xxviii. Platanus Occidentalis (Sycamore)

Sycamore is a large deciduous tree that grows to 45 meters in height and has a trunk diameter of up to 4 meters. It prefers moist soils along streams and on bottomlands, but it will grow on dry upland slopes (Brown and Brown 1972:124). The species is mentioned by Lawson in North Carolina in 1701 (1952:102).

xxix. Taxodium distichum (Bald Cypress)

These are deciduous, cone-bearing trees that grow naturally only in swamps or wet soils, where the roots develop erect, conical "knees" that extend above the water level. Cypress wood is moderately heavy, hard, strong, and very resistant to decay (Brown and Brown 1972:12).

> . . . there is a kinde of wood we called Cypres, because both the wood, and leafe did most resemble it, and of those trees there are some neere 3 fadome and about at the root very straight, and 50, 60 or 80 foot without a branch [Smith 1986:151].

Hariot says of bald cypress, "Cyprus . . . is a wood of price and no small estimation" (1893:34).

> Cypress is not an Ever Green with us, and is therefore called the bald Cypress, because the Leaves, during the Winter-Season turn red, not recovering their Verdure till the Spring. These Trees are the largest for Height and Thickness, that we have in this Part of the World; some of them holding thirty-six foot in Circumference. Upon Incision they yield a sweet-smelling grain, though not in great Quantities . . . [Lawson 1952:99].

Robert Evelin in mid-seventeenth-century New Jersey in the vicinity of Delaware Bay mentions bald cypress (Force 1836-1846:II:23, see Section IV.B.4.a.vii, above). Other descriptions of the forests of the Delaware Bay region of New Jersey also refer to bald cypress (Force 1836-1846:II:20, see Section IV.B.4.a.xiv, above).

Bark of the bald cypress was generally preferred for the construction of homes (Lawson 1952:187):

> The Bark they make their Cabins withal, is generally Cypress, or red or white Cedar; and sometimes, when they are a great way from any of these Woods, they make use of Pine-Bark, which is the worser sort. In building these Fabricks, they get very long Poles of Pine, Cedar, Hiccory, or any other Wood that will ben; these are the Thickness of the Small of a Man's Leg, at the thickest end, which they generally strip of the Bark, and warm them well in the Fire, which makes them tough and fit to bend. Afterwards, they stick the thickest ends of them into the Ground, about two Yards asunder, in a Circular Form, the distance they desire the Cabin to be (which is not always round, but sometimes oval) then they bend the Tops and bring them together, and bind their ends with Bark of Trees, that is proper for that use, as Elm is, or sometimes the Moss that grows on the Trees, and is a Yard or two long, and never rots; then they brace them with other Poles to make them strong; afterwards cover them all over with Bark, so that they are very warm and tight, and will keep firm against all the Weathers that blow. They have other sorts of Cabins without Windows, which are for their Granaries, Skins and merchandizes, and others that are covered overhead; the rest left open for the Air. These have Reed-Hurdles, like Tables, to lie and sit on, in Summer, and serve for pleasant Banqueting-Houses in the hot Season of the Year. The Cabins they dwell in have Benches all round, except where the Door stands on these they lay Beast-Skins, and Mats made of Rushes, whereon they sleep and loll.

Bald cypress bark was also preferred for building dugout canoes (Plate E-18):

> Of these great Trees [cypress] the Pereaugers and Canoes are scooped and made, which sort of Vessels are chiefly to pass over the Rivers, Creeks, and Bays, and to transport Goods and Lumber

> from one River to another. . . . This Wood is very lasting and free from the Rot. A Canoe of it will outlast four Boats, and seldom wants repair. They say that a Chest made of this Wood will suffer no Moth or Vermin to abide therein [Lawson 1952:99].

A few waterlogged canoes dating to the seventeenth century and made of cypress (*Taxodium distichum*) have been recovered archaeologically (McCary 1964).

Lawson states that bald cypress also had medicinal applications (1952:99):

> the Nuts which these (bald cypress) Trees bear plentifully yield a most odoriferous Balsam, that infallibly cures all new and green Wounds which the Inhabitants are well acquainted withal.

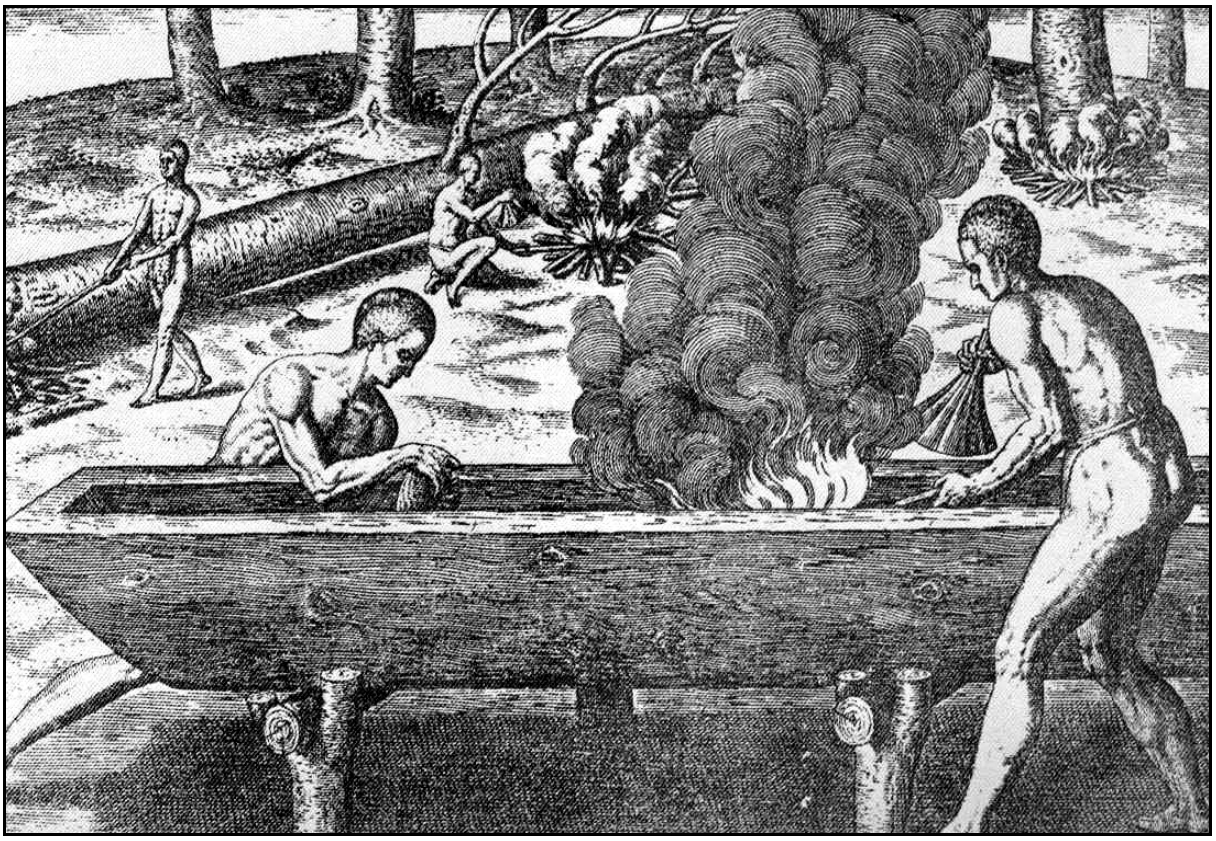

PLATE E-18: ***The manner of making their boates***
SOURCE: Hariot 1893:XII

xxx. Tilia americana (Basswood, American Linden)

Basswood is a deciduous trees that grows to 40 meters tall and up to 120 centimeters in diameter. The wood is soft, nearly white, and was historically used for baskets (Brown and Brown 1972:230).

The inner bark was an important fiber plant among the Iroquois (Hennepin 1903:522).

> [the women] make Thred of Nettles, and of the Bark of the Line Tree [Tilia americana], and of certain Roots, whose Names I know not [1903:528].

xxxi. Ulmus americana (American Elm), Ulmus rubra (Slippery Elm)

The American elm (*Ulmus americana*), once abundant, has been ravaged by the Dutch Elm disease, caused by a fungus accidentally introduced from Europe about 1930 and spread by elm bark beetles. This deciduous hardwood was once prevalent throughout valleys and floodplains in mixed hardwood forests. Its wood is useful though unremarkable for construction, and is rated mediocre to poor as a fuelwood (Graves 1919).

Ulmus rubra is a moderate-sized tree with a dark grayish bark that is coarsely ridged on the exterior and very mucilaginous on the interior (hence its common name). It prefers rich soils; it is most common on dry soils and limestone formations in the Piedmont, and is rare on the Coastal Plain. The bark of the slippery elm was easily stripped from living trees when the sap began to flow in the spring. This bark was heavily relied upon as a building material, and the inner bark was utilized in the manufacture of strong cordage.
Hariot mentions elm in his accounts (1893:34).

> There are two sorts of Elm; the first grows on our High-Land and approaches our English; The Indians take the Bark of its Root and beat it, whilst green, to a Pulp, and then dry it in the Chimney where it becomes of a reddish Colour. This they use as a Sovereign Remedy to heal a Cut or green Wound, or any thing that is not corrupted. It is of a very glutinous Quality. The other Elm grow in low Ground, of whose Bark the English and Indians make Ropes; for as soon as the Sap rises, it strips off with the greatest ease imaginable. It runs in March, or thereabouts [Lawson 1952:95].

Elm was also an important species for canoe construction:

> If they wish to proceed by water, or having been hunting are anxious to return home heavily laden with meat and skins, they speedily make a canow of bast, load it with their things and go whither they will. These canows are fashioned of one piece of bast bark, the outer side of which is turned inward, both ends sharply pointed and securely sewn with bast, the inside being stretched out by a ribbing of bent wooden rods, which keeps the canoe in its proper form. These canows are so light upon the water that they easily glide away from under the feet of one unaccustomed to them when attempting to stand. Capsize they cannot, because they are very broad and carry heavy burdens. To make one they choose a tree according to the size of canow desired and peel the bark off careful so that there may be no rent. If a canow gets out of repair . . . the Indians know how to repair it . . . There is a kind of elm-wood bast which they crush or pound fine and which is of a sticky consistency, serving them in place of tar, to keep their canows water-tight so that they do not leak [Zeisberger 1910:23].

Robert Evelin in 1648 describes plant resources of the Delaware Bay region (see Force 1836-1846:II:23, Section IV.B.4.a.xix, above).

Elm was used to make strong cordage (Lawson 1952:187). It was also used to make sleeping platforms or stiff bark shelving stacked inside of homes, upon which corn was dried (Lafitau 1977:11, 13). Kettles made of slippery elm bark were used to capture maple syrup (Smith 1870:38; Zeisberger 1910:23). Elm bark was also commonly used in home construction (see Section IV.B.4.a.vii, above).

Medicinal uses for *U. rubra* are many, including in poultices, and tonics and teas made to be taken as a physic (Erichsen-Brown 1979:49-52).

