...PARK AND RESOURCE PRESERVATION
NAT. PARK SERVICE, DOI

MULBERRY TREES AND SILKWORMS. The Story of Sericulture in Early Virginia Which Began at Jamestown in 1608-1609.
By: Charles E. Hatch, Jr. - November 1953

COLO:096
333/130570
CRBIB#001518

MULBERRY TREES AND SILKWORMS. Silk Production at Jamestown and in Early Virginia.
By: Charles E. Hatch, Jr. - December 1955

333/130569
CRBIB#001517

Colonial NHP
National Park Service
Southeast Regional Office

19.2

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
REGION ONE
RICHMOND, VIRGINIA

File reference:
K38

DEC 22 1953

Memorandum

To: The Director

From: Acting Regional Director, Region One

Subject: "Mulberry Trees and Silkworms" - new publication for Colonial National Historical Park

Submitted herewith is complete copy for the booklet on mulberry trees and silkworms at Jamestown and in early Virginia, which is in the approved publications program for Colonial National Historical Park.

This manuscript is an adaptation of Historian Hatch's early documented study on the same subject which was sent to the Washington Office September 24, 1954, with favorable comment by Mr. Harrington.

(SIGNED)

A. C. Stratton
Acting Regional Director

JWHolland:rnp

Attachments

Copy to: Supt., Colonial NHP

General
Daybook

MULBERRY TREES AND SILKWORMS

The Story of Sericulture in Early Virginia Which Began at Jamestown in 1608-1609.

By: Charles E. Hatch, Jr.
Park Historian
Colonial NHP

November 1953

MULBERRY TREES

AND

SILKWORMS

The Story of Sericulture in

Early Virginia Which Began at

Jamestown in 1608-1609

By: Charles K. Hatch, Jr.
Park Historian
Colonial National
Historical Park

November 1953
(Typed: February-August 1954)

FOREWORD

This is a study of the attempts to establish sericulture in early Virginia, that industry which concerns itself with the raising of silkworms under domesticated conditions including the feeding and care of the worms, the production of cocoons, the harvesting of the silk fiber, and measures necessary to insure stock for succeeding crops. Such activity began in Virginia, at Jamestown, in 1608 and was continued seriously on an experimental basis for some three-quarters of a century, never succeeding commercially, yet from time to time producing a measurable result. Its practice was known in eighteenth century Virginia, and serious efforts were expended in its behalf in the first fifty years of our early National era.

For Colonial National Historical Park and the areas authorized for inclusion in the Park, sericulture is a particularly interesting and a rather significant chapter in our agricultural and industrial beginnings. It was first practiced at Jamestown in 1608-1609, was being followed at Jamestown by a prominent colonial leader, George Sandys, at a reasonably well identified location in 1623, and very probably at other times. It was vigorously pursued by Governor Sir William Berkeley at Greenspring in the 1660-1670 decade, and in the preceding decade was equally as determinedly pursued by another colonial governor, Edward Digges, whose grave marker, in the burial plot of his estate (now Bellfield) on the York River adjacent to the Colonial Parkway, is surviving testimony. It appears to have been associated, too, with the Moore House area in Yorktown when this property was a Ludlow estate, near the middle of the seventeenth century.

C O N T E N T S

	Page
Foreword	1
Illustrations	iii
Royal Interest	1
The First 12 Years (1607-1619)	3
Production under Sandys (1619-1625)	13
From Company to Commonwealth (1626-1650)	32
The Silkworm	36
"Silk Houses"	46A
Cultivation of the Mulberry	52
The Mulberry Tree	61
More Serious Effort--Much More (1650-1675)	71
A Continuing Hope: 1675-1830	90
Bibliography	112

ILLUSTRATIONS

		Page
1.	*Yucca filamentosa* ("silk grass") — as photographed on a roadside in Yorktown, Va.	8A
2.	Title page of a 1620 volume dealing with Sericulture	17A
3.	Title page of John Bonoeil's 1620 volume on Sericulture	17B
4.	The silkworm "Butterflies" and "code" (a 1622 interpretation)	36A
5.	Feeding the worms (a 1622 interpretation)	47A
6.	Accomodations for the spinning (1622)	47B
7.	Winding silk illustrated (1622)	51A
8.	A white mulberry (*Morus alba*)	65A
9.	A "paper mulberry" (*Broussonetia papyrifera*)	68A
10.	The tomb of Edward Digges at Bellfield near Yorktown, Va.	74A

MULBERRY TREES AND SILK WORMS

Sericulture in Early Virginia

There is little reason to wonder why the early colonists at Jamestown were conscious of silk, the silkworm, and the mulberry tree, for their sovereign, James I, was a devout patron of sericulture. In it he had a lasting and persistent interest. He encouraged his subjects in this too, requiring landowners to purchase and plant mulberry trees and recommending that they foster the cultivation of the silkworm as both a desirable and a necessary endeavor. All over England this was emphasized, and it led to the establishment of mulberry nurseries as well as to the construction of silkworm accommodations. The King himself, took the lead in planting a tract in mulberries near his Westminster palace and later in building a special establishment with a keeper employed to care for his worms, all the while urging his subjects to follow his example both by written and oral exhortation.[1]

---

[1] Mary Anne Everett Green (ed.), Calendar of State Papers, Domestic Series, of the Reign of James I (London, 1857-8), 1603-1610, pp. 244, 393, 562; 1611-1618, pp. 29, 246, 555, 592; 1619-1623, p. 422; J. C. Loudon, Arboretum et Fruticetum Britannicum (London, 1844), III, p. 1252; Alexander Brown (ed.), The Genesis of the United States (Boston, 1890) II, 1022.

In January, 1607, King James ordered the planting of 10,000 mulberry trees, and in January 1608, he licensed one William Stallenge to promote the planting and the better breeding of silkworms. In 1609 Stallenge was given a warrant for 935 £ enclosing ground and planting mulberries at "Westminster Palace." Two years later the King's attendant is known to have had nine pounds of silk spun from the cocoons of his worms. In 1614 a grant was made to John and Francis Bonnal (Bonnell) for the office of keeping silkworms at Whitehall and Greenwich. This interest of James I continued. An entry in the records for July, 1618, tells that the King's "Groom of the Chamber" was paid his expenses for a three month's period during which he was traveling about with the King's silkworms wherever "His Majesty" went.

Silk had been known for centuries and its use had increased with the passing generations. It was, however, neither common nor easy to come by in early seventeenth century England. Moreover, it was a promising new industry. Silk culture, the organized rearing and care of silkworms and their cocoons, began, it seems, some 5,000 years ago in a distant China province. Knowledge and use of it spread slowly across Asia and into Europe. The well guarded secret of its production traveled even more slowly but finally was known along the shores of the Mediterranean. It was late in the fifteenth century that its culture was established in France where it grew rapidly. The sixteenth century saw it introduced into England. Experimentation with it gained some momentum in the reign of Queen Elizabeth but at the turn of the seventeenth century it was still little more than a hopeful prospect.[2] Consequently, it was only natural that James I should seek, with the royal sanction, to push for the maturity of a relatively new and promising item in the economy.

These and other attempts to raise silkworms on a commercially profitable scale in England were to prove disappointing and unsuccessful while the manufacture of the raw silk supplied by other countries was to grow, later, into a sizable industry. This, however, in no way lessened King James' interest in raising silkworms himself, in exhorting his country to do likewise in England, and in pointedly emphasizing that

---

[2] William Kendrick, The American Silk Grower's Guide; or the Art of Raising the Mulberry and Silk (Boston, 1839), pp. 3-16, 147; John d'Hemergue and Peter Stephen Duponceau, Memorial upon American Silk. Report on the Committee on Agriculture on the Growth and Manufacture of Silk (Washington, 1830) pp. 9-13.

such endeavor be undertaken in Virginia. His interest was both in the culture and in the manufacture.

The First 12 Years: 1607-1619

The Jamestown colonists were not long in answering the royal directive. The very first settlers in Virginia were quick to note that the mulberry tree — essential food of the silkworm — grew naturally here both in quantity and in size. This was the red rather than the more commonly used white mulberry that they saw; however, this was not thought to be of particular consequence. Word went back to England and soon silk worm eggs ("seed" they were called) were being hatched, and worms were being tended at Jamestown — an act that gave English America's first permanent settlement another entry in its long list of priorities.

This first attempt at sericulture on the James was short lived. It was nevertheless an honest effort to use a natural resource of the country to create a product that would satisfy a demand for goods and thereby establish a source of income. Like the unsuccessful effort to make glass in 1608, it represents one of our first economic efforts. Unlike glass manufacture, however, it was not easily abandoned. It was persistently pursued throughout much of the seventeenth century and even in later times, not only in Virginia but in the other colonies as well.

The story of the very first effort in sericulture was cryptically described by Captain John Smith in 1612 in his description of the Virginia that he saw and knew during the years of 1607-1609 when he was a leader in the Colony. He relates:

> By the dwellings of the Savages are some great Mulberry trees; and in some parts of the County, they are found growing naturally in prettie groves. There was an assay made to make silke, and surely the wormes prospered excellent well, till the master workerman fell sicke: during which time, they were eaten with rats. [3]

It is difficult to determine the exact time at which this "assay" was made. We do know, however, that the "Silkemen, with all their appurtenances and materialls," [4] including "seed," came either with the First Supply which arrived near the beginning of January in 1608 or in the Second Supply which reached Virginia in the fall of the same year. Such could have been made ready for dispatch in the First Supply. No great preparations would have been necessary, when the ships that brought the settlers to Virginia arrived back in England with news about the abundance of mulberry trees, other than the location of "Silkemen" who would make the journey, a stock of "seed," and, perhaps, a few materials. Since natural food was available this created no problem. Had they come in the First Supply, it would not have been necessary to keep the "seed" all winter with the subsequent possibility of damage.

There is some evidence, however, that suggests that they came in the Second rather than in the First Supply. In this case it was in the late fall of 1608 and in the winter and early spring of 1609 that the "Silkemen" were busy at Jamestown with the construction of the

---

[3] Edward Arber (ed.), Travels and Works of Captain John Smith (Edinburgh, 1910) I, 56

[4] John Smith in his Advertisement for the unexperienced, or a Path-way to erect the Plantation (1631) in Arber, Smith's Works, II, 928.

appropriate and necessary housing and frames either in their quarters in, or adjacent to, the "Fort" or in a nearby special building set aside for the purpose. The "seed" were hatched late in March, or early in April, as the first tender leaves appeared on the mulberries which had been previously located for the purpose of sustaining the worms. The gathering of leaves and the constant watch over the worms then began. Before the work was complete, however, the "master workeman" became ill and neglect ensued to the extent that the rats overran the silk "establishment" and ate the worms.

The possibility that these activities occurred in March and April, 1609, during the second, rather than the first, spring that the settlers were in Virginia, is drawn from the known fact that in April, 1609, Jamestown was deluged with "many thousand rats." These, which had "increased so fast" from those first brought in "from the ships", destroyed not only the silkworms but also the supply of corn — that essential grain — which the colonists then had on hand.[5]

Even accepting the second supply date, however, sericulture came early in the Virginia colony and as such constitutes one of America's industrial beginnings, a number of which, like it, are associated with Jamestown. It was a contemporary of the attempts to produce "Pitch," "Tarre," "Frankincense," "Glasse," and "Sope Ashes," however, it came after earlier beginnings in agriculture, lumbering, the fabrication of wood products (clapboards and masts), and siding, only

---

[5] Arber, Smith's Works, I, 155 and II, 471.

the last of which had negative results.

The abrupt halt to the first try at the introduction of silk culture in Virginia apparently discouraged no one for long. Promotional literature describing the Colony continued to extoll the natural advantages of the Country and the products which were surely destined to succeed. Silk was almost invariably one of these products. In 1610 Sir Thomas Gates reported that there was an abundance of mulberry trees "which in so warm a climate may cherish and feede millions of silke wormes, and returned us in a very short time, as great a plenty of silkes as is vented into the whole world from all parts of Italy ..." In this Gates was reflecting the same opinion about the silk production potential that was shared by most of the early colonists who have left a record of their opinion. Even John Smith, who became critical of the Company efforts to establish such activities in the very first years of the Colony, felt that "Silke" was among those things which the Country would afford in time by industry "even to the extent of rooting the Italian market."[7]

---

[6] Grain was planted in May, 1607 and there is reference to the export, early in 1608, of "masts, cedar [logs], blacke walnutt, clapboarde" and "Could oare ...which beinge sent from England proved dirt." These are before the trials of pitch, tar, glass, frankincense, soap ashes, clapboards, and wainscote which, it is stated, were sent home in December, 1608 in the ships which seemingly had brought the silkworm seed. (Lyon G. Tyler, Narratives of Early Virginia, 1606-1625 (New York, 1930), pp. 19,71,81,136,139,159; Thomas H. Wynne and H. S. Gilman, Colonial Records of Virginia, Virginia Senate Document, Extra (Richmond, 1874), p. 70; Louis B. Wright (ed.), The History and Present State of Virginia by Robert Beverley (Chapel Hill, N.C., 1947), pp. 30-1).

[7] Virginia Company, A True Declaration of the estate of the Colonie in Virginia (London, 1610) as printed in Peter Force (ed.) Tracts and Other Papers Relating Principally to the Original Settlement and Progress of the Colonies in North America (Washington, 1836-1846), Vol. III, Tract No. 1, p. 22. Arber, Smith's Works, I, 64 and II, 928.

Among those things considered needed for the "Plantation" of Virginia late in 1609, or early in 1610, were "2. Silke-dressers."[8] Instructions issued to Gates (who was coming as Governor to Virginia) in May 1609, just as the first effort to produce silk was ending on the banks of the James, specified that he seek to encourage sericulture. Such instructions were repeated for Lord Delaware just a little later.[9] William Strachey, writing in 1612, tells us that "this wilbe a commoditie not meanely profitable." Then he added "How yt is seriously considered of, and order taken that yt shalbe duly followed."[10] This seems to establish the fact that sericulture

---

8 Virginia Company, A True and Sincere declaration of the purpose and ends of the Plantation begun in Virginia ..." (London, 1610) as given in Brown, Genesis, I, 353.

9 Susan Myra Kingsbury (ed.), The Records of the Virginia Company of London (Washington, 1906-1935), III, 22. Hereinafter cited as Va. Co. Rec.

10 R. H. Major (ed.), William Strachey, The Historie of Travaile into Virginia Britannia (London, 1849), p. 117.

was again underway in Virginia. It seemingly was followed on a small scale without serious interruption for the next five years.

11

Strachey records the history of the first attempt in very much the same language as that used by Capt. John Smith which is quoted above.

In 1612 William Strachey wrote, too, about a "kind of silke grasse [which] growes there [in Virginia], as yet disorderly, which having the ground prepared and fitted for yt, would retribute a comoditye worthie the paines. . ." This silk grass, so named "because of its accession to the quallity of silke", was separate and distinct from the silk of the silkworm. The plant in question here is Yucca filamentosa (Adam's needle, bear grass, common bear grass) an exotic and desert country looking plant that is actually a variety of Yucca which is indigenous to the Atlantic coastal area from Maryland to Florida. It was found growing naturally in Virginia (particularly in the Point Comfort-Kecoughtan area) and can still be found, quite often, about old gardens. (Strachey, Historie, p. 61; Brown, Genesis, I, 385, 504; Earl G. Swem, Brothers of the Spade: Correspondence of Peter Collinson, of London, and John Custis, of Williamsburg, Virginia, 1734-1735 (Worcester, Mass., 1949), pp. 46, 169; Alfred Rehder, Manual of Cultivated Trees and Shrubs Hardy in North America . . .(New York, 1927), p. 76; Gray's New Manual of Botany (7th edition, New York, 1908), p. 290; Edward Williams, Virginia: More Especially the South Part Thereof, Richly and Truly Valued (London, 1650), in Force, Tracts, Vol. III, Tract 11 (hereinafter cited as Williams, Virginia Valued) pp. 24-5).

Even before 1612 Sir Thomas Gates and Lord Delaware had been instructed to be alert "in gatherings silke of the grasse" as a merchantable product in the company of hemp and flax — a suitable source for cordage — "approved to make the best Cordage and Lyne in the world." (Va. Co. Rec., I, 352, III, 22). Ralph Hamor, in 1614, reported: "Now I proceed to the silke grass which groweth like unto our flax . . . Captaine Martin . . .hath made exceeding fine and exceeding strong silke, and himself hath replanted many of the wilde plants this yeere, the silke whereof he purposeth to returne for triall." (Ralph Hamor, A True Discourse of the Present Estate of Virginia,(London, 1615), p. 35).

Interest in the development of this plant continued for decades. Samples of it were sent home from time to time although little came of it. Although thought of most often as chiefly suitable for cordage and coarse material it was described as late as 1649 as "a kind of Flax the Indians use to make threads of and strings. . . it's fine to make both Linnen and stuffe of it: abundance in many places of it groweth." (A Perfect Description of Virginia: Being a full and true Relation of the Present State of the Plantation (London, 1649) in Force, Tracts, II, Tract No. 8, p. 10; Edward D. Neill, History of the Virginia Company of London (Albany, 1869), pp. 174, 373. Sarah P. Stetson, "John Mercer's Notes on Plants" in Virginia Magazine of History and Biography, (hereinafter cited as Va. Mag.) LXI, p. 36 (Jan., 1953).



Yucca filamentosa — as photographed on a roadside in Yorktown, Va.

There is record that additional "seed" were sent to Virginia in the ship Elizabeth which left England in October, 1613, and reached the colony in the following winter. The worms "came foorth many of them the beginning of March, others in Aprill, May, and June" at which time it was further reported by Ralph Hamor that "thousands of them [had] grown to great bignesse, and [were] a spinning, and the rest well thriving of their increase, and commodity well knowne to be reaped by them..." He went on to predict: "we have almost assurance (since sure I am) no Country affoordeth more store of Mulberry trees, or a kind with whose leafe they more delight, or thrive better."[12]

Some Virginia grown silk was carried to England by John Rolfe in 1616. This conclusion is drawn from Rolfe's statement that "Silke-wormes some of their labors, and tastes of other good and vendible commodities were now brought home."[13] He wrote this while in England where he had gone in 1616 with his bride, Pocahontas. This checks, too, with the report that some "samples" of the "desyred works of Silkwormes" was "by the Industry of Sr Thos Dale...sent home in y^e 9^th and tenth year [1616 and 1617] of the 12 first years..."[14] That experienced supervision was available in the colony at this time is known for John Bonoeil, a silkworm keeper of much skill for James I, ...rations, in 1622, a servant trained by him in the rearing of worms who

6 ...

---

12 Hamor, A True Discourse, p. 35; Brown, Genesis, II, 663, 669; Alexander Brown, The First Republic in America (Boston, 1898) p. 202.

13 John Rolfe, A True Relation of the State of Virginia Lefte by Sir Thomas Dale Knight in May last 1616 (Printed from the original manuscript in the private library of Henry C. Taylor, New Haven, 1951), p. 35.

14 Va. Co. Rec., II, 396.

spent at least six years in Virginia where he went about 1615.[15] Thus, by 1616, silk culture had succeeded to the point that a proof of production went home to England undoubtedly to the great satisfaction of the settlers and Company sponsors as well. The initial proof submitted in 1616 was followed by additional proofs in the exports of the next year.

On June 9, 1617, Governor Samuel Argall, in a letter drafted at "Vames Towne" about a month after his arrival in Virginia, reported that "silk wormes thrive exceedingly" indicating the continued success of the venture.[16] Following this optimistic statement there is little data on Virginia sericulture for the next two years. There is evidence to indicate that it was allowed to lapse while attention went elsewhere when Argall was directing Colony affairs. One accusation (made during the heated argument that later plagued the Virginia Company) was that in this period "...all the endeavors for those other Commodities were abandoned and the Colony possessed of y^e Dotinge affection of Tobacco." It was said, too, that the under-pricing of silk was a major deterrent to production.[17] Whatever the cause for the lessening of attention to the silkworm, it was but a temporary condition.

---

15 John Bonoell, A Treatise of the Art of Making Silke, or, Directions for Making Lo[illegible]s, and the Breeding, and Ordering of Silkewormes, for the Planting of Mulberry Trees, and All Other Things belonging to the Silke Art...(London, 1622), p. 2 (This work is hereafter cited as Bonoell, Art of Making Silke.)

16 Va. Co. Rec., III, 73.

17 Ibid, II, 393.

Before continuing the story, it is well to point out that the successful efforts to produce silk in the period between 1612 and 1617 represented a well organized effort. It is recorded that "there was a house built to preserve the Wormes in when they brought and Mulberry trees were also planted...neere the habitations of o^r people..."[18] It would appear that some of the silkworms raised at this time, as was true less than a decade later, may have been hatched from "seed" sent by James I from his "owne store."[19] Production, too, may have been greater than the "taste" mentioned by Rolfe and the "samples" mentioned at one point in the Company records, for in answering some of the charges leveled against the Company administration of Virginia affairs in May, 1623 it was stated that the settlers under the old government had "returned from thence [Virginia] silke in some q^antitie w^h was spunne in S^r Thomas Smiths Hall."[20] This silk, which was exported to England, very likely was sent out from Virginia in the form of Cocoons ("Coddes") just as the worm had made them but after the chrysalis had been killed. It is possible, however, even quite likely, that the thread was reeled on to spools before it left the Colony.

The records do not tell us where in the Colony the officials built their early silkworm "house". It could very well have been at Jamestown where the first silkworms were reared in 1609 although it is possible that it could have been at one of the other settlements along

---

18 Ibid, IV, 143.

19 Ibid, III, 116

20 Ibid, IV, 143.

the James. Since, however, it was a royally sponsored project and had the active support of the governors and since settlement had not spread far in the 1612-1614 period, it could very well have been at the seat of government which was now well established -- a good point at which it could be actively supervised by the responsible Company officials.

Production under Sandys
1619 - 1625

When the management of the Virginia Company shifted, in 1618, from the Sir Thomas Smith to the Sir Edwin Sandys group, there was a renewed interest in, and effort toward, the diversification of the economic base of the colony. New emphasis was placed on the production of wine, the growing of hemp, the manufacture of pitch and tar, the production of glass, and related activities. The production of raw silk was another of these that was high on the list of required activities. For this raw silk, as in the case of many items for which Virginia was considered ideal, England was dependent on her European rivals. This was thought to be an undesirable and an unacceptable permanent solution. Consequently in 1619 we find a greater emphasis being placed on these needed commodities within the colony of Virginia.[21]

The Assembly which convened at Jamestown in July and August, 1619, the first representative legislative assembly in the New World, entered the picture by attempting to stimulate the increase of mulberry trees thereby insuring the food supply for the silk project. Even before this, in June, John Pory, who arrived in Virginia in April, 1619,

---

[21] Lewis Cecil Gray, History of Agriculture in the Southern United States to 1860 (Washington, 1933), I, 16.

"The rich Furres, Caviar and Cordage, which we draw from Russia with so great difficulty are to be had in Virginia, and the parts adioyning, with ease and plenty. The Masts, Planckes, and Boords, the Pitch and Tarre, the Pot-ashes and Sope-ashes, the Hempe and Flaxe . . . from Norway, Denmarke, Polonia, and Germany . . . The Iron, which hath so wasted our English Woods . . . The Wines, Fruits, and Salt of France and Spaine; The Silkes of Persia and Italie, will be found also in Virginia, and in no kinde of worth inferiour." (Va. Co. Rec., III,306-9).

expressed a keen interest in promoting silk culture in the Colony. Six months later, in another letter to Sir Edwin Sandys, he reported that "Vignerons" (vine dressers), skilled in the breeding of silkworms, such as were found in the "low Countries about Cambray and Landrecies" be found and sent to Virginia. In the instructions, dated September 4 of that year, issued for the settlement of Berkeley Hundred, specific mention was made of "mulberry trees for nourishing of silke worms." It has been stated, too, that John Berkeley the following year brought several Frenchmen to Virginia to capitalize on this resource.[22]

In a note on the shipping, men, and provisions sent to Virginia in 1619 it is recorded that: "For the setting up of which Commodity [silk], his Majesty [James I] hath been graciously pleased now the second time (the former having miscarried) to bestow upon the Company plenty of Silke wormes seed." This seed was from the King's "owne store, being the best to be had; which together with such other as from other places we could procure" was sent in the July "at a seasonable time of year." It had been specified that this be "dispersed amongst the Colony, with the order for the using thereof; and especially to keep the Wormes from the aire of Tobacco, which is mortal to them." It was noted on May 17, 1620, that "divers skillful Vignerons" had already been sent to Virginia and "some now are sent."[23]

---

[22] Tyler, Narratives of Early Virginia, pp. 264-5; Va. Mag., I, 285, 289-90; Va. Co. Rec., III, 208, 254; Tyler's Quarterly Historical and Genealogical Magazine, I, 56.

[23] Va. Co. Rec., I, 67, 353; III, 116, 261, 279. Included in the cargo of the London Merchant which went out from England in March, 1620 was "one pound of wora seed," Perhaps these silkworm eggs.

