

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Textile Society of America Symposium
Proceedings

Textile Society of America

2002

On Women's Work In Silk Reeling: Gender, Labor, And Technology In The Historical Silk Industries Of Connecticut And South China

Janice E. Stockard
Stanford University

Follow this and additional works at: <https://digitalcommons.unl.edu/tsaconf>



Part of the [Art and Design Commons](#)

Stockard, Janice E., "On Women's Work In Silk Reeling: Gender, Labor, And Technology In The Historical Silk Industries Of Connecticut And South China" (2002). *Textile Society of America Symposium Proceedings*. 549.

<https://digitalcommons.unl.edu/tsaconf/549>

This Article is brought to you for free and open access by the Textile Society of America at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Textile Society of America Symposium Proceedings by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

**ON WOMEN'S WORK IN SILK REELING:
GENDER, LABOR, AND TECHNOLOGY IN THE HISTORICAL
SILK INDUSTRIES OF CONNECTICUT AND SOUTH CHINA**

Dr. Janice E. Stockard, Copyright © 2003

Introduction. This paper is part of a larger project that focuses on the historical sericultural industry of Connecticut, based in the town of Mansfield during the eighteenth and nineteenth centuries.¹ In this paper, I focus on one specific role in the production of raw silk: silk reeling. In the heyday of its sericultural industry, Mansfield was situated in Windham County, Connecticut. The particular perspective that I bring to this study of silk reeling is one shaped by my experience as an anthropologist who has conducted research on another sericultural area: Shunde County near Guangzhou (Canton) in South China. In both Windham and Shunde counties, sericulture was practiced more intensively than elsewhere in the United States and China, respectively.

This fact in itself seems to invite cross-cultural comparative analysis. In the discussion that follows, I use the South China case as a lens through which to examine the development of sericulture and the practice of silk reeling in Mansfield. Of particular interest to me is the issue of the cross-cultural transmission of a skill: Is it possible to learn the highly skilled role of silk reeling from a printed manual? In Mansfield, and in New England more generally, instructional manuals, some with illustrations, and all translations from the original languages, were the means to learn an industry and a skill. I return to this interesting issue later in the paper.

Mansfield Sericulture. Mansfield, Connecticut, occupies an important position in the history of silk production in the United States. It figures prominently both in the practice of "sericulture" (or raw silk culture) in this country, as well as in the development of the technology of industrialized silk thread and textile production. Mansfield was an early site of experimentation in sericulture, which was established in the 1760's. Local families cultivated mulberry trees for their leaves, which they fed to the silkworms that they raised at home in attics and sheds. Each family nurtured hundreds of silkworms at once across the several weeks of their lifecycle, from newly hatched eggs, through several moultings, to mature silkworms, which at last spun their cocoons, the goal of the family enterprise.

Cocoons were unwound or "reeled" by hand, by women in the family, to produce filaments of raw silk, the basic component of silk thread. Filaments from several cocoons were wound off together at hearthside onto the common reel. Later, the reeled silk underwent further processing by twisting it into thread, which was wound onto a "wool wheel" and measured off into skeins of standard length as "sewing silk." This was the most common product of the Mansfield sericultural industry. Some of it was refined still further, twisted into a denser product called "silk twist."

Although not the first place in this country to practice sericulture, Mansfield in its sericultural heyday in the 1820's and 1830's could claim to be first in the nation in raw silk production. It was the place where sericulture was practiced more *intensively* than anywhere else. In 1789, thirty-two Mansfield men were granted a charter to incorporate

¹ Janice Stockard, "The Silk Road to Connecticut: Mansfield's Silk Industry, 1760-1860," unpublished manuscript.

as the Company of Connecticut Silk Manufacturers, becoming the first corporation in the country established for the purpose of manufacturing. Two hundred pounds of raw silk were produced that same year. Although the company did not prove to be an especially successful economic venture, it is symbolic of the early effort by Mansfield residents to pursue sericulture in an organized and sustained manner. By 1793, Mansfield could boast that it produced 265 pounds of raw silk. The town persevered in its sericultural experiment, and Mansfield in 1825, by then a town of almost 3,000 residents, could claim that three-quarters of its families were engaged in sericulture. According to a household survey taken in 1827, 260 Mansfield families produced a total of 2,629 pounds of raw silk for that year.² This meant that on average, each family produced ten pounds of raw silk, although one family produced 75 pounds. Except for its intensive engagement in sericulture, Mansfield was in every other respect very much like other farming communities in New England of that era.