The bark of the roots of elm (*Ulmus* sp.) had medicinal applications, as was noted by Lawson:

> The Indians take the Bark of its Root and beat it, whilst green, to a Pulp, and then dry it in the Chimney where it becomes of a reddish Colour. This they use as a Sovereign Remedy to heal a Cut or green Wound, or any thing that is not corrupted. It is of a very glutinous Quality. The other Elm grow in low Ground, of whose Bark the English and Indians make Ropes; for as soon as the Sap rises, it strips off with the greatest ease imaginable. It runs in March, or thereabouts [Lawson 1952:95].

b. Shrubs, Woody Vines, and Canes

i. Amelanchier sp. (Shadbush, Serviceberry)

Species of Amelanchier are deciduous trees or shrubs bearing attractive white or pinkish flowers and fruits that are either a dry or a fleshy pome. Hybridization between species is common, complicating identification (Brown and Brown 1972:134-142).

Lawson mentions the Indians of North Carolina eating serviceberries (1952:107).

ii. Castanea Pumila (Chinquapin)

C. pumila is a shrub or small tree, 2 to 10 meters in height, which often spreads by underground stems. It has burs 2.5 to 3.5 centimeters in diameter, densely covered with spiny bristles enclosing a single plump, ovoid, dark brown nut that is 101.5 centimeters in length. The seed is sweet and edible. It is called "Chinquapin," from the Indian word "Chechinquamins," and was one of the first American plants cultivated in England (Brown and Brown 1972:66).

> In some parts were found some Chesnuts whose wild fruit equalize the best in France, Spaine, Germany, or Italy, to their tasts that had tasted them all. . . . Of their Chesnuts and Checkinquamens boyled 4 houres, they make both broath and bread for their chief men, or at their greatest feasts [Smith 1986:I:151, 153].

Nuts were mentioned as a food resource in Virginia, South Carolina, and Delaware.

> Chinkapin is a sort of Chesnut, whose Nuts are most commonly very plentiful, insomuch that the Hogs get fat with them. They are rounder and smaller than a Chesnut, but much sweeter. The Wood is much of the Nature of Chesnut, having a Leaf and Grain almost like it. It is used to timber Boats, Shallops, &c., and makes anything that is to endure the Weather [Lawson 1952:101].

> Chinkapins have a Taste something like a Chesnut, and grow in a Husk or Bur, being of the same sort of Substance, but not so big as an Acorn. They grow upon large Bushes, about as high as the common-Trees in England, and either in the high or low, but always barren Ground [Beverley 1705:132].

(See also Force 1836-1846:II:23, Section IV.B.4.a.vii, above.)

iii. Corylus americana (Hazelnut)

Hazelnut is a shrub that grows to 3 meters tall, usually in thickets. It bears an edible nut of good flavor, best collected in the fall, after frosts have loosened them from the branches. It is common inland, but infrequent on the Coastal Plain (Brown and Brown 1972:54).

Beauchamp Plantagenet describes "Filbirds," perhaps meaning *C. americana*, among a list of edible wild plants from mid-seventeenth-century Delaware:

> Sometimes wilde Pease and Vetches, and Long Oats, sometimes Tuckaho, Cuttenoman ground, Nuts, Marhonions, sometimes small nuts, Filbirds, Walnuts, . . . [Force 1836-1846:II:31].

Beverley mentions that the natives of Virginia would not eat hazelnuts (1705:181).

> The Hazle-Nut grows plentifully in some places of this Country, specially towards the Mountains; but ours are not so good as the English Nuts, having a much thicker Shell (like all the fruits of America, that I have met withal) which in Hardness exceeds those in Europe [Lawson 1952:106].

> Hasel-nuts are there in infinite Plenty, in all the Swamps; and towards the Heads of the Rivers, whole Acres of them are found upon the high Land [Beverley 1705:132].

iv. Hamamelis virginiana (Witch-hazel)

Witch-hazel is a flowering shrub common throughout the Middle Atlantic in woodlands or brushy fields. The bark is used for making witch-hazel lotion (Brown and Brown 1972:121).

Hariot mentions witch-hazel as being a preferred wood for making bows (1893:34).

v. Myrica pensylvanica (Bayberry, Candleberry), M. cerifera (Wax-myrtle or Candleberry)

Myrica pensylvanica and *M. cerifera* are deciduous to partly evergreen shrubs that bear fruits that mature into clusters of globose, bluish-white, hard, waxy drupes. These fruits were boiled to extract scented wax for candles and medicines (Brown and Brown 1972:43-44). Both species are common to the Coastal Plain. *M. pensylvanica* prefers dunes and poor, dry soils, whereas *M. cerifera* grows in sandy swamps or wet woods.

Beverley (1705:137-138) and Lawson (1952:91) mention making candles from *M. pensylvanica*, but it is unclear whether they refer to a colonial or Native American practice.

vi. Ribes americanum (Wild Black Currant), R. Cynosbati (Prickly Gooseberry or Dogberry), R. rotundifolium (Eastern Wild Gooseberry)

The native currants and gooseberries are low, deciduous, often prickly shrubs, with loose, shredding outer bark and round twigs. The berry is globose or ovoid, with calyx persistent on its tip (Brown and Brown 1972:118-120).

Smith describes what is probably *R. Cynosbati* in Virginia in 1612:

> They have a berry much like our gooseberry, in greatnesse, colour, and tast; those they call Rawcomenes, and doe eat them raw or boyled [Smith 1986:I:154].

Beverley mentions two varieties of currants growing in Virginia:

> There grow naturally Two Sorts of Currants, one red, and the other black, far more pleasant than those of the same Colour in England. They grow upon small Bushes [1705:131].

Lawson describes three varieties of currants:

> There is a very pretty, bushy Tree, about seven or eight Foot high, very spreading, which bears a Winter-Fruit, that is ripe in Octover. They call them Currants, but they are nearrer a Hyrt; I have eaten very pretty Tarts made therof. They dry them instead of Currants. This Bush is very beautiful.
>
> The Bermudos Currants grow in the Woods on a Bush, much like the European Currnat. Some People eat them very much; but for my part, I can see nothing inviting in them, and reckon them a very indifferent Fruit.
>
> We have another Currant; which grows on the Banks of rivers, or where only Clay hath been thrown up. This Fruit is red, and gone almost as soon as come. They are a pretty Fruit whilst they last, and the Tree (for 'tis not a Bush) they grow upon, is a very pleasant Vegetable [Lawson 1952:108-109].

vii. Rubus sp. (Raspberries, Blackberries)

Rubus species are erect, trailing shrubs, usually armed with prickles or stiff bristles. They bear a delicious, aggregate fruit. Many species of *Rubus* are native (Brown and Brown 1972:158-159).

Ethnohistoric accounts of raspberries and blackberries are numerous (see Smith 1986:I:92, Section IV.B.4.a.xvii, above).

Beverley mentions the wild raspberry, but says it is inferior to the English varieties (1705:131).

> Our Rasberries are of a purple Colour, and agreeable Relish, almost like the English; but I reckon them not quiet so rich. When once planted, tis hard to root them out. They run wild all over the Country, and will bear the same year you transplant them, as I have found by Experience [Lawson 1952:106].
>
> Our Dew-Berries are very good, but the Black-Berries are bitterish, and not so palatable, as in England [Lawson 1952:107].

viii. Smilax pseudo-china (China-root, China-briar), S. laurifolia (Bamboo Vine)

These *Smilax* species feature a stem that climbs with tendrils and prickles at the base. They are common to low woods or damp, sandy soils on the Coastal Plain, and bear a blue-black berry in June and July (Brown and Brown 1984:353). Roots of all species within the genus are edible.

The roots of several species of the genus *Smilax*, or greenbrier, feature prominently in ethnographic accounts of diet in the southeast.

> Tsinaw a kind of roote much like vnto the which in England is called the China root brought from the East Indies. And we know not anie thing to the contrary but that t maie be of the same kind. These roots grow manie together in great clusters and doe bring foorth a brier stalke, but the leafe in shape far vnlike; which beeing supported by the trees it groweth neerest vnto, wil reach or climbe to the top of the highest. From these roots while they be new or fresh beeing chopt into small pieces and stampt, is strained with water a iuce that maketh brea, and also being boiled, a very good spoonemeate in maner of a gelly, and is much better in tast if it bee tempered with oyle. This Tsinaw is not of that sort which by some was caused to be brought into England or the China roote, for it was discouered since, and is in vse as is afore saide: but that which was brought hither is not yet knowne neither by vs nor by the inhabitants to serue for any vse or purpose; although the rootes in shape are very like [Hariot 1893:25-26].

> They dig up these roots, and while yet fresh and ful of juie, chop them in pieces, and then macerate them well in wooden mortars; this substance they put in vessels nearly filled with clean water, when, being well mixed with paddles, whilst the finer parts are yet floating in the liquid, they decant it off into other vessels, leaving the farinaceous substance at the bottom, which, being taken out and dried is an impalpable powder or farina, or a reddish color. This, when mixed in boiling water, becomes a beautiful jelly, which, sweetened with honey or sugar, affords a most nourishing food for children or aged people; or when mixed with fine corn flour, and fried in fresh bears grease, makes excellent fritters [Bartram 1958:49].

> The small Bamboo . . . which is a certain Vine, like the rest of these Species, growing in low Land. They seldom, with us, grow thicker than a Man's little Finger, and are very tough. Their Root is a round Ball which the Indians boil as we do Garden-Roots, and eat them. When these Roots have been sometime out of the Ground they become hard and make good Heads to the Canes, on which several pretty Figures may be cut. There are several others of this kind, not thoroughly discovered [Lawson 1952:103-104].

ix. Vaccinium vacillans (Low Blueberry), V. corymbosum (Highbush Blueberry), V. caesariense (New Jersey Blueberry), V. angustifolium (Low Sweet or Late Sweet Blueberry), V. atrococcum (Black Highbush Blueberry)

Blueberries are much-branched, deciduous shrubs common to a variety of environments on the Coastal Plain and the Piedmont. Two species, *V. vacillans* and *V. corymbosum*, are most common to coastal Delaware. *V. vacillans* prefers thickets and old fields, and *V. corymbosum* is more common in open woodlands and swamps, bogs, and moist woods. Each species bears a tasty fruit (Brown and Brown 1984:270-272).

Beverley mentions three kinds of blueberries:

> There are Three Sorts of Hurts, or Huckleberries, upon Bushes, from Two to Ten Foot high. They grow in the Vallies and sunken Grounds, having different Relishses; but are all pleasing to the Taste. The largest sort grow upon the largest Bushes, and, I think, are the best Berries [1705:131].

(See also Smith 1986:I:92, Section IV.B.4.a.xvii, above).

In New York State circa 1648, blueberries are mentioned along with an abundance of wild fruits (see Force 1836-1846:II:23, Section IV.B.4, above).

During his travels in South Carolina during the first years of the 1700s, Lawson describes seeing

> great Copses of many Acres that bore nothing but Bushes, about the Bigness of Box-trees, which (in the Season) afford great Quantities of small, black-berries, very pleasant Fruit, and much like to our Blues, or Huckleberries, that grow on Heaths in England [1952:23].

> The Hurts, Huckle-Berries, or Blues of this Country, are four sorts, which we are well acquainted withal; but more Species of this sort, and all others, Time and Enquiry must discover. The firest sort is the same Blue or Bilberry, that grows plentifuly in the North of England, and in other Places, commonly on your Heaths, Commons, and Woods, where Brakes or Fern grows.

> The second sort grows on a small bush in our Savannas and Meads, and in the Woods. They are larger than the common Fruit, and have larger Seed.

> The third grows on the single Stem of a Stick that grows in low good Land, and on the Banks of Rivers. They grow three or four Foot high, and are very pleasant, likt the first sort but larger.