In the summer of 1620 John Pory, again writing from "James City", was convinced that "Silke is a marvellous hopefull comodity in this Country." The Company, too, seemingly intended to assure its success. It acted to require all persons obtaining "Patents or Indentures of Grants of Land" to "covenant" to employ their people "in great part in Staple Commodities" including silk.[24]

In July, at a court meeting, the Virginia Company gave more attention to "Staple Commodities" and, in addition to the general committees which were to push the project, named special persons to advance "some several parts" of the program. Silk, olives, and wines were selected for special attention at the hands of Abraham Chamberlin and Richard Wiseman. A first endeavor was to be the location and organization of a "great store of Silkewormes seed" about "Michaellmas" and the fitting of "men skillfull in the orderinge of the Wormes and the Silke" to be sent out in a "Pinnace" in October. Later, in September, there was thought of sending the seed by Dr. Lawrence Bohun, who was then thinking of leaving for Virginia in October. He sailed, as he had planned, yet it appears that the seed which he took "miscarryed."[25]

The minutes for the Quarter Court of the Company which met on November 15, 1620 revealed that "certaine Instructions were sent in writinge" in the Bona Nova, a ship that left England in November and

---

[24] Ibid., III, 303, 360.

[25] Ibid., I, 392-393, 490 and III, 214-5, 407; R.A. Brock (ed.), Abstract of the Proceedings of the Virginia Company of London 1619-1624 (in Collections of the Virginia Historical Society, new series), I, 84.
This is the same Dr. Bohun who some ten years earlier was collecting plants and herbs on Jamestown Island to determine their medicinal value in one of the very earliest chapters of medical experimentation in the Virginia Colony.

reached Virginia about two months later. These instructions dealt with the planting of mulberries and the construction of "fitt rooms for the Silkewormes." Sir Edwin Sandys described this as having been "exceedinglie well done." He added that a French book on the same subject had been recommended to him and he moved, and the Court approved, that this be translated into English and "a good number" printed for dispatch to Virginia and "ther dispersed amongst the Planters soe as everie household might have one." It was approved, too, that the book carry a listing of the rates that would be paid to the "Planters" for the specified staple commodities.[26]

In December it was reported that the first part of this volume "was now allmost fynished as likewise the valuacon of the severall Comodities to be had in Virginia . . ." The book would be ready for the printer in a few days. Copies of this, Observations to be Followed, for the making of fit rooms, to keepe Silk-wormes in: As also, for the best Manner of planting of Mulbery trees to feed them, are known to have been sent to Virginia in February, 1621, probably reaching the Colony in June in the ship Abigail.[27]

Here was the beginning of a sizeable body of seventeenth century literature on sericulture which embraced at least four distinct titles (exclusive of variations) devoted particularly to the subject in addition to a number of others which discussed it in part. John Bonoeil, "keeper of the Kinges Silk-worms at Oatlandes," appears to have been responsible for this first tract published in 1620--at least for the translation of it.

---

[26] Brown, First Republic, p. 410; Va. Co. Rec., I, 94-5, 422.

[27] Va. Co. Rec., I, 431-2; Brown, First Republic, p. 419. The volume mentioned here will, after this, be cited as Bonoeil, Observations.

He was responsible, too, for the more complete volume of 1622 which included diagrams and engravings and carried his name on the title page. Bonoeil took an active part in, and expressed great hope in, the Virginia silk enterprise, expecting much from the work. In April, 1621 the Company rewarded him for his continuing effort with two shares of "Land" and the appellation "free brother of the Company."[28]

S. W. Fletcher, in his "A History of Gardening in Virginia" has concluded that the earliest writings on the production of any crops in Virginia were on the subject of the production of silk.[29] To this might be added as well the cultivation of the mulberry tree which constituted a part of it and a beginning of horticultural activity in English America. The 1620 tract may have been the first such tract in Virginia in printed form. James I had called for a book of published instructions in January, 1607 to encourage the silk trade in England. It has not been established, however, whether this was done, or if done, whether copies of it reached the Colony. Copies of the 1620 volumes were sent and there is record that these and later volumes were in Virginia homes and in use.[30]

---

28 Va. Co. Rec., I, 459, 470 and III, 63; D.J. Browne, The Trees of America: Native and Foreign, Pictorially and Botanically Delineated, and Scientifically and Popularly Described (New York, 1846), p. 45.

29 A reprint from the Proceedings of the Thirty-Seventh Annual Meeting of the Virginia Horticultural Society December 6, 7, and 8, 1932, p. 11.

30 Green (ed.), Calendar of State Papers, Foreign Series, of the Reign of James I, 1603-1610, p. 344; Samuel Hartlib, Reformed Virginia Silk-Worm; or, a Rare and New Discovery of A Speedy, Easie, Sure, and Profitable Way, Found Out by a Young Lady in England . . . or the Feeding of Silk-Worms in the Woods (London, 1655), in Force, Tracts and Other Papers, III, Tract No. 13, p. 27 (hereinafter cited as Hartlib, Reformed Virginia Silk-Worm); The Lower Norfolk County Virginia Antiquary, I, 122. William E. Powell, "Books in the Virginia Colony before 1624" in The William and Mary Quarterly, 3rd Series, V, 179-180 (April, 1948).

OBSERVA-
TIONS TO BE
FOLLOWED, FOR THE
making of fit roomes, to keepe
Silk-wormes in:

As alſo,

FOR THE BEST MANNER OF
planting of Mulbery trees, to
feed them.

PVBLISHED BY AVTHORITY
for the benefit of the Noble Plantation
in VIRGINIA.



AT LONDON,
Imprinted by *Felix Kyngſton.* 1620.

Title page from a volume dealing with sericulture which was published in 1620. (From a John Carter Brown Library copy.)

HIS MAIESTIES GRACIOVS LETTER TO THE EARLE OF SOVTH-HAMPTON,

Treasurer, and to the Councell and Company of *Virginia heere: commanding the present setting of Silke works, and planting of Vines in Virginia.*

And the Letter of the Treasurer, Councell, and Company, to *the Gouernour and Councell of State there, for the strict execution* of his Maiesties Royall Commands herein.

Also a Treatise of the Art of making Silke:

OR,

Directions for the making of lodgings, and the breeding, nourishing, and ordering of Silkewormes, and for the planting of Mulbery *trees, and all other things belonging to the Silke Art.*

Together with instructions how to plant and dresse Vines, and *to make Wine, and how to dry Raisins, Figs, and other fruits,* and to set Oliues, Oranges, Lemons, Pomegranates, *Almonds, and many other fruits, &c.*

And in the end, a Conclusion, with sundry profitable *remonstrances to the Colonies.*

Set foorth for the benefit of the two renowned and most hopefull Sisters, *Virginia*, and the *Summer-Ilands.*

By *Iohn Bonoeil* Frenchman, seruant in these imployments to his most Excellent Maiesty of Great *Brittaine, France, Ireland, Virginia*, and the *Sum. r-Ilands.*

Published by Authority.

London Printed by *Felix Kyngston.* 1622.

Title page of John Bonoeil's 1622 volume on sericulture. (From a John Carter Brown Library copy.)

The publication of the book of instructions was not the only good news about silk late in 1620. It was reported to the Company that a "good store of Silkworm seed" had been received from France, Italy, and Spain and that much more was expected "very shortly." There was still, however, a great shortage of men skilled in the business. Most from France were deserted, due to the good work of Mr. Chamberlin. A more concrete result was the entering of a servant of Jasper Fullonge who had been employed for five years in "tending of the Kinges Silkewormes." He promised the necessary skill in tending the worms and in winding their silk as well as skill in preparing. He agreed to go to Virginia for the remainder of his apprenticeship with but three years yet to run, and the Company agreed to his payment provided he instruct others in the Colony in this important work. It was further specified by the Company that the "old Planters" in Virginia who "had executed others in buildinge of fit howses for Silkewormes and in plantinge Mulberie Trees and Vynes", as directed, should have first choice of the other apprentices to be sent "shortlie" as a reward for their efforts and an example to others.[1]

In its summary of achievements in 1620 the Company reported that the good store of seed from France, Italy, and Spain had been dispatched as had been instructions for the work. It specified, too, that eight "French Vignerons" had been "procured from Languedock" through the efforts of John Bonnell and that they were now "very skilfull also in breeding of Silkeworms, and making Silke." It was further related that, "There are also some Englishmen sent that have been trayned up therein." Others, too, had been hired for the silk project--a minister, a grave man for "Silke Cocons" (cocoons) and 13 shillings, 4 pence was given for "Silke."[2]

---

[1] Va. Co. Rec., I, 99-100, 431-2.

[2] Ibid., III, 237, 240, 474.

It was quickly pointed out in Virginia that this article was a great value evaluation in a locality where it cost 3 shillings per day "for the labors of a man who hath no other wage but to dig and delve." It was emphasized very forcefully that Virginia was not a populous country and there were no great numbers of women and children, and labor was not cheap as in Italy, Spain, and France. In the "silk season" men were not to be had "at any rate" for the time and in the "busiest season about our crops."[33]

It appears that the "seed" contained so hopefully in December 1620 was dispatched in the Bonaventure and John, a 150 ton ship which reached Virginia in April. They were in the care of Jasper Challenge's servant, but "the silk worms' seed miscarried" in shipment, relating to the warning given in the instructions published late in 1620: ". . . there is great danger in carrying of the silk-worms seed, so long a journey by sea to Virginia. For the sea is much contrary to the nature of the silk-worms seed, and easily corrupts it, by reason of the moisture, and cold and tempests, especially carried in winter time . . ."[34] It may not have been the cold and moisture in this case, however, for there is indication that the seed may have hatched enroute with the worms dying for lack of mulberry leaves.[35]

This disaster all but ended the hopes for silk in the early years of 1621. George Thorpe wrote to Sir Edwin Sandys on May 15 that "The silkewormseed is all perished saving a worke male scantilie worth one in the keeping of Mistress Ayr which the Governor hath taken great care." This, Thorpe hoped, to bring to perfection, yet his plan was to "save it

---

[33] Captain Thomas Nuce to Sir Edwin Sandys, a letter from Elizabeth City dated May 27, 1621, in Va. Co. Rec., III, 497.

[34] Beverly, Observations, p. 16.

[35] Brown, First Republic, pp. 116-17; Va. Co. Rec., IV, 15.

all for need" for labor use.[36] Captain Thomas Dove, of Elizabeth City, was disappointed, too, since he had hoped to make a trial of it "though to my losse" since it "might have given the Company satisfaccon." He went on to relate that "the people are verie much discouraged" in silk as well as in more basic things. He added, for example, that the Colony was in serious need of more "Cattle both for the plough and payle."[37]

Arrangements continued to be made in England, however, as the Company approved the publication of the second treatise on sericulture and mulberry trees and, in May, 1621, Sir Edwin Sandys stated in the House of Commons that he hoped for as good silk in Virginia as was made in Persia. Early in May the contract with the Frenchmen from "Languedock," who had already taken passage for Virginia where they would plant vines and "order" silkworms, was sealed by the Company. In several vague and ellusive, instructions to Virginia in September urged that the colonists treat them well--that they "be kindly used and cherished." It was related that "divers provisions of victualls" as well as "cloth to make them cassocks," "hose and shoes," and such had been sent for them or should be furnished from the "Companies stock there."[38]

Steps were taken, too, in England, to devise a process to carry the seed, now expected from Italy, Persia, and India, in September--"at which time silkworms spoken for, and promised to be here ripened that time." It was requested by the Company that Mr. Chamberlin continue his efforts to

---

[36] Ku. Ba. Rec., III, 447

[37] Ibid., III, 497.

[38] Brown, First Republic, pp. 403, 409; Ku. Co. Rec., I, 466 and III, 502.

got other seed especially from "Valentia" where the seed produced worms with more ability. It was only to be wished to other climates. Thereupon he undertook to get the seeds of seed from this source.[39]

One instruction of note issued at this time was a work on the rearing of "Worms in Cloaths" in Virginia, and it was specified that only the "Council & heads of Hundred" could wear gold in their clothes or "silk till they make it themselves." Instructions to Governor Sir Francis Wyatt in July, 1621 required: "Next to corn, plant mulberry trees, and make silk, and take care of the Vineyards . . . try with speed . . . plant abundance of vine . . ." He was warned, too, that James I had "often" furnished seed for the Colony and that care and emphasis of this project was necessary. Twice ten had been sent out and "very excellent bodies . . . unto him we refer you for your better direction." On July 10 the Company expressed "much great content to hear that our Whole Proceedings in Vines, and silke, began to be planted . . . and that they prospered with so good successe . . ." as had been related in recent letters from Virginia.[40]

It was expected that the Duke which was to sail in October, for Virginia would carry a "store of Silke worm seed" and vines and the Colony was alerted to make advance preparations to accommodate them of both in each of the plantations. It was designed that corn had been received that both vines and mulberries had heretofore been "grandiously abused."[41]

---

[39] Ku. Ge. Doc., I, 483, 490, 491; Brown, Abstract of the Proceedings of the Virginia Company of London, I, 130-2.

[40] Ku. Doc., IV, 514; William Bullein Bowne, Speaking at Jamestown, 1607, Being a Collection of Papers Read Before the Historical Society of Virginia (Richmond, 1857), 1, 115; Ge. Co. Doc., I, 302-3 and 114, 116.

[41] Ku. Ge. Doc., III, 500. The Duke evidently did not get away in September as had been planned originally.

Delay in the shipment of the seed again caused, however, and they left England late in November in the Discovery, actually only a very small quantity of seed was dispatched instead of the shipment that had been expected until "Other things intervened." The new Second volume, authorized in the spring, was not yet complete and the "good number of the Gold Medals" could not yet be dispatched.[42]

In 1621 George Sandys, who was named "Treasurer in Virginia," was given other special duties. The Company "committed to his custody and superintendency care per sometime of all our orders Charters and Instructions tending to the setting forth, Surveys and registeridge of the said Staple Commodities." This included special attention to the production of silk.[43] He may have been in part responsible for settling the "Frenchmen" who reached Virginia in 1621 at "Cape Ann" in the "Ilmanock Citie" even under the eye of Captain Ward who was residing there. In any case it appears that the men from "Langedoc" took up their abode here although they were disappointed in not finding all the conditions, provisions, and accommodations which they expected.[44]

42

Sainsbury, Virginia Colonial Entries, pp. 263, 270; The Va. Mag., I, 383; The Magazine, IV, 324.

Perhaps the Discovery had been ordered, as had the Marigold in January, to deliver all "Cattle, Servants, provisions, etc., to James Citie or James River in the Dominion of Virginia unto the Governor and Council of State residing there." The Marigold reached Jamestown on December 16, (Va. Co. Rec., III, 478; Sainsbury, Calendar of the Court of Wards and Liveries, 1610-1660/70 (Colchester, 1915), p. 14.)

43

Va. Co. Rec., III, 478-9.

44

Va. Co. Rec., III, 463, 554-5.

Some three Frenchmen were Anthony Bonnell, Miles le Count, James Bonnell, Peter Arundell, and David Ferie. (William and Mary Quarterly, 1st Series, II, 261 (Lyon G. Tyler, Jamestown and James River, Seeds of the Republic (Richmond, 1906), p. 261.)

Despite the loss of seed for the spring production in 1621 there was considerable hope that the Assembly convened in November and December of that year. It was pointed then that all ways inclined to follow silk and that they were desirous of producing it. In letters sent from Virginia late in 1621 to the city Company, which received England in March, it was stated that a "list" of silke had been sent to the city, and in regard to silk it was reported "that their hopes are more greater than ever [sic] a flourishinge Country in a short time with that rich Commodity of Silke in respect the Purchasers there do report the Mulbery trees to be of the best kinde that are and do daille encourage the people by their example to plant them in abundance, which were then all destroy that Steps of Silkewormes be sent yo first convoytaney." [15] Lastly the President considered that Virginia "farre excelled thatt great Country of Languedocke" in the potential to produce silke. The only seed in the spring of May, 1622 was said to be "harde" --conflicted [16] pulled and combtilled labor.

Since I undoubtedly received these reports with a great deal of pleasure. We are told, however, Henry about the lack of sustained production, and on June 10, 1622 the Company wrote to the Governor and Council in Virginia that "His Majestie above all things requires from us a proofe of silke, thereby procuringe the explect thereof." The Colony was urged that its little stock of roome be carefully increased. The Company even resolved to send "one hundred ounces of Silkewormes seed at least" before Christmas. In this letter it is reported that

---

15 Ibid., I, 403

16 Ibid., III, 501, 506-7, 511 and IV, 522; In. Mss., IV, 2-3; Edward Waterman, A Declaration of the State of the Colony and Affaires in Virginia With a Relation of the Inhumane Massacre (London, 1622), p. 16.

the seed formerly expected from Velentia arrived in England too late for transshipment to Virginia and had to be hatched there. In June, two parishes were sent for the Freshmen in Virginia and the hope was expressed that they were inviting others in the Colony.[47]

On July 9, Anno I, in a letter to Company officials, personally directed attention to sericulture in Virginia:

> Whereas We understand that the Soyle in Virginia naturally aboundeth Store of excellent Mulberry trees, We have taken into Our Princely consideration, the great benefit that may grow to the Adventurers and Planters, by the breeding of Silkewormes, and setting up of Silkemylnes in those parts. And therefore of Our gracious Inclination to a designe of so much honour and advantage to the publike, We have thought good, as at sundry other times, so now more particularly to recommend it to your speciall care, hereby charging and requiring you to take speedy order that our People there, may all possible diligence in breeding Silkewormes, and erecting Silkemylnes, and that they neither hasten their Labours in gathering this rich and noble Commodity, then in that of Tobacco . . .

The King went on to commend John Bennett and his values on silkworms, mulberry trees, and vineyards and stated that he required that the colonists carefully put them instructions in practice "whereunto our Plantations there, that on the worke may goe on cheerfully, and receive no more interruptions nor delayes."[48]

The Virginia Company took it in command and responded entirely and on the same day returned a letter to the Governor and Council in Virginia. In this the Company stated that attention to silk and vines should be given high priority. Those who were negligent in planting vines and mulberry trees or in "the providing of convenient rooms for the breeding of Wormes," or who willfully refused to do these things were to be

---

[47] Smith, Virginia Company, pp. 103-4; R. Co. Rec., III, 647, 651.

[48] R. Co. Rec., III, 672; Sainsbury, Calendar of State Papers, Colonial Series, 1574-1660, p. 11.

given "severe discredit and punishment." It was further pointed out that "to the, either of difficulty or impossibility" ought to be imputed. It was at this time, too, that Bennett's volume with very detailed instructions was ready "to serve as an Instructor to everyone." The Company dispatched a "store of them to be dispersed over the whole Colony, to every Master of a Family one."[49]

These volumes, as did 80 copies of silk seed, left England in September reaching Virginia late in December, 1622 in the ship, Peter Bonadventure, although the seed sent in 1621 were damaged in shipment, those reported to have arrived safely and to be "well conditioned, and likely carefully preserved."[50]

In March, 1623 Sandys acted to require that every plantation having two heads of ground and upwards in vineyard were and to build "a house of two stories, with stack, for silkworms." Then came the measure which was a serious blow to all such projects. In the case, that of Captain Ward (Ward), it is reported that he had made all preparations "and the silk-worms [eggs] ready to be conveyed but will was left . . . by the Governor . . . ." This, however as it is concerned, was but an interruption and both continued with the saving of 1623 being a busy season. There is little reason to suppose that anyone was discouraged by Governor Johnson's charge that the Virginia colonists grew

---

[49]
Va. Co. Rec., III, 495-96.

Copies of the King's and the Company's letters were printed and made a part of the Bennett volume (Va. Co. Rec., III, 501-4).

[50]
Brown, First Republic, p. 501; Brown, Genesis of the United States, II, 1007; Smith, Va. Rec., p. 174; Va. Co. Rec., IV, 114.

[51]
Va. Co. Rec., IV, 511; Brown, First Republic, pp. 502-503.

that a Friends in Unity which destroyed the difference when they came to any Fiends. . . ." It was about this time that the Yearly Meeting, in reply to inquiries, had stressed that with "wise and industrious persons quite in great quantities" it was best that nine and six be spread in two of the most promising single communities. To promote these it was necessary that the Society "send men over that are expert in those faculties."[32]

George Fenger, to protest the steps received in December, stood then all in the experienced hands of the "Brethren" and left them in their custody until the women are right for betrothal which appears to have been in April. Into in March he wrote asking that John Bennett be enlisted to locate "the Brethren" when he visited in England, at the charge, in Virginia.[33] He explained the fact that there was a lack of interest in the project although he himself was working it. He reported that "The Thirteen are joined together at Wilmington City & altogether inclined about alike-serious, that we may preserve the seeds & send you home one also the next year. . . ." He pointed out, too, that the Brethren's time was up the next year and that they should be encouraged to stay in Virginia until others could be sent to support their number.[34]

It was reported in April, 1663 that Peter Arundell "doth take very great progress at Lin in opening a rite house at his own charge and

---

[32] Arber, Smith's Works, II, 939; Tyler, Narratives of Early Virginia, p. 341; William Wirt, The History of the First Discovery and Settlement of Virginia (Philadelphia, 1817), p. 82; Journals of the House of Burgesses, 1659-1693, pp. 54-5.

[33] Edward D. Neill, Virginia Vetusta, During the Reign of Anne the Third (Albany, 1885), pp. 177-8; Va. Mag. Hist., II, 24, 64.

[34] Va. Mag. Hist., II, 178

in cherishing of silkworms." He did this at "Dutchess" in Elizabeth City, and it reduced its supply to a very small store of provisions, which, he said, was but "a handfull of Seede to keepe us and my Servants from this time till Harvest." He added, too, in one of his letters that "All my Hen in Lower corne was brought up to James Towne & I cannot gett a graine of it to relieve my need though I produced a Will of Sir W Sterl which he owed me." He wrote on April 25 that there was a shortage of mulberry trees at Dutchess where they were not being preserved as they should be and the use of the leaves on those existing had caused a quarrel between Capt. Whitakers and Anthony Bonnell. As for his success he wrote "Our Wormes are well hatched & very hopefull: If I live I will bring home some silke." He relates, too, that various townsmen had come to look over his new "silke warehouse" and that he had discovered some improved methods for "the easier hatching of the wormes." He mentioned, too, that his son, John Arundell, if anything happened to him, would "follow the silke works for I find his very fitt for it."[55]

The letters of the "French Vignerons, or Vinedressers" were reported to be hopeful in the spring of 1623 "those Silkewormes they have prosper exceeding well, and soe fitter they hope to send this yeare, there wanting nothing to set up that rich Commodity but store of hands wherewith England doth abound."[56]

While considerable activity was afoot in the Dutchess and Elizabeth

---

55
Ibid., IV, 98, 234-5.
John Arundell, along with William English, represented "The lower parte of Elizabeth City" in the Assembly of 1623. (Hotten, Lists and Index of Emigrants 1600-1700's, p. 214).

56
Wheelhouse, Declaration, p. 10.

City area, Pierce fought then living at Jamestown also was undertaking to advance his culture at Virginia's capital town. When he was reported to be in "almost daily attendance at the Council table" he was residing there at his plantation on the south side of the James River across from Jamestown. Rather, he had taken quarters in the home of Captain William Pierce at Jamestown where he "prepared the chamber where in I lye at Lieftenant Pierces (the fairest in Virginia) for that purpose [during sickness]." It was here, too, that Pierce penned the lucid of his two English verse.[57]

The residence of Pierce is believed to have been a new dwelling in 1623 and to have been located on the fringe of the "New Town" to the rear of the presently standing ruins of the earlier Rolfe. Pierce was exiled to Governor Sir Francis Wyatt's guard and was, in 1623, named Lieutenant Governor and Commander of James City, the Island, and the Blockhouse.

The Company in a letter to the Governor and Council on May 8, 1623, not knowing yet of these hopeful prospects, was much discouraged at the lack of progress in staple commodities. It was feared that whose visible progress (exports)—especially in iron, wines, and silk—was not forthcoming that it would harm royal favorites and the loss of the King's support. At this point Alderman Johnson's charges leveled

---

57

1. Ibid., IV, 68, 102; Charles W. Porter, III, "Historical Record on the Fort Huntle Tract, Fort Huntle, Virginia" (a National Park Service Report, dated December 5, 1952, in the files of Colonial National Historical Park, Yorktown, Va.), p. 2; Alexander, (ed.), The Colonial Lords of Maryland . . . The Land Grant Policies of the Proprietary Proprietors, 1633-1700 (New York, 1916), p. 174; Hotten (ed.), The Original Lists of Persons . . . , p. 174.

of the failure to this request did little to strengthen the Company claims. The question which was raised but for which no answer has been found, "whether the milkmaid on Easter Sunday 1623 [sic] [illegible] were not sold in July," indicates that actual milk was being shown to substantiate the claims that Virginia could produce it.[58]

Upon arrival in August 6, the Company wrote cheerily to the officials in Virginia reporting the necessity for production results particularly in the matter of "Vines and Silk." They were reminded that the Company invested "some fruite as we hope to in this returne." Such proof was needed to silence the "Whisperers of this Plantation" and to reassure the "well willers" who seem to "stagger us in expectacy of belief, either of the Countries fertilnes for them, or of the diligently of your selves our Interpreters for accomplishing of them." The Company called for combined effort, diligence, strict accounting and the enforcement of rules including the penalties for individual failure. The Colony officials were urged to supply Mr. Lake (and more of the "Frenchmen whose Worke is chiefly vndone." Every effort was to be made to have them stay in Virginia permanently and if not permanently then long enough to train others to direct the work. The Company was not to be a position financially to send others of similar skill, hence it was important that they be encouraged to stay.[59]

What has such effect this sharp reminder has in practice that, five months later the report of the Virginia officials was general and evasive with reference to the silk industry which the Company wished to promote. The documents ordinarily cite when any part of

---

[58] Kingsbury, Rec. Va. Co., II, 306-7 and 463, 511.