Mansfield's production figures for raw silk in the first two decades of the nineteenth century marked its practice of sericulture as successful among the many regional experiments in sericulture underway at that time in the United States. In an 1810 survey of state manufacturing, Windham County (including Mansfield) was listed as producing \$27,375 dollars worth of sewing silk for that year.³ In the census of 1820, the value of Mansfield's sewing silk alone (apart from the other towns in Windham) was valued at \$20,000. This achievement established Mansfield's reputation as a model for the successful practice of sericulture, a model to be emulated elsewhere. Its success in sericulture seemed to fulfill the vision of eighteenth century silk enthusiasts, from Connecticut and beyond, who held that sericulture was an enterprise that was indeed adaptable to New England farms, practical for even small landholders, and one that promised prosperity to all who engaged in it.

It should be noted, however, that establishing a dollar value on the silk Mansfield produced was problematic, for several reasons. As mentioned earlier, the primary product was sewing silk, which circulated as a medium of exchange, bartered and traded for goods and services. Sewing silk acquired in this way could be used again in barter, or sold, or peddled by itinerant traders to distant markets and buyers. Records of these transactions fill the pages of account books kept by local shopkeepers. In addition, however, the process of reeling silk itself created much waste silk, which was ingeniously turned into useful products by women in the family: They boiled, cut, and carded it, then spun it alone or together with other fibers. For example, straw was spun with silk to fashion popular Tuscany-style bonnets. Waste silk was also spun and woven into blankets and carpets, reported to be very strong. And, last but not least, silk was spun alone or with fibers of various origins to produce yardage suitable for domestic clothing. In the 1810 survey cited earlier, Windham County is listed as producing almost 300,000 yards of "blended and unnamed cloths and stuffs," the highest figure for that category in the state of Connecticut.⁴ In short, many products made of silk were not sold as "silk" but consumed by family members.

² Edmund G. Howe to Eleazer Bennet, 21 Dec. 1827. Mansfield Historical Society.

³ Tench Coxe, *A Statement of the Arts and Manufactures of the United States of America for the Year 1810* (Philadelphia, 1814), 28. Connecticut Historical Society.

⁴ *Ibid.*, 28.

In part as a consequence of Mansfield's growing reputation in sericulture, the United States Congress in 1826 initiated an inquiry into the practice of sericulture in each state. The intent was to assess its prospects as a national enterprise, and to weigh the issue of support and protection for the young industry. In 1828, Congress published a report, *The Growth and Manufacture of Silk*, written by the Secretary of the Treasury, Richard Rush, and based on the data compiled during the inquiry.⁵ In this report, Rush both recommended sericulture as an industry with a future and singled out Mansfield's achievements for praise. Delegations and visitors from other regions, states, and nations visited Mansfield, and its reputation grew.

In light of these confident forecasts for the expansion and success of this industry – and after almost seventy years of rising production in Mansfield itself – it comes as a surprise to learn how suddenly sericulture declined, abandoned by families in Mansfield and in towns across New England by the middle of the nineteenth century. The end of sericulture as a major family enterprise did not come as a consequence of any fall off in the domestic production of cocoons or raw silk. The dominant explanation for the end of the age of sericulture places the blame on a variety of mulberry tree, recently introduced from Asia, referred to as “*morus multicaulis*” or the “Chinese mulberry.” I will return to this tree at later point in this paper. First, however, I will briefly introduce silk reeling as it is practiced in South China, a case I use to examine the reeling process as it developed in Mansfield.

Silk Reeling in South China. To outside observers, expert reeling can appear to be more art than skill. Accomplished reelers seem to effortlessly manipulate the fine silk filaments, resembling spiders' webs, to produce raw silk thread. One of the questions guiding my research on Mansfield sericulture has been: Can the skill of silk reeling be transmitted well by way of an instructional manual alone? This issue arises out of the several years of field research that I conducted on sericulture in South China. In brief, silk reeling was considered to be a critical factor in determining the success or failure of the entire family sericultural enterprise. This was due in part to the high degree of skill required to effectively master the twisting of filaments from several cocoons. The twisting was necessary to attach the filaments of new cocoons as the older ones ran out, thus creating a continuous, even thread. Twisting also creates a better cohesion among filaments, thus strengthening the thread. However, another factor affecting the inherent value of the task of reeling is its place in the long sequence of stages required to produce raw silk thread. After all the time spent to cultivate mulberry, gather leaves, feed and tend silkworms, and harvest cocoons, a family's investment rests with the ability of its women reelers to turn cocoons into thread, efficiently, without breakage, and with minimal waste. From the South Chinese perspective, silk reeling was too important to be left to untutored hands.