> The fourth sort grows upon Trees, some ten and twelve Foot high, and the Thickness of a Man's Arm; these are found in the Runs and low Grounds, and are very pleasant and bear wonderfully. The English sometimes dry them in the sun, and keep them to use in Winter, instead of Currants. The Indians get many Bushels and dry them on Mats, whereof they make Plum-Bread, and many other Eatables. They are good in tarts, or infused in Liquors [Lawson 1952:107].

Peter Kalm writes,

> Bilberries were likewise a very common dish among the Indians. They are called huckleberries by the English here, and belong to the various species of Vaccinium. . . . The American ones grow on shrubs, which are from two to four feet high; and there are some species which are above six feet in height. The Indians formerly plucked them in abundance every year, dried them either in the sunshine or the fireside, and afterwards prepared them for eating in different manners. These huckleberries are still a dainty dish among the Indians. On my travels through the country of the Iroquois, they offered me, whenever they designed to treat me well, fresh corn bread, baked in an oblong shape, mixed with dried huckleberries, which lay as lose in it as the raisins in a plum pudding. I shall write more about it later [Kalm 1966:262].

x. Vaccinium macrocarpon (Large or American Cranberry)

V. macrocarpon is a prostrate evergreen shrub that grows to 1 meter, is much branched, and roots from the stems. It bears a globose, ellipsoid or pear-shaped fruit measuring 1 to 2 centimeters in diameter, which turn a bright red at maturity in the autumn, and persist on the plant into the winter months. *V. macrocarpon* is native mostly in mountain bogs (Brown and Brown 1972:274), and extends to Coastal Plain bogs—often as a result of escape from cultivation during historic times. This native species is the now-familiar cultivated cranberry.

Only one *clear* reference to the American cranberry was noted in the course of this research. Robert Beverley mentions the species in the following passage:

> Cranberries grow in the low Lands, and barren sunken Grounds, upon low bushes, like the Gooseberry, and are much of the same Size. They are of a lively Red, when ripe, and make very good Tartes [Beverley 1705:131].

Beverley also speculates that the *Raxcomens* noted by Captain John Smith may be a reference to *V. macrocarpon* (Beverley 1705:131).

xi. Viburnum recognitum (Smooth Arrowood)

V. recognitum is an erect shrub that grows to 3 meters in height and has straight stems that branch little during the first year or two of growth. It is common in moist soils for thickets and open woods. The straight stems of this species were used for arrow shafts, as is indicated by the common name of the species (Brown and Brown 1972:313).

> Arrow-Wood growing on the Banks, is used by the Indians for Arrows and Gun-Stickes. It grows as straight as if plained, and is of all Sizes. 'Tis as tough and pliable as the smallest Canes [Lawson 1952:102].

xii. Vitis sp. (Grape)

A variety of *Vitis* species are native to eastern North America (Plate E-19). Early historical accounts of grapes are extensive; however, they seem to focus on the suitability of grapes for viticulture enterprises in the New World, rather than their use by native peoples.

PLATE E-19: *Vitis labrusca* (Fox Grape) at the Puncheon Run Site

Strachey comments on the great variety and quantity of wild grapes observed in Virginia:

> to behold the goodly vynes, burthening every neighbour-bush and clymbing the toppes of highest trees, and those full of Clusters of grapes in their kynd how over-dreepend and shadowed soever from the Sun and though never pruned or manured. I day say yt that we havu eaten there as full and lusheous a Grape as in the villages betweene Paris and Amiens, and I haue drunck often of the rath (early) wine . . . [1967:121].

The English interest in spurring a wine industry in the Virginia colonies, like the delusion of silk production, persisted from the earliest days of European contact.

> Of vines great abundance in many parts that climbe the toppes of the hightest trees in some places, but these beare but fewe grapes. But by the rivers and Savage habitations where they are not overshadowed from the sunne, they are covered with fruit, though never pruined nor manured. Of those hedge grapes wee made neere 20 gallons of wine, which was neare as good as your French Brittish wine, but certainely they would prove good were they well manured. There is another sort of grape neere as great as a Cherry, this they call Messaminnes, they bee fatte, and the juyce thicke. Neither doth the tast so well please when they are made in wine [Smith 1986:I:152].

Hariot writes,

> . . . two kinds of grapes that the soile doth yeeld naturally: the one is small and sowre of the ordinarie bignesse as ours in England: the other farre greater & of himselfe lushious sweet. When they are planted and husbanded as they ought, a principall commoditie of wines by them may be raised [1893:16].

> . . . grapes and wallnuts innumerable; the vines being as common as brambles . . . [Force 1836-1846:III:13].

Beauchamp Plantagenet describes a valley filled with grapes near Delaware Bay in New Jersey:

> . . . a thicket of four sorts of excellent great Vines running on Mulberry and Sassafras trees; there are four sorts of Grapes, the first is the Tholouse Muscat, sweet scented, the second the great foxe and thick Grape, after five moneths reaped being boyled and salted, and well fined, it is a strong red Xeres; the third a light Claret, the fourth a white Grape creeps on the land, maketh a pure Gold colour wine . . . [Force 1836-1846:II:26].

Father Andrew White, writing in 1638 from Maryland, described wines made from native grapes:

> . . . this autumne I have drank wine made of the wilde grapes not inferior in its age to any wine of Spaigne. It had much of muscadine grape but was a dark redd inclining to browne. I have not seene as yett any white grape excepting the foxgrape which hath some stayne of white but of the red grape I have seen much diversity: some less some greater, some stayne, some doe not, some are aromaitcall; some not [The Calvert Papers 1889:208].

Grapes are listed among tradeable commodities with the mid-seventeenth-century Delawares (Lindeström 1925:223).

Beverley devotes a lot of attention to describing the grape species native to Virginia, followed by speculation as to their suitability for wine-making.

> Grapes grow wild there in an incredible Plenty, and Variety; some of which are very sweet, and pleasant to the Taste, others rough and harsh, and, perhaps fitter for Wine or Brandy. I have seen great Trees covered with single Vines, and those Vines almost hid with the Grapes. Of these wild Grapes, besides those large ones in the Mountains, mention'd by Batt in his Discovery, I have observed Six very different Kinds, viz.
>
> 1. Two of these Sorts grow among the Sand-banks, upon the Edges of the low Grounds, and Islands next the Bay, and Sea. They grow thin in small Bunches, and upon very low Vines. These are noble Grapes; and tho' they are wild in the Woods, are as large as the Dutch Gooseberry. One Species of them is white, the other purple, but both much alike in Flavour.
>
> 2. A Third Kind is produced throughout the whole Country, in the Swamps and Sides of Hills. These also grow upon small Vines, and in small Bunches; but are themselves as big as the English Bullace, and of a rank Taste when ripe, resembling the Smell of a Fox, from whence they are called Fox-Grapes. All these Three sorts, when ripe, make admirable Tarts, being of a fleshy Substance, and, perhaps, if rightly managed, might make good Raisins.
>
> 3. There are Two Species more, that are common to the whole Country, some of which are black, and some blue on the Outside, but are both red within. They grow upon vast large Vines, and bear very plentifully. The nice Observer might, perhaps, distinguish them into several Kinds, because they differ in Colour, Size, and Relish; but I shall divide them only into Two, viz. The early, and the late ripe. The early ripe common Grape is much larger, sweeter and better than the other. Of these some are quite black, and others blue; some also ripen Three Weeks, or a Month before the other. The Distance of the Ripening, is from the latter End of August, to the latter End of October. The late ripe common Grapes are less than any of the other, neither are they so pleasant to the Taste. They hand commonly till the latter End of November, or till Christmas . . .
>
> 4. The Sixth Sort is far more palatable than the rest, and the Size of the white Muscadine in England; but these are peculiar to the Frontiers, on the Heads of the Rivers. They grow upon very small Vines, which climb not higher than the Shrub, or smallest Bushes, on which they generally rest, or on the Plants, which annually spring out of the Ground: But these are so greedily eaten by the small Birds,

> and other wild Creatures, to whom they hang convenient, by the Lowness of their Vine, that (as it was said of the Indian Cherry) it is a great Rarity to find any of them ripe; though they are in great Plenty to be met with, while they are green. These, in all Likelihood, would make admirable Wine; unless the Earliness of their Ripening, may be an Objection [Beverley 1705:134-136].

Robert Evelin in 1648 describes plant resources of the Delaware Bay region (see Force [1836-1846:II:23] in Section IV.B.4.a.xix, above).

Other accounts of the riches of forests of the Delaware Bay region of New Jersey feature the potential of native grapes for wine and raisins:

> . . . with the goodliest woods of Oaks and all Timber for ships and Masts, mulberries for sillk, sweet Cypresse, Cedars, Pines and Firres, 4 sorts of Grapes for wine, and Raisins, with the greatest variety of choice fruits . . . [Force 1836-1846:II:20].

Lawson observed six kinds of grape in North Carolina in the early eighteenth century:

> Among the natural Fruits, the Vine first takes place, of which I find six sorts, very well known. The first is the black Bunch-Grapes which yield a Crimson Juice. These grow common and bear plentifully. They are of a good Relish, though not large, yet well knit in the Cluster. They have a thickish Skin and large Stones, which makes them not yield much Juice. There is another sort of Black Grapes like the former in all respects, save that their Juice is of a light Flesh-Colour, inclining to a White. I once saw a Spontaneous white Bunch-Grape in Carolina; but the Cattle browzing on the sprouts thereof in the Spring it died. Of those which we call Fox-Grapes, we have four sorts; two whereof are called Summer-Grapes, because ripe in July; the other two Winter-Fruits, because not ripe till September or October. The Summer fox-Grapes grow not in Clusters or great Bunches, but are about five or six in a Bunch, about the Bigness of a Damson or larger. The black sort are frequent, the white not so commonly found. They always grow in Swamps and low, moist Lands, running sometimes very high and being shady, and therefore proper for Arbours. They afford the largest Leaf I ever saw to my remembrance, the Back of which is of a white Horseflesh Colour. The Fruit always ripens in the Shade. I have transplanted them into my Orchard and find they thrive well, if manured. A Neighbor of mine has done the same; mine were by Slips, his from the Roots, which thrive to Admiration, and bear Fruit, thought not so juicy as the European Grape, but of a glutinous Nature. However it is pleasant enough to eat.
>
> The other Winter Fox-Grapes are much of the same Bigness. These refuse no Ground, swampy or dry, but grow plentifully on the Sand-Hills along the Sea-Coast and elsewhere, and are great Bearers. I have seen near twelve Bushels upon one vine of the black sort. Some of these, when thoroughly ripe, have a very pretty vinous Taste and eat very well, yet are glutinous. The white sort are clear and trasparant, and indifferent small Stones. Being removed by the Slip or Root, they thrive well in our Gardens, and make pleasant Shades [Lawson 1952:105].

xiii. Xanthoxylum amercanum (Prickly Ash, Toothache Tree, Suterberry)

Prickly ash is a shrub with thorny stems, pinnately compound leaves; and greenish yellow flowers (Brown and Brown 1972:194).

Prickly ash is a powerful medicinal plant, with the bark, root bark, leaves, and fruit all having some usefulness against a variety of ailments, including toothache, venereal disease, rheumatism, gastrointestinal ailments, minor maladies, cholera, sore throat, and excess pus (Erichsen-Brown 1979:155-157).

In sixteenth-century Virginia, Beverley mentions the use of *X. americanum* among the native population:

> The Bark of the Root, of that which we call the Prickly Ash, being dried and powder'd, has been found to be a Specifick, in old Ulcers, and Long-running Sores [Beverley 1705:141].

