided in the foregoing section, he, she, or they, shall prove to the satisfaction of the town clerk of the town in which such person resides, that the same was raised by him, she or them, within such town, and the same shall be exhibited and weighed in the presence of such town clerk, who is hereby authorized and empowered to examine such person or persons on oath, in relation to the same, and if such town clerk shall be fully satisfied that the same applicant or applicants, did raise and produce the cocoons so offered within the said town, such town clerk shall thereupon give to such person or persons a certificate of the following tenor :

STATE OF VERMONT.

(Town)

(Date)

COUNTY, ss.

Then } personally appeared before me and
exhibited } pounds of cocoons, and made satisfactory proof
before me that the same were raised by the said
within the town of } in said county, the present
(or past) year, and that the same or any part thereof have
never before been presented or offered for the purpose of ob-
taining the premium thereon as allowed by law.

Town Clerk.

Which certificate the said Treasurer is hereby authorized to receive and account for as herein before directed.

An act to promote the culture of Silk in the State of Georgia, passed 1838.

Whereas it is desirable that the culture of silk should be encouraged within the limits of this State.

Be it therefore enacted by the Senate and House of Representatives of the State of Georgia, in General Assembly met, and it is hereby enacted by the authority of the same. That from and after the passage of this act, whenever any person or persons, either individually or collectively, shall raise any silk within the limits of this State, he, she, or they, shall be entitled to draw from the State Treasury, a premium of fifty cents, for each and every pound of cocoons, so by him, her, or them raised, and ten cents per pound on each pound of good silk, by him, her, or them, reeled from cocoons, so raised, and the person, or persons, so claiming the premium aforesaid, shall first exhibit the cocoons reeled, and the silk reeled as aforesaid, to one of the Justices of the Peace, within the County where the same shall have been raised, and the said Justice shall thereupon examine the person or persons claiming the premium as aforesaid, upon his, her, or their oath, or legal affirmation, and shall require the party so claiming the premiums, to swear or affirm that the cocoons were raised in the State of Georgia, after the passage of this act, that the premium has not before been claimed by, or paid to any other person for said cocoons or silk; and in relation to all other facts and circumstances, as may, in the opinion of said Justice, be connected with the raising or reeling of the same; and upon such evidence proving satisfactory to his mind, he shall thereupon make out and sign a certificate with his seal thereto affixed, which certificate shall be sufficient authority to his Excellency the Governor, and he is hereby required to receive in his department the same, to draw his warrant upon the State Treasury, in favor of the party to whom said certificate is granted, for the amount of said premium, as per said certificate, to be paid out of any money not otherwise appropriated. This act shall be and continue in full force and effect, for and during the term of ten years, from and after its first passage. All laws and parts of laws repugnant to this act, be, and the same is hereby repealed.

Pennsylvania.

On the 2d of April last, a law was passed by the Legislature for the encouragement of the culture and manufacture of silk, which provided that a premium should be paid by the State of 20 cents for every pound of cocoons raised, and 50 cents for every pound of silk reeled.

Delaware.

An act has passed the Legislature of Delaware, allowing a premium of fifteen cents per pound, for cocoons raised in the State, and fifty cents per pound for raw silk reeled from such cocoons. The law is to continue for four years, and incorporated silk companies are to be excluded from its benefits.

From the Ladies' Magazine.

The Silk Worm.

There is no form upon our earth,
That bears the mighty Maker's seal,
But has some charm—to draw this forth,
We need but hearts to feel.

I saw a fair young girl—her face
Was sweet as dream of cherished friend—
Just at the age when childhood's grace
And maiden softness blend.

A silk worm in her hand she laid,
Nor fear, nor yet disgust was stirred;
But gaily with her charge she played,
As 't were a nestling bird.

She raised it to her dimpled cheek,
And let it rest and revel there—
O, why for outward beauty seek!
Love makes its favorite fair.

That worm—I should have shrunk, in truth,
To feel the reptile o'er me move,
But loved by innocence and youth,
I deemed it worthy love.

Would we, I thought, the soul imbue,
In early life, with sympathies
For every harmless thing, and view
Such creatures formed to please:

And when with usefulness combined,
Give them our love and gentle care—
O, we might have a world as kind,
As God has made it fair!

*Exhibit of the value of Silks, Imported and Exported,
from 1821 to 1837 inclusive.*

Year.	Imported.	Exported.	Year.	Imported.	Exported.
1821	\$4,486,924	\$1,057,243	1830	\$5,932,243	\$1,061,054
1822	6,840,928	1,016,262	1831	11,117,946	1,186,129
1823	6,718,444	1,512,449	1832	9,248,907	1,337,073
1824	7,204,588	1,816,325	1833	9,493,366	1,332,872
1825	10,299,743	2,590,381	1834	10,997,964	1,036,057
1826	8,327,909	3,357,015	1835	16,677,547	758,900
1827	6,712,015	1,871,276	1836	22,980,212	762,730
1828	7,686,640	1,270,461	1837	14,352,823	1,207,802
1829	7,192,698	956,925			

T. L. SMITH, Register.

TREASURY DEPARTMENT,
REGISTER'S OFFICE, Aug. 31, 1838.

Mulberry Trees and Silk Worms' Eggs.

The subscriber, having cultivated mulberry trees for a number of years past, and having procured the best varieties for the production of silk, is now prepared to contract to deliver Multicaulis, and other kinds of mulberry trees, in the autumn of 1839, or at any period after that time that the purchaser may designate. The trees will be equal to any in the market, and the terms of payment made easy upon good security.

I have also fed silk worms for a number of years, and procured the best kinds,—I should like to contract to deliver eggs of the best varieties in the fall of 1839, or at any period after that time. The eggs will be forwarded to purchasers and the terms of payment made easy. Please to direct orders, post paid, to

JONATHAN DENNIS, JR.,
PORTSMOUTH, RHODE ISLAND.

TO MANUFACTURERS AND WEAVERS.

PATENT REACTING, SELF-ADJUSTING TEMPLES.

The subscriber having obtained Letters Patent for the Reacting Self-adjusting Temple, is now prepared to receive orders from manufacturers and others for the same; and is also ready to sell State, County, and Town rights. These Temples are acknowledged by the best manufacturers to be superior to any that have heretofore been offered to the public. They are so constructed, that if the shuttle stops between the temple and the reed, the temple will be pressed back by the shuttle, without injury to the temple, shuttle, or reed. This is one of the many advantages they possess over any other temples heretofore used. Those wishing temples, or rights, will address, post paid,

JONATHAN DENNIS, JR.,
PORTSMOUTH, RHODE ISLAND.

LIBRARY OF CONGRESS

0 002 842 940 A