[59] Ibid., IV, 68ff.

the staple commodity although not the silk and wine projects were still considered active whereas things like the attempt to produce iron were at this time dead. Throughout 1623 there was outbreak on the increase and preservation of mulberry trees. Active men began to receive every freedom to raise (grow-silk) a garden of from one fourth (2) to a full acre and to plant at least 1 mulberry trees and 20 vines.

For the next two years records for detailed operations in Virginia are not as full as for the four previous years. It is difficult to follow the silk project which, although not very fruitful, seems to have been continued at least on an experimental basis. It is clear, for example, that George Sandys continued active in this. The census, taken early in 1623, records that he had "1 silkeman house and garden, and a vineyard of 1 acres," not at Jamestown where he had been putting silkgrass in the spring of 1621, but at the plantation (3) "Over the water," on the south side of the James River.

One list of persons living in Virginia in 1623, and the census of 1623 indicate that not all of the "Tenethem" who were sent to Virginia actually settled or remained in the Henrico-Citie-Dutch City area. It is possible that some were at "Martin's Hundred," a Bullen Wicket," Kiquotan (Citie), "Berrickle Hundr," and elsewhere. The implication is clear too that where these "Tenethem" lived there were silk operations at least for a time. If such was the case, as is indicated, then sericulture was attempted on a much wider scale than at the known

---

(2)
Hale., IV, 158, 202; Brown, Genesis of U.S., I, 169; Va. Mag., II, 178. Even prior to this date, however, a number of fruits throughout the colony including Jamestown and the "New Towne" patented there.

(3)
Va. Mag., VII, 261-71; Brown, First Republic, p. 488; H. C. Johnson, "Jamestown Island and 'The Road' Thereto," in Va. Mag., II, 176.

locations of Jamestown, Surry County, and Elizabeth City. Little more is known of these activities while they were under the direction of the Virginia Company which was dissolved in 1624.[62]

In the 1618-1625 period considerable attention was paid to sericulture in Virginia with negligible results. A considerable amount of seed was planted and some trees matured fully grown. The amount of actual silk produced, however, was not at all impressive. The effort in these years was but a continuation of that begun much earlier and there seems to have been no break in the work when the Company changed directors in 1619. Men, such as the servant of John Bennett, in Virginia for six years, 1615-1621, must have continued in their work despite the predicament of Company administrators.[63]

---

[62] Tatum, The Industrial History of Virginia, p. 222; J. H. Stowe, Studies in Southern Economic Development (Morristown, N.J., 1916), pp. 56-7.

[63] Bennett, Art of Silk, p. 24.

The dissolution of the Virginia Company did not end the hopes for staple production in Virginia particularly the production of silk. The Privy Council on October 24, 1625 sent word to the Governor and Council in Virginia that they should "use their best endevors, to bring" staple commodities "to perfection"--"Corne, Wine, Silke, Cotton, Salte, Sulfatch, Flax, Hempe, Indico, Woade, Madder, and the like." Governor Wyatt replied in the spring of 1626 that the country was growing populous and that such things would be given his attention "since all neither can nor must bee suffered to tend Tobacco." He then made the sensible proposal that a number of staple commodities be selected for exclusive attention rather than to scatter the effort so widely by grasping "all at once." But a "choise must be made," he wrote, "as vyne, silke, salt, fish and iron."

In 1628 the Governor, this time John Harvey, was again instructed to give attention to the staples which included word "to plant mulbery trees, and to attend silke worme." Earlier in the same year, in March, the Governor, Council, and Burgesses had written in reply to letters from the King in which they discussed the question of tobacco--"being at present under [the colonists] only cause of subsistence." It is clear

---

[1] Wm. Hand and Jeanne Morris (eds.), Acts of the Privy Council of England, Colonial Series (Hereford, 1908-10), I, 93; Wyatt, Letters of Instructions to the Governors Issued Under the Authority of the Commissioners for Virginia, 1625 to 1634, p. 104; Governor to Privy Council for Virginia, May 17, 1626, Kingsbury, Rec., III, 53. Sir Francis Wyatt further proposed that "there are neither to be reformed to the Industries of private men, then the multitude found to be employed upon thereinn." (The William and Mary Quarterly, 2nd Series, VIII, 164-5). Wyatt also, wrote "...certainly of the Malmsey, wherein of the Vynes, enormus of cattle unto be building, houses convenient for both seasons, planting gardens and orchards for delight and health setting vines and Mulberry trees for raising those two excellent commodities of wine and silke, is worke enough for one seven yeares, and will employ our whole forces, and all contributions of the well willers to this worthy letters ..." (William and Mary Quarterly, 2nd Series, VI, 164-5.)

from this letter, and from other sources, that the Frenchmen brought in by the Virginia Company to cultivate vines and raise silk worms (at least a number of them) still in Virginia. This gives, too, an answer for some of the lack of progress in their work for the letter relates that they "have purposely neglected or concealed their skill." This being the case, the Lieutenant and the Governor asked that others be sent and they made the proposal that "the colony ought be glad to defray the charges of sending over for that employment..."[65]

It is not established whether, or not, a proposal made in 1630 was in any way connected with this request or whether or not anything came of the proposal. It had to do with a number of Protestant families in France and England who wished to settle in New England, or Virginia, to traffic in silk and other merchandise. Mention was made of available mulberry trees and pointed reference was made to "the river St. Jaques to the south of Virginia."[66]

Early in 1632 the assembly took steps to discipline the Frenchmen who had been in Virginia for "these ten years" and had somewhat learned skills in sericulture. It was specified that they, and their families, were to be restrained and prohibited from planting tobacco, under penalty of the forfeiture of their leases and improvement, until they departed from the colony. It is difficult to determine if this was enforced since data for these years seems to be too meager to tell us much of silk and wines if such were being seriously considered.[67]

---

[65] Acts of the Privy Council, I, 117-8; W. Noel Sainsbury (ed.), Calendar of State Papers, Colonial Series, 1574-1660, (London, 1860), pp. 74-80.

[66] Sainsbury, Calendar of State Papers, Colonial Series, 1574-1660, p. 114.

[67] Hening, Statutes at Large, I, 161. There is evidence that Elias La Guard, identified as one of the French Vignerons, was still living, in 1633, in Elizabeth City. (William and Mary Quarterly, 1st Series, XIII, 289).

A somewhat isolated reference in 1638 reveals that there may have been a short lapse in the production of the silk worm's larva, however, that was followed by complete success. On January 10, 1639 Governor Harvey and the Council wrote to the Privy Council "Two are quite bestowing with silk worms for Mulberry to have lately presented to His Majesty a quantity made this years [illegible] in the country, which is thought fit to be Secretary Windebank." Harvey and the Council in a letter of the same date to Secretary Windebank described this as "the first fruits of their late endeavours." Here again there is record of Virginia produced silk, some thirty years after the first attempt at filatures, being sent to England as proof that it could be produced in the Colony.

Additional records for this period are scanty. Sir Francis Wyatt, going to Virginia for another term, was, in 1639, ordered to see that white mulberries were planted. This was one of the earliest references to the interest was in Virginia of any but the native red mulberry trees. This instruction was coupled with the direction "to attend silk worms." In 1641 a 1638 act for vine and mulberry trees was repealed. Despite this Wyatt's instructions were repeated for Sir William Berkeley in 1642--"every Plantation to plant a proportion of Vines, answerable to their numbers, and to plant white Mulberry Trees, and attend Silk Worms." How effective these instructions were remains a matter of conjecture. It may be that this was the beginning of Berkeley's intense interest in agriculture which reached a peak after his restoration to the Governor's office in 1660.

---

68 A letter from "Queen Christe" to Va. Mag., III, 341 Gottenburg, Colonies of North America 1624-1640, MS Notes.

69 Ibid., pp. 338-9.

70 Va. Mag., II, 207, II, 57 and II, 54.

The account of conditions in Virginia during the 1620's and 1630's pointed out that there was great progress made in the production of staple commodities with which being specifically linked among them. How much of this occurred before 1625 it is difficult to determine. There is more information, however, in a description of Virginia which occurred in 1649. This records a continuing interest and work in agriculture:

> And now they receive [illegible] which is sent them and their hopes are good of the thriving of it: a commodity that may soon exceed them all, also little known, were we rather all Naturalls as plentiful and at hand, the fish in abundance, the climate warm, and the work done in five weeks, most whilst there, by women and children as well as men, and it is time of the year in May, that it kindles and another [illegible] planting, sowing or the like employments. [71]

To increase the economic aspects of the situation the original evaluation placed on silk and other staple commodities in 1621 had by 1624 been increased (with little success, it should be said) with evaluations being raised from fifty to three hundred percent. [72]

---

[71] John Hammond, Leah and Rachel, or the Two Fruitful Sisters Virginia and Maryland (London, 1656) in Force, Tracts and Other Papers, Vol. III, Tract No. 14, p. 9.

[72] Further Information of Virginia (1649) in Force, Tracts and Other Papers, Vol. II, Tract No. 6, p. 6. Also published in Virginia Historical Register, II, 65.

[73] Williams, Virginia Valued, p. 32.

The Silkworm

It was with mystery and almost reverence that the promoters of silk culture approached the silkworm.

> . . . there is nothing in the world more proper than this studious show of Nature the Silkworm: to see this ant-sight artist spin out of his transparent bowels, himself such a movement out of his own intestine, as may be the theme of artists, such a theme that Solomon in all his glory might confess the meanness of his overall, in relation to the workmanly, cannot but bring them to admiration. 7/

The insect so highly regarded in its mature form was a somewhat inconspicuous looking moth (Bombyx mori) of an ashy white color and hairy body with four almost transparent wings measuring about one-half inches across. In length it is, perhaps, less than an inch. Being a true moth its life cycle passes through the customary four stages of egg (seed), larva (caterpillar), pupa (chrysalis), and insect(moth). The moths are white grey in color and very active averaging some 10,000 to the ounce. When hatched, the caterpillar grows from its very small beginning into an ash grey, or green colored, silkworth larva three to three and one-half inches long in a matter of some eight weeks with a greatly increasing appetite as the days pass.

Having reached its full development the caterpillar then spends some three days in spinning its 600 to 1,200 yards of silk around its body to form its cast, or cocoon, in which it lay for some 10 to 12 days in the pupa state. With its transformation complete it then breaks from its cocoon as an adult moth. Mating takes place almost right away and then, in from 4 to 6 days, the female lay its eggs, upwards from 500, and soon dies--completing the life cycle in about eight weeks. This is the general

---

7/ Edward Williams, Virginia / Virginia Silk and Trade Volumes, p. 33.



The silkworm "Butterflies" and "cods" — A 1622 interpretation

pattern although there are variations, depending on the particular breed of the eggs. They were even in the period under survey here many breeds since the silkworm had been mixed, for the most part, artificially and had been watched carefully for particular traits and tendencies.[75]

It was around this life cycle that the activities of silk culture were built. It represented concentrated work in the spring months and left little time to the worker from the hatching of the seed until the cocoons had been sealed.

The seed of the silkworm had to be preserved during the period from one harvest to the next. They were placed in a box and left in a dry location which was always sufficiently cool (but above freezing) to prevent premature hatching. The hatching had to be controlled to coincide with the leafing of the mulberry trees--"The Spring being over, and the mulberries budding it will be seasonable to put them to hatching." This was possible by a number of ways but the keeping them in a bone, in some pocket, between a woman's breast &c.[76]

The most highly recommended method was to transfer the seed from the small to a somewhat larger box lined with cotton, or linen, not leaving them more than one half inches deep. Over the seed was placed a piece of clean white paper perforated with small holes. On the paper were put a few young and tender mulberry leaves. Until hatching started some warmth was needed--both by day and by night. The box could be placed over the fire or heated with a pan every two hours, and at night placed in bed between pillows.

---

[75] John Clarke, A Treatise on the Mulberry Tree and Silkworm, (Philadelphia, 1809), pp. 22-23; Transcribed from American Silk, pp. 12-13.

[76] Edward Williams, Virginia's Discovery of Silkworms, with their benefit, and the Implements of Husbandry Fitting (London, 1650), p. 10, (hereafter cited as Williams, Virginia's Discovery); Transcribed from American Silk, pp. 109.

Then hatched "the little and blackish worms" crawled through the holes in the paper and on to the leaves. When the leaves were full they were moved to a larger "room or sieve" and new leaves were put in the "hatching bag" to accommodate the worms left to come up. Hatching began within three or four days and continued for "seven or more days till all be hatched." It was important to place together all those coming out within a two or three day interval. At this point the worms needed to be fed daily and attempts were made to stimulate them to the "readiness of the spring." The native seed hatched later and if too late were rejected.[77]

In this way the silkworm began to develop. In the period that followed it grew into a fully developed caterpillar and in the process passed through four periods of inactivity, each lasting 2 or 3 days --"three times each time enwrapped, ye[t] change his skinne, which in the space of his so many slothfulness." The first change, or moult, came in about 12 days and, as was true of later changes, was preceded by observable symptoms. When the sickness was past the worm changed color and moved on to the nearest leaves to feed. The succeeding changes occurred about eight days apart. The third change was thought to be more dangerous to the worm and at this time "cold spring" could be deadly.[78]

With each stage more space, more food, and greater care carefully was essential. When first hatched the worms ate about 200 square feet, but after the first sickness they stood at some 144 square feet. The rule of thumb was that if the worms crowd each other fifteen minutes after getting fresh leaves, then

---

77 Hartlib, Reformed Virginia Silk-Worm, pp. 6-7.

78 Williams, The State's Discovery, pp. 14-16; Hammond, Art of Making Silke, p. 21; Hartlib, Reformed Virginia Silk-Worm, p. 7.

It was necessary to transfer them to larger boxes, or shelves, and to "feed out the old leaves and their owners."[79]

The collecting of leaves and the feeding of the worms was a time consuming activity. As soon as the worms became active they needed to be fed twice a day a little at the time, then twice daily to greater quantity. Between the third and fourth sickness three times daily and after the fourth" as many [times] as they will eat." William Kenrick wrote, in 1830, "At the beginning we go to gather leaves with feathers-chiefs, then with baskets, lastly with carts & waggs." The leaves, properly selected and dry, were simply placed on the worms and every two or three days all leaves were removed and the boxes, or shelves, cleaned well. Good quality leaves with no yellow spots, mutilated, or imperfections were essential. If the leaves were poor then "One hundred of them give the last request that your Worms shall have most of... The most agreeable to all Worms is to be fed with leaves of their own age . . ."[80] Kenrick wrote that leaves from older trees should be kept until the "Worms have passed their third and fourth Sickness; for then it is, that they beget their silke; and the leaves of such old Trees beget more Silke than the young ones."[81] In no case should the worm be treated to a type of mulberry leaf other than that on which he has been accustomed to feeding. In gathering leaves care should be exercised to prevent damage

---

[79] Kenrick, Art of Making Silke, no. 17, in Hutchinson Book Concerning Silk, pp. 102-3.

[80] Williams, Harriot's Observations, pp. 26-27; Kenrick, Natural Wealth Advanced, no. 5.

[81] Kenrick, Art of Making Silke, no. 31-4.

to the tree. Clipping or plucking "hats after leaf" was undesirable, yet this was "most economical". A faster method was "plucking them from the branches" but it was more damaging to the tree and even stripping and "pulling" was to be avoided.

The 40,000 worms from one ounce of seed would require in their short life span more than 1,200 pounds of mulberry leaves—in the first stage, perhaps, 10 pounds; in the second, 20; in the third, 60; in the fourth, 180; and, after that over 1,000 pounds. To produce this quantity of leaves 20 trees (root and shoot) would suffice. The end result, within very approximate limits, was 150 pounds of cocoons (250 to the pound) yielding 10 pounds of reeled silk. In 1839 it was estimated that this would sell for about 10 ₹ and that the labor of a man and boy would be able to tend all of the worms from six ounces of eggs until after the fourth ecdysis. At this point, it would be necessary to add three or four helpers for the feeding and sifting of the worms.[83]

The silkworm was a sensitive soul, in many ways, delicate beast and reacted sharply to disturbing environmental factors. A contemporary rendering of this scene thought was made in 1839: "Quietness, pleasure, healthfulness, aliment free offensive vapours, decay and hardships, growth to the extreme of cold, sustenance in the extreme of warmth". That sufficient space was considered as a prime requirement to meet from this last statement: "It is a thing well known, that a few silk-worms,

---

[82] Williams, Kimball's Discovery, pp. 3-5, 6-10.

[83] Howell, Art of Raising Silk, pp. 7-9; Merritt, National Thesaurus, pp. 2, 17; Thornton, Some Leaders, pp. 100-07; Lowell, Reflections, III, 1832-7.

[84] Williams, Kimball's Discovery, p. 10.

fed at large, and some, some farre more alike than a greater number,
put in narrow and ill-favoured roe[65]."

Excessive handling of the worms was injurious, especially in the early stages of development. Cleanliness was particularly important, too, making it necessary to keep the boxes, or trays, scrupulously clean as well as the general surroundings. Clean and well "dryed" and scented hands were considered prerequisites for handling the worms and the smell of tobacco was considered deadly. "Tobacco . . . is exceedingly contrary and mortall to the Wormes; even the very breath of one that hath taken it, breathing upon them, will certainly kill them." The damage done by dampness in the room and especially the feeding of wet or moldy leaves was underlined and constantly stressed. Feeding, too, had to be carefully watched to avoid "the too sparing, or too abundant, administrations of victualls" especially in times of the sicknesse.

Ventilation, too, was important and it was recommended that the wax in the candles used for lighting should have a pleasant odor. In addition it was recommended that "the Lampes should bee affixed on the wall, and bee portable lights . . ." At times the worms needed bright light and again they needed soft, subdued light especially in the sicknesse. Some even thought that the fragile worms were "hurt by Thunder in Virginia," but the authorities rejected this.

---

[65] Bonoll, Observations, p. 22.

[66] Bonoll, Art of Making Silke, p. 10.

Specific diseases of the eyes were recognized and proper remedial measures were duly prescribed. Despite this it appears that in many instances a sickness became a relief war. The contagious nature of infection was recognized and the prompt removal of a sick, or dead, worm was urged with vigor. With certain clearly marked symptoms the worm was of further service only as a means "to repeat your fruitly."[37]

Experience counted for a great deal but it was thought that "one skilled in the 'Art Apiary' could teach a novice better him. Five or six weeks tending by a master was considered sufficient, but the novice with "arguments of brass and profit" was to be encouraged to invest his knowledge in those other bits. Attention to the honey rules was stressed for one in Virginia, however, careful observation and experimenting was considered essential--"We must not threadbare contemn the nature of the Climate to our Rules, but our Rules to it. . . ." Both "Books and experience are needful."[38]

In the end the silkworm reached maturity. Sometimes after they "were bitigned to their full bigness of body" they "ceased to eate." It was observed that they would "keep on the leaves without eating" and became "very light and dryes in their body." A week before

---

[37] Hall, pp. 7-10, 32; Hilliard, Virginia's Discovery, pp. 6-10, 21-23; Virginia, Reformed Virginia Silk-Worm, pp. 7-8, 10; Dickens and Lucas, English Folk, pp. 117-127.

[38] Hilliard, Virginia School, pp. 7-9.
In 1622 Bennett voiced the same needs of wisdom "Time and observation will teach you many particulars, out of which perhaps more rules of art may be made, as best fitting in some particularities, the Country and Climate of Virginia, which if they, after good trial made, you shall find out with the rest of your loving brethren, that in time they may be published also . . ." (Ark of Virginia Silke, pp. 7-8.)

this stage was reached, preparations were required. Branches of trees or vines, small yet firm, were needed—branches of "thirty lengths, both or either, brown, cuttings of vines," rosemary, chestnut, oak, elm, or ash. These branches, thoroughly dry and some 15 inches tall, were then placed upright "the bigger end resting upon the lowest shelfe" and the small end resting against the "next upper shelfe or board" with ledge spread and arched as much as was possible. The bees were at least an inch and a half apart. The worms and fresh leaves were then placed in the shelf. Soon eating ceased and the worms were ready "to make their tiles". At this point they would "be climbing up upon the boughes" where they could proceed to spin their cocoon. At this stage "you must cleanse them very often, because they dung much . . ." It was necessary to help some of the worms get on to the branches. In placing them there care to avoid crushing and to avoid contamination by unclean hands was important. Good ventilation was now imperative as well as sufficient heat which "comforts the Worms." Heat came from ovens or from "fire in the Chimny of the rooms, or in a pan with wood coales well kindled first." The work of milking the cocoon ("God," "silkeball," "bottom") required about 10 days and while the spinning went on it was reported that the worms made "a pleasant hunning."[59]

The silkworm remained in its "tod" for about ten days in the pupa state and then, if left undisturbed, emerged as a fully developed "butterfly," or moth. Before this occurred, however, it was necessary to select the cocoons to be set aside for seed production and to gather the remainder for immediate reeling or for treatment that would kill

---

[59] Ibid, pp. 21-3; Hillman, Virginia Housewife, p. 84; Williams, Virginia's Treasury, pp. 41-2.

the depositor. If the moth were left to develop fully and to breed the end it secured the silk fibre remarkably out of much less value.

The best "silk balls" were reserved for seed purposes with the estimate in mind that 500 balls produce about one ounce of seed. The double, or triple balls, (where several cocoons were joined) were often selected when the reeling of these was difficult. The selected cocoons could then be strung with thread and hung on "rafters, or wooden pieces." When the "butterflies" came forth they were placed on a dark cloth that the silk and the moths lay evenly together." Often eggs they were put on a cloth, preferably the best side of old velvet. These kind of eggs are much esteemed for silk. Silkworm larvae hatched together could be fed in the ordinary way on leaves, but they demand pet much scuffle. In short for eggs the best is, says "Oregon Grubber" and could be pinned off the cloth, or turned with a knife and if a few very close, the silkworm mixed with paper to keep out air and dust. This small box was then ready to be put "in a shady, dry & dry temperature place"—but the box was not to be quite air-tight the most harmful.

The greater part of the "cocoons" was gathered for reeling into silk—this was the harvest. The "rich" in the process, put it. The first thing, of the unwinding of the silk fibre from the cocoon, was less dove trouble-lately. "It is best to reduce the silks from off the bottoms before they begin to lay "butterflies" since the "dung" binding the cocoon

---

[1] Russell, Art of Making Silks, pp. 5-6.

In selecting "seed" care is put the correct proportions of male and female bottoms were essential. The former was "put in stronger and a fit place to work. The latter was large, active, quiet at rest and pointed at the other. Twice of good seed hatched forces to be the until about eight months cost. "Fourth hatch and cocoons." Then, too, is reference about the good seed worth while and the poor worth both.

together would not be set. Each was not switchable in most instances, however, because of the time element. Conveniently in most factories the dayrolls was filled to prevent access to the "can." This was done in several ways. It could be effected by the presence of the bottom to the hot side-way arm and then machining is cited. Then, too, they could be placed on boards in a "C" given "after you have opened your bread from the oven" or after it has been basted for the current and "all other" reasons. Here it was necessary to be careful not to burn the oil or to cause it to be "too much dried up."

Perhaps the preferred method was to take "great Cauldrons or Kettles, such as those [for "Sweets"] use, fill them half full of water, and bring a fire to the bottom" to heat the water. Then within each "Cauldron" place a "round tin or copper of plates and round perforated like a Sive or Cullender which may stand handy of the water. The account went lined on this platform and a "Sheet of Paper" and then the cullenders covered with the lids. The resulting heat and steam killed the bugs and left the oil clear with no color change and easy to strain. This resolved into the use of two processes to allow the customer

92

to be able to buy their requirements.

The final step was to work on grade the germs and then to peel off the milk fiber from each containing a number (five or six) to form a continuous, uniform, and regular thread of "raw milk" which was then ready for use in the knitting of silk products. In regard to this step for peeling it was necessary to soften the "germs" sometimes the several together and this was usually done in heated water in which, for example

---

92

Emerald, Art of Making Silks, pp. 87-91; Mills, Handicrafts Illustrated, pp. 324-5.

buttons, some "no-o-o-ture lye or liquor", "some crutch", or weed ashes, had been dissolved. This reading was laborious and the concentrating although thought to be simple enough for children to do.[92]

The "charmed" buttons, those broken by the emerging butterfly, were exhumed after they could not be pulled and were only opened with. There were not to be "tenderness in every button and button. They were then "dipt and washed and 'beat . . . with a round muffle of a good blueness upon a stone or some block' until white and smooth. Then rolled out, smoothed and dyed they were ready to be "cut on a diliatte and sphere as small as you can or please."[93]

The leather used was the sort that was the basis of contributors to their livelihood, however, it was known that other sorts, also, produced a different substance to suffice their purpose. This was a form of silk, that was not suitable for manufacturing purposes. Such was another kind found in Brazil in the stems of the calendars and were a result of the industrial silkworms. They were urged from Portugal, particularly about the middle of the seventeenth century, to be used in the theories. This, however, in part, at least explains the other persistent comment that Virginia was a place "where the Silkery and the Vines are elephantic."[94]

92
Hamlin, Reformed Virginia Silk-Worm, p. 10.
Each butterfly or cocoon, which is [illegible] thought better for this [illegible] Silke Worke . . . [illegible] subject to a continuous quality, from which [illegible] quality arises." Most from a "thousand" flies were thought enough flies to have an ounce.