During my field research, I conducted interviews with one hundred and fifty women that focused on silk reeling traditions and marriage practices in the rich sericultural area near Guangzhou (Canton), especially Shunde County. From my interviews and my observations in reeling workshops and factories – I came away with an

⁵ United States Congress, 20th, Doc. no. 158, *Letter from the Secretary of the Treasury Transmitting the Information...the Growth and Manufacture of Silk* (Washington D.C., 1828). Connecticut Historical Society.

appreciation for the high level of skill required of young women who perform silk reeling in South China.⁶ Although the Chinese from this area believe silk reeling to be “women’s work,” they do not believe the skill to be innate to the female gender. It must be learned by practice and example. The preliminaries to reeling silk in Shunde and Windham counties were the same, entailing first soaking the cocoons in a basin of near boiling water to loosen the sericin (or gum) binding the filaments. After the outer layers of floss or waste silk were removed, the ends of several filaments were carefully picked up in preparation for unwinding the cocoons and transferring the raw silk onto hand-turned reels. And it is here that the distinctive cross-cultural differences in reeling become apparent.

In the South China case, the filaments of the several cocoons being reeled are twisted together to form a composite thread--*as they are being reeled and wound*.⁷ This produces a stronger and more even thread, but is a sophisticated technique. To accomplish this requires practiced coordination to maintain a constant tension in the thread, as it is twisted and wound onto the reel. As the end of the filament of each cocoon is reached, a skilled reeler is able with smooth, continuous movements to attach the ends of new cocoons to the diminishing ends of the old, twisting them together to create an unbroken thread of consistent thickness. To master the technique requires practice on the part of the novice reeler – as well as instruction and demonstration by an expert reeler.

In South China sericultural families, young women apprenticed for this key role under the tutelage of experienced family reelers for about two years. It was only through the acquisition of proper technique and after years of experience that a silk reeler avoided breaking and snagging threads, which reduced the value of the family’s silk. At this juncture in the sequence of stages in sericulture, the value of the raw silk produced was completely dependent on the skill of the reeler. Even when all other tasks had been successfully executed, flawed reeling would reduce the value of the raw silk and family profit by half, or more.

Mansfield and the Promotion of Silk Culture. The history of efforts to promote sericulture in Connecticut features the offer of incentives, including bounties or premiums, awarded for a specified number of mulberry trees planted and maintained, or for the weight of raw silk produced. During the Colonial era, such incentives were periodically offered by Great Britain, which also waived customs duties at British ports for silk imported from the American Colonies. (All raw silk produced was required to be sent to Great Britain to be manufactured into cloth, and the domestic manufacture of silk cloth was banned.) In addition, the London Society for the Encouragement of Arts, Manufactures, and Commerce also offered its own program of bounties, as did the Colony (and later state) of Connecticut itself.

During the Colonial era, none of these measures to promote sericulture in Connecticut resulted in any sustained efforts to cultivate mulberry trees or raise silkworms, with one exception. I note this particular early experiment as it highlights the difficulties presented in attempting to learn silk reeling from written instructions, alone.

⁶ Janice Stockard, *Daughters of the Canton Delta* (Stanford: Stanford Press, 1989).

⁷ It seems to be the case that silk reelers in South China twisted the thread more--and reelers in Mansfield twisted less--than in other sericultural traditions, both within China and the United States respectively.

This sericultural experiment was undertaken by Jonathan Law, Governor of the Colony of Connecticut from 1741-50. In a letter dated 1747-8, Law writes that he has spent sixteen or seventeen years raising silk in Connecticut. He writes that his family learned “how to take it off of the Balls” from “a french man whose business it was in france.” He writes that he even sent a family member to Cambridge in order to teach reeling to the wife of Dr. Wigglesworth, the Harvard professor credited with introducing silkworms to New England. Law divulges that after ten years of experimentation, the Wigglesworths still had not learned to do it properly.⁸ It seems clear that simple unwinding could be learned from manuals and experimentation, but that effective reeling, producing good quality thread, was best learned by example and instruction.