> Prickly-Ash grows up like a Pole, of which the Indians and English make Poles to set their Canoes along in Shoal-Water. It is very light, and full or Thorns or Prickles, bearing Berries in large Cluster of a purple Colour, not much unlike the Alder. The Root of this Tree is Cathartick and Emetic, used in Cachexies [Lawson 1952:103].

c. Herbs

i. Wetland Species

1) Acorus calamus (Sweet Flag)

Acorus calamus is an aquatic, perennial herb with a long, horizontal, and aromatic rhizome, usually forming dense patches. This species is common on the Coastal Plain in freshwater, swamps, or shallow water (Brown and Brown 1984:298).

The tall, three-angled scape includes a spike-like spadix covered with tiny yellowish green flowers. The species was given the common name sweet flag because the interior of the stalk is sweet. *A. calamus* has a fleshy root with a pungent, biting flavor. It is from this rootstock that the drug calamus is made. The root can be boiled, and then boiled again in a thick syrup to form a candied sweetmeat.

Of the 2,582 plant species detailed in Daniel Moerman's *Native American Ethnobotany* (1998), *A. calamus* is listed as one of the most "useful" species. Moerman's research ranked it as the fifth most useful plant overall, and the second most useful medicinal plant documented. The root of sweet flag was used crushed or pulverized, decocted and infused, smoked, or in compounds.

Wood in New England mentions "flagges," probably including *A. calamus*:

> In the Summer they gather flagges, of which they make Matts for houses . . . [1865:107].

Beauchamp Plantagenet in the Delaware Bay region mentions a plethora of marsh plants with edible roots, describing what was probably *A. calamus* as "seg roots":

> . . . are had, as in all the huge long Meads and Marshes, sweet seg roots, round nuts, Tucaho and Cuttinamon roots for Hogs . . . and berries of sweet Muskerats . . . [Force 1836-1846:II:27].

Among the Delaware Indians, documented medicinal uses for *A. calamus* include using an infusion of the root for suppressed menses, colds, and coughs. In addition, roots were used with sassafras roots for intestinal pains (Tantaquidgeon 1972:37). Among the Nanticoke, the plant was used to treat colds and gastrointestinal ailments (colic), and as a pediatric aid (Tantaquidgeon 1942:55, 84).

The Oklahoma Delaware used *A. calamus* as an abortifacient, an analgesic, a cold remedy, and cough medicine (Tantaquideon 1942:31, 32, 68, 74). Sweet flag was also used as a blood remedy and to treat tape worms, as well as for boils, epilepsy, dental work, and disease prevention (Herrick 1977:279; Rousseau 1945:70).

The Chippewa used *A. calamus* as a mordant with bloodroot in dyeing (Gilmore 1933:131).

2) Arundinaria gigantea (Giant Cane)

Arundinaria gigantea, is the giant grass that formed extensive "canebreaks" from Virginia to Missouri, and south to Florida and Louisiana. It was common to freshwater marshes, growing from 15 to 25 feet tall, and is somewhat woody, with large clusters of seeds forming at the top. These starchy seeds provided an edible grain much used by Native American populations throughout the range of the species. The young, tender shoots may be cooked as a vegetable. Giant cane was heavily relied upon as a building material by Native Americans (Brown and Brown 1984:196; Medsger 1966:129). Native populations of *A. gigantea* have been much reduced by environmental disturbance throughout the historic era, and by loss of habitat to more aggressive wetland species (i.e., *Phragmites australis*).

Smith describes "Mattoume" (mattoumme) growing in early seventeenth-century Virginia; this is probably a reference to *A. gigantea.*

> Mattoume growth as our bents do in meddows. The seede is not much unlike to rie, though much smaller. This they use for a dainty breat buttered with deare suet [Smith 1986:I:153].

Lawson describes "hollow reed," which appears to be *A. gigantea*:

> The hollow Reed or Cane, such as Angling-Rods are made of and Weavers use, we have great Plenty of, though none Northward of James-River in Virginia. They always grow in Branches and low Ground; Their Leaves endure the Winter, in which Season our Cattle eat them greedily. We have them (towards the Heads of our Rivers) so large that one Joint will hold above a pint of Liquor [Lawson 1952:103].

Sharped stems of giant cane (*A. gigantea*) were used as knives (Callahan 1981:232-234, 236). (See also Section IV.B.4.c.i.9, below.)

3) Nelumbo lutea (American Lotus, Lotus Lily, Water Chinquapin, Yellow Lotus)

Nelumbo lutea is an native aquatic herb with fleshy rhizomes that grows in isolated populations in quiet freshwater (Plate E-20) (Brown and Brown 1984:459). The starchy seeds, shoots, and rhizomes are edible. Rafinesque states that the long, creeping roots are acrimonious when fresh—a condition that was remedied by local Indians by repeated washings prior to consumption (1817:23).

No direct documentation of the use of *N. lutea* by the natives along the eastern seaboard of North America has been located. The paucity of data in support of the use of the plant by the Native Americans of the Delaware region may be due to the isolated and patchy distribution of the species.

Nineteenth- and twentieth-century ethnographic accounts of the consumption of *N. lutea* shoots, rhizomes, and seeds among Midwestern and Great Lakes Indians are plentiful. The Comanche boiled the roots for food (Carlson and Jones 1940:523); the Dakota made soup with the hulled seeds combined with meat, and cooked peeled tubers with meat or hominy (Gilmore 1919:79). The Huron Indians considered *N. lutea* a starvation food when it was used along with acorns (Aller 1954:63); the Meskwaki cooked the seeds with corn, and cut terminal shoots crosswise and strung them on strings to be dried for use in the winter (Smith 1928:262). The Ojibwa Indians roasted the seeds in their hulls and ground them into a sweet meal; they also cooked the shoots with venison, corn, or beans (Smith 1932:407). The Omaha Indians peeled the tubers and cooked them

PLATE E-20: *Nelumbo lutea* (American Lotus)

with meat or hominy (Gilmore 1919:70), or boiled the roots to eat as vegetables (Fletcher and La Flesche 1911:341). The Pawnee hulled the seeds and used them with meat to make soup, or peeled the tubers and cooked them with meat or hominy (Gilmore 1919:79); the Ponca also used the hulled nuts in combination with other ingredients to make soup, and boiled the tubers with meat or hominy (Gilmore 1919:79). The Potawatomi gathered the seeds to be roasted like chestnuts, and cut, strung, and dried the roots for use in the winter (Smith 1933:105). The Winnebago made soup from the seeds, and boiled lotus tubers with meat or corn (Gilmore 1919:79).

A large population of American lotus once grew at Dover, Delaware, in the St. Jones River (Plate E-21; see Plate E-4). During the Victorian era, these famous "lotus lilies" were quite a tourist attraction, especially during the third week of August, when the lilies were in full bloom. Local legend held that the lilies originated in China and India, and were mysteriously transplanted to the St. Jones (Bragg 1980:164).

The St. Jones lilies are described in some detail in the diaries and memoirs of J. Alexander Fulton, 1865-1900.

> It is frequently said, but no one pretends to know how truly, that there are only a few places in the United States where the Lotus is indigenous, and that St. Jones Creek is one of them. Their rarity makes them especially interesting, particularly to visitors from other places and, as the beds are accessible only by water, a trip down the creek by boat is always a pleasant diversion and a lovely sight when the flowers are in bloom. There are small beds at different locations, but the finest display is at the mouth of a branch between Moore's Mill tract and the Hunn 'Wild Cat Manor' farm, where there were acres of them without a break.
>
> The flower is white with a yellow center. It grows upon a single stem which is rooted on the bottom and varies in length according to the depth of the water. The stem is brownish in color, somewhat

> ropelike and supple in texture, and frequently grows to fifty inches in length. In picking, if pulled by the flower, the stem will break shortly below it, but, if grasped by two hands farther down, it will break at the bottom. The leaves are very large, rarely less than 12 inches and sometimes as large as 24 inches in diameter, and are dark green in color. In the beds where they are thick, and while growing, they hold up above the water and the edge stands at different angles but, when thinly set, they lie flat on the water and rise and fall with the tide. At that point the tide rises about fifteen inches, is still fresh and does not get brakish for a couple of miles lower down. The flower itself has five bottom or stem leaves and twenty four flower leaves proper. These are about four inches long and one and three quarter inches wide and are pure white. The seed head in the center, about one and one half inches in diameter and bright yellow in color, combined with the white petals, forms a very handsome blossom, and combined with and resting among the large green leaves, furnishes a beautiful and unusual spectacle when seen in such numbers [Fulton n.d.:69-70].

The St. Jones lilies are now nearly extinct, except for a small group of the plants off Lotus Lane in the vicinity of the Puncheon Run Site (William McAvoy, personal communication 1998). The population of *N. lutea* that once thrived around Dover suffered following the realignment of the St. Jones River after World War I. Changes in the depth and course of the river as a result of these improvements altered local environmental conditions, creating unsuitable conditions for the species.

PLATE E-21*: Nelumbo lutea* (American Lotus)
SOURCE: Holmgren et al. 1998:42

4) Orontium aquaticum (Golden Club)

Golden club is an aquatic perennial herb with a thick, deep rhizome, common in shallow water on the Coastal Plain. Golden club blooms in April and May (Brown and Brown 1984:298). The bulbous rootstock of *Orontium aquaticum* is edible when cooked. The dried seeds resemble peas and were eaten, after repeated boilings, by both Native American populations and European settlers (Medsger 1966:197).

Historical references to the various root crops utilized as food by coastal Algonquian groups are frustratingly unclear, and native plant names (or food names) are usually used. It is likely that many of the roots described by early ethnographic literature were *O. aquaticum*. The following excerpt from Peter Kalm in the Philadelphia area appears to clearly refer to golden club:

> Taw-kee is another plant, so named by the Indians who eat it. Some of them call it Taw-kim, and others Tackvim. The Swedes call it by the name of Taw-kee. The plant grows in marshes, near moist and low ground, and is very plentiful in North America. The cattle, hogs and stags, are very fond of the leaves in spring; for they are some of the earliest. . . . The Indians pluck the seeds, and keep them for eating. They cannot be eaten fresh or raw, but must be dried. The Indians were forced to boil them repeatedly in water, before they were fit for use; and they ate them like peas. When the swedes gave them butter or milk, they boiled or broiled the seeds in it. Sometimes they employ these seeds instead for bread; and they taste like peas [Kalm 1966:162].

> In the watry valleyes groweth a berry which they call Ocoughtanamins very much like unto Capers. These they dry in sommer. When they will eat them they boile them neare halfe a day; for otherwise they differ not much from poyson [Smith 1986:I:152, 154].

5) Peltandra virginica (Arrow Arum, Wakerobin)

This aquatic perennial herb has arrow-shaped leaves that grow from a mass of thick, fibrous roots. The species is frequently found on the Coastal Plain in swamps, ponds, and marshes (Brown and Brown 1984:296).

The identity of root crops used as food by native peoples of the Atlantic coast is very difficult to confirm based on early ethnohistories. Tuckahoe (also known as tucaho, tuccahoe, taw-ho, taw-him, tuckáh, tuckahoo) is a commonly cited root plant whose identity is particulary elusive. Tuckahoe is most likely *Peltandra virginica*, *Orontium aquaticum*, or *Pontederia cordata*. All references to tuckahoe (and its many derivations) are presented here, under *Peltandra*, and are then referred to in discussions of other candidate species.