93
Hamlin, Virginia's Memories, pp. 77-81.

94
Ibid., p. 72, Hamlin, Reformed Virginia Silk-Worm, pp. 23-2, 27.

"Silk Houses"

In the successful production of sericulture it was recognized at the outset that there were two important factors that must be observed — "First, the making of lodgings for the Silk-women; Secondly, the abundant planting of the best Mulberry trees ... to have the best leafe to feed the Worms...."[95] In Virginia shelter was, perhaps, the more important of the two, certainly in the beginning, since for food there was the native mulberry growing wild in some abundance.

To insure prompt attention to these matters abbreviated instructions were sent to the colony by the Virginia Company in 1620 and these were followed in 1622 by more detailed and very carefully prepared directions. In the years that followed these were further implemented. In 1656 it was specifically stated that the Colonists should "...first...make the lodgings and room for the Silk-worms, as conveniently and conveniently for them, as they may easily do their worke, to yeild you abundance of silke which is but a meane hyre, if you lodge them in a place improper, and contrary to their nature. The Chambers for to lodge and keep up the Silk-worms in, must be made spatious lightsome, pleasant, warme, and wholesome, free from ill smels, damps, fogs, and hurtfulness worse to cold, and cold in hot weather...."[96]

Suitable lodgings could be of two types both of which were known to have been used in Virginia. Accommodations could be arranged within a

---

[95] Purrell, Observations, p. 3.

[96] Ibid, p. 4.

[illegible] the Parishioners such as George Savage had at Jamestown or there could be a separate house for the negroes such as Savage had at his plantation [illegible] in Isle of Wight County across the River from Jamestown. The French called was authorized since housing was a problem and the slaves worked for "two months only in the Year," which, for the remainder of the year, he used for other purposes. Those requirements, it was ordered, should be as the house of a room 24' long, 16' wide, and 12' high to accommodate "the fifty-second family of ten persons at least".

In selecting areas in a residence, or in a building set apart exclusively for [illegible] action, it was important to locate it away from the ground to avoid moisture and to see that it was not the case the roof where there might be excessive heat in hot weather. In a three story building, the attic, the second floor was the most ideal. It was possible, however, to adapt a one story building. In this case it was important that the floors be dry and boarded. In addition the ceiling had best be "close laughed" as well. In no case should the worms be kept close to the [illegible] of the roof which [illegible] allows "the Chimney harmful to them, because [illegible] the Heat and the cold diminish thereof, and the heat of the Summe [illegible] is thereby diminished, when it flies from the roofe in his full force".

The feeding room, it was specified in 1621, "must have casements windows to open and shut on both sides of the roome, being opposite one against another, from East to West, or from the North to the South ... to procure good ventilation as needed. It was noted that "you must take heed,

---

[illegible] p. 1-3

[illegible]

[illegible] the windows be open and that have well glazed or screened, and made [illegible] to shut as close by a cold weather, but no cold ayre get in at them..."

It was important that the chimney be detachable and that the opening be [illegible] with "bars" to "keepe out poultry, and birds, which may fly in and make the house" when the windows were open and unprotected.

Windows were thought to "deale to be in a light place as to [illegible] admit the sun..." In addition to good windows it was recommended that the walls of the rooms should be "smoothly whited on the inside". The smooth walls would also tend to discourage the movement of mold a serious threat to the wares. It was primarily for this reason it seems that "finished pewter" were felt to be quite unsatisfactory "because they harbour dirt in time, which are great detectors of the Pewter". It was further put out that "All shining, scouring, and boiling, must be clean stopped, that there be no place of retreat left, for the fire, birds, bitches, or other vermine, unable to endure the [illegible] vermine." Materials for this were cited to be present in form of "lame", [illegible] "tiles", and "tiles".

Also included in this part were some specific instructions for the construction of a house devoted entirely to the silk work. These were, in general, similar to the directions of two years before. Several things, however, were not specified as will be seen from the description below:

[illegible] p. 6. For the types of casement windows seemingly favored was the [illegible] to supervise given on page 47A. This was one of the [illegible] tive treatises used to direct the settlers in their construction activities.

[illegible] Instructions, p. 6. In 1623 it was recommended as desirable to select or clear the lands of the Piedmont very well wooded. (Hilton, Virginia's Discovery, pp. 14-15)

[illegible] 1st in Indian Affairs, pp. 77-79; Williams, Virginia's Discovery, pp. 30-31.

"...there a place to read upon, over the library table, and there build a long bench, in form of a feeding alley, covered over, but a little higher and somewhat larger. They must cover it well, either with tiles, shingle, or other thing, against the heats and rains, for the preservation of the bench. And the side of the walles next to well closed either with planks, planks or other matter. In these walls, make many windows on both the sides of the bench: let the windows be of wood, to open and shut, and to give open to the morning, whenever they need it.... Then windows may be covered with glass, with thinnes may be set on or taken off the bench when need is.... Before this, that the rays of the windows beat not upon."

Bennett pointed out that when with "bright air" there a bit better that it was important to make necessary provision to keep the bees out, from the beginning, to the end of your "observation hive." It may noted that Virgil's dreamed with "Chaos Saturnia," to erect three "beehedging with," which will cost you nothing, but a little labour, to cut out some posts, and to fit them and set them up in the form and small quarre, and pricks, and thorns, and boards, to form the stone instead of walls, and to cover the south border of them."

---

[1] Bennett, op. cit. Making Hives, pp. 3-4.

[2] Ibid, pp. 77-8. Bennett also recommended that those hives that were not to be kept with them near the dwelling, should not be painted, to prevent the bees from entering.

[3] An account of various materials used in hive-making was presented in most of the bee culture instructions that were sent to the colony. (Williams, Practical Beekeeping, p. 114.)

This information was repeated in the instructions of 1650 when further account was made to the effect that there was an "abundance of Woods, which will runne out slit, and cleave into long lengthes, and breadthes, which by the directnesse of the Ground will ly in a manner, as if they had been sawn for the worke. All which must be so close layd, joyned, and nayled together, the one still laid over the other, that no Wind or Rayne may penetrate therein to offend that laborious Creature..." It was suggested, too, that "Indian Mats" could be used to good advantage to keep out wind and rain. Where the "lodgings" and living accommodations were built, for convenience, in the Mulberry groves away from a more settled area it would be possible, it was explained, to keep them together "not end to end" and "cast into the form of a Fort, which palisaded, and fortified by halfe a dozen good Peeces, will be sufficient defence against all the Nations..."[104]

It was thought important "to make a partition in one end of the house, and to board that corner as parked with boards," as a special area in which to cool, or dry, the mulberry leaves after they had been gathered. There would be two doors in this room with one leading into the area where the worms were kept and one leading to the outside.[105]

It was mentioned in the early instructions, and emphasized in those prepared in mid-seventeenth century that "lodgings" did not, of necessity, have to be complex and expensive. It was related that in some countries the people of small means brought the worms "to lodge them in that house which is their Kitchin, their Chamber, their all." Position the worms

---

[104] Williams, Virginia's Discovery, p. 347.

[105] Ibid.

were called in a simple "dry cabinet of Dover," after the owner of Kelly. In 1655 it was pointed out that even the Indian type of house built with "poles interwoven and covered top and sides with mats" would be suitable for silk culture.[106]

Irrespective of the type of "interior" employed, one feature was essential,--tables or scaffolds. These were frames in which the worms were kept from the time the "seed" was hatched until the cocoon had been spun. In 1732 they were described as:

> "...a certain frame of wood, with boards or little tables, one stage or story still above another, every one of which stages of tables or shelves must be distant from one another one foot and a half, or thereabout, and in every frame, there may be five or six stories or rooms of shelves, according to the height of the rom of the house, all of one distance one from the other..."[107]

It was important that the first shelf, or table, within the door be at least three feet from the floor and that the topmost one be six feet from the roof. To overcome the difficulty in feeding the worms, it was specified that they should be no deeper than four feet. These scaffolds were correctly located when they were in the center area of the room and not placed flush against the wall. This was a measure against waste as well as a measure to prevent loss of operations. The "border silkes"

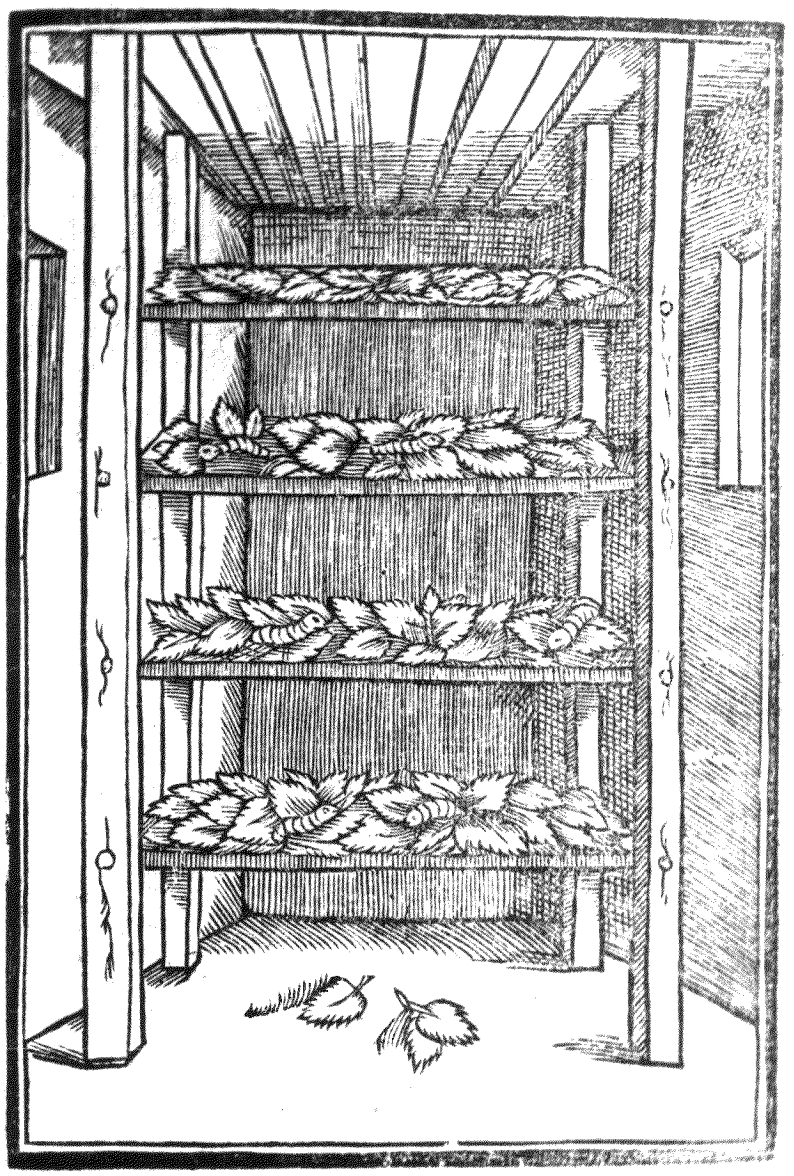
---

[106] Russell, Act of Making Silke, p. 8; Hewitt, Reformed Worlde Silke Worm, (Lond., Printed, 1623, Sheet 13), p. 17.

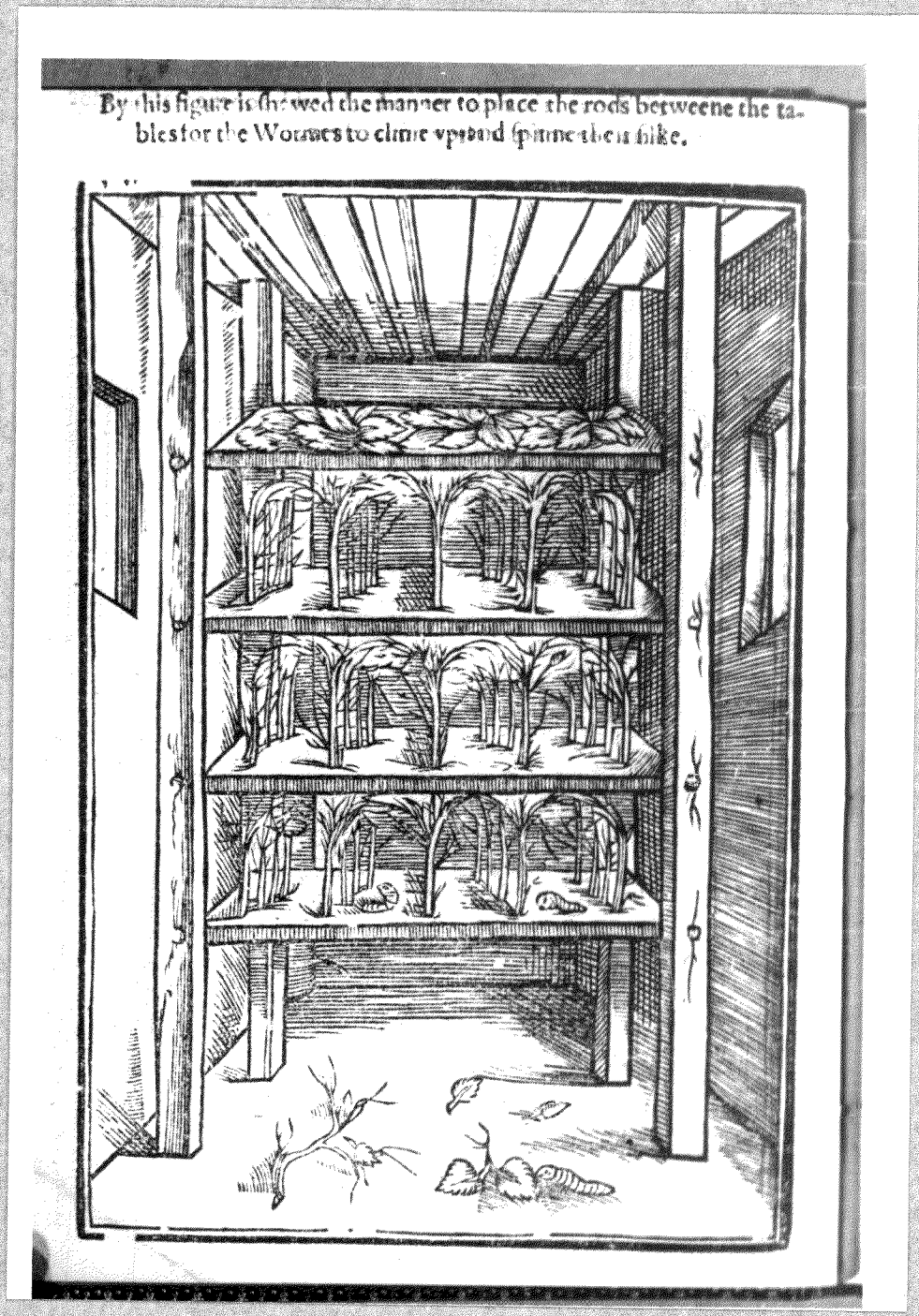
[107] Russell, Act of Making Silke, p. [illegible].

In 1656 these scaffolds were described as "square Pillars or Compartures," erected perpendicularly from ground to ceiling. The tables crossed the pillars and were supported by joints. Each table was four inches less in width than that under it, resulting in a "pyramidall forme." (Williams, Virginia's Discovery, p. [illegible].)

By this figure is shewed the order, to ranke the tables on the scaffolds, for to lay the leaues on, to feede the wormes there.



Feeding the worms -- A 1622 interpretation.



Accomodations for the spinning (a 1622 sketch).

Reinforcement in the frames were to be built of "fire" or of wood that did not have a strong smell. Indian oaks were recommended as better than wood shavings since they were porous and would allow a free ingress of air. Because of their flexibility, however, it was important in the event that they were used to support them with "several fothes of hoops" or to use "rods put thereto the bowed below of the sides of the frame, as hoderds to a bedstead". Several rods of coatrides could be set against each other if the size of the room allowed. It was necessary that the coatrides be sturdy to support the weight of the warps and to accommodate the "latter with the former slender", or the pillows, a "little matter" of boards.

As an aid to Virginia workers, diagrams were furnished to aid in the construction of coatrides. These frames needed to be rugged, yet it was suggested that they were easily built in large or small "patterns" and they could be of permanent or temporary construction. In fact, when necessary, they could be in a room portable. When needed they could be assembled and when not in use they could be taken apart and stored thereby freeing the room which they had occupied. Before assembly, however, it was important that they be sanded well and rubbed with "smooth smelling leaves, as with rosemary, fine, fennell or such like." In no case should they be contaminated

---

[108] Hewett, Art of Needle Work, pp. 5-6.

[109] Wilkins, Virginia's Pioneers, pp. 11-12. Cedar and cypress were recommended as first wood products for builders in Virginia.

[110] See plates given on pages 57A and 57B.

with tobacco, a substance considered deadly to the worm.

As in the case of beards, so in the case of scaffolds, an attempt was made, in the eighteenth century, to simplify construction. This, perhaps, was an effort to make silk-culture more attractive to more persons. Colonists were urged to "...take your Reeds and small Canes in Virginia, and run but a stout, wooden rod thereof there the Reeds which will hold them together, and so you may presently make shelves and tables...". The lack of mechanic or equipment reached a peak, perhaps, in 1655 when culture in the open on the trees was proposed. It was obvious, however, that the writers of these instructions were not so familiar with spring moths in Florida as they should have been. There was, on the other hand, quite possibly an element of truth in the observation that "...the Indians are too superstitious and ceremonious in the ruling which are many that they give concerning the ordering of the worm, which are not so necessary as they pretend."[112]

From the beginning the susceptibility of the silk worm to moisture and cold was recognized but it is not suspected that they sought to make provisions to control this. As early as 1682 detailed descriptions for furnaces, or "Kak-houses" were included in the instructions and

---

[111] Russell, Art of Making Silk, p. 10.
A refinement of the scaffold device was described in 1658:
"But the most assured way to preserve the Worms until their several changes in warmth and security from Vermine, dust, or other inabilities of nature, is by a Great Frame or Cupboard made with many steps, purposely or framed for the apportionments of the Glass with the Boxes, Mats of Rush, or Mats, and to draw out at will separately, equally distant frame inches, supported round about within Linnen Sheets to the Doors, with paper windowes the entirety of the coasting and those vacant places being left at first to enlarge them, as they increase in growth may be distributed according to the Rules of their first appearance on the Mulberry..." (Hilton, Virginia Discovery, p. 17).

[112] Bertin, Reformed Florida Silkworm, pp. 15-17.

exceptionally recommended for use in Virginia. This was a wonderful natural device on the hard description written by Jim Russell [illegible]. In a mostly one bedroom city house that would [illegible] In a large house, however, one was recommended for each suite.

"And it must be built in this fashion...First, a hole should be made in the house wall, through which your bedroom or study, and through which, as it were by duty, after the manner of the Dwelling Pens. The first mark must be at the center of the house, with a little thinner to it, and the back of the Pens, still in the front of the house. Then next you have entire pens, like flower pots, without holes in the bottoms, and screen on [illegible], which must be made separately so as they may be able to enter the first. These pots must be filled with a certain proportion of sand, between wet and dry, and so build them in, within the width of the said Pens, with their rims and edges the mouth of the said pots must stand out at the back of the Pens, and look into the inside of the house, for the bottoms of the pots must stand out and look towards the fire, within the inside of the house; and in this manner must the pots be incorporated within the Pens. After this done, you may make fine in the Pens that pots shall keep for the pots being hot, will thereby cast a smoke out, and warm all the house, and the smoke pots out of the chimney of the Pens's on the, at the middle of the house... These Pens or Stoves will last very well in Virginia, especially in those [illegible] which should be built between the Pens, there stone of thirty [illegible]."[13]

---

[13] Quoted, Art of Virginia Cities, pp. 6-7.

As an added improvement to the health and contentment of the worms it was recommended that branches of "rosemary, lime, thyme, juniper, etc" be put into the pots where the heat would cause their fragrance to [114] permeate the room.

Another item of equipment needed in the house was a wheel to facilitate the winding of the silk from the "cods". This was described in some detail and, fortunately, was depicted in an engraving designed to show "the fashion of the Engine, how to wind off the Silke from the [115] cods, with the Furnace and cauldrons for that purpose." This device was composed of a stove which was the source of heat for a container in which the "cods" were immersed in water. A skilled operator then unravelled the silk fiber from each cocoon and fed it in the proper manner through a winding device which in turn fed the thread on to a [116] reel which was rotated by an assistant operator.

This then was a well appointed "silkhouse" -- a properly designed and constructed house which included space for the silk worms and the hanging of mulberry leaves; proper shelving with tables, a heating unit, and a mechanism for reeling silk. All was to be operated by skilled attendants and helpers.

---

[114] Williams, in 1655, repeated in some detail essentially the same description as Bonnell.

[115] See plate given on page 51A.

A verbal description can be found in Williams' Hortulus Hesperus, pp. 10-11.

In 1657 it was stated that "The making of a wheel" was sufficient to describe an instrument. Consequently the gentleman had been reached to send to the Colony as soon as it was possible "a wheel ready made, and a man that shall instruct all such as are desirous to learn the true knowledge". In the meanwhile the silk growers were to do the best that they could on the basis of instructions already given. (Harrild, - National Heritage Silkhouse, p. 9).

By this figure is shewed the fashion of the Engine, how to wind off the silke from the cods, with the furnaces and cawthens for that purpose.

Winding silk illustrated (1622)

Cultivation of the Mulberry

The initial program for silk culture in Virginia stressed from the planting of a considerable quantity of mulberry trees growing in a native state. One of the reasons for the failure of silk production in England had been a lack of such trees, consequently greater attention was focused on Virginia and Italy as the other favorable colonies.[117] It was soon realized, however, that even with the numerous free grants given by the colony for an extended supply of trees to provide enough leaves to sustain a prosperous silk operation would require extensive cultivation. To this end the colonists were instructed in the best known methods of planting, rearing, and using the mulberry and conditions to interest developed in preserving and planting the trees. It is worthy of note that those burgesses who convened at Jamestown in late July and early August, 1619, to what was the first representative legislative assembly in the New World, voted to protect and increase the supply of available mulberry trees to the end that silk culture might succeed.

Since the function of mulberry trees is to support that organism which is termed scientific history, and the other pursuits employed by man to promote silk growth also mulberry trees at the basis and as here seen to be still highly essential, it is evident that mulberry shall have its place, and that all such persons as shall neglect the planting & maintenance of that small vegetation, shall be liable to the censure of the Governor, and Council of State.[118]

---

[117] Scott, _____ _____ _____ _____, p. 12.

[118] Hening (ed.), _____ _____ _____ _____ _____, I, 127.

This was but the beginning of a series of legislative and executive actions that followed one upon the other for decades to come. The cultivation of mulberries was encouraged by threat of penalties by reward of bounties by exhortation and by counsel with varying degrees of success.

Proper cultivation in nursery fashion should begin, it was outlined in the instructions sent to the colony, with the collection of fruit from the best trees — those with "the fairest and greatest leafs". When washed in several waters and after pressing by hand the small seed could then be taken from the bottom of the washing pan where they would settle. They could then be planted wet, or they could be dried and planted later, in prepared beds.

Nursery beds needed to be eight feet wide and of earth pulverized to the depth of two feet — "for earth, the more labor made small, and well dunged with goat and sheep, thoroughly sifted." The dry seed was then sown, to be placed, if the sowing after the dunge of fruit had passed, in "straight lines of equal or furrowes" some six to twelve inches apart and about an inch deep. Planting thusly would take it easier for weeding and watering — very necessary care in the first year.

Transplanting to new ground was necessary in the second year to give the plants more room for development. Here, their spread from one to three feet apart, they were to grow until they were once six feet high with a trunk "as bigge as a man can at his wrest." Proper pruning would favor branching. Having reached the desired state of maturity a second transplanting was in order.

During this, the last planting, the trees were to be put some 25 to 30 feet from each other. The distance depended in large part on the manner in which they were to be grown — as a hedge, "in the out borders of your

[illegible] at [illegible], we show the part of a distinguished [illegible] and words were most often strewed. In any case, extraordinary [illegible] 119 [illegible] to be taken to avoid the [illegible].

Transplanting was possible any time from September through April if "it be any frosty weather" or if the sun was not too hot. Perkins was convinced directly to [illegible] that they put, "all the roots whole and entire, without any being broken or bruised if it be possible," before moving they should be cut back sharply and holes should be prepared for them there could be always fully [illegible] enough to accommodate all roots and to keep them at the depth from which they were taken. The roots should 120 be carefully covered by hand having no "hollowness" about them.