Raw silk culture came to be established in Mansfield and Connecticut primarily as a result of the efforts of four exceptional men. Some of their names are more familiar than others, and not all of them were from Connecticut: Benjamin Franklin, Jared Eliot, Ezra Stiles, and Nathaniel Aspinwall. Their efforts to implement what had previously been only an idea about the possibilities of sericulture is a subject that I treat in depth elsewhere. Here I will only note that all of them were eighteenth century men of science, sharing a pragmatic interest in agriculture and botany, as well as a passionate belief that sericulture could be profitably practiced within families. Early visions of a sericultural future promoted a plan whereby that industry could be practiced alongside the primary enterprise of agriculture. Sericulture was to be a subsidiary economic venture to farming. For example, mulberry could be grown alongside fields, as hedgerows, where it wouldn’t interfere with the cultivation of corn and other crops.

All four men were in communication with each other on the subject of sericulture. They engaged in experiments, shared information, and in general collaborated to implement their belief in a sericultural future. Franklin’s correspondence documents his interest at home and abroad in the conduct of sericulture, and his lively and public advocacy of that industry. His communications with Stiles, who experimented with sericulture first in Rhode Island in the summer of 1763 and later as President of Yale, document collaboration and shared expectations in the promising future of sericulture. Stiles distributed mulberry tree seed to eighty ministers in Connecticut, later determining that his efforts had resulted in the establishment of more than 260 mulberry nurseries.

Nathaniel Aspinwall, a Mansfield native, is credited with introducing the white mulberry tree and silkworms to Mansfield in the 1760’s, and with promoting sericulture locally. A compatriot of Stiles, Aspinwall established several mulberry nurseries, including one on Long Island and another in Pennsylvania, later petitioning for state support of raw silk culture. Stiles documents his inspections of Aspinwall’s own sericultural enterprises, reporting on the progress of his crops of silkworms.

Jared Eliot inspired them all with his passion for scientific investigations of agriculture, and the publication in 1759 of his *Sixth Essay on Field Husbandry*, one devoted to the cultivation of mulberry and practice of sericulture.⁹ For this essay, he interviewed neighbors engaged in sericulture in the vicinity of his homes in Killingworth

⁸ Jonathan Law to Eliakin Palmer, 27 Jan. 1747-8, *The Law Papers. Collections of the Connecticut Historical Society*, vol. III. (Hartford: Connecticut Historical Society, 1914), 192.

⁹ Jared Eliot, *The Sixth Essay on Field Husbandry* (New Haven, 1759).

and Guilford--and observed the experiments of his brother-in-law, Governor Jonathan Law, whose experience was cited earlier. Both Eliot and Franklin, because of their international reputations and range of correspondents, received samples and specimens from abroad, including, for example, silkworm eggs from Spain. All four sericultural enthusiasts collected and shared instructional manuals, as well as other sources of information on the practice of raw silk culture cross-culturally. Franklin and Stiles traded annotated Chinese diagrams, as well as French treatises on Chinese sericulture. Italian and German sources were also consulted. One set of Italian instructions on the conduct of sericulture provided the basis for an early manual published by two Mansfield residents.

The Evolution of Reeling in Mansfield. Of the earliest silk reeling adventures in Mansfield (and in New England in general) little is directly known. Although deeds and letters reveal a concern on the part of farmers about the cultivation of mulberry and life cycle of the silkworm, comment by wives on the trials and tribulations of silk reeling are not part of the extant record. The historical archive does contain evidence of a growing appreciation of the skill required for reeling, however. In some letters, silk enthusiasts write seeking to hire an experienced reeler for her services, or to report the engagement of one. One example is contained in a letter written by Colonel Jedediah Elderkin, who established one of the earliest mulberry orchards in Windham County. In a 1773 letter to a fellow silk enthusiast in Philadelphia, Elderkin requests assistance in procuring a woman skilled at reeling and able to journey to Windham and remain for a year.¹⁰ From Jonathan Law's letter, too, it is clear that he considers himself most fortunate to have found a person skilled in silk reeling. In these occasional reports and queries can be read the lessons learned about silk reeling, acquired through experimentation and improvisation with reeling techniques described in manuals.