Captain John Smith described the following:

> The chiefe roote they have for foode is called Tockawhoughe, It groeth like a flagge in low muddy freshes. In one day a Savage will gather sufficient for a weeke. These rootes are much of the greatnes and taste of Potatoes. They use to cover a great many of them with oke leaves and ferne, and then cover all with earth in the manner of a colepit; over it, on each side, they continue a great fire 24 houres before they dare eat it. Raw it is no better then poison, and being roasted, except it be tender and the heat abated, or sliced and dried in the sun, mixed with worrell and meale or suck like, it will prickle and torment the throat extreamely, and yet in sommer they use this ordinarily for bread [Smith 1986:153-154].

Swanton suggests that the "Sacqvenvmmener" mentioned by Hariot (1893:27-28) refers to the berries of *P. virginica* (1946:363).

> Out of the ground they dig . . . a Tuberous Root they call Tuckahoe, which while crude is of a very hot and virulent quality: but they can manage it so as in case of necessity, to make Bread of it. . . . It grows like a Flagg in the miry Marshes, having Roots of the magnitude and taste of Irish Potatoes, which are easy to be dug up [Beverley 1705:181].

> . . . are had, as in all the huge long Meads and Marshes, sweet seg roots, round nuts, Tucaho and Cuttinamon roots for Hogs . . . and berries of sweet Muskerats . . . . [Force 1836-1846:II:27].

Kalm mentions the root and berries of *Arum virginiana* being eaten by "the savages" (1966:67).

> Taw-ho and Taw-him was the Indian name of another plant, the root of which Indians eat. Some of them likewise call it Tuckáh; but most of the Swedes still knew it by the name of Taw-ho. It grows in moist ground and swamps. Hogs are very fond of the roots, and grow very fat by feeding on them. Therefore, they often visit the [wet] places where these roots grow, and they are frequently seen rooting up the mud, and falling with their whole body into the water, so that only a little of the back part is out of the water. It is therefore very plain, that these roots must have been extirpated in places which are frequented by hogs. The roots often grow to the thickness of a man's thigh. When they are fresh, they have a pungent taste, and are reckoned a poison in that fresh state. Nor did the Indians ever venture to eat them raw, but prepared them in the following manner: they gathered a great heap of these roots, dug a great long hole, sometimes to or three fathoms and upwards in length, into which they put the roots, and covered them with the earth that had been taken out of the hole; they made a

> great fire above it, which burnt till they thought proper to remove it; and they dug up the roots and consumed them with great avidity. These roots, when prepared in theis manner, I am told, taste like potatoes. The Indians never dry or preserved them, but always dig them fresh out of the marshes, when they want them. This Taw-ho seems to be the same as the Tuckahoo, of the Indians in Carolina [Kalm 1966:260-261].

> Wee had more Sturgeon then could be devoured by dogge and man; of which the industrious, by drying and pownding, mingled with cavaire, sorrel, and other wholsome hearbs, would make bread and good meate; others would gather as much Tockwough roots in a day, as would make them bread a weeke . . . [Smith 1986:I:264].

Beauchamp Plantagenet, speaking of the Delaware region in 1648, describes tuckahoe among a list of wild edibles:

> sometimes wilde Pease and Vetches, and Long Oats, sometimes Tuckaho, Cuttenoman ground, Nuts, Marhonions, sometime small nuts, Filbirds, Walnuts, Pokiberries, ten sorts of Berries . . . [Force 1836-1846:II:31].

P. virginica was used as a pediatric drug among the Nanticoke Indians (Tantaquidgeon 1942:58). It was administered by grating the root into milk, and was fed to babies to treat unspecified ailments. Sturtevant reports the use of *P. virginica* as a food plant among the Mikasuki Seminole (1954:494).

6) Pontederia cordata (Pickerelweed, Tuckahoe)

Pickerelweed is an aquatic herb with creeping rhizomes that are edible. It is common in shallow freshwater habitats (Brown and Brown 1984:309).

P. cordata is one possible candidate for the plant called "Tuckaho" (and related names). (For a full discussion and citations, see *Peltandra virginica*, Section IV.B.4.c.i.5, above).

7) Sagittaria latifolia (Arrowhead)

Arrowhead is a perennial herb that grows in shallow water from short fibrous roots. These tuberous roots were much used by Native Americans as food throughout the range of the species (Medsger 1966:169-710).

> Sagittaria, Katniss is another Indian name of a plant, the root of which they were also accustomed to eat, when they lived here. . . . The Indians either boiled this root or roasted it in hot ashes. Some of the Swedes ate it with much relish at the time when the Indians were so near the coast; but at present none of them make any use of the roots . . . the Indians, especially the women, traveled to some islands at about Whitsundtide, dug out the roots, and brought them home; and while they had them they desired no other food. They were said to have been destroyed by the hogs [brought over by the Europeans] which were exceedingly greedy for them. The cattle are fond of their leaves. I afterwards got some of these roots roasted, and in my opinion they tasted good, though they were rather dry. The taste was nearly the same as that of potatoes . . . [Kalm 1966:259].

Beauchamp Plantagenet in the Delaware Bay region mentions a plethora of marsh plants with edible roots, and may refer to *S. latifolia* as "cuttinamon":

> . . . are had, as in all the huge long Meads and Marshes, sweet seg roots, round nuts, Tucaho and Cuttinamon roots for Hogs . . . and berries of sweet Muskerats . . . [Force 1836-1846:II:27].

And as “cuttinoman”:

> He that is lazy . . . may live as an Indian . . . sometimes wilde Pease and Vetches, and Long Oats, sometimes Tuckaho, Cuttenoman ground . . . [Force 1836-1846:II:31].

Robert Beverley may mean *S. latifolia* when he refers to “Cuttanimmons.”

> They make Food of another Fruit call’d Cuttanimmons, the Fruit of a kind of Arum, growing in the Marshes: They are like Boyl’d Peas, or Capers to look on, but of an insipid earthy taste [Beverley 1705:181].

Rafinesque reports that the species is called Katnip among the Lenapes, and it is an important root for trade and to make bread, soups, and other dishes. The root is used as a refrigerant and subastringent, and is useful when applied to the feet and dropsical legs. Leaves are applied to breasts to dispel mothers milk (1817:259).

Smith among the Ojibwe noted that the corms are a most valued food source, and that the Indians will dig them if they cannot get them more easily by appropriating the stored caches of beaver and muskrat, who hoard them in great numbers (1932:353).

8) Typha latifolia (Broad Leaf Cattail), Typha angustifolia (Narrowleaf Cattail)

Cattails are a perennial marsh or aquatic herbaceous plant with creeping rootstocks. The fruit is a linear or fusiform achene that matures in August and September. It is common throughout the Coastal Plain (Brown and Brown 1984:42). *Typha* species were useful as a fiber plant—the leaves were used for weaving mats and the downy seed heads to stuff mattresses and quilts. Medicinally, cattails down was used to dress and protect wounds, and the crushed roots were applied as a poultice. As a food, the starchy central rootstock was dried and ground into meal; the tender shoots and young fruiting spikelets are also edible (Medsger 1966:196).

Huron Smith’s work among the Ojibwe, Menomini, Potawatomi, and Meskwaki documented a multitude of uses for *Typha* species. The root was used as a natural oakum for caulking leaks in boats, and the leaves were used to make mats for siding homes and to diaper babies. The root was also used as a poultice, and the fuzz was used as bedding (Smith 1923:77, 1928:248, 1932:390, 1933:85).

Peter Kalm mentions various uses for *Typha angustifolia* in the Philadelphia region in 1749 (1966:278). Hennepin wrote that “the Indians . . . make mats of bulrushes to lie upon” (1903:528).

> The Mats the Indian Women make, are of Rushes, and about five Foot high , and two Fathom long, and sewed double, that is, two together; whereby they become very commodious to lay under our Beds, or to sleep on in the Summer Season in the Day-time, and for our Slaves in the night . . . There are other Mats made of Flags, which the Tuskeruro Indians make, and sell to the Inhabitants . . . A great way up in the Country, both Baskets and Mats are made of the split Reeds, which are only the outward shining Part of the Cane. Of these I have seen Mats, Baskets and Dressing-Boxers, very artificially done [Lawson 1952:200].

> The Baskets our Neighboring Indians make are all made of a very fine sort of Bulrushes, and sometimes of Silk-grass, which they work with Figures of Bests, Birds, Fishes, &c. . . . A great way up in the Country, both Baskets and Mats are made of the split Reeds, which are only the outward shining Part of the Cane. Of these I have seen Mats, Baskets and Dressing-Boxers, very artificially done [Lawson 1952:200].

9) Zizania aquatica (Wild Rice)

Wild rice is a stout, aquatic annual that grows 1 to 3 meters in height and has long leaves. Its seeds were used as food by Indians, and it is still a specialty food item. It was once quite common on the estuaries of Delaware Bay, but is scarcer today due to crowding by more aggressive species.

Thomas Hariot was undoubtedly speaking of *Zizania aquatica* when he described the following:

> There is a kind of reed which beareth a seed almost like unto our rie or wheat, & being boiled is good meate [Hariot 1893:29].

The mattoume mentioned by Smith (1986:I:153) may also refer to *Z. aquatica* (see Section IV.B.4.c.i.2).

10) Unidentified Roots

The following passages describe additional roots that have not yet been conclusively identified:

> Coscushaw, some of our company tooke to bee that kinde of roote which the Spaniards in the West Indies call Cassauy, whereupon also many called it by that name: it goweth in very muddie pooles and moist groundes. Being dressed according to the countrey maner, it maketh a good bread, and also a good sponemeate, and is vsed very much by the inhabitants: The juice of this root is poison, and therefore heede must be taken before any thing be made therewithal: Either the rootes must bee first sliced and dried in the Sunne, or by the fire, and then being pounded into floure will make good bread: or els while they are geene they are to bee pared, cut into pieces and stampt; loues of the same to be laid neere or ouer the fire vntill it be floure, and then being well pounded agiane, bread, or spone meate very good in taste, and holsome my be made thereof [Hariot 1893:27].

ii. Non-wetland Species

1) Ambrosia artemisiifolia (Common Ragweed)

Ambrosia artemisiifolia is a coarse, annual species common to open environments (Brown and Brown 1984:989). It bears an edible seed.

A. Artemisiifolia was used medicinally by the Delaware as a poultice to prevent blood poisoning (Tantaquidgeon 1972:35).

Seeds of the giant ragweed (*Ambrosia trifida*) have been recovered archaeologically, and it is supposed that the species was a quasi-cultivated grain plant in the Midwest (Yarnell 1987).

2) Andropogon sp. (Beardgrass)

Andropogon is a perennial grass with elongated, narrow leaf-blades; it grows in tufts or patches (Brown and Brown 1984:77).

> After they had reaped the corn, they kept it in holes under ground during winter; they seldom dug these holes deeper than a fathom, and often not so deep; at the bottom and on the sides they put broad pieces of bark. If bark could not be had, the Andropogon bicorne [bicornus?], a grass which grows in great plenty here, and which the English call Indian grass and the Swedes wild grass, supplied the want of the former. The ears of corn were then thrown into the hole and covered to a considerable

> thickness with this grass, and the whole again covered by a sufficient quantity of earth. Corn was kept extremely well in these holes, and each Indian had several such subterraneous stores, where his corn lay safe, though he traveled far from it [Kalm 1966:269].