The operation of [illegible] is more as a means of [illegible] than one of several methods of obtaining stock. Examples in which plants were grown from seed were recognized as rare, but it was also known to be a [illegible] end of fruit production. It was then according as well to [illegible] the other trees which were of more value -- Theophrastus teaches, that the leaves of the old Hickory trees are healthful for the bones 121 and more [illegible] than those of the young trees." It was generally [illegible] 122 rule to seek those where they grew naturally...which tended to better. Grafting was recommended as was the planting of cuttings, the latter being derived, -- "out your [illegible] as big as your thumb, shut the foot [illegible] and put them into good well-[illegible] ground in [illegible] setting them

---

119 Worlidge, Art of Gardening, pp. 83-4; Worlidge, Universal Planter, [illegible], pp. 3-4; Worlidge, Universal Gardener, pp. 4-5; Worlidge, Dictionary, p. 14.

120 Worlidge, Dictionary, pp. 9-10.

121 Bridge, p. 5.

122 Worlidge, [illegible] [illegible] and other parts of [illegible].

123 Worlidge, Art of Gardening, pp. 83-4.

a foot in the ground, bridging the ends of them, and watering them the next Summer will if need be ..." There were those who thought hopefully that poplar, plum, oak, cherry and apple trees would prove a serviceable substitute to feeding the silk worm. Such, although attempted in Virginia, did not prove successful.[123]

The care of adult trees was stressed and Harvell noted that "The Mulberry trees are to be harkened, opened, dipped, and dunged at the roots, as the Olive trees..."[124] Then upon planting was practiced, it was considered desirable to plant "Peas and Fetches" under the trees while it was recommended that corn be avoided since it impoverished the ground too much. The vine was thought to be a natural companion of the mulberry tree and the cultivation of the two together was viewed with high favor either when adult trees were preserved in a clearing or when a grove, or hedge, was raised from nursery stock.[125]

Mulberry trees were believed to prosper in a dry rather than in a wet soil. "The earth which is full of Springs, Lakes, Rivers, or (which is worst of all) Marshes, is particularly to be avoided." Excessively rich soil was not thought to be the best. It is true that it produced luxuriant foliage, yet its nutritional value for the worm was questioned.[126]

---

123 Hartlib, Reformed Virginia Silkworm, p. 22.

124 Act of Making Silk, pp. 2-3.

125 Ibid., p. 58; Edward Williams, Virginia Richly and Truly Valued, p. 18. "But wild Mores rooms naturally over Virginia, certain experiments declares the delicatie in the Neighbourhood of their beloved Mulberry-trees incomparable sweetnes over all that Country." (Williams, Virginia Richly and Truly Valued, p. 14.)

126 Williams, Virginia's Discovery, pp. 1-2.

The necessity for a large stock of trees was continually stressed, for one, it was estimated, would need some two to three thousand trees to yield a good profit. A further estimate was that it would take a thousand weight of leaves to support the worms from an ounce of seed "all also being small". Such a quantity of seed "takes easily five or six pound of silke." To produce a "thousand weight of leaves" some 20 to 25 good trees were needed.[127]

In the attempt to stimulate interest in the preservation and propagation of the mulberry tree, it was pointed out that while serving as the source of food for the silk worm was the first importance it was by no means the sole value of the tree. The yellow close-grained wood was considered good for the turnation of "Hedges and Edg and Arrowes" and wine casks. John Evelyn writing in 1670 spoke of "the Commodiousness and use for the Joyner and Carpenter" and its suitability for "Keeles, Oares, Shovels, and even Nibs for small Vessels in stead of Oak."[128] It was "best of Elme and Water" and its excellence for "Coaches" was stressed even in 1664.[129] Later, because of the wood's compactness and elasticity and the fact that it could be polished, it was thought to be of value to the upholsterer and carver. It was recognized too, because of its resistance to the action of water, as a good Pumpe part materially, being compared to the wood of the Lignum.[130]

---

[127] Worlidge, Systema, pp. 16-17

[128] John Evelyn, Sylva, or a Discourse of Forest-Trees, and the Propagation of Timber in His Majesties Dominions, (London, 1670), pp. 374-75.

[129] Worlidge, Systema, pp. 17-18.

[130] William Londrie, The American Silk Improver's Guide, p. 87; Edwin Jones, Common Sense Trees of America, (Charlottesville, Va., 1968), p. 13.

The bark of the tree was said to make "good linen cloth and Cordage" while the fruit was palatable to both human and animal and could be made into wine. The native Indian liked the nature mulberry fruit and for this reason had trees growing near their dwellings. During the first weeks in Virginia in 1607, it being mulberry season, the Indians often had them in quantity at the "Emporia" which followed the meetings of white men and natives. They even offered them in trade with the English. The fruit, too, was recognized as "good food" for poultry and excellent for hogs as well. It was further noted that the foliage of the tree which was left to fall at the end of summer when "given hogges to eate" helped to keep them in good state, and begin to put them in flesh."[131]

The production of silk on a commercially profitable scale in Virginia was doomed to ultimate failure; however, the successful propagation and spread of the mulberry through natural and horticultural means evidently was a pronounced success and, begun in the first days of the settlement, continued for decades with only an occasional pronounced lapse. Initially the native trees were simply left as nature had provided them which, as in the case of Mulberry Island, must have been in quantity. This place designation, still in current use, was given as early as July 7, 1610 to describe a large tract on the James River

---

[131]
Kennedy, Chamberlayne, pp. 17-18; Byrd, Commonplace Book, ed. by William K. Boyd, Jr., "Notes on the Forests: The Uses of Timbers in the Wilds of Colonial Virginia" in Virginia Cavalcade (Summer, 1952), pp. 34-41; Ed Kennedy, "The Use and Abuse of Forests by the Virginia Indians," in The William and Mary Quarterly, First Series, Vol. XIX, p. 247; Byrd's Commonplace Book: Natural and Commercial History, ii, 244. Henry Barham's An Essay upon the Different Species of Many Improvements Most Into Carolina Indeed (published in London in 1712) carried these suggestive headings relating to mulberry uses: "To preserve Mulberries", "To make Mulberry Sweet", "To make Mulberry Wine", and "To make Mulberry Brandy". Each was followed by a discussion of a proper method, or methods, of procedure.

[illegible] debates [illegible] documents.

The actual supply of these was [illegible] forwarded as [illegible] [illegible] and other items [illegible] aimed to support a [illegible] [illegible] [illegible]

Bylaws on planting and cultivating trees continued as in the instructions to Governor Wyatt in 1639 and Governor Berkley in 1662, yet data on the actual results is hard to come by. To stimulate interest, the Assembly in 1656 acted again to require planting by law. It was stipulated that every land owner should plant 10 trees for every 100 acres of land on the basis that it would provide silk which would become a profitable commodity. Less two years later the act was repealed as "rather troublesome and burthensome;" however, it was soon revived, and continued to be the law of the land.[134]

In 1662 it was agreed by the Burgesses that a special reward should be given to anyone who should "provide fifty thousand trees by the time limited." In 1663 young mulberry trees were in short supply and it was necessary to extend the time limit for planting the specified number of trees. The implication here is that the act was being seriously considered by the planters. A minister, Mr. Mundy, in Gloucester County reported in February, 1665 that he had "planted here already two thousand mulberry trees" and expected in two or three years "to make good silk."[135]

134

Hening, Statutes at Large, I, 533, and II, 30; Hatchings, Journals of the House of Burgesses, 1659-1693, p. 11; Mary Newton Stanard, The Story of Virginia's First Century (Philadelphia, 1928), p. 232.

135

Hatchings, Journals of House of Burgesses, 1659-1693, p. 83; Hening, Statutes at Large, II, 299; Bruce, Economic History, 2nd Series, II, 106.

Mr. Mundy continued: "I have planted them in an extraordinary way, which advantage from 2 or 3 years recovery in respect of being soon in ready and they are now, at writing hereof, February 7 holding good, in bud and having although this has been a very long and bitter winter with us, much longer and colder than ever I did find in Scotland or England." (Bruce, Economic History, 2nd Ser., II, 106).

Major Thomas Walker, also of Gloucester County, was even more seriously interested in the mulberry tree. It is reported officially that he planted more than seventy thousand "White Mulberry Trees" in two years - 13,000 in 1666 and 57,755 in 1667. As a result of this he attempted to collect the bounty which had been offered and on October 2, 1667 the House of Burgesses ordered to account 30,000 pounds of tobacco as a reward since he had "planted trees from his own and since he had "advised the Government accordingly."[136]

In 1666 the sequi-bicentennial planting of mulberry trees was again stressed with the Assembly expressing the wish "in hope that since it had been established that silk culture was beneficial that "all our people are convinced of the profits accruing thereby will of their own accords vigorously prosecute those now apparently profitable designs."[137] By this date, it seems clear the mulberry in several types was a familiar part of the scene throughout the Colony. At Jamestown, as could very well have been the case elsewhere, the mulberry was prominent in land descriptions being one of the most frequently cited boundary marking trees as seen in the phrases "a young Mulberry tree on the North side of the Lane already" "the Mulberry Tree", "another former Mulberry", and the Mulberry tree by the water side."[138]

---

[136] Hotchkiss, Chronicle of the House of Burgesses, 1660-1693, p. 104 No. 1666, 1667, 1668.

[137] Hening, Statutes at Large, II, 281.

[138] Jamestown items in the Hening Papers in the Library of Congress and Land Records in the Virginia State Land Office (photostats in Colonial National Historical Park Library, Yorktown, Virginia).
Other trees mentioned as landmarks in these records are "pokeberry", "persimon", poplar, red oak, pine, and white oak. In the case of a number of these trees, including the mulberry, it is possible to pinpoint their location on the ground today although they no longer stand.

The Subway Line

[illegible] [illegible] [illegible] [

It was also the settlers realized that they were confronted with a new species of the military type — one unlike the white military [illegible] but less noticeable generally than the white military — it is difficult to determine. Edward Williams writing in 1630 described only the white and Black species, however, his discussion on military terms, and on many aspects of white military seem to have been taken hastily from Penrith's writings thirty years before. Also Wolfe in 1670 did not describe the red species although the discussion it was to be noted, the settlers largely on Puritan terms. It may be significant that Governor Winthrop's instructions in 1631 and those of Governor Bradford in 1632 omitted an order for the shooting of native Indians, however, instructions directing reformers generally did not specify a particular race. If these instructions are taken literally it would that [illegible] was being, or had been, exterminated from Europe, for no trace of this species from native to eastern America. By 1650 it must have been well established since one may note Thomas Hutchinson's history, he presented as having planted over 70,000 in two years. Further it has been noted by this date that the native species have not characteristics unlike either the black or the white military-American differences in body, head, and teeth.

---

[1] "All the trees will serve to maintain the military, but the white military (being this) and its varieties, are considered with the best," (Thomas, [illegible] of America, p. 100). This same thought is expressed in Edwards, [illegible] p. 201, and Williams, [illegible] p. 124, in [illegible] p. 201, and [illegible] p. 124.)

[2] Williams, Penrith's Planters, pp. 1-2.

[3] Wolfe, [illegible] pp. 3-4.

[4] [illegible], II, 207 and 214-15.

[illegible] recently a native of Perth, had been taken for
[illegible] the Northernmost and had been elected to England for
[illegible] the service of Inverness, at the opening of the
[illegible] century it was thought preferable for all communication
[illegible] like it was seen to be largely to the main tracks but
[illegible] to be placed and added for the [illegible] high, about
[illegible] of the [illegible] street station. It was known
[illegible] should be visited and it would have been natural for the
[illegible] to have brought in a prime [illegible] at least some of the
[illegible]. That there was an exchange of [illegible] between the [illegible] and the
[illegible] is an early date is well known, but having differed
[illegible] in that they were either owned and [illegible],
[illegible] a problem, hence they [illegible] to [illegible] the [illegible]
[illegible] [illegible] was capable of attaining great age.

[illegible] [illegible] [illegible] [



A veteran white mulberry (Morus alba) at Jamestown, Va.

Beverley mentions the white specifically and calls it one of "four Mulberies" certainly indicating, as he did in the case of Morus nigra, that at the close of the seventeenth century it was well established in the Colony. He spoke of them as "tall spread large bodied Trees, which run up surprizingly fast. These are the proper food for the Silk-Worm." Byrd, too, commented on the white mentioning that its fruit was not as good as the black--a point also noted by Beverley. Somewhat later (1762) John Clayton, in a more professional manner, specifically listed the red, the black, and the white as then growing in Virginia.

Although at first not properly identified, or evidently the native mulberry was used and observed and eventually recognized as a tree both alike and distinct from the mulberries seen previously in western Europe. It took some time for the colonists to conclude that the Morus rubra was generally not as suitable, although it could be used for raising silkworms, as were a number of varieties of Morus alba. That was known much before William Byrd's Natural History was published, however, in this the conclusion is rather concisely and effectively stated:

> This species of mulberry trees [five to be found in Virginia]. The first of them is the common red mulberry tree, which becomes ripe earliest of all fruits (except strawberries) and has fine sweet berries. These trees become very tall and large here, and give a very beautiful and pleasant shade in summer. Their juice is crimson red, and gives good wine, but no one hath to take trouble enough in order to make it. The other species has

---

153 Beverley's History of Virginia, pp. 131-32.

154 Byrd's Natural History, p. 34.

155 John Clayton, Flora Virginica editione Gronovii (Leydae Batavorum, 1762) as printed in Reginald (Cambridge, Mass., 1946) p. 116.

very tender foliage, food for silkworms.

It is the red mulberry that contributes to it the most extent of the three species in Virginia. In habit the tree sometimes reaches 60 or 70 feet and its dark wine red berries can be both large (one inch or one inch and a half long) and pleasantly sweet. The fruit usually matures in early July, although Dr. John Smith spoke of the berries being fully ripe in May and in June. It produces short branches which grow into a round head and its bark cannot harbor the woolly louse. They are a rather medium sized tree and a fairly fast growth. The buds are alternate and the dark brown to reddish twigs have flat stipules. The light yellowish colored wood is that which was favored for flute parts and for some kinds of boat construction.

---

[156] Lyon, Sacred History, pp. 31-37.

[157] Peter Kalm has been lavish, too, in these references. Among [illegible] he was fascinated with the "red or Virginia mulberry-tree" and is said to have been acquainted in his boyhood days in the Swedish country. (Peter Kalm, Travels into North America, pp. 57-58; William Vaughn, A Treatise on the Culture and Management of Fruit Trees, (Albany, 1809), p. 145).

[158] Kalm, Travels into N. Am., p. 58; Downing, Fruit and Fruit Trees of America, pp. 476-77; Michaux, North American Sylva, pp. 74-75; Browne, The Trees of America, p. 239; Martin and Hanson, Handbook of Agriculture (Rev. ed.), pp. 376-77; Sargent, Manual of Trees (7th ed.), pp. 424-26.

Paper mulberry

There is another tree that ought to be mentioned at this point. It is the paper mulberry, so named for the use to which, particularly in Japan, the inner bark is often put. This tree is often distinguished from the ordinary mulberry chiefly by the fact that its leaves are usually lobed. In Japan and in other countries adopting in the colonial era and in subsequently accepted as being well established in this country prior to the American Revolution, formally the paper mulberry (Broussonetia papyrifera) is of a value entirely from the bark and consequently possesses characteristics which set it apart from the mulberries who value is truly multiply purposed.

It is probably correctly said that man was native to China, Japan, and Polynesia, but in America can not be found from the bark to florida and west to Nebraska. It is often an escape from cultivation along it is usually propagated by suckers as well as by layers, root cuttings, and seeds. It is a fast growing tree that matures early and often gives a large shade. The trees frequently reached at a short distance above the ground have numerous branches. It is a dioecious tree with large inconspicuous, but deeply lobed, leaves. The trees are rough and have no prickles. The tree drops leaves, has fly ordeal on the fall when entire, chiefly, in autumn there is a yellow tint which makes the fall from the tree. The catkin like flowers appear in the spring with, or before, the leaves. The fruits, resembling in appearance the fruits of the mulberries in shape and size, ripen with the leaves in the fall. The fruit of the mulberries is fleshy sweet. The fruit of the tree, especially the young trees,



A Jaguar safhung (Leopardus pardinus) at Zoo Atlanta, GA.

the seed into trees and others had grown confidently in England to permit the transfer across the Atlantic in each case. It has been reported that the first sole plant (the most common food) of the Pennsylvania copperfire was introduced from Europe in 1751 by William Hamilton of the Woodlands near Philadelphia.[141] It does seem highly significant that John Clayton did not list it in 1762 although he did mentioned the imported Morus alba and Morus nigra.[142]

It is of interest to note that Thomas Jefferson, who was ever alert to add to his garden at Monticello, did not, judging by the entries in his Garden Book, actually obtain paper mulberries until 1806. These he obtained from Thomas Main at the cost of 50¢ each and they constituted the first in a number of plantings which he made. In 1815 Jefferson recorded that the paper mulberry was "the most beautiful and best shading tree to be near the house, entirely clean, bearing no fruit, generally not known in America." As late as 1860 the paper mulberry was being sold in New York for 50¢ per 100 male and 75¢ for the female plant and price consistently in excess of the white mulberry (Morus alba).[143]

---

[141] Sargent, The Trees of America, p. 161-62.

[142] Clayton, Flora Virginica, p. 146.

[143] Jefferson's Garden Book, p. 338, 344, 536, and Elsworth Lewis, Advertising, III, 1961-62.

[illegible] by [illegible] and [illegible] by [illegible] [illegible] and
of [illegible] primarily by the [illegible] of Virginia Planter and the [illegible] of
[illegible] Chamber, Second Dwelling, and Offices, there was a [illegible] of [illegible]
to [illegible] [illegible] but the Policy of the [illegible] in the [illegible] of the
[illegible]
Seventeenth Century.

[illegible] that the climate was favorable, that proper food was
[illegible] to [illegible], that [illegible] generally used, and [illegible]
here, or could be had, plentiful, and that [illegible] [illegible], [illegible],
and [illegible] [illegible] problems. The Dutch had [illegible] and [illegible] a
[illegible] [illegible] of [illegible] [illegible] [illegible] [illegible] over Albany. The
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

Perhaps the bit of verse by John Carver Edmondson that says it all is the last two lines of the often-published sonnet

> Where Venus and Jove the naturally steward,
> A Gilbert Chinn Tech can here be found
> Florida swells the world in rod,
> Jones and Dalton can give any Bids truth.

Among the bits selected from Edmondson's verse, several are fine or questionably more original or previously noticed but little embodied points. One was the possibility of a double, or multiple, bill harvest each year -- "Neither do I comprehend a northbound Shrimp may be on Tampa's Atlantic as that of Florida, there may not be a double Nine harvest." The use of natural setting, mentioned as early as 1939, was most spectacularly discussed by Samuel Martin in 1955, who went on to promulgate the latest idea on mate's dilemma, from the cultivated type, in the open to naturally growing trees. He observed that the average of trees was the only real Reason that Florida did not support with plenty of the Sarasota wild-to Shipworms." Such natural feeding was heralded as a new discovery by Florida farmers.

---

[26] Martin, Informal Florida Oil Corp, p. 31.

[27] Gilliam, Florida Shrimp and Their Friend, pp. 3-4ff.

[28] Informal Florida Oil Corp, pre. Shelly 16, 21; Green (ed.), Shrimp as the Economic Factor, p. 17.

[29] Edmondson, Florida Shrimp, pp. 1-2. Edmondson's verse, it was said, was "not to be taken seriously by the critic" and consequently would not have been cited except for its relation with other work, not even with whom "if you will have read it once."

It was rejected authority, too, that the Indians could be shut up in a reserve for the sake of the later shocks by tearing the tribes out by the roots of the "Dead". It was thought that it would appeal to their authority and individualism and might be attractive to them to wrap the dirt children could be sent of the race. Indeed it might even be a blow from God was aimed with them and Luther crowned the [illegible] with the expressive proverb: It . . . becomes [illegible] the Devil, to which no people more thereto are more inclined. . . [illegible]

An understanding of Indians at this time may be had by the [illegible] for critical opinion from other countries "We interpret on to the Indians." It was pointed out that their ways, with the exception of some superstitions from their contacts to discover it may come from the reserved to communities their tendency, they may be observed, noting the continuance of their freedom of a stage in the capital of every land there . . ." Contracts with the should be correspondingly learned to every detail. The "Indian-friendliness" of sometimes but it was thereby there the original sense why Virginia as this day death but accept with that emotional sensibly of city. Those who had been learned writings had been [illegible] to labour in the quality of Indians." It was only proved that they had exposed their experiment of the [illegible] native their customs and in exchanging the race.

In spite of a [illegible] and putting [illegible], despite the adequate methods and her protection, that the current and economic difficulties, despite the [illegible] in Indians and the need for

---

[1] Quoted, Merritt B. Pound and Hugh Shearer, [illegible], p. 10.

[2] Indian Affairs.

quick profit to finance slave labor, and despite inexperience and the lack of trained workers, efforts in sericulture were expanded in the 1650-75 period. Possibly one of the spurs that set off the new and other combined efforts was the shipment of a "store of Silkworme-eggs" by Virginia Farrer who was interested in seeing that none who wanted a stock to begin the "Silk-work" would lack it.[171]

One of the most prominent persons to espouse fully the cause of silk in this period was Edward Digges who, in 1650, had established his home on the York River, between Poligbon and Indian Field Creeks, some four miles above present Yorktown. He, coming from a distinguished English family was the second governor of the Colony in the Commonwealth period, succeeding Richard Bennett, after selection by the Assembly, in March, 1655. This office he held until March, 1658.

At his home on the York, Digges distinguished himself also, first other than political, growing a remarkably fine crop of tobacco known as the "C-head" which gave his estate the designation "D.H. Plantation." He himself appears to have been ever prouder of his interest and success in the raising of the silkworm. His wife, Elizabeth, saw fit to incorporate pointed reference to this on his epitaph which is now in the old Digges burial ground adjacent to the York where he lived comfortably and

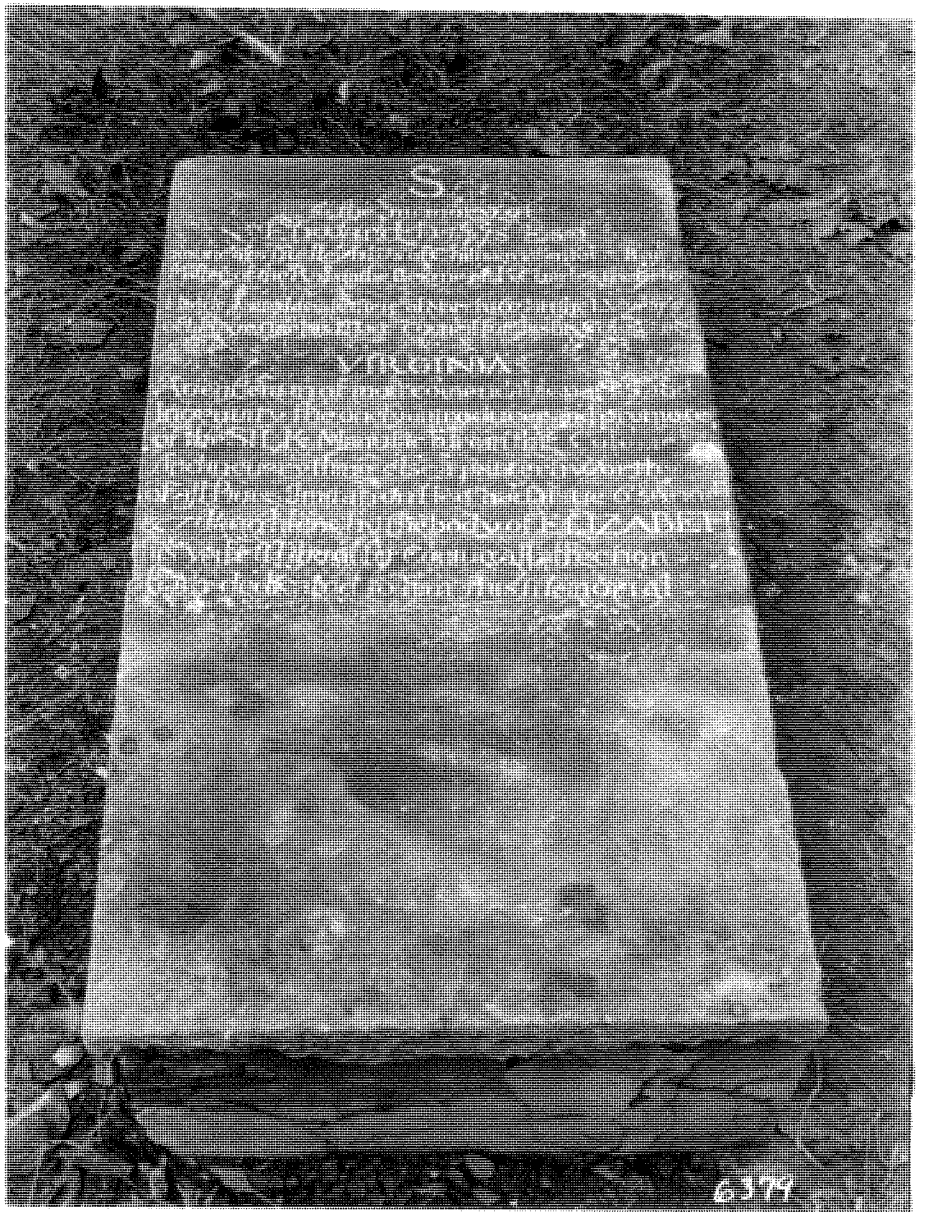
---

171

Berkeley, Historical Magazine, pp. 11, 71; Robert Beverly, The History and Present State of Virginia, p. 110; Pierre, A Treatise on the Culture of Silk, p. 10; Philip Ludwell Grove, The Ancestry of William Fitzhugh and His Wife Ursula Beverley . . . (Oxford, 1964 — a reprint), p. 16.