Shortly after the incorporation of Mansfield's Company of Connecticut Silk Manufacturers in 1789, one of its members, Samuel Storrs, along with another Mansfield man, Lemuel Eldredge, published a manual of instruction in sericulture. This work was a translation of an Italian set of instructions, originally communicated to the American Philosophical Society at Philadelphia in two letters from London silk merchants in 1774 and 1775. It was jointly published by Storrs and Eldredge in 1792 as *Some Modern Directions for the Culture and Manufacture of Silk, taken from a manuscript As it was wrote by a Gentleman in Italy. Containing, the most necessary Instructions for the Culture and Manufacture of Silk, From the hatching of the worm, till the silk is prepared for the loom.*

In this manual, the instructions for silk reeling require that the "windster" (the person who reels) cross or twist the filaments of silk that comprise two threads as they are reeled from the cocoons. The two threads (which in this example are each made up of the filaments of four cocoons) are twisted "round each other, twenty or twenty five times, that the four ends of each thread may the better join together, crossing one another that your silk may be plump which would otherwise be flat..."¹¹ These instructions apply to

¹⁰ Jedediah Elderkin to Clement Biddle, 22 Jan. 1773. William L. Weaver Genealogy of Windham Families. Connecticut Historical Society.

¹¹ Samuel Storrs and Lemuel Eldredge, *Some Modern Directions for the Culture and Manufacture of Silk* (Windham, 1792), 25-26. Connecticut Historical Society.

the reeling of the silk from the cocoons, in advance of the next stage, the “throwing” of the silk, which requires additional twisting and processing to produce finished silk thread.

The technical manipulation of the silk filaments as they are reeled from the cocoons, while not an exact duplication of the technique of the women reelers of South China, still obviously required training and experience to execute. And it certainly required a more sophisticated reeling device than the common reel and spinning wheel, which were employed by eighteenth century Connecticut reelers. One can easily imagine the difficulties and frustrations those first wives and daughters encountered as they tried to interpret and adapt instructions contained in a foreign manual, a difficulty compounded by never having directly observed the execution of this technical process. One can also imagine the degree of improvisation focused on adapting foreign instructions to local conditions. Mansfield was a community renown for its technical ingenuity and mechanical inventions. Undoubtedly a great deal of experimentation across the next fifty years led to the publication of the second Mansfield silk instructional manual in 1839.

The title of the new manual bears citing in full: *Mansfield Domestic Silk-Grower's Manual. Practical hints on the culture of the mulberry tree, together with the art of raising silk worms in the best manner, with the cheapest and most simple furniture and fixtures. Adapted to the resources of almost every family in the country. By a citizen of Mansfield, Conn. Who has been familiar with the process during the last twenty years.*¹² The unidentified author is widely reputed to be Zalmon Storrs, a descendant of one of the authors of the earlier manual, and an informal advisor to the Secretary of the Treasury, Richard Rush during the compilation of the manual published by the United States Congress in 1828, cited earlier.

The procedure described for silk reeling in this manual bears scarcely any resemblance to the one outlined in the first manual, translated from the Italian and published in 1792. In the 1839 manual, there is no twisting or crossing of threads recommended during the reeling of the silk filaments from the cocoons onto the reel. The method of reeling employed by Mansfield women for that era is briefly outlined in this manual. However, the fullest description of the technique employed by Mansfield reelers after their almost seventy years of improvisation is presented in yet a different manual, one written by an outsider who observed the process first hand and took exacting notes. With the spread of Mansfield's reputation as a successful silk industry heightened by the recent Congressional inquiry, visitors journeyed to Mansfield to inspect the mulberry orchards and observe the process of raising silkworms and reeling silk. One of these visitors was Joseph Harper, delegated by the Legislature of New Hampshire to tour the silk districts of Windham and Tolland counties in 1829. The following year he published his report on the practice of sericulture and the conduct of reeling in Mansfield.¹³

Harper reports that several cocoons are reeled simultaneously, but as separate filaments, with no twisting or crossing. When many of the filaments end as the cocoons run out, all of the remaining filaments are broken off and the whole segment tied off as one piece. More cocoons are then reeled and tied off together, each segment separate

¹² Citizen of Mansfield, *Mansfield Domestic Silk Grower's Manual*. (Hartford: Gurden Robins, 1839) Connecticut Historical Society.

¹³ Joseph Harper. *Mr. Harper's Report to the Legislature of New-Hampshire on the Culture of Silk* (1830), 26-27. Connecticut Historical Society.

from any reeled earlier. It is only at a much later stage in the process of producing "sewing silk" or "twist" that the ends of the separate segments are twisted together and united into one thread.