3) Angelica atropurpurea (Angelica)

Angelica is a large herbaceous plant growing to 2 meters. The roots are strongly aromatic. The plant grows in rich, moist soils from Labrador south to Delaware and West Virginia. The seeds and roots were useful as medicine, and fresh young sprouts and roots were eaten raw. The root was also used as a hunting and fishing aid (Brown and Brown 1984:713; Clayton 1968:14-15). Angelica is a popular flavoring in confectionary and liquors, and is sometimes used as a substitute for Juniper berries in the distillation of gin (Grieve 1971:38-40).

John Clayton in late seventeenth-century Virginia describes *Angelica atropurpurea*:

> I will now mention to you an herb though unknown, yet worthy to be fetched from Virginia yielded the country nothing else, it is the herb called there Angelica . . . the seeds are much like Angelica seeds . . . It stops the flux and cures it to a wonder; again it often loosens and purges the bodys of those that are bound and have the grips especially if it proceed from cold; and prevents many unhappy distempers; I have reason to speak well of it, for it is to it, under God, that I attribute the saving of my own life . . . I take it to be the most soverign remedy the world ever know in the griping of the Guts and admirable against Vapours, it is sudorific and very Aromatick, and will not be concealed for wherever it is mixed it will have the predominant scent. It is mostly called by those who know it in Virginia by the name of Angelica. But showing a piece of the root to a great Woodsman to see whether he knew it and could tell me where it grew, he seemed surprized to see me have therof, and told me that he kept an Indian once for some weeks with him; because he was an excellent Woodsman, and going a hunting . . . they came where some of this root grew; The Indian rejoycing gathered some of it, but was very carfull to cut off the top of the root and replant it; He then asked him why he was so carfull, whereunto the Indian replyed, It was a very choice plant and very scarce for they sometimes travelled 100 or 200 miles without finding any of it. He then asked Him what use it was of, to which the Indian answered you shall see by and by. After some time they spyed 4 Deer at a distance, then the Indian contrary to his usual custom went to windward fo them, and sitting down upon an old trunk of Tree, began to rub the root betwixt his hands, at which the Deer toss up their heads and snuffing with their noses, they fed towards the place where the Indian satt, till they came within easy shot of him, whereupon he fired at them, and killed a large buck. . . . I have often taken notice that the Indians smell generally strong of this herb. And I have since learned from others that the Indians call it the Hunting root. . . . Another Gentleman, a White native of that Country, when I once pulled a piece of the root out of my pocket to bite therof, for I frequently carry'd some of it about me, asked me if I loved fishing . . . said you have gotten some of the fishing root . . . when we were boys we used to get some of it to lay with our baits to invite the fish to bite [Clayton 1968:14-15, in Erichsen-Brown 1979:246-247].

Rafinesque mentions *Angelica lucida*, probably referring to *A. venenosa* (hairy angelica):

> The Nendo of the Virginian Indians. . . . Highly valued by the southern Indians, and cultivated by them: used as a carminative, and in cookery. This root is said to give an excellent flavor to Virginia hams and pork when hogs feed on it. It is bitterish, subacrid, fragrant and aromatic, stomachic and tonic, useful in colics, hysterics, menstrual suppressions. . . . The powdered seeds kill lice . . . root an antidote against yellow fever, chewed when visiting the sick [1817:192].

Each of these references to *Angelica* species, while later in history, elude to the propagation, if not cultivation, of the plants by native peoples. It is unclear whether or not this was an aboriginal practice.

Hariot may refer to Angelica in the following excerpt:

> Habascon is a roote of hoat taste almost of the forme and bignesse of a Parseneepe, of it selfe it is no victuall, but onely a helpe beeing boiled together with other meates [Hariot 1893:27].

Beverley also mentions Angelica.

> The Indians also pulverize the Roots of a kind of Anchuse or yellow Alkanet, which they call Puccoon, and a sort of wild Angelica . . . [Beverley 1705:219].

John Banister in late seventeenth-century Virginia mentions beaver traps smeared with a substance to attract the animals (Banister 1970:386). This attractant may have been a pulverized form of the "hunting root" identified as *Angelica* sp. by John Clayton (Roundtree 1989:39).

4) Apios americana (Ground Nut, Wild Bean)

Apios americana is a twining perennial vine with showy purple-brown flowers preceding sickle-shaped pods that enclose edible seeds and tuberous underground stems (also edible) (Brown and Brown 1984:591-592).

In the following passage, Hariot probably refers to *A. americana*, or perhaps (though less likely) to *Ipomoea pandurata* (see Section IV.B.4.c.ii.11).

> Openauk are a kind of roots of round forme, some the bigness of walnuts, some far greater, which are found in moist & marshish grounds growing many together one by another in ropes, or as thogh they were fastened with a string. Being boiled or sodden they are very good meate [Hariot 1893:26].

Describing Delaware in 1648, Beauchamp Plantagenet possibly mentions *A. americana*:

> sometimes wilde Pease and Vetches, and Long Oats, sometimes Tuckaho, Cuttenoman ground, Nuts, Marhonions, sometime small nuts, Filbirds, Walnuts, Pokiberries, ten sorts of Berries . . . [Force 1836-1846:II:31].

(See also Force 1836-1846:II:24, Section IV.B.4.a.v, above.)

Hariot reported on "wilde peaze" encountered in sixteenth-century Virginia: ". . . like unto ours in England but that they were lesse, which are also good meate" (1893:29).

Gladys Tantaquidgeon reports that the Delaware dried the roots and ground them into flour, which was used to make bread, and boiled the roots to eat as the cultivated potato (1972:59). The Delaware considered the ground nut roots a winter food (Tantaquidgeon 1972:59). Other historic Indian tribes used *A. americana* in a variety of ways. The Cherokee used uncooked seeds substituted for pinto beans in bean bread (Perry 1975:46), used the beans "for food" (Hamel and Chiltoskey 1975:24), and cooked the roots like potatoes (Perry 1975:46). The Chippewa ate the tubers (Gilmore 1933:133), and the Dakota roasted or boiled the tubers as food (Gilmore 1919:33). The Huron used the roots with acorns during times of famine (Aller 1954:63). The Menomini cooked the roots with maple sugar to make a dish similar to candied yams, and they peeled, parboiled, sliced, and dried roots to store for winter use (Smith 1923:68). Smith reported that root stocks were eaten raw, as well as peeled, parboiled, sliced, and dried for storage (1928:259). The Mohegan ground dried roots into a flour used for thickening stews, and ate the roots fresh or dried (Tantaquidgeon

1972:83). The roots were boiled or roasted and eaten by various other tribes, including the Omaha, Winnebago, Pawnee (Gilmore 1919:33, 94), Potawatomi (Smith 1933:103), and Seminole (Sturtevant 1954:492).

The "Ground-Nuts or Wild Potatoes" mentioned by Lawson (1952:188) are likely *A. americana.*

> Hopniss or Håpness was the Indian name of a wild plant, which they ate at that time. The Swedes still call it by that name and it grows in the meadows in good soil. The roots resemble potatoes, and are boiled by the Indians, who eat them instead of bread. Some of the Swedes at theat time likewise ate this root for want of bread. Some of the English still eat it instead of potatoes. Mr. Bartram told me that the Indians who live farther in the country do not only eat these roots, which have as good taste as potatoes, but likewise take the peas which lie in the pods of this plant, and prepare them like common peas [Kalm 1966:259].

5) *Apocynum cannabinum (Indian Hemp), A. androsaemifolium (Dogbane)*

Apocynum cannabinum (Plate E-22) and *A. androsaemifolium* are perennial herbs with tough, fibrous outer strands. They prefer moist soils, where they tend to grow in homogenous stands; this tendency would have facilitated its harvest by human populations. *Apocynum* species are indigenous to North America, and more than 60 species have been documented.

PLATE E-22: *Apocynum cannabinum* (Indian Hemp)
SOURCE: Holmgren et al. 1998

Both species were extensively used by Native Americans for both food and medicine, and also as a source of fine, strong fiber to make thread and cordage for sewing and for weaving lines and nets used in fishing. Yarnell proposes that *A. androsaemifolium* was of such economic importance among the coastal Algonquians that women carried the seeds of the species with them when they married into other tribes (1964:92). This suggests that the species was certainly husbanded, if not exactly cultivated. However, Hariot's report from sixteenth-century Virginia points out that hemp was not cultivated there, but was harvested from the wild, where it grew in natural stands.

> The trueth is that of Hempe and Flaxe there is no great store in any one place together, by reason it is not planted but as the soile doth yeeld it of it selfe; and howsoever the leafe, and stemme or stalk doe differ from ours; the stuffe by the judgement of men of skill is altogether as good as ours [Hariot 1893:8].

> They train their daughters in this and also in such other work as will be expected of them, as cooking, bread-making, planting, making of carrying-girdles and bags, the former used to carry provisions and utensils on their backs while journeying and the latter to hold the provisions. Both are made of wild

> hemp which they gather in the fall and use for various purposes, for mending shoes and making the tread with which they sew amongst the rest. . . . Wild hemp is much tougher than that cultivated by the whites. . . . These carrying girths are made by the women of wild hemp which is first spun. The part of the girths which passes across the breast and over the shoulders is three fingers broad and decorated with various figures; from it depend long, plaited, durable bands to which the burden is bound. . . . The women make blankets of turkey features which are bound together with twine made of wild hemp. Of such many are to found even at the present day among the Indians, and these in winter are better protection against the cold than the best European blanket. The women also make themselves petticoats of wild hemp [Zeisberger 1910:16, 24, 29].
>
> And the savages use a kind of hemp, which they understand making up much stronger than ours is, and for every necessary purpose, such as notassen, (which are their sacks, and in which they carry everything); they also make linen of it [De Vries 1909:219].
>
> Apocynum cannabinum was by the Swedes called Indian hemp (wild help), and grew plentifully in old grain grounds, in woods, on hills, and in high glades. The Swedes have given it the name Indian hemp, because the Indians formerly and even now apply it to the same purposes as the Europeans do hemp; for the stalk my be divided into filaments, and is easily prepared. When the Indians were still living among the Swedes, in Pennsylvania and New Jersey, they made ropes of this Apocynum, which the Swedes bought, and used them as bridles, and for nets. These ropes were stronger and kept longer in water than such as were made of common hemp. The Swedes usually got thirty feet of these ropes for one piece of bread. Many of the Europeans still buy such ropes because they last so well. The Indians also make several other articles of their hemp, such as various sizes of bags, pouches, quilts, and linings. On my journey through the country of the Iroquois I saw the women employed in the manufacture of this hemp. They made use neither of spinning wheels nor distaffs, but rolled the filaments upon their bare thighs, and made thread and strings of them, which they dyed red, yellow, black, etc. and afterwards worked them into goods with a great deal of ingenuity. The plant is perennial, which renders the annual planting of it altogether unnecessary. Out of the root and stalk of this plant, when it is fresh, comes a white milky juice, which is somewhat poisonous. Sometimes the fishing equipment of the Indians consists entirely of this hemp [Kalm 1966:277-278].

In Virginia, silk grass is thought to have referred to *Apocynum cannabinum* (Indian hemp) (Roundtree 1989:65). Descriptions of the forests of the Delaware Bay region of New Jersey feature a reference to "silk grass" (Force 1836-1846:II:20).

Medicinally, the bitter roots of many *Apocynum* species are effective for their emetic, diaphoretic, tonic, laxative, and expectorant influences (Hutchens 1991:40).

6) Asclepias syriaca (Common Milkweed, Pleurisy Root)

Asclepias syriaca is the most common and abundant milkweed species in the Middle Atlantic region (Plate E-23). It is a coarse perennial herb adapted to a diversity of habitats, including meadows, open woods, and waste places. The species is poisonous to livestock (Brown and Brown 1984:752).