The Edward Diggs Tomb at Bellfield
near Yorktown, Va.

"S
To the Memory of
Edward Diggs Esqr.
Sonne of Dudley Diggs of Chilham in
Kent Kn't & Bar't
Master of the Rolls in the Reign of K.
Charles the First
He departed this life the 15th of March
1674/5 in the LV yeare
of his age, One of his Maj'tys Councell
for this his Colonie of
VIRGINIA
A gentleman of most commendable parts and
Ingenuity, the only introducer and promoter
of SILK Manufacture in the Colonie
And in every thing else a pattern worthy
of all Pious Imitation. He had issue 6
sonnes
and 7 daughters by the body of Elizabeth
his wife Who of her Conjugall
affection
hath dedicated to his this Memorial"



74A

and there he was buried after his death on March 15, 1675.[172] It reads in part, "A gentleman of most accomplish parts and dignity, the only introducer and promoter of the Silk Manufacture in the Colonie, and in everything else a patteen worthy of all Due Imitation. . . ."[173]

Edward Digges was spending his silk interest well before he became governor and was in correspondence with the farmers in England. A letter from Digges directed to John Farrer in Buckinghamshire and dated June 24, 1624, was printed in the following year and in this form is still available. In it he commends about Farrer's "many and severall letters, printed papers, and Charles" which he had received. In it, too, he requested that Farrer "present my service to the vertuous Lady Virginia."

In this letter Digges related that "I am confident I have conquered all the great feared difficulty of this rich commodity [illegible], and made its easy and speedy Profitt as evident to all Christians." He felt that it would be of great benefit and that England, too, would reap considerable profit. He hoped that he himself might have "the content and joy, in setting up so noble, so heartfelt, a staple commodity."

In the spring of 1624 he was hamstrung by an inadequate supply of mulberry trees near the "present Plantation," and this "only difficulty made me to make but 200 pound weight of Silke-threame" which he then had wound. In addition to this he made two pounds of "Seed" which he intended to "give away to diverse Planters" to whom he hoped to show that silk

---

[172] Elwert Lee Shattuck, Ancient Seat of Governor Digges" in Historical Notes (A miscellaneous periodical prepared by Colonial National Historical Park), Jamestown, 1938, pp. [illegible]; William and Mary Quarterly, 2nd Ser., IV, 3-4; Tyler, Cradle of the Republic, 2nd Ed., p. 45; Lyon G. Tyler, Encyclopedia of Virginia Biography, I, 1915, p. 1; Lyon G. Tyler, "Governor Digges' Ancestry, Family and Descendants," in Tyler's Quarterly Historical and Genealogical Magazine, I, July 1919 to April, 1920, pp. 1-11.

[173] See illustration on page 74a.

would "put an all higher their too such talented Silkers, but that they may proceed with both together." Then, they too could become "Silk-[174] workers" as was Digges.

It was about this time, too, perhaps that Digges sought to import workmen to teach him the skills of silk culture. At the "very great charge" he "sent for two Inventors out of Turkey, skillful men." It may be that Digges, who was governor then, had a hand in the Assembly action which in 1656 set aside 4,000 pounds of tobacco for "Thomas the Inventor" to encourage him in the making of silk and to induce him to "stay in the country and continue the same." It may very well have been, too, that Digges had a voice in the measure to stimulate the planting of mulberry trees and to provide a bounty for silk production - acts which passed in the years 1656-1657. It seems ironical that the payment of tobacco in 1657/8, as in most other cases, was limited to bags of twenty-five pounds so that he would first produce 100 pounds of wound silk in one year. A law of 1656 had estimated that ". . . by experience silke will be the most profitable commoditie for the country [175] (if well managed). . .

Edward Digges in the period of the 1650s and later was by no means alone in the production of silk. His fellow workers and associates were well scattered within the Colony. There was Col. George Ludlow who moved from his earlier home in Norfolk County and settled on the York

---

[174] Beverley, Historical Virginia Silkworm, p. 27.

[175] Ibid., p. 28; Stanard, Story of Virginia's First Century, pp. 238-41, 244; Hening, Statutes at Large, I, 400, 404.

George the Inventor apparently remained in Virginia for some time for in September, 1663 the Assembly granted him the specific reward for "having procured the making of ten pounds of wound silke". (Hening, Statutes at Large, II, 199).

just downstream from present Yorktown. He, as did Hayes, thought "That thence from silk great profit will arise" and he hoped "That he and others shall soon weave" "rich silken stuffs made wholly there [in Virginia]." In Charles City County a leader in the enterprise was Major John Hamthrope who was also loud in praise and in hope. Then, too, there was George Webb, "That prudent old planter" of Isle of Wight County, who in 1656 sat in the Assembly at Jamestown. Silk promoters in the Norfolk area included the name of Mary Ward, cousin of Virginia Pawley Sr. Richard Russell, a "learned Physitian" and, possibly Mrs. Sarah Willoughby. In Nansemond County there was Master William Bright and Mrs. Thomas Burbage. In James City County Col. Thomas Pettus was a leader, while in Middlesex County there was Sir Henry Chicheley.

It was Edward Hayes who led the way, however, if the following bit of verse by John Pory, Jr., is accepted:

176

The Stone House, home of Augustine Herrman, where the surveyor lines for Cornwallis were drafted on October 18, 1781, still stands adjacent to the site of the earlier Indian town.

177

Hamlin, Reformed Dutch Churches, pp. 25-31-35; Tyler, Encyclopedia of Virginia Biography, I, 51, 111; 272, 318, 357; Conrad A. Wall, The Irish Settlement in the Colony under the Duke of Charles the First and Second, (Albany, 1928), p. 208; William and Mary Quarterly, 1st Series, VII, 228, 291 and III, May Meeting, Yearbook at large, I, 106.

Others mentioned as silk producers, or experimenters, were Lawrence Ward (a landowner in Isle of Wight County), Esq. Ino Perry, and Mistress Hayth.

But while Byrd carries the ball away
(Land west of ogle note to credit the away)
To the Frenchmen from Turkey sent
Are now left busy on his barren attempt
And had he stock sufficient for next years
Ten thousand pound of silks would then appears
And to the cities his worthy deeds upreare.

Byrd was something of an experimenter, too, as is revealed in a letter which he wrote from Virginia to Bailey Belsar in England. In this he remarked: "I have kept leaves about twenty four hours after they were gather'd, and then, water sprinkled to keep them from withering; yet when I have fed the Silkworms without wiping the leaves I observed they did as well as them fresh gather'd. Further . . . I never observed but the moth of Worms, or moths which are hurt, did any ways annoy the Silkworms which is contrary to the general received opinion. . . ." Likewise he found that thunder had no effect on the worms -- "In Thunder, . . . [they] kept to their business as if there had been no such thing." Baily he found to be a good material for making "Grounds or hooks Branches" on which the worms could spin without any regard for, or inconvenience from, the "prickles." At the time of his letter to Palmer, his experiments on the two crops per year basis were inconclusive due to errors, or mistakes, on the part of his servant. On this he wrote "I must crave your patience till next year."[178]

Statistics to determine just how much silk was produced or how much time was devoted to the enterprise are difficult to obtain. It seems that production was small, but the time used was considerable. John Hammond

---

[178] Smith, Historical Records of Virginia, II, Misc. No. One, 77, Letter from Wm. Byrd to Bailey Belsar, 20 June 1684. The letter of 12 Feb to Palmer is given in Hunter's MS Diary.

writing in 1656 spoke hopefully of tobacco being "laid by" in favor of planting of silk (a sample of 100 lbs. both already been sent for England, [179] and approved of . . .)". No connection between this and the persistent report that Charles II wore a robe made of Virginia silk at his coronation has been drawn. Doubtedly, however, Virginia silk was there to be used. It appears clear from a letter to Edward Digges, in March, 1660, that he had taken silk to England, where he went as a special agent in 1658, or that he had received some while there for presentation to the King -- silk produced by Col. Thomas Pettus. The letter reads:

"I have att last obtain'd a Transcript of his Matties gracious and kind acknowledgment of the Satisfaction hee received in the present of silke made to his Matie by yor hands from Colonell Pettus . . ." The letter continues with an expression of the King's interest in enterprises such [180] as silk.

Edward Digges persisted in his interest. Hornsby, in 1670, in recommending him for the post of auditor-general of Virginia, a post which he held from 1670-1675, spoke of him as the man who had moved the [181] fellow Virginians how to successfully wind silk.

---

[179] Lyon and Hatch, or the Two Political Sisters Virginia and England, p. 17

[180] British Museum, Additional MS, Manuscripts, Manuscript Division, Library of Congress, No. 11411, p. Penn's Register of Letters Relating to East Jersey, 1676-1680, folio 6a; Hening and Hunn Statutes, 2nd Ser., I, 64. John Hart (Mayor of Norfolk, p. 10) quotes Chamberlayne, p. about 1684, to anything that he had seen Virginia silk which was as inferior to that produced in other countries. This here fools could be the source of the accusation made above.

[181] Hamond, Story of Virginia's First Century, p. 216. "In a brief Memorial concerning the Affairs of Virginia" (1670) it is related that "the present Governour [Berkeley] ... granted his commission to Edward Digges Esq. (a person every way fitly qualified for it) who by his great industry and charge hath fully brought silke to that perfection, that the Plantation hereunto (in all probability) will shortly be much increased by it." (Va. Mag., XIX, 360).

He continued to raise worms at his York River plantation as well as on his acres at "Denbigh" in Warwick County. A small ball of raw silk said to have been produced by Edward Digges at "Denbigh" in 1675 has survived and is being preserved in the rooms of the Virginia Historical Society in Richmond, Virginia.

When in 1660 Sir William Berkeley became for a second time the royal Governor of Virginia, an office which he held until 1676, the Colony was again headed by an executive who believed that silk had a real future as did other of the so called staple commodities. He saw the evils of a one crop economy and for that reason sought to reduce its output while encouraging other activities. In his A Discourse and View of Virginia, Berkeley wrote: "For though Virginia not only produceth Tobacco, as to the sole of her Staffles, yet it has produced Silk, Wax, Flax, Hemp, Iron, Pitch, Tar . . .[9] As for silk, he continued, "we want only artificial men to teach us to produce them the cheapest and readiest way . . . within seven years if we are instructed and encouraged, we shall bring in yearly as much silk into England, as now costs the Nation two hundred thousand pounds sterling at least . . ."[10] Such was his feeling; and insofar as he could he sought to encourage its production by others throughout the Colony while he gave it his personal attention at his Greenspring home. In this he was following his personal predilection which coincided, at least in form, with the expressed wishes of the King, of Council of

---

[9] See pages 5, 7, and 12, of the Norfolk, Connecticut, 1954 reprint of the London, 1663 edition.

[10] Berkeley's economic policy is concisely discussed in Neville Lee Mitchem, "Sir William Berkeley, Virginia Governor" in William and Mary Quarterly, 2nd Series, XVIII, 416-43.

Foreign Plantations, and on occasion, particularly in hard times, of the Virginia planters.

For February, 1661 the minutes of the Council of Foreign Plantations contain statements urging Virginia to look to the development of staples and the enforcement of less consumption. Then -- laws such as those requiring the planting of "white mulberry trees." In March, 1662 the Virginia Assembly passed still another act to require mulberry tree planting. For each 100 acres occupied it was necessary to plant 10 trees "at twelve foote distance each from other, and secure them by weeding, and a sufficient fence from Cattle, Horses, &c." This act, too, carried a bounty of 50 pounds of tobacco for each pound of "wound silke" produced. In May of the same year Virginia planters and merchants, suffering from an over production of tobacco, went on to petition the King to approve their planned cessation of planting and limitations on the shipment of the commodity from the colony. This would give greater encouragement to the staples -- silk included. This petition was rejected by Order in Council on June 13, 1662.[103]

The Council, at this time, also directed Berkeley to return "to his Government in Virginia" and to work with Maryland officials to find ways to promote the staples. Berkeley had repaired to England the year before to protest the navigation restraints and seemingly lost in his attempt to curb tobacco production and to get customs exemption for staples. After the King had directed his return to Virginia, Berkeley petitioned

---

[103] Hening, Statutes at Large, II, 114-8; Va. Mag., XVIII, 395, 399, 401; Salisbury (ed.), Calendar, 1661-8, p. 90.

The tobacco aspects of this act well presented in James H. Soule's introduction to Tobacco: Its History Illustrated by the Books, Manuscripts and Engravings in the Library of George Arents, Jr., (New York, 1937), Vol. I.

for a few skilled men to assist him in the encouragement of those long sought commodities — men who could "teach the easiest & cheapest way to produce such commodities." In this he seems to have been correct. Likewise his request for cochineal was granted. The King issued a warrant to allow him a ship load of tobacco (300 tons) custom free, but after he should send a ship to England of the same capacity loaded with silk, hemp, flax, pitch, and potash which had been produced in Virginia.[114]

In March, 1663 Berkeley wrote to the authorities in England that Virginians "in eighty members will shortly be employed in perfecting those excellent Commodities of Hemp and Flaxe, & silk, which this Country is most capable of, and now the Planters are more industriously intent on . . ." Berkeley was at this time paying 500 ℔ a year wages to workmen and within two years his own family, he wrote, would send home to England a ship load of flax, hemp, and potash. Of the latter he sent a ton in 1663.[115] A less hopeful note was seen in the proceed of the Virginia Assembly in September, 1663 to repeal the act requiring the planting of mulberries. It contained, too, a realistic thought in that "it is hardly conceived that (if it be hereafter) men as they find themselves in a capacity will fall upon it,

---

[114] Hatsworth, Calendar, 1661-4, pp. 96, 110; Va. Mag., XVIII, 304-5, 309.

Mary Newton Stanard (The Story of Virginia's First Century, pp.212-3) relates that when Berkeley sailed for England in April, 1661 he took a present of silk from Virginia to King Charles. He returned in the fall of 1662.

[115] A letter dated March 30 in the British Public Record Office Manuscripts (No. 2395, folio 302) in the Library of Congress.

[silk culture] without complaint."

Berkeley was not easily convinced, however, and tenaciously clung to his opinion. In August, 1665 he wrote that there had been "great & unexpected progresse in silk" which he felt would double each year until two hundred thousand pounds per year would be produced, as much as 40,000 people "can do". At the moment there was great need for "good stocks (the French call them Mills) from Barbadoes or Bermudas." Mulberries were deemed plentiful -- "innumerable trees which in four or five years will come to their perfection."[167]

In spite of the mulberries, Berkeley undoubtedly had in mind the considerable activity such as had taken place in Gloucester County, here Thomas Walker had planted in excess of 70,000 trees and the Rev. Alexander Henry, near his "home in Bare Ay, in Bedgood Ay," some 10,000. Henry in June, 1665 was hoping "to reap good silk" within two or three years. He had improved the method of planting, he pointed, and now planned to set them "as corrans and gooseberrys or hops as in Belgoe." This would produce their growth easily reached, factors that heretofore had been "the only obstruction of that work." The old method of gathering from trees entailed "loose of their time and pains." In Belgoe leaves would be young and tender and could be cut quickly with a "pair of sissers." He had thought, too, of seeding some acres with mulberry seed and cutting it with% sith."

---

[166] Berkeley, Virginia at Large, II, 202.

[167] The Hist. Mag., XVIII, 167; Weinberg, Colonies, 1661-1, pp. 2001, 2016.

Hevy's thoughts extended to caring for the silkworm as well. He wrote:

> . . . I have bethought also of a new way, for a few hands to serve many worms and that more cleanly than before . . . to separate unwholesome worms from healthfull, and by which a great many more may be kept in a room, than otherways upon shelves as is usual here, and how to kill worms with expedition, w^ch^ here is a great difficulty, they lying sometimes 3 or 4 dayes in the ovn, before they dye, and being very inconvenient upon divers, who have endevoured the work, but of those things, as my experience[136] shall confirm me, I shall afterwards inform you more at large.

In 1666, the Assembly, by the "Act for debts and rates" attempted to evitate necessities for the commodious of producers, creditors and debtors. In this scale a pound of "wood silke" was made the equivalent of 200 pounds of tobacco or 20 shillings. In comparison, wheat was set at 4 shillings, or 40 pounds of tobacco per bushel. For silk this was the same value placed on it in March, 1658. For wheat it[137] was a decline of one shilling.

In July, 1666 Berkeley, in a letter to Lord Arlington, spoke of the promotion of useful commodities and continued that considerable

---

136

Letter, dated June 15, to Sir Robert Hevy in Hilton and Hevy Manuscript, 2nd Series, II, 1674.

137

Hevy, Yorktown at Large, I, 170 and II, 233
Other estimates in 1666 were:

"Indian corne shelled", per bushel	40	lbs.	tob.
"Oates" per bushel	20	lbs.	tob.
"English peas", per bushel	40	lbs.	tob.
"Indian Peas of all sorts," per bushel	25	lbs.	tob.
"Barley", per bushel	30	lbs.	tob.

progress had been made in silk and flax. Here he mentioned, too, that a present of 300 pounds of silk had been prepared for the King. Such was mentioned about the same time by Thomas Ludwell, Secretary of Virginia, who described it as "the first fruits of their labours." Berkeley, in a letter to the Earl of Clarendon, mentioned that the Assembly had ordered it as a "present and sacrifice of their first fruits to" Charles II. Some delay ensued in the shipment of this silk and it was not until 1667 that the King received this, perhaps, the best known, certainly the most publicized, proof that Virginia could produce silk. In the meanwhile the "plot of mulberry" grew worse and a committee of planting in 1667 was projected, a condition that Thomas Ludwell observed was sure to "put the planter upon making more silk, flax, and other staple commodities."[190]

On July 22, 1668 Berkeley could write to the King that "Here that peace has given us some security" it was possible to send the long promised present of silk in expectation that it would reach him safely. He included, too, word about the prospects of silk production generally, pointing out that there, "not full threescore years since" had begun to make silk and it was a source of "income wealth" for the French. Virginia he pointed out was "more proportioned suitably to produce this

---

190

Salisbury, Calendar, 1661-8, pp. 336, 339, 464; a letter of Berkeley to Clarendon, July 22, 1668, in the Bodleian Library, Clarendon Manuscripts (No. 84, folio 230) in the Library of Congress; Va. Mag., XI, 102 and 11, 24.

As L.C. Gray has observed, the attempts to produce "staples" increased in periods of depression. ("The Market Surplus Problem of Colonial Tobacco" in The William and Mary Quarterly, 2nd Ser., VII, 5.)

advisable commodity then Pearl can be . . ." Virginia needed skilful men to teach the processes, however, and Berkeley sought permission, which he did not obtain, "to go into France to procure" them.

Charles II, writing from Whitehall on November 25, 1668, graciously acknowledged the receipt of the present of silk. He told Berkeley and the Council that,

> We have received with much content y^r dutifull respects of that Our Colony in y^r present lately made us by you, & y^r Council
> there of y^r first product of y^r new Manufacture of Silke, w^ch, as a mark of Our friendly acceptation of yo^r duteous & affectionate endeavours, We resolve to give to yo^r Industry in y^r promotion and improvement of that or any other usefull Manufacture, We have commanded to be wrought up for y^r use of Our own person.[191]

As further encouragement Charles II, by writing directly, gave his thanks in his "owne royall hand."

Words of praise from the King were well received and much appreciated by the officials in Virginia. Charles II, it appears, did use this silk in a personal manner. It was reported in a news letter, dated October 27, 1668, that the King "has ordered [the Virginia produced silk sent to him as a gift] ... to be wrought in to bed furniture for his own use."[192]

---

[191] Salisbury, Calendar, 1668-9, pp. 596-5; Neill, Virginia Carolorum, pp. 264-5.

[192] Byrne and Gilman, Colonial Records of Virginia, Virginia State Documents, Series (Richmond, 1874), pp. 7-8; Salisbury, Calendar, 1668-9, p. 627.

John Dudley, writing in 1670, related that "Virginia has already given Silk for the cloathing of our King; and it may happen hereafter to give cloathing to a great part of Europe, and a vast Treasure to our King: If the Silkworms shall thrive there (of which there seems to be no [123] doubt) the profit will be inexpressible..."

In 1662 the Assembly acted again to promote "the advancement for the making of silke" for the honor of the present and the future. The old bounty of 50 pounds of tobacco for a pound of wound silk was [124] restored. Berkeley, in June of that year, predicted a far greater harvest of silk within a decade. Later he went on to recount his difficulties, however, which were both technical and financial. He concluded that his salary was insufficient to support his expenses and again he requested the "gratuity of a crop of tobacco" so that he could visit England and while there go to the Continent to study sericulture practices in France and Italy. The King's reply was the same as it had been some years before. The gratuity on such a scale would be burdensome when Berkeley could send a ship of 300 tons loaded with staple crops -- silk, hemp, flax, pitch, and potash. This was despite Berkeley's plea that such staples were "but fitly performed yet." Berkeley's insistence that the hand spent his whole time and energy in perfecting these great and beneficiall Commodityes" was not sufficient [125] to persuade the Crown.

---

[123] Dudley, Observations on Domestic Affairs, 1670-1675, Sainsbury, Virginia's Colonial Correspondence, Misc. Manuscripts, Library of Congress, p. 274, Va. Mag. of Hist. & Biog., I, 274.

[124] Hening, Virginia Statutes, 1619-1792, Henings, Statutes at Large, II, 178.

[125] Sir William Berkeley, 1662-1670, Sainsbury, Calendar, 1574-1718, p. 77.

In 1671 Berkeley again reports on progress to the Commission of Trade and Plantation and he wrote, on June 27, that he was sending "a Patterne [of silk] as we now raise it." He continued that when the remainder he had was reeled he planned to send the King 60 or 70 pounds which was made in my own house [Twenty-six] this year." It could not be sent at the time of the letter for it was "badly reeled" and consequently not ready. In answer to possible inquiries, Berkeley stated that they had "great hopes of silke" and if they had skilled men, from Italy, Naples, or Granada they could attain "ten or fifteen pounds a year to a hand." It was the lack of skilled men and the inability to train them in the colony which was the continual obstacle of this work. It was reported in 1671 that: "Commodities . . . we have had any but tobacco . . . out of late, we have begun to raise silk and . . . many mulberry trees are planted, and planting . . . ."[197]

In January, 1672 Berkeley again reported some of his former requests, with, it seems, the same negative results. This time he specifically asked that the Indian vessels in England might be instructed to send some skilled workmen into England for transfer to Virginia. Berkeley agreed to pay for their transport and normal employment as soon as they should arrive in this another country. He still felt that if he had but six men to teach the right way to feed worms and to wind silk that enormous progress could be made in a short time.[198]

---

195 Mr. White, Va. 1671 Controversy, Colonial Office, 1/22, p. 109; Howard, Virginia's First Generation, p. 219; Beverly Chronicle, Proceedings and Debates of the Virginia Colonial Convention of 1774, Statement by the House of Burgesses (Boston, 1905), p. 109; Virginia Historical Magazine, 43, p. 14.

197 Beverley, History and Present, II, 53.

198 Mr. White, Va. 1671-2 Controversy, Colonial, 1/22-74, p. 201.

here the substantial seventeenth century attempts to produce silk came to end. After some seventy years of hopeful trial and periods of intense activity which were attended by partial success, the efforts on a large scale were allowed to lapse. Bacon's Rebellion and Berkeley's ultimate withdrawal from the scene may have been the principal reasons. In any case no hopeful prospects were given, it appears, in answer to the request from the home authorities, in 1676, for information about the present state of the Silk Trade that Governors or Deputyes do attend it."[199]

This was not, however, the final act in the Virginia attempts to produce silk. Interest was to continue for the next two hundred years. The note of finality sounded by Thomas Glover in 1676 was too premature when he wrote in his An Account of Virginia, its Situation, Inhabitants, Productions, Inhabitants and Their manner of Planting and ordering Tobacco, that

"I had almost forgot to mention their Silkworm-Trees, whereof they have good store about their Houses. These were planted at first to feed Silkworms, but that design failing, they are now of little use except Fuel."[200]

---

[199] _The Ency._, IX, 650-1

[200] A version from the Philosophical Transactions of the Royal Society, June 20, 1676 (Oxford, 1906).

A Continuing Theme

1675-1699

In the last two decades of the seventeenth century silk culture in Virginia was largely a matter of conversation and exhortation. There was little in the way of results or even in the direction of action. It ventured in the proposal to settle Greeks in the Colony in 1675, and it formed a strong paragraph in Lord Culpeper's instructions some seven years later--"And you shall particularly endeavor to advance the Production and Manufacture of Wine, Silk, Hemp, Flax, Pitch and Potashes for which we are well assured that Climate and Soile is very proper..." Culpeper was urged to establish good bounties and to encourage the enactment of specific laws. This, again, came to nought.[1]

In 1697 Henry Hartwell, James Blair, and Edward Chilton, as had earlier writers about Virginia, joined in saying that:

> It is a good Country for the Manufacture of Silk; for Mulberry-Trees, the proper Food for Silk-Worms, thrive as well there, as any Tree whatsoever, and a great deal of Silk Work being the Feeding of the Worms, and winding off of the Silk, might be performed by Negro Children, that are now as many Children Heads.[2]

---

[1] Hening, II, 518 and Hening, IV.