He also describes the process by which Mansfield women made the common sewing silk for which this area was known: The reeled segments were soaked and then twisted together to form thread. This step was followed by further boiling and twisting before the finished sewing silk was wound off into skeins of a measured length.

Of Technology and Trees. In the early decades of the new nation, Mansfield silk met the rising domestic demand for affordable silk. With additional processing at home, it could be wrought into items of utility and luxury, such as everyday gowns, blankets, and carpets, as well as lace, ribbons, handkerchiefs, stockings, and fringes. Mansfield silk was part of an era characterized by pride in wearing American "homespun," which lessened dependence on foreign (and expensive) imports.

Over the years, methods of reeling had been improvised, based in part on instructions found in foreign manuals and adapted to local conditions, but increasingly had come to reflect accumulated first hand experience. However, as a product of individual families, raw silk varied in quality from house to house. Bartered in skeins that were standardized by length but not weight, the silk was in general uneven and lumpy, which made it difficult to refine. In addition, an excessive amount of waste silk was created in the process of reeling, estimated as high as thirty per cent. In short, the silk that was produced was suitable for the various domestic uses to which it had traditionally been put, but it was not generally of a quality that could be readily used in manufacturing silk thread or cloth. It could not easily be further processed by "throwing" (as Europeans called it) in preparation for weaving, because of its inconsistent quality. In fact, Edmund Golding, the first European "throwster" to visit Mansfield could not secure work in his field because the hand-spun silk was not suitable for throwing.¹⁴ (It should be noted, however, that Golding remained in Mansfield, advising on the improvement of reels and becoming a founding member of the Mansfield Silk Company in 1829)

A remarkable achievement of Mansfield sericulture was its pragmatic approach, rendering complex, foreign technical requirements into "simple furniture and fixtures," found in most homes, and turning them to the production of silk. The shared virtues of thrift and self-sufficiency motivated the early sericulturalists to adapt and improvise with what they already owned. In this, Mansfield silk producers realized the vision of the first silk enthusiasts. Sericulture could be practiced within families, alongside primary agriculture and with little interference, especially for the farmers themselves. However, the primary work of sericulture -- the indoor work of raising silkworms and reeling silk -- was performed by the women of the family, with the assistance of children.

During the first decades of the nineteenth century, in sericultural areas across New England, new energies of invention focused on improving or replacing the "simple fixtures" of sericulture, especially the common reels and wheels that had been employed in reeling silk and producing sewing silk. Experimentation with new reels took place both at the basins where the unwinding of cocoons took place, as well as at the later throwing stage, where reeled silk was refined, cleaned, doubled, and twisted into finished thread,

¹⁴ Alfred T. Lilly, "The Silk Industry in the United States from 1766-1874," *American Wool Manufacture* (New York, 1876), 266-67.

ready for weaving. These efforts were harnessed to standardize the quality of silk produced locally, improving its quality for weaving, and enabling it to compete on the open market with silk produced in Europe. One milestone in the development of silk reeling technology was realized in 1810 when Mansfield sericulturalists Horace and Rodney Hanks invented machinery to harness waterpower to spin silk. Their small enterprise, although not a successful commercial venture, became the first water-powered silk mill in America.

As exemplified by the popular Piedmont reel, the new reeling technology accomplished the simultaneous and yet separate unwinding of multiple cocoons from the basin, at a faster, more even speed than could have been achieved by traditional hand reeling, using a common reel.¹⁵ This produced a better quality thread, both more quickly and efficiently, with less breakage, snagging, and waste. As a skill, silk reeling was transformed by the introduction of new reels, which removed some of the control over the silk from the hands of human reelers. From the perspective of South Chinese silk reeling, the new reels lessened the skill required to unwind the cocoons. They effectively removed much of the difficult twisting of filaments (performed by Chinese reelers at their basins) and transferred it to a later stage in silk production, i.e., throwing. In short, what constituted the process of silk reeling in South China had, in effect, been broken down into two distinct stages, unwinding and throwing.