> They have an other roote which they call wighsacan: as th'other feedeth the body, so this cureth their hurts and diseases. It is a small root which they bruise and apply to the wound. . . . Every spring they make themselves sicke with drinking the juice of a root they call . . . wighsacan, and water, whereof they powre [pour] so great a quantity that it purgeth them in a very violent maner; so that in 3 or 4 daies after they scarce recover their former health [Smith 1986:I:154].
>
> Wysauke. The hearbe wich the Sauages call Wysauke whereiwth theie cure their woundes which they receeue by the poysoned arroes of their enemys [caption by White; Lorant 1946].

> Ribwoort or Plantaine, set together by couples at certaine distances. The flowers come foorth at the top of the stalks, which as yet are not obserued, by reason the man that brought the seeds and plants heerof did not regard them: after which, there come in place two cods (seldome more) sharpe pointed like those of our Swallowe woort, but greater, stuffed full of most pure silke, of a shining white colour: among which silke appeareth a small long toong (which is the seede) resembling the toong of a bifde or that of the herbe called Adders toong. The cods are not onely full of silke, but euery nerue or sinewe wherewith the leaues be ribbed are likewise most pure silke; and also the piling to the stems euen as Flaxe is torne from his stalks . . . [Hariot 1588:445].

Medicinally, the *A. syriaca* is called pleurisy root, as it is useful as an expectorant and diuretic.

The downy fibers could be used for textiles, although *A. incarnata* was more commonly employed (Small 1933:1070).

7) Dioscorea villosa (Wild Yam)

It has been suggested that the "kaishcupenauk" described by Hariot is the wild yam *(Dioscorea villosa)* (Swanson 1946:270).

> Kaishcupenauk a white kind of roots about the bignes of hen egs and nere of that forme: their tast was not so good to our seeming as of the other, and therefore their place and manner of growing not so much cared for by vs: the inhabitants notwithstanding vsed to boile and eate many [Hariot 1893:26].

8) Fragaria virginiana (Wild Strawberry)

The native strawberry *Fragaria virginiana* is a low perennial plant that spreads by runners, very similar to the cultivated strawberry of today. It bears a fleshy fruit and is common to woodland borders and open fields.

> Straberries there are as good & great as those which we have in our English gardens [Hariot 1893:28].

> Strawberries they have, as delicious as any in the World, and growing almost everywhere in the Woods, and Fields. They are eaten almost by all Creatures; and yet are so plentiful, that very few Persons take care to transplant them, but can find enough to fill their Baskets, when they have a mind, in the deserted old Fields [Beverley 1705:131].

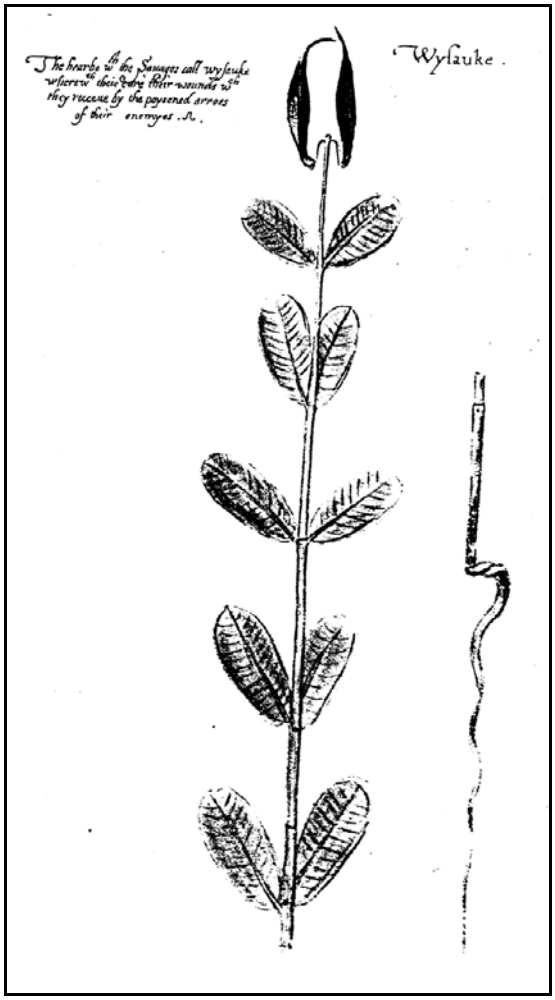

PLATE E-23: John White's Watercolor of Wisanck
SOURCE: Lorant 1946

(See also Smith [1986:I:92], in Section IV.B.4.a.xvii, above.)

Traveling in South Carolina, Lawson mentions strawberry vines growing on abandoned "Indian Plantations" (1952:28, 114).

9) Hierochloe odorata (Holy Grass, Sweet Grass)

Hierochloe odorata is a sweet-smelling, fragrant perennial grass which grows in New England and the Midwest. The species has been widely used by Native Americans both ceremonially and medicinally, and also as a basketry fiber.

H. odorata is only known in Delaware on an island in Rehoboth Bay, Sussex County, immediately adjacent to an ancient village and burial ground (McAvoy, personal communication 1998). The only known population of *H. odorata* in Maryland is in Baltimore County, at the Soldiers Delight serpentine barren, a site also associated with prehistoric occupation. It is likely that the presence of these isolated populations of *H. odorata*, far outside the natural range of the species, is the result of prehistoric introduction of the species by Native Americans using the plant for medicine, basketry, or ritual purposes.

No ethnohistoric documentation for the use of *H. odorata* in the Middle Atlantic region exists, although the following accounts from historic Indian tribes shows a range of uses for the species.

H. odorata was considered a ceremonial item among the Blackfoot, Cheyenne, Lakota, Menomini, and Sioux (Hart 1992:28; Hellson 1974:9; Johnston 1987:20; Smith 1923:75; Rogers 1980:30). It is widely used medicinally and cosmetically, and as a perfume (Moerman 1998:266-267). It is also used as a basket material by the native peoples of New Brunswick and eastern Canada generally (Rousseau 1945:67; Speck and Dexter 1951:258, 1952:6), and by the Menomini Indians (Smith 1923:75).

10) Humulus lupulus (Common Hop)

Although it is mentioned by Beverley (1705) and Byrd (see Bassett 1901:287), hops is not a plant native to North America (Brown and Brown 1984:388).

"Wild hops" is listed as a trade good in the mid-seventeenth century (Lindestöm 1925:223).

11) Ipomoea pandurata (Wild Sweet Potato)

The wild sweet potato, or Man-of-the-earth (*Ipomoea pandurata*), is a perennial plant growing from deep and large (sometimes enormous) roots (Plate E-24). This native species is common to dry soils in fields and open woods, and is frequently found on Delaware's Coastal Plain.

I. pandurata produces an edible root, and the vine and root were used for medicinal applications. Accounts of the wild sweet potato emphasize the largeness of the root:

> Okeepenavk are also of round shape, found in dry grounds: some are of the bignes of a mans head. They are to be eaten as they are taken out of the ground, for by reason of their frinesse they will neither roste nor seeth. Their tast is not so good as of the former rootes, notwithstanding for want of bread and sometimes for varietie the inhabitants vse to eate them with fish or flesh, and in my judgement they doe as well as the household bread made of rie heere in England [Hariot 1893:26].

Ethnographies of historic Indian tribes across North America feature *I. pandurata* in a range of medicinal applications. The Cherokee used a poultice of the root to sooth rheumatism; they also took the plant for coughs, asthma, and consumption; as a diuretic, laxative, and expectorant; to treat cholera morbis; and as a kidney aid. They also made an infusion of the vine to deter insects and moles (Hamel and Chiltoskey 1975:51). The Creek used *I. pandurata* as a diuretic and for "nephritic complaints" (Swanton 1928:670).

The Iroquois used the drug as an Analgesic (decoction of roots taken for abdominal pains and to treat headaches and upset stomachs), as a cough medicine, as a liver aid, in a compound infusion of bark, roots, and leaves, as a blood purifier, and in the treatment of tuberculosis (Herrick 1977:419). The Iroquois also believed that the plant had "magical potency" (Herrick 1977:419).

Ethnographies of the Cherokee describe the use of *I. pandurata* roots for food (Hamel and Chiltoskey 1975:21, 51).

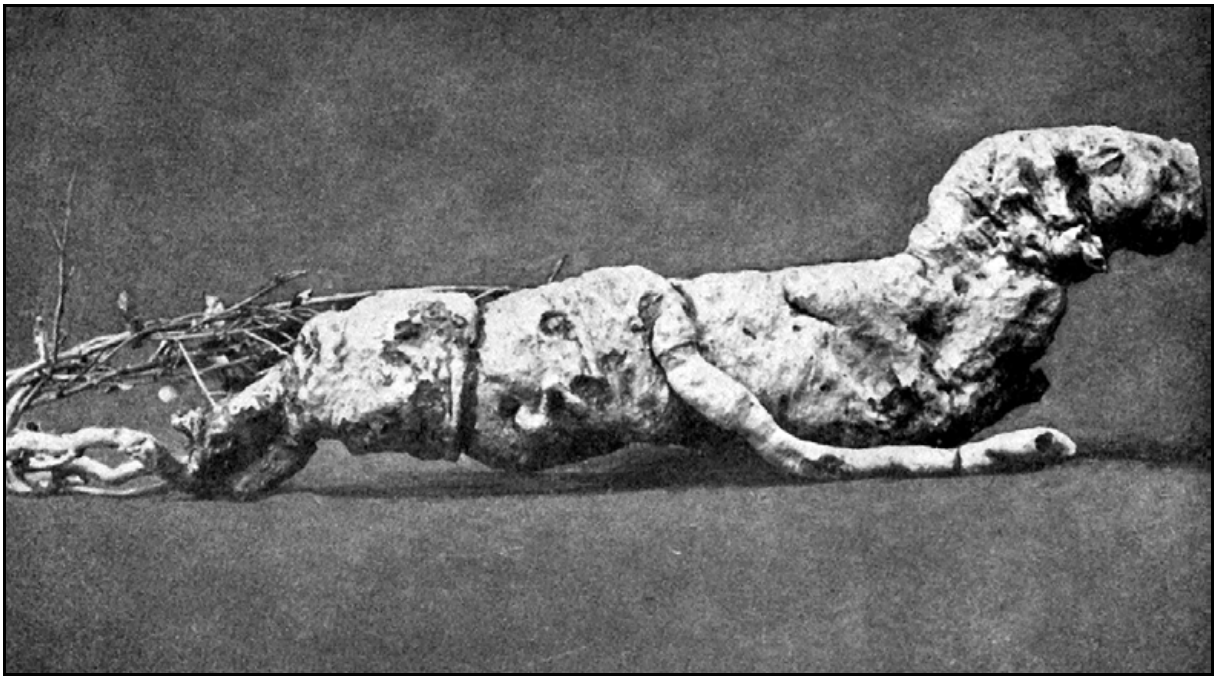

PLATE E-24: The Massive Root of *Ipomoea pandurata* (Wild Sweet Potato)
SOURCE: Medsger 1966

12) Laportea canadensis (Wood Nettle)

Wood nettle is a coarse perennial herb with large, serrated leaves and stiff, stinging hairs. It is common to rich woodlands and streambanks (Brown and Brown 1984:392). *L. canadensis* was an important fiber plant to human populations throughout its range. Ethnohistoric descriptions refer to a group of fiber plants collectively as "hemp" (Erichsen-Brown 1979:443), the most common being *L. canadensis* (wood nettle), *Urtica gracilis* (nettle), *Tilia americana* (basswood), *Apocynum* sp. (dog bane), and *Asclepias* sp. (milkweed).