[2] Hunter Dickinson Farish (ed.), The Present State of Virginia and the College by Rev. Mr. Hartwell, James Blair, and Edward Chilton (Williamsburg, Va., 1940), pp. 54-55.

Favorable comment on the mulberry tree was made, too, by Robert Beverley near the turn of the century. In 1705 A Plain & Friendly Perswasive to the Inhabitants of Virginia and Maryland for Promoting Peace & Consolidation noted that "There is a Country Capable of producing every Staples, as Hemp, Flax, Wool, Silk, Cotton, and Wine too, and still exports the Tobacco Trade."[203]

In the fourth decade of the eighteenth century when plans for the Swiss and German Colony for the western part of Virginia were put forward, the production of silk was among the avowed considerations. Jacob Stauber and Daniel Berlin's journey into the area revealed, among other things, "a proper climate to produce Silk." Such a thought, too, was in the mind of William Byrd II as he considered the settlement of his land in North Carolina.[204]

It was not all a purely academic matter either for William Byrd relates that the art of sericulture was not entirely lost. He writes that the mulberry "foliage is best for silkworms, which produce very beautiful silk in Virginia, which many people have tried, and is still continued daily by the Germans." There may, however, be trouble in silk, "although the silks are as good as the best Italian or French can be," for "the inhabitants of Virginia want to take no trouble to plant anything other than their usual Tobacco, which they will never abandon... What habit can do even people!" Although a hundred years had brought no change in the interest of the people of the Colony.[205]

---

[203] Beverley, Present State of Virginia, p. 295; Va. Mag., IV, 257.

[204] Va. Mag., II, 227; XVII, 105, 109, 251-2, and XXIV, 182; William and Mary Quarterly, 2nd Series, I, 134.

[205] Bailey, ed. The William Byrd's Natural History of Virginia, pp. 51-2.

In November, 1762 the Assembly went on record as favoring "a bounty premium" for the production of silk and wine. It would cost little the legislature thought and it "might employ our young and old, at present a great charge on the community." Some action seemingly followed for it appears that in the same year William Cabell, Jr., subscribed, along with other gentlemen, the sum of one pound for eight years to go toward the bounties to encourage domestic silk and wine.[206] Some twelve years later the interest was continuing, or, at least, the idea was still alive. A Norfolk man advertised that he had "a journeyman well acquainted with this weaving and, if the Ladies would take the trouble to raise Silk Worms, will furnish them with Seeds of his manufacture, agreeable to any Pattern they may send". In 1775, there is isolated reference to one silk enthusiast. In the Virginia Gazette, under a Williamsburg date line of June 24, it was reported that "Mr. [Andrew] Estave, at the vineyard near this city has collected thirty bushels of cocoons from the silk-worms which he raised this year; it is computed they will produce at least one hundred pounds of silk fit to manufacture."[207] In another direction, too, Virginia was active in this period. The Colony was exporting mulberry trees.[208]

---

206 Hening, Statutes at Large, VII, 566-7; R. Mich. Records, III, 109.

207 Virginia Gazette (Purdie and Dixon), June 2, 1774, p. 2, column 1; Virginia Gazette (Dixon and Hunter), June 24, 1775, p. 3, column 1. It was also noted that Andrew Estave, "the silk manufacturer, had the premium "for making three or four hogsheads of wine in the fall."

208 John [illegible] of Newport, Rhode Island, "imported from Virginia" three hundred trees in 1763 and another hundred in 1764. (Dana Online, A manuscript volume relating to silk culture, 1763-1790, in Yale University Library, pp. 17 and 206.)

Thoughts of silk production continued into the American Revolution and much beyond. In August 1778 Thomas Jefferson joined the others who felt that it had a future. From Barbadoes he wrote to Richard Henry Lee that "Our own country wants nothing but skilful laborers to raise with success wine, oil & silk."[209] It was to him once Richard Henry Lee who earlier in 1778 had written from Boston, Francis, to William Lee that measures should be taken at Grandpre (where a century earlier Sir William Berkeley had done the same) to preserve and increase the "White Mulberry trees." He counsel that they should not be neglected and pointed out that "the corner of the Fences of the Farms, around all the fields, will be proper places" for them. His purpose, it seems, was rooted in a determination to do something about agriculture--"If, ever I return, the Culture of Silk, will be my principal object, which I am morally certain, will succeed to the most sanguine expectations".[210]

The lead in attempts to produce silk had by this time been lost by Virginia. It was now "a hopeful prospect" throughout the English colonies in America. In fact, it was already an old story in many localities for, although Virginia was first in the field other colonies followed the lead. Others had joined in the work with equal enthusiasm even before the turn of the seventeenth century. The trees, insects, gloves, shearing, and reels, and the cultivation, curing, future, and quality of silk, along with

---

[209] Ford, VIII, 135.

[210] From "Hints Taken on Conveyancing" in Ford, XVIII, 295.

silk thread, cloth, lace, ribbon, beads, netting, and taffeta were in such demand. A source for these things in the colonies was, and continued to be, to some, a tempting price.

As early as May, 1671 the proprietors of Carolina received instructions to encourage the establishment of silk, and it was the intention that observations be made of the husbandry and manufacture of the product as it was then being done in Virginia. A decade later Huguenots in England and France ask ask for the identity with the production of wine, olive, and silk culture in mind. Activity persisted, as the decades passed, especially in South Carolina, with some measurable results. In the early part of the eighteenth century, it is reported that some families produced 10 to 20 pounds a year, and in so doing employed Negro children in the work. Later, it was fostered through articles in the papers of the day and bounties served as encouragement. There were token exports in the middle of the century, samples were produced, and the raising of worms became fashionable among the ladies. In 1766 a winding factory was opened at Charleston and another at Hillsboro.

211

Lyman C. Draper and Sistia P. Hart, Virginia Gazette Index, 1736-1780 (Williamsburg, Va., 1950), II, 1047-49; Earl G. Swem, The Virginia Historical Index, II, 745.

212

Gray, History of Agriculture in the Southern United States to 1860, pp. 124-25; Lewis M. Hacker, The Shipping Merchants (New York, 1947) pp. 257, 278, 290-91; Gilbert Chinard (ed.), A Huguenot Exile in Virginia (New York, 1934), pp. 21, 66, 87; Olmsted, A Journey in the Seaboard Slave States, pp. 11-17; Letter from the Governor of New Providence, Proposals for the Increase of Trade, Navigation and Revenue of the Province, Particularly by the Improvement of Its Staple Commodities, and Other Means, Humbly Submitted to the Consideration of the Lords Commissioners for Trade and Plantations, by Governor Tonyn, with Observations on the Same, Made by Order of the Board of Trade, Both Confidential, 1st Session, Document No. 101 (Washington, 1908) pp. 1-14.

At one point, January, 1772, it was reported that 155 pounds "of unwinding fine raw silk, & thirty six pounds of ordinary" had been shipped - "all of the Growth & Culture of Pennsylvania".[23]

An account published in 1760 gives an interesting threefold sketch of how the work was pursued:

> Silkworms in South-Carolina are hatched from the Eggs about the Birth of Mayday before having wholly exhausted them to serve into this new Form of Being, at the same Time that the Mulberry-Leaves, which are their first Ingin to grow, attended and fed six weeks, they eat no more, but have small Twigs set up for them, where they spin themselves into Balls, which are thrown into warm Water and then the Silk is wound off them.[24]

In the case of Georgia, initially, in 1732, sericulture was contemplated as a principal article of attention. Here the practice of land was tied to the planting of mulberry trees, and the trustees sent over both mulberry trees and silkworm seed as well as instructors in the art from Piedmont in Italy. To emphasize the work the silkworm was featured on the public seal with the motto "vom stid und stille." In the end silk culture proved itself profitable only when enslaved, and cotton and rice won the struggle there as did tobacco in Virginia. It took some sixty years to clearly establish this, however, and it was not thus

---

23 Pelzel, "Silk-culture" (same), p. 208.

24 A Description of South Carolina, Containing Many Curious and Interesting Particulars Relative to Its Situation, Trade, Inhabitants, Climate, Soil, Produce, Curiosities, &c. Extracted from the Best Accounts Hitherto Published of That Country... (London), p. 32.

This account places exports of raw silks from South Carolina to Great Britain in the 1730-1755 period at the pounds weight in 1732, 52 in 1733, 67 in 1740, 110 in 1750, 83 in 1753 and 54 in 1755. It states, too, that of that produced in the twelve months period following November 1, 1757 that "0 Pounds" valued at £0 from South Carolina entered Great Britain. (Pages 31 and 32)

without considerable emphasis on, and trial of, sericulture. This included bounties, literature, regulations, instruction, and the like. The first product seems to have been eight pounds of raw silk sent from Savannah in 1735--silk which was made into a present for the Queen. For most of the next twenty years there were exports particularly from the settlement of Ebenezer, and later for Georgia. In 1751 a public filature was erected by order of the trustees. Reports relate that 1,050 pounds of raw silk was produced in 1757. Two years later exports of raw silk reached 10,000 weight, all of which brought premium prices. In 1760, the colony produced more than 15,000 pounds of cocoons. There was a sharp decline after 1760 when approximately 1,000 pounds of raw silk was sent out.[25]

Silk culture in Connecticut became well established after 1760 when M. Aspinwall brought in the white mulberry and silkworm seed from the Levy Island nursery. Two nurseries were set up and, with the support

---

[25] Quoting Francis Downey (compiler) and Bessie G. Reinwater (ed.), Georgia History of Georgia 1732-1933 (Atlanta, 1933), pp. 1-24; Lyttelton, The Silkworm and Its Culture, p. 104; Davy, History of Sericulture in the Southern United States to 1845, pp. 1-2; Clarke, A Treatise on the Mulberry Tree and Silkworm, pp. 110-117; Growth and Manufacture of Silk (65th Congress, 1st Session, Document No. 150), pp. 11-15; Hilton, "Silk Culture" ms., p. 2.

A report in the London Magazine (1755) is of interest at this point for what it has to say about Georgia silk:

"A paper was laid before the Commissioners for Trade and Plantations, by about forty eminent silk throwsters and weavers, declaring, that having examined a parcel of about 300 pounds weight of Georgia raw silk, imported in Mulberry Bay, they found the colors and texture of it truly good, the color beautiful, the thread even, and clean as the best Piedmont, and will be worked with less waste than Italian silk." (Quoted in Growth and Manufacture of Silk (65th Congress, 1st Session, Document No. 150), p. 15.)

In Dane County, legislation was obtained which led to bounties for mulberry trees and for raw silk as well. It is said that the first silk worms raised in New England were those raised in 1727 by the Reverend T. Wigglesworth of Harvard College and that the Honorable Jonathan Law, governor of Connecticut, made the "first silk dress and stockings made of New England silk" in 1747. Later he raised worms, produced silk, and sent it to London "to be manufactured". It is reported to have been made into a "gown" in 1750, for his daughter--the first such gown of New England silk.[226]

Dr. Stiles took his experiments in sericulture seriously enough, his worms carefully and lengthy copious notes. Others, too, took up the work as in the case of William Hunter of Haverhill who in 1768, it was reported, produced "silk sufficient to make three woolen gowns". In Lebanon "a silk house" was "already erected." Stiles, himself, kept in touch with activity in other areas exchanging information with Benjamin Franklin and others. His production was small yet commendable. In 1768 he had [illegible] ounces of his own reeling and in 1772 he sent a "parcel of Cocoons to the Painters in Philadelphia." In 1772 some of his own silk, or rather silk from his, Stiles "was producing", was woven, by Henry Merchant of London, into cloth for a gown. It was not quite enough for the purpose and Stiles bought, through "Dr. Franklin", enough to complete it.[227]

---

226 Growth and manufacture of silk (York Congress, 1st Session, Document No. 1007, pp. 15-16); Charles, A Treatise of the Mulberry Tree and Silkworms, pp. 11-13; Stiles, "Silk Culture" MSS, p. 410.

227 Stiles, "Silk a Home" MSS, pp. 92, 117, 156-7, 252, 276-300.

The Stiles manuscript is quite detailed in regard to the mothers' work and includes tables and schematical sketches of worms in their various stages of development.

Silk culture actively survived the American Revolution in better order in Connecticut, perhaps, than in any other colony. A tract on the subject was published in Hartford, in 1772, and this gave an impetus to the work. In 1789, 200 pounds of raw silk is said to have been produced in the town of Deerfield. This was the same year that Dr. Noah Webster, now at Yale College, undertook a campaign of sending "white Mulberry Seed" to ministers in the state hoping thereby to establish district nurseries on a wide scale. In 1790 New Haven had some 60 families engaged in the business to the extent of 112,000 silkworms. For the year 1810 it was estimated that the value of sewing silk and raw fiber produced in the areas of New London, Windham, and Tolland reached $20,000. In 1826, it was reported three-fourths of the families in Deerfield were engaged in producing silk, each family making from 5 to 50 pounds -- some even 100 pounds. One author writing in 1826 remarked that:

> It may be said...to the honor of Connecticut, that she is the only state in the union, which has continued the business, without intermission, and probably produced more silk from the time of her commencement, up to the year 1830, than all of the rest of the states together.[210]

In the decade before the American Revolution never leading to the production of silk began in New Jersey and in Pennsylvania. Funds were

---

[209] Growth and Manufacture of Silk (60th Congress, 1st Session, Document No. 1307), p. 14-15; Thomas Trego reported by U.S. Patent Service, a Philadelphia dealer in Colonial and Silk Publications, Thomas Trego's Diary, A Chronicle of the Doings, Sayings and Silkworms, p. 14-17; Silk Culture, 1844, p. 192, etc.

[210] Stevens, Trees of America, p. 152.

raised for the establishment of a filature which was set up in Philadelphia to handle the locally produced cocoons. One report is that in the summer of 1771 some 2,300 pounds of cocoons came in from Pennsylvania, New Jersey, and Delaware.[220]

The production in Pennsylvania in 1772 promised more promised to top producers. There were several winners. The first was a Lancaster County man (72,000 cocoons), the second was from Chester County (41,760 cocoons), the third a Philadelphian(31,330), and the fourth was from Bucks County (20,000). One of the three raised for the "best sample of reeled silk" went to Lancaster County producers, the third to a Bucks County weaver.

Benjamin Franklin and the American Philosophical Society were among those who were interested in, and recommended, the production of the worm. Late in 1775, for example, Franklin wrote to Philip Mazzei that:

> We have experienced that silk may be produced to great advantage. While in London I had some thrown [silk spun] from here [Philadelphia] three successively, and it sold by auction for about 10/6 the [each] pound, which was much above the silk from Italy.[221]

220
Stiles, "Silk culture" ASM, pp. 206, 207, 208.

221
Mitchell and Mary Goodwin, Second Series, II, 83.

Despite the interest and a show of production this activity in the middle colonies did not survive the Revolution except in isolated localities. In New York, by way of illustration, it is said that Samuel Chidsey of Cayuga County, during the war years, produced and sold [222] [223] seven silk to the amount of an annual 500.

Thus it was that in Colonial times interest in silk culture had widespread although never profitable nor self-supporting. Most of the colonies gave it a try as did the French in Illinois, the residents of the lower Mississippi area, and the British in Florida. The home government in England continued to urge for the consideration of silk as a staple commodity almost to the eve of the Revolution as did private organizations there. In 1769 bounties for production were authorized to the extent of £5 5 for every 5 lbs value of raw silk raised in North America. It is reported that over an eighteen year period, beginning in 1755, one London society, seeking to promote the "arts", paid out several hundred pounds sterling to various individuals in Georgia, South Carolina, and Connecticut for planting mulberry trees and for producing cocoons [224] and raw silk. The usual line of thinking was given by Joshua Gee in 1729 in The Trade and Navigation of Great Britain and Ireland:

---

222 Clarke, A Treatise of the Mulberry Tree and Silkworm, p. 116-117; Growth and Manufacture of Silk (Both Documents, 1st Session, Document No. 150), p. 16; Brown, Tower of Freedom, p. 150.

223 Growth and Manufacture of Silk (Both Documents, 1st Session, Document No. 150), p. 16.

224 Gray, History of Agriculture in the Southern United States to 1860, p. 75, 110; Growth and Manufacture of Silk (Both Documents, 1st Session, Document No. 150), p. 16-17.

If care were taken to cultivate and improve the raising of silk in our plantations, Carolina, Virginia, Maryland, and Pennsylvania would produce the best silk, and as fit for organzine as any in the world.[225]

The American Revolution dealt a serious blow to the continued experimentation with mulberry trees and silk worms. Interest, however, survived this struggle, and the establishment of the new nation. In the last decades of the eighteenth century and in the first quarter of the nineteenth not only did activity persist but there was a spectacular increase, particularly in the Connecticut area and, later, in other localities. It involved, too, new areas such as in Ohio and Kentucky where settlers, especially those from the silk growing districts of Massachusetts and Connecticut, took up sericulture.[226]

Interest in, and concern for, sericulture existed and again became widespread. In 1825 the matter reached the halls of Congress where it was referred to the committee on agriculture for appropriate action. A manual on the subject was directed. This, prepared under the direction of the Secretary of the Treasury, when completed in 1826, was laid before Congress and 6,000 copies of it were ordered printed. In it was annotated the data obtained through queries to various persons in the United States and to those considered experts in the field of sericulture. The principal source of data on Virginia was Governor John Tyler's answer to the silk circular which was sent to him.

Two years later, in 1828, in another publication sponsored by Congress, it was reported that

---

[225] Quoted in Clarke, A Treatise of the Mulberry Tree and Silkworm, 110.

[226] Growth and Manufacture of Silk (20th Congress, 1st Session, Document No. 150), pp. 11-12, 21-24; U. S. Mag., III, 303.

> The cultivation of the mulberry tree and the raising of silkworms have for many years past, engaged in a remarkable manner the attention of the people in the United States. In every part of the country this important branch of agriculture is more or less attended to. Societies of various kinds have been established for its promotion. With the same views, acts of incorporation have been granted by the state legislatures [Delaware and Tennessee], and the national government themselves have not thought this object unworthy of their special patronage. The work of foreign authors on this interesting subject have in translation and abridgment from our primary Manuals and even periodicals, are published by American authors, all tending to produce the same result--the introduction of silk as a profitable object of culture in this country.[227]

A report proposed that Congress authorize the expenditure of $10,000 to [illegible] Congress to establish "a normal school of silkture" in Philadelphia for the free training of sixty men for a two year period. This would fill a need for men trained in silk culture and its processes. The bill failed of passage by a slight margin in 1838.[228]

---

227 Thompson, American Silk, pp. iii-iv.

228 Clarke, A Treatise of the Mulberry Tree and Silkworm, p. 120; Thompson, American Silk, pp. vi-xv.

Rather than marking the end of the silk enterprise, it might be said that this was the beginning of a decade of intense activity. Sericulture became a crazy craze. This was due in part to the recent introduction of a new variety of the white mulberry--the Morus multicaulis. Gideon B. Smith of Baltimore is credited with introducing this small, many stemmed tree, or large shrub, in 1826, from France where it is reported to have been introduced in 1821 from India. A native of the Far East and Pacific Islands, this fast growing, large leafed form of the mulberry was hailed as the long awaited perfect food for the propagation of the silkworm and the production of excellent silk fiber.[229]

The "new" mulberry stimulated the public imagination and set off a wave of speculation of considerable proportions. "It is doubtful if there has ever been as intense and extravagant an agriculture craze in the United States" wrote Lewis Cecil Gray in his History of Agriculture in the Southern United States to 1860. This, too, coming as it did [230]

229

Lanier, Athenaeum, III, 1830 as Cited Browne, Trees of America, p. 445; Dewey, Law Journal of Botany (New York, 1836), pp. 347-8; Clark, A Treatise on the Mulberry Tree and Silkworm, 1841, pp. 1-2.

The morus multicaulis was called, too, the Black Chinese Mulberry for it bears a long, black fruit similar in size to that produced by morus nigra. It is sometimes, too, called the Leghorn-Canton Mulberry since one of its characteristics is to produce vigorous shoots.

The morus multicaulis appears to be a variety of morus alba and not the paper mulberry (broussonetia papyrifera) with which it is sometimes confused. (Gideon Brown Dyer, "Hunter's Multicaulis Mania" in Va. & Mary Coast., 2nd Ser., XII, 85-93 (Jan., 1930).)

230

II, 839. Sometimes, p. 709.

in a period which saw other agricultural crazes. Everyman threw caution to the wind and the general public soon followed suit and "Morus multicaulistus" multiplied. The excitement began in the north and spread south without due thought to later needs and to the suitability of the new leaf. The result was a large volume of silkworm food per acre. Hundreds of thousands of mulberries were planted and numerous new companies formed. Demand outstripped supply and uncontrollable speculation set in. One Virginia observer of the contemporary scene, writing some years later and commenting on a promotional meeting which convened in Baltimore, related that:

> The Baltimore Convention was not the only one held in the interest of Morus multicaulis culture. Conventions were held in various places, attended mainly by men of intelligence in an enlightened age that was expected to enrich all classes of society and every part of our country, especially our Southern society. The newspapers were filled with articles on the subject, setting forth in glowing terms the immense advantages of the proposed culture. The public was thoroughly aroused on the subject. All classes of people entered into the speculation. Women as well as men, and accomplished farmers as well as enthusiastic adventurers, went into the cultivation of the Morus. Garden as well as fields, and the choice spots on many farms were planted in the gold producing shrub... It was no uncommon thing for bold speculators to pay, or at least promise to pay, $30,000 to $40,000 for a small field covered with the precious growth. To intensify the excitement

in a short time a estimate of domestic silk began to be exhibited as decisive proof that the Morus multicaulis would nourish the silkworm, and that American industry and enterprise would soon [231] feature its cocoons into strong silk cloth...

The craze which developed around the new mulberry reached its peak in the late 1830s and in the first years of the decade which followed. When there were more tree sellers than buyers the bubble collapsed. Sudden credit restrictions in 1839 were disasterous to the over-extended promoters. Prices fell, and later the severe winter of 1841 demonstrated that the tree was not wholly adapted to the American [232] climate.

The Morus multicaulis was but a part, albeit an important part, of the over all silk craze. Reeleries and silk factories were set up in a number of localities. Societies were organized and a number of periodicals such as the Silk Culturist, The Silk Tree, The Silk Journal

---

[231]
Samuel Bell Dater, The Recollections of a Long Life (Wilmington, 1891), pp. 235-36.

Dater went on to report that "For some years the Morus craze might be seen standing on almost every farm, but by degrees, with great reluctance and at considerable cost, they were pulled up and the grounds used for more profitable products. Now a Morus multicaulis tree is rarely seen."

[232]
Davy, History of Agriculture in the Northern United States to 1860, II, 228-29; L. C. Fletcher, "A History of Fruit Growing in Virginia", pp. 11-12; Dater, Recollections, 235-237.

Dater concludes that New Jersey, perhaps, took the lead in the speculation with Pennsylvania, Delaware, Maryland, and Virginia coming close behind. He noted, too, that : "The only thing that can be fairly said in favor of the speculation is that it was a delusion and not a fraud."

L. C. Fletcher ("A History of Fruit Growing in Virginia", pp. 11-12) relates that hardwood cuttings of the trees sold for $500.00 per 100 and that in 1842, when the fever reached the boiling point, two one year old trees sold for $100 and $120 in a Connecticut nursery.

and The American Silk Grower were initiated. Regional meetings were held such as that at the "Hall of the Franklin Institute" in 1839 where specimens of woven and dyed silk were displayed.[233] In 1843, near the end of the cycle, there was a National Silk Convention in New York--the first meeting to be held on such a wide scale. The purpose, one that had been stated many times before, was to expedite the matter of "making silk one of the staples of the country."[234]

The matter of silk production faded into the background after the middle of the fifth decade of the nineteenth century. In November, 1844 (in the report of the Commissioner of the United States Patent Office) there is a record for the year of the production of silk cocoons on a statewide basis which in itself shows how widespread activity was even after the high water mark of the "silk craze" had passed:[235]

Conn.	—	176,210 lbs.	Va.	—	7,660 lbs.	Ark.	— 1,110 lbs.
Mass.	—	37,690	S.C.	—	6,930	Ill.	— 1,100
Penn.	—	33,100	Fla.	—	6,580	Del.	— 1,050
Ohio	—	31,600	Ky.	—	5,810	Me.	— 850
Tenn.	—	25,090	Md.	—	5,200	Fla.	— 510
Vt.	—	10,990	Del.	—	1,500	Miss.	— 270
Ala.	—	7,170	Ill.	—	1,250	Ark.	— 270
Md.	—	8,530	Mich.	—	1,730	Ia.	— 260
N. C.	—	8,050	La.	—	1,110	Wis.	— 30
Ga.	—	7,790	Ala.	—	1,050	Total	—396,790 lbs.

---

233 Gray, History of Agriculture in the Southern United States to 1860, II, 826-829; Lamoreaux, The American Silk Grower's Guide, p. 107; Pierce, A Treatise on the Mulberry Tree and Silkworm, pp. 116-117.