It is interesting to note, however, that in the case of some of the many reels invented in the early nineteenth century, the twist is added back to the silk reeling stage. The "Improved Contra Twist Silk Reel" invented by Jonathan Dennis of Rhode Island was endorsed by the Massachusetts sericulturalist J. H. Cobb, who praised it for the twist accomplished during reeling: "There is a twist given to the threads of silk reeled...This twist enables the tender to join additional fibres from new cocoons with the greatest facility, and thus keep the threads of a uniform size...it saves a great deal of trouble and time when the reeling is commenced, and the threads are not half so likely to break in reeling..."¹⁶

In addition to a heightened interest in devising new reeling technology, sericulturalists in the first decades of the nineteenth century also sought new varieties of mulberry. They sought a tree that would produce more abundant leaves than the standard white or "Italian mulberry," introduced in the 1760's, and yield them early in the growing season. Thus, fewer trees but more leaves. Hypothetically, this tree would enable families to raise more silkworms and produce more raw silk, all with the same effort. On reflection, it is clear that those responsible for mulberry cultivation (i.e., men of the family) might expend less effort and realize more profit as a result of such a tree. However, for women of the family, to whom fell the primary responsibility of raising silkworms, the promise of higher yields of silkworms meant more work. More silkworms would require that wives and daughters spend greater time and effort on their maintenance – and on the reeling of more silk. During the 1830's, sericulturalists throughout New England believed that they had found their dream tree and invested

¹⁵ For this insight, I observed a working model of a Piedmont reel, constructed by students of Dr. Marjorie Senechal of Smith College..

¹⁶ J.H. Cobb, *Cobb's Manual* (Boston: Weeks, Jordan and Company, 1839), 158. Connecticut Historical Society.

heavily in it, leading to what has been called a mulberry "mania." I now return to the decline of sericulture and the failure of the new variety of mulberry tree, called by many the "*morus multicaulis*," by others "the Chinese mulberry." I choose to call it the latter, for reasons that will become apparent.

The decline of sericulture in Mansfield and New England is generally attributed to three factors relating to mulberry trees, especially "the Chinese mulberry." First was the widespread over-speculation in the Chinese mulberry that caused prices to soar, climaxing eventually in the collapse of prices in 1839-40, bringing financial loss and ruin to many New England sericulturists. This crash was immediately followed by a winter of severe storms and temperatures in 1939 that decimated the extensive orchards of Chinese mulberry, further dashing the expectations of investors for a supposedly hardy tree, and adding to their financial losses. Only five years later, what has been called a general blight struck at the remaining trees, inflicting damage on even the proven Italian mulberry. These three events, occurring within a short span of five years, are followed by reports of the widespread neglect and even destruction of surviving mulberry trees. Surely the causes for the abandonment of sericulture are multiple, deserving of further consideration at a later date. It is tempting, however, to conjecture that the failure of the Chinese mulberry might have prompted some of those hardworking Connecticut silk reelers to rethink a future devoted to sericulture, choosing other domestic projects instead. For housewives, sericulture had been added to an already full complement of domestic chores within the home. To them would fall the increased responsibility and work of an intensifying sericultural industry, with its larger brood of silkworms to tend.

It is of course important to re-emphasize that the end of sericulture did not mark the end of the New England silk industry, but its shift to the manufacturing of raw silk imported from sericultural areas abroad, primarily Japan and China. This transition in the New England silk industry was, ironically, to have profound effects on the lives of silk reelers in sericultural families in South China. There, beginning in the late 1860's and as a direct result of the increased demand for raw silk from European and American weaving factories, new reeling technology was introduced to further improve the quality of raw silk. Alongside silk reeling practiced in families and village workshops, where women employed hand-turned and treadle-powered reels, filatures were established in which reels were powered by steam. Most of the filatures in South China were constructed in Shunde County, where they employed thousands of reelers, daughters from local families. The practice of sericulture in Shunde intensified to the extent that seventy per cent of the land in that county was devoted to sericulture, and rice (the diet staple) had to be imported from as far away as Southeast Asia.

The mulberry tree that had proved such a disaster in New England supported the intensification of sericulture in Shunde County. Given the tropical climate there, the "Chinese mulberry" provided subsistence for six to nine generations of silkworms during the long growing season each year. The transition in Connecticut and greater New England from sericulture to the manufacture of imported raw silk contributed to the lengthening of the silk reeling season in Shunde County, where reeling became a near year-round occupation for women. The full time employment of silk reelers in Shunde factories during the 1880's through the 1930's was to have profound effects on marriage customs and family life in that area, which I have described elsewhere.