Analysis of fabrics recovered from Hopewellian rockshelters in Ohio (circa 300 BC) reveals the use of *L. canadensis* and *U. gracilis* in their manufacture (Whitford 1941:13; Yarnell 1964:189).

The following historical references are unclear as to particular species, and may refer to either *L. canadensis*, or to *U. gracilis* or *U. dioica*.

> There grows in the woods a prodigious quantity of nettles good for making hemp; the savages, Hurons & Iroquois use them to make many things, such as bags, nets, necklace & armor. . . . Nettles with which thread and very good cordage is made [Boucher 1964:34-35].

> It is called Stadacona, there is as good earth here as it is possible to see . . . other trees underneath which grows hemp, as good as that of France, growing without being planted or cultivated [Rousseau 1937:123-124].

> The Iroquois in the fishing season make us of a Net of forty or fifty fathom long, which they put in a great canow; after they cast it in an oval Form in convenient places in the Rivers. . . . They sometimes catch four hundred white fish, besides many sturgeon, which they draw to the Bank of the River with Nets made of Nettles [Hennepin 1903:522].

Du Ponceau notes the use of nettles, hemp, and "some plants unknown to us" for spinning thread and yarn (1834:130).

A fiber of nettle was spun by the Iroquois women into cords with which they made fish nets (Hennepin 1903:522, 528).

In the following passage Smith describes an unknown "grass" for making cordage:

> Betwixt their hands and thighes, their women use to spin, the barks of trees, deare sinews, or a kind of grasse they call Pemmenaw, of these they make a thred very even and readily. This thred serveth for many uses: As about their housing, apparell, as also they make nets for fishing, for the quantity as formally braded as ours. They make also with it lines for angles [Smith 1986:I:163-164].

Another account from Virginia states,

> There is a kind of flax the Indians use to make threads of and strings, we call it silke grasse, i'ts fine to make both Linnen and Stuffe of it; abundance in many places of it groweth [Force 1836-1846:II:10].

Fiber plants are described as flax and hemp:

> The trueth is that of Hempe and Flaxe there is no great store in any one place together, by reason it is not planted but as the soile doth yeeld it of it selfe; and howsoeuer the leafe, and stem and stalke doe differ from ours; the stuffe by the judgemnt of men of skill is altogether as good as ours. And if not, as further proofe should finde otherwise; we haue that experience of the soile, as that there cannot be shewed anie reason to the contrary, but that it will grow there excellent well; and by planting will be yeelded plentifully: seeing there is so much ground whereof some may well be applyed to such purposes. What benefite heereof may growe in cordate and linnens who can not easily understand? [Hariot1893:14].

13) Lilium superbum (Turk's Cap Lily)

Lilium superbum is a perennial herb that grows from a bulb with an erect stem bearing many narrow leaves (lower ones whorled, upper ones alternate), and has a showy yellow-orange or orange-red flower. It is commonly found in wet meadows and along streambanks (Brown and Brown 1984:337).

The fleshy bulbs of *L. superbum* are edible. Medsger (1966:197) cites Thoreau's observation that the bulbs of *L. superbum* were eaten by Native Americans, who used them to thicken soups.

14) Lithospermum caroliniense (Puccoon), Lithospermum canescens (Hoary Puccoon, Indian Paint)

Lithospermum caroliniense was an extremely valuable plant to coastal Algonquian groups at the time of European contact (Roundtree 1989:56). The rhizome of this species, and of its close relative, *L. canescens*, yields a vivid red pigment that was used as a dye and body paint. *L. caroliniense* rarely occurs on the Coastal Plain, but can be found in the mountain and piedmont regions of Virginia and the Carolinas, primarily in pine barrens. *L. canescens* is also rare on the Coastal Plain, uncommon in the piedmont of North Carolina, and common in the mountains of Virginia.

Smith mentions pocones (puccoon) used as a dye and medicinal plant:

> Pocones, is a small root that groweth in the mountaines, which being dryed and beate into powder turneth red. And this they use for swellings, aches, annointing their joints, painting their heads and garments. They account it very pretious and of much worth. . . . Their heads and shoulders are painted red with the roote Pocone braied to powder mixed with oyle, this they hold in somer to preserve them from the heate, and in winter from the cold [1986:I:154, 161].

Beverley describes Puccoon as a dye plant:

> There are several Woods, Plants and Earths, which have been fit for the Dying of curious Colours. They have the Puccoon and Muscquaspen, Two Roots, with which the Indians use to paint themselves red [1705:138-139].

> The Indians also pulverize the Roots of a kind of Anchuse or yellow Alkanet, which they call Puccoon, and a sort of wild Angelica . . . [Beverley 1705:219].

Lawson describes a scarlet root, undoubtedly a species of *Lithospermum*:

> They are never bald on their Heads, although never so old, which, I believe, proceeds from their Heads being always uncovered, and the greasing their Hair, so often as they do, with Bear's Fat, which is a great Nourisher of the Hair, and causes it to grow very fast. Amongst the Bear's Oil, (when they intend to be fine) they mix a certain red Powder, that comes from a Scarlet Root which they get in the hilly Country, near the Foot of the Ridge of Mountains, and it is no where else to be found. They have this Scarlet Root in great Esteem , and sell it for a very great Price one to another. The Reason of its Value is, because they not only go a long way for it but are in great Danger of the Sinnagers or Iroquois, who are mortal Enemies of all our Indians, and very often take them Captives or kill them before they return from this Voyage. The Tuskeroros and other Indians have often brought this Seed with them from the Mountains; but it would never grow in our Land. With this and Bear's Grease they anoint their Heads and Temples, which is esteemed as ornamental, as sweet Powder to our Hair. Besides, this Root has the Virtue of Killing Lice, and suffers none to abide or breed in their Heads [Lawson 1952:181-182].

Beverley echos some of these unidentified dye plants, referring to Lawson's work:

> Particularly he takes Notice of Wasebur, and Herb; Chapacour, a Root; and Tangomockonominge, a Bark [1705:138-139].

Hariot describes three unknown plants used to produce vegetable dyes, and *Lithospermum* species may be among them:

> There is Shoemake well knowen, and used in England for blacke; the feede of an hearbe called Wasewówr: little small roots called Cháppacor; and the barke of the tree called by the inhabitaunts Tangomóckonomindge: which Dies are for diuers sorts of red: their goodness for our English clothes remaynes yet to be proved. The inhabitants use them only for dying the hayre; and colouring of their faces, and Mantles made of Deare skinnes; and also for the dying of Rusheds to make artificiall workes withall in their Mattes and Baskettes; having no other thing besides that they account of, apt to use them for. If they will not prove merchantable there is no doubt but the Planters there shall finde apte uses for them, as also for other colours which wee knowe to be there [Hariot 1893:19].

References to two valuable dye plants, *Lithospermum* species and *Sanguinaria canadensis* (bloodroot) (see Section IV.B.4.c.ii.20, below), are often confusing. They have been distinguished here based on geographic range.

15) Opuntia humifusa (Prickly Pear, Indian Fig)

A member of the cactus family, *Opuntia humifusa* prefers dry, shaley or sandy soils (Plate E-25). It produces a soft, edible pulp fruit 2 to 5 centimeters long and 1 to 2 centimeters in diameter in June and July.

Hariot mentions *O. humifusa* as Metaquesunnauk in Virginia during the 1500s:

> Metaquesunnauk, a kinde of pleasaunt fruite almost of the shape & bignes of English peares, but that they are of a perfect red colour as well within as without. They grow on a plant whose leaves are verie thicke and full of prickles as sharpe as needles. Some that have bin in the Indies, where they have seen that kind of red die of great price wich is called Cochinile to grow, doe describe his plant right like unto this of Metaquesunnauk but whether it be the true Cochinile or a bastard or wilde kind, it cannot yet be certified; seeing that also as I heard, Cochinile is not of the fruite but founde on the leaves of the plant; which leaves for such matter we have not so specially observed [Hariot 1893:28].

PLATE E-25: *Opuntia humifusa* (Prickly Pear), by Gonzolo Fernandez de Oviedo y Valdés (1526)

SOURCE: Reveal 1992

Lawson may be referring to *Opuntia* when he mentions wild figs:

> The wild Fig grows in Virginia, up in the Mountains, as I am informed by a Gentleman of my acquaintace, who is a person of Credit, and a great Traveler in America. I shall be glad to have an Opportunity to make Trial what Improvement might be made of this wild Fruit [Lawson 1952:107].

16) Passiflora incarnata (Maypop, Passionflower, Passion Vine)

Passionflower is a strong perennial vine that grows to a length of 15 to 30 feet, is generally low-climbing or trailing, and is found frequently on dry, sandy soils (Plate E-26). It boasts showy, unusual blossoms 2 inches in diameter, with sepals (4 or 5 in number) about 1 inch long, green on the periphery, and lavender within. Broad white petals contain a crown of purple or pink threadlike fringe. It bears a yellow, fleshy, edible fruit,

about the size and shape of a hen's egg (Medsger 1966:59). *P. lutea* also bears an edible fruit, although inferior, and is rare on the Coastal Plain.

Beverley mentions *P. incarnata* as Maracock:

> . . . which is the Fruit of what we call the Passion Flower, our Natives did not take the Pains to plant, having enough of it growing ever where; tho' they eat it with a great deal of Pleasure: this Fruit is about the Size of a Pullet's egg [1705:142-143].

PLATE E-26: *Passiflora incarnata* (Passionflower)
SOURCE: Hutchens 1991:214

According to Captain John Smith, *P. incarnata* was a quasi-cultivated plant in Virginia:

> They plant also Maracocks a wild fruit like a lemmon, which also increase indefinitely. They begin to ripe in September and continue till the end of October [Smith 1986:I:158].

> During somer there are either strawberries which ripen in April; or mulberries which ripen in May and June, Raspises, hurtes [blueberries], or a fruit that the Inhabitants call Maracocks, which is a pleasant wholesome fruit much like a lemond [Smith 1986:I:92].

Lawson, in early eighteenth-century North Carolina, remarks,

> The Maycock bears a glorious Flower, and Apple of an agreeable Sweet, mixt with an acid Taste. This is also a Summer-Vine [Lawson 1952:97].

(See also Section IV.B.4.c.ii.18, below.)

17) Phytolacca americana (Poke)

The pokeweed is a stout perennial that grows in rich, loamy soil in neglected places, especially in new clearings. Poke establishes itself only where some external factor has opened up raw earth and eliminated more aggressive vegetation. The species flourishes in open niche habitats, such as those created by natural agents (e.g., the scoured habitat of open streambanks) or cultural agents (open habitats created by human habitation) (Sauer 1952). New shoots emerge in early spring and are edible as a potherb when harvested before they grow too large (Medsger 1966). The root of the plant is poisonous, but has a long history of usefulness in medicine. Both the root and the berries are used for their emetic, cathartic, alterative, and deobstruent effects (Hutchens 1991). Poke berries were used by historic Native American populations as a fiber dye (Brooklyn Botanic Garden 1964).

Beauchamp Plantagenet, speaking of the Delaware region in 1648, describes poke among a list of wild edibles:

> sometimes wilde Pease and Vetches, and Long Oats, sometimes Tuckaho, Cuttenoman ground, Nuts, Marhonions