234 The Silk Culturist Containing Reports of the Proceedings of the National Convention of Silk Growers and Silk Manufacturers, p.5.

235 Quoted in Brown, Trees of America, pp. 402-3

Regarding Virginia's place in this table it bears out C. B. Fletcher's observation that the Old Dominion did not at this time get the silk fever in its most virulent form even though Fountain portions of Tidewater, especially the Northern Neck, can quite a high temperature."[236]

Prior to 1830 there is scarcity reference to the production of cocoons near Norfolk, and, in September, 1833, it was reported in the Farmers Register, in a news release from the Lynchburg area, that:

> We are glad to perceive that several persons in this section of the country are turning their attention to the culture of silk as occupation amusing and profitable, while it is not at all laborious. Some weeks ago we saw a beautiful specimen of sewing silk, manufactured in the family of Capt. Lewis Brown, of this place; and on Tuesday morning last, a gentleman called at our office and exhibited a quantity of the same article, manufactured by the lady of Mr. Robert Mills of Bedford County. Nothing delightsome and the culture of silk is attended with so little trouble and expense, that we hope it will be generally practiced by the ladies, who will find it no inconsiderable source of pleasure.[237]

---

[236] A History of Trade Growing in Virginia, pp. 11-12.

[237] Silkworms from Southern Mills, pp. 80-81

[238] Vol. 1, No. 1, p. 230

The Farmers Register in January, 1834 went on to publish a digest of the Secretary of the Treasury's Manual—a digest which had been prepared and published by the Pennsylvania silk society to promote [239] "the culture of the mulberry tree, and rearing of silk worms." In 1837 T. M. Randolph wrote to the Governor of the State to call his attention to the value and importance of encouraging silk. He went on to relate that the mulberry was indigenous and that the climate was well suited to the work. The latter was not true of some of the areas to the north where the residents were quite aware of the value of silk production. "They are pushing to overcome the almost insuperable difficulties presented by a stubborn soil and a congenial climate, and to vie by energy and enterprise, aided by legislative liberality, the boon so freely and almost gratuitously offered to us." Randolph then called for a bounty to encourage the work—"a trivial bounty may be the means of opening a new road to material and individual wealth." To prove his point he cited the aids already provided, or under consid- [240] eration, in other states.

---

[239] Vol. I, No. 8, pp. 477-85.

[240] M. W. Flannery (ed.), Calendar of Virginia State Papers, VI, 2-3.

In Maine it was 5¢ per pound for cocoons and 50¢ per pound for reeled silk in Vermont, 10¢ per pound on cocoons in Massachusetts, $2.00 per pound on all silk grown, reeled, and thrown here, in Connecticut, 50¢ per pound for silk reeled on an improved reel. In New York, New Jersey, Ohio, Pennsylvania, and Maryland the governors had already recommended encouragement of a similar work to their respective legislatures.

When the American Silk Society held the first convention in Baltimore in 1838, Thomas S. Pleasants and Jesse Tinsley went as delegates from Virginia, the latter recently a national vice-president. Thus, Virginia took some of the lead in the promotion of silk inside and outside of the State. Even before this two silk companies were incorporated within the Commonwealth and "many private individuals" had produced "a cocoon in the cocoonery." One account relates that "some-odd thousand land" was to be devoted to the culture of silk and this, it was hoped, would help stem the tide of emigration to the west which was "threatening to depopulate the country." One project would have set up a large establishment in Fitzgerald's County, had the "silk bubble" not exploded, and the other involved the use of Bellona Arsenal in Chesterfield County, near Richmond, for silk-manufacturing on a large scale.

Thomas Mann Randolph, of "Tuckahoe" believing that there was a future in silk-culture, obtained permission to utilize the facilities of Bellona Arsenal and proceeded, with government sanction, to plant mulberry trees and to set up a nursery here. He labored for three years but found it necessary to pull out in 1840 leaving his partner to carry on the mill powered works. This was Thomas S. Pleasants, Jr., of Goochland. In 1842, however, the experiment was pronounced a failure. The mulberry trees were cut down to make room for corn, but the upper apartments were left with their accumulation of dead silkworms and mulberry brush.[1]

---

[1] Clarke, A Treatise on the Mulberry Tree and Silkworm, pp. 134-4; Speeches of Various State Agents, 1, 2-3; Ruffner, "America's Mediterranean Lands" in Mss. & Misc. Coll., Jud. Ser., III, 32-33.

[2] William B. Cabaniss, Jr., "When Silkworms and Flax: Bellona Arsenal and Bellona Foundry Saw Service under Two Flags" in Virginia Cavalcade (Autumn, 1953), pp. 34-37.

before the half-way mark of the nineteenth century had been reached, this, the latest, ebbs crests and grows and then dissipated itself without the achievement of its goal. It was the last of the serious efforts to do what had first been attempted in English America at Jamestown in 1607-1609. Like the first effort, more than two hundred years before, even this did not entirely dispell the belief and conviction that sericulture was both possible and feasible. As late as 1880 the President of Agriculture of Virginia predicted:

> There is no reason that we know of that this might not become a profitable industry in Virginia, particularly for females and children. Those of us who are old enough can well remember the fine growth of "Morus Multicaulis," at a time when people were in a frenzy to produce the mulberry and to raise cocoons, but forgot to provide themselves with the silkworm to manufacture the cocoons.[83]

---

[83] *Fourth Annual Report* (Richmond, 1880), p. 169.

He went on to note the report of the successful raising of silk worms by Mr. E. Pennock of Raleigh, N.C., who had shipped two bales, each containing 200 pounds of cleaned cocoons, to Marseilles, France, at a profit. The same producer had extracted "Gum" as well.

Thus it was that sericulture was a recurring theme in Virginia for some two and a half centuries. Truly it was a hope that would not die. Whatever else might be said of it, it cannot be said that it was easily and quickly laid aside as unworkable and unprofitable although such proved to be the case on both scores. Time and again there were those who seemed to believe, and to be motivated by, the fanciful and impracticable theme:

> "Look to the Silk Culture for the
> true Gold Mines of the United
> States looking to Independence,
> Wealth, and Power."[24]

---

[24] From the title page of John Clarke's "A Treatise on the Mulberry Tree and Silkworm (Philadelphia, 1839).

Bibliography

Primary Sources

1. Author Unknown, Library of Congress. Unfavorable review in the Library of Colorado National Standard, City, Territory, The.

2. Aryan, Edward, (ed.). Travels and Views of Colorado. John Smith, 2 volumes, Cold Creek, Territory, 1861.

3. Barnes, Henry, An Essay upon the Silkworm. Containing Many Experiments Made During Several Years Residence in Colorado Territory, Together with Proper Directions for Such Gentlemen, Ladies, Schools, &c. Who Are Inclined to Undertake the Same, Cold Creek, Territory, 1839.

4. Hastings, Mr. William, A Discourse and Plan of Colorado, Intended for the Information of Such Persons Who Are Desirous of Settling in That Country, Cold Creek, Territory, 1858.

5. Smith, John Henry, (compiler), Colorado Territorial Census, 1860. Volume One: Cold Creek and Environs, Cold Creek, Territory, 1860.

6. Stewart, Henry, The Unfortunate Journey of the Party of Twenty-Seven, Which Left Cold Creek, Territory, on the Fifth of April, 1860, Bound for the Gold Fields of Colorado, Cold Creek, Territory, 1860.

7. Stewart, Henry, Supplement to the Unfortunate Journey of the Party of Twenty-Seven, Which Left Cold Creek, Territory, on the Fifth of April, 1860, Bound for the Gold Fields of Colorado, Cold Creek, Territory, 1860.

8. Wood, W. W., (ed.), Journal of the Proceedings of the Worthy Company of Pioneers, Which, 2 volumes in Collection of the Colorado Territorial Archives, Fort Morton, Kit, Territory, 1860.

9. Brown, Elizabeth, (ed.), The Journals of the United States Exploring Expedition to the Rocky Mountains, 1 volume, Cold Creek, Territory, 1860.

10. Stewart, Gilbert, (ed.), A Thousand Miles in the Rockies, or Journal of a Journey from Cold Creek, Territory, to the Pikes Peak Gold Fields, and Return, Cold Creek, Territory, 1860.

11. Clayton, John, Three Treatises Written Fifteen ... [illegible] Delivered Charges, Map and Reference, 1728 (Photostatic copy made by the County Planning Co. for the Amelia Historical Commission, Amelia, 1964.)

12. A Description of South Carolina, Containing Many Curious and Interesting Particulars Relating to Its Climate, Soil, and Produce, Together with Directions to Such as Intend to Settle There, Printed for J. and R. Tonson, London, 1761.

13. Parish, Charles Stevenson, (ed.), The Journal Kept of Virginia and the Settlement by Thomas Morton[?], Indian Traders, and Colonel Chiswell, Colonial Williamsburg, Williamsburg, Va., 1956 (Travel published in 1727, written in 1707).

14. Pittendrigh, John [ed.], The Charter of Georgia Published 1732-1752, 2 volumes, Georgia, Pittman Co., Savannah, 1908.

15. Powell, Peter (collector), Powell and Other Papers Relating to the Early History of Georgia, Including Some Papers of Colonel Alexander Vanderhorst, Also the Journal of Peter Gordon, Surveyor for the Trustees, 1732, 2 volumes, Printed for Peter Force and Friends, Washington, 1848-1849.

16. Ward, Paul Leicester (ed.), Notes on the Life of Thomas Bray, Thomas Bray Memorial, Protestant Episcopal Society, Philadelphia, 1934 (Reprint of original edition of 1708).

17. Fourth Annual Report of the Commissioner of Agriculture of Virginia, [illegible], Superintendent Public Printing, Richmond, 1906.

18. Glover, Thomas, An Account of Virginia, Its Inhabitants, Temperature, [illegible] Transactions of the American Philosophical Society, Philadelphia, 1904 (Reprint of the Royal Society, June 2, 1676).

19. "Land Laws Here Outdate 1607" in The Times and Democrat, Orangeburg, S. C., May (July, 1960).

20. Smith, E. L., and Harris, Jesse (eds.), Acts of the Privy Council of England, Colonial Series, 2 volumes, Hereford, 1908-1912.

21. Weeks, Mary Cain Sumrell, (ed.), Gilbert of Three Rivers, Journals, Letters, and Papers of Gilbert Sumrell, 2 volumes, [illegible], Georgia, Printed by Reporter Printing, Lumber City, 1957-61.

22. Hammond, John, Leah and Rachel, or the Two Fruitful Sisters Virginia and Maryland: Their Present Condition, Impartially Stated and Reviewed. Printed by E. Hall [London], 1656 (as in Peter Force, Tracts and Other Papers, Vol. III, Tract No. 14.)

23. Hamor, Ralph, A True Discourse of the Present Estate of Virginia, and the Successe of the Affaires There till the 18 of June, 1614. Printed by John Beale for William Welby, London, 1615 (a reprint).

24. Harlow, Thomas, A Brief and True Report of the New Found Land of Virginia. London, 1588 (as in Richard Hakluyt, The Principal Navigations of America. Hall, Glasg, & Murphy, New York, n. d.).

25. Harriot, Thomas, Ingangned Virginia Commodities, & Their Merchandise, after the Manner of Exchange, with Other Wares and Merchandises, at Reasonable Rates, Both for Englishmen and Savages. Printed by Felix Kyngston for Walter Burre, London, 1609 (as in Peter Force, Tracts and Other Papers, Vol. III, Tract No. 13.)

26. Hening, William Waller, The Statutes at Large; Being a Collection of All the Laws of Virginia [1619-1792]. 13 volumes. Richmond, 1809-1823.

27. Hotmanning, John, and Hagemeyer, Peter Charles, Fifteenth Year American Title. Report of the Committee on Bibliography and the Secretary's Office. National Archives Bulletin No. 104, 1st Edition, First United States Congress. Washington, 1936.

28. Hotten, J. C., The Original Lists of Persons of Quality, Emigrants, Religious Exiles, Political Rebels, Serving Men Sold for a Term of Years, Apprentices, Children Stolen, Maidens Pressed, and Others Who Went from Great Britain to the American Plantations 1600-1700. G.P. Putnam's Sons, New York, 1931.

29. Department Land Patents, Virginia State Land Office, Richmond, Virginia (photostatic copies in Library of Colonial National Historical Park, Yorktown, Va.)

30. Peters, Jeremiah Tell, The Identification of a Lost Life. The Hartford Herald Co., Richmond, Va., 1924.

31. Montgomery, Thomas Lynch (ed.), The Records of the Virginia Company of London. 3 volumes. U. S. Government Printing Office, Washington, 1906-1935.

[illegible]. Letter from the Secretary of the Treasury, transmitting the information required by a resolution of the House of Representatives of the 11th of May, 1826, in relation to the amount and description of property belonging to the Cherokee Indians. Document No. 190, 19th Congress, First Session [Serial Volume unknown]. Printed by Gales and Seaton, Washington, 1826.

[illegible]. (ed.) [illegible]. Journals of the House of Burgesses of Virginia, [illegible]. 13 volumes. Library Board, Virginia State Library [illegible], 1905-1915.

[illegible], William J., and Beatty, Richmond Croom, (eds.). William Gerard Hamilton, Parliamentary Logician. [illegible]. Michigan State College Press, Eaton Rapids, [illegible]. Pp. 1-207 (Part One Thesis and Dissertations Series, Publication 1737).

[illegible]. Some Difficulties Affecting Rural Development Projects in Virginia. Printed for Manual Training, Lansing, 1967 (as in Peter Force, Tracts and Other Papers, Vol. I, Tract No. 6).

Palmer, William P., et als. (eds.). Calendar of Virginia State Papers and Other Manuscripts. 11 volumes. Richmond, 1875-1893.

A Further Investigation of Virginia Water & Soil and Some Relations of the Presence of the Parasites. Printed for National Research, Lansing, 1967 (as in Peter Force, Tracts and Other Papers, Vol. II, Tract No. 8).

Parsons, Samuel, Northwest Part Journal, or Perhaps the Fit Place, Vol. III (Continuation of "Some Descendants of the Wyatt and Pendleton of the Thomas Cutter..."). Ames Publishing and Sons, Cincinnati, 1906.

Smith, John, Chesapeake Account of Virginia in 1624 [Fourteen of Virginia], in The Southern Literary Messenger, Vol. I, pp. 401-417 (January 1835).

Tabernacle, T. Noel, (ed.). Calendar of State Papers, Colonial Series, American and West Indies, [illegible]. 3 volumes. Longman & Co., London, 1860-1894.

Thornley, Nathaniel, A True Relation of Virginia and Maryland With the Commodities Therein... London, 1609 (as in Peter Force, Tracts and Other Papers, Vol. III, Tract No. 7).

Strachey, William, The Historie of Travaile into Virginia Britannia written by W. S. Hakluyt. The Hakluyt Society, London, 1849.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

54. Wright, Louis B., (ed.), The Darker and Present Days of Virginia by Robert Beverley, University of North Carolina Press, Chapel Hill, N. C., 1947 (from the 1705 edition)

55. Byrne, Thomas F. and Gibson, R. L., (eds.), Colonial Records of Virginia, Virginia Senate Journal (Extra), 1874, Richmond, Va., 1874.

Secondary Materials

1. Adkerson, A. B., "Jamestown Island and 'The Starry River'", Virginia Magazine of History and Biography, LV, 196-198 (April, 1947).

2. Brodrick-Song, Hermon B., The Life of Peter Collinson, F. G. Moulton & Co., London, 1926.

3. Brown, Alexander, The First Republic in America, Houghton, Mifflin, & Co., Boston, 1898.

4. Brown, Everett S., (introduction and notes), Tobacco the History Illustrated by the Books, Documents and Engravings in the Library of Everett Brown, Jr., J. Wallmann, The Rosenbach Co., New York, 1937-1939.

5. Brown, A. A., The Cruise of Christopher Newport, Historically and Geographically Considered, Together with Some Account of the Discovery of the Chesapeake, Harper & Bros., New York, 1908.

6. Burk, John, The History of Virginia From Its First Settlement to the Present Day, Dickson & Pescud, Petersburg, Va., 1805.

7. Campbell, Charles, History of the Colony and Ancient Dominion of Virginia, J. B. Lippincott & Co., Philadelphia, 1860.

8. Chalmers, George, Political Annals of the Present United Colonies From Their Settlement to the Peace of 1763, For the Author and Sold by J. Bowen, London, 1780.

9. Clarke, John, A Treatise on the Mulberry Tree and Silkworm, And on the Production and Manufacture of Silk, Published with Practical Directions, Thomas, Cowperthwait & Co., Philadelphia, 1839.

10. Conway, Lorraine Brooks, (compiler), and Bateman, Hattie C., (ed.), Indian Wonders of Georgia Trails, Georgia Bicentennial Edition, The Peachtree Garden Club, Atlanta, Ga., 1933.

11. Coe, Oliver, "Shellfield, Ancient Seat of Governor Wilcox", Hartford, Maine (A Hitherto Unpublished Portion) Issued by Colonial Historical Monument, Hartford, 1932, pp. 1-5.

12. Delagnel, William Whitehead, "The Plans of the Peninsula of Virginia", Reprinted from Papers of the Historical Society of Delaware, Arts and Letters, IV (1874).

13. Hamor, John, Trve, and a Discovrse of Svmmer-Ivnds, and the Present State of Them in the Forme of a Letter, Written to a Friend in England, Wherein Is Truly Related the Worth of Those Parts, Published for John Martin and James Stansby, Printers to the Honorable Society, London, 1615.

14. Fletcher, R. L., "A History of Fruit Growing in Virginia", Reprinted from the Proceedings of the Virginia Horticultural Society of the Virginia Horticultural Society, Volumes 1, 2 and 3, 1952.

15. Forgrie, William (with notes by William Corbett), A Treatise on the Culture and Management of Fruit Trees, N. Y. T. King, Printer, 1805.

16. Gaines, William H., Jr., "Seeds of the Future for Peace in the Time of Colonial Virginia", Virginia Cavalcade, II, pp.24-30 (Summer, 1952).

17. Gaines, William H., Jr., "Some Difficulties and Trials Indians Annual and Perennial Planting Was Carried Under Two Flags, Virginia Cavalcade, III, pp. 32-37 (Autumn, 1953).

18. Gray, Lewis Cecil, History of Agriculture in Southern United States to 1860, 2 volumes, Carnegie Institution, Washington, D. C., 1933.

19. Hedrick, Ulmer Peter, A Handbook of the Flowering Plants and Ferns of Central New York and Vicinity, Revised and Enlarged Edition, New edition, arranged and revised by the Flora Committee and Harriet Lyndon Pomeroy, American Book Co., New York, c. 1951.

20. Harlow, William M., and Harrar, Ellwood S., Textbook of Dendrology, Covering the Important Forest Trees of the United States and Canada, McGraw-Hill Book Co., New York, 1937.

21. Hatch, Charles E., Jr., "A Preliminary Historical Study of the Tyuth Tract of 1653 (including a Sketch to Accompany Same in 1638) on Chesapeake Island in Colonial Isle of Wight County, A Dissertation Present in the Library of the Mary, Richmond, Virginia, dated June 7, 1950.

22. Hedrick, Harold Ray, and William Hermiller, Wayside Flowers of the Hilltop and Hill Culture Countries, Illustrated Interesting and Useful, Friendly Library (Friendly Library, 1937).

23. Jones, Charles, "Colonial Forest Trees of Virginia", Bulletin No. 86, Virginia Agricultural Experiment, College of the State University, Charlottesville, Va., 1952.

24. Lawson, William, The Country Will Housewife's Jewell, or The Art of Husbandry and Gardening, Ref Editions, Henry, Printer to Co., London, 1618.

25. Lukeish, J. Kilby, and Holmes, Mrs. Lymond E., "Potable Trees of Florida", Bulletin of the Florida Polytechnic Institute, 1917, No. 7 (March 15, 1917).

26. Lunan, J. C., Arboretum et Fruticetum Britannicum; or The Trees and Shrubs of Britain, Native and Foreign, Pictorially, Botanically, Uses, and Economically, Lon. Ed., 1838.

27. M'Mahon, Bernard, (revised by J. Jay Smith), The American Gardener's Calendar, Adapted to the Climate and Seasons of the United States, 12th edition, J. B. Lippincott & Co., Philadelphia, 1857.

28. Mathews, F. Schuyler, Field Book of American Trees and Shrubs, G. P. Putnam's Sons, New York, c. 1915.

29. Mell, Edward D., History of the Florida Country of Levin, Post Pummell, Albany, N. Y., 1885.

30. Mell, Edward D., Florida Chronicles, The Colony Under the Rule of Charles the Fifth, 1562-1565, Post Pummell's Sons, Albany, N. Y., 1886.

31. Mell, Edward D., Florida Vendetta, Double the Duke of Alva: The First Conflict between Protestant and Catholic Europe in America, Post Pummell's Sons, Albany, N. Y., 1887.

32. Porter, Charles W., III, "Historical Report on the Fort Caroline Area, Fort Caroline, Jacksonville", a typewritten report in the Library of Colonial National Historical Park, Yorktown, Va., dated December 5, 1956.

33. Powell, William S., "Books in the Virginia Colony Before 1624", The William and Mary Quarterly, 3rd Series, V, 177-181 (April, 1948).

34. Rehder, Alfred, Manual of Cultivated Trees and Shrubs Hardy in North America, Exclusive of the Subtropical and Warmer Temperate Regions, Macmillan Co., New York, 1927.

35. Rogers, Julia Allen, The Tree Book, A Popular Guide to a Knowledge of the Trees of North America and to Their Uses and Cultivation, Doubleday, Page & Co., Inc., Garden City, N.Y., 1914.

36. Ryland, Elizabeth Bonny, "Journal's Multifarious Reader", The William and Mary College Quarterly Historical Magazine, 2nd Series, XIX, No. 4, (January, 1939).

37. Shenefelt, Arthur Ray. Trends in Catalysis of Dyes Active to UV Irradiated by Southeastern American Indian Pottery Sherds. Ph.D. Thesis, Purdue University, Graduate School, Department of Anthropology, Dec., April, 1978 (revised to January, 1979), in the archives of Colonial Williamsburg, Williamsburg, Va.

38. [illegible]

39. Truesdell, Mary Dorothy, The Story of Virginia's First Century. J. B. Lippincott Co., Philadelphia, 1957.

40. Weiss, Ellen, The Letters of Tho. Jefferson and Buffon and Other Papers, Privately Printed by Ellen Weiss, Charlottesville, Va., 1977.

41. Wheeler, Alden Hays, Molecular Orbitals, The Long Range Interaction Between Two Molecules, Ph.D. Thesis, Purdue University, Graduate School, Department of Chemistry, The Interaction Energy, Lafayette, Ind., 1970.

42. Powell, Chas. Fay, Colonial Ventures, Being a Brief Narrative of the Early Settlements, The Macmillan Company, New York, 1957.

43. Mills, Lena Courtney, The Deeds of the Colonial Governors and Other Items, The Virginia Magazine of History and Biography, Vol. LXVII (October 1959).

44. Myers, Lena Courtney (Mrs.), Descendants of William Strachey, Gentleman, Secretary of the Virginia Colony, Ann Arbor, 1955.

45. Mumey, Nolie, The Steel Axe of the Ute, Stone-Age to Steel-Age, Vol. XVI, No. 2, The University of Denver Publications, Denver, Colorado, 1950.

46. Nuttall, Zelia, A Penitential Procedure, Colonial American Civilization, Vol. I, No. 1, A. S. Knopf, New York, 1927.

Magazines and Periodicals

1. *Lower Norfolk County Virginia Antiquary*, edited by Edward Alexander Wyatt, 5 volumes, 1895-1951.

2. *The Parson's Cabinet*, edited by Miguel Walker, Vol. I only, 1832-1833.

3. *Tyler's Quarterly Historical and Genealogical Magazine*, edited by Lyon G. Tyler, Vols. I to X, 1919-1928.

4. *Virginia Genealogy*, published by The Virginia State Library, Vols. I to III, 1956-1959.

5. *Virginia Gazette*, published by Alexander Purdie and John Dixon and by William Rind, Sr., for the years 1736-1775.

6. *Virginia Historical Register*, edited by William Maxwell, 6 volumes, 1848-1853.

7. *Virginia Magazine of History and Biography*, published by the Virginia Historical Society, 68 volumes, 1893-1960.

8. *William and Mary College Quarterly Historical Magazine*, first series, published by the College of William and Mary and edited by Lyon G. Tyler, 27 volumes, 1892-1919; Second series, published by the College of William and Mary and edited by Earl G. Swem, 23 volumes, 1921-1943; Third Series, published by the Institute of Early American History and Culture, 11 volumes, 1944-1954.

Miscellaneous

1. Ely, Mrs. Lester J., and Duff, Stella V., (compilers). Virginia County Index, 1726-1750. The Institute of Early American History and Culture, Williamsburg, Va., 1950.

2. Colonial National Historical Park (Yorktown, Va.) Files containing letters, memoranda, etc.

3. Colonial Williamsburg (Williamsburg, Va.), Research Department files containing letters, memoranda, clippings, etc.

4. Owen, Ruth Lee (compiler). Virginia Historical Index. 2 volumes. Stone Printing and Manufacturing Co., Roanoke, Va., 1934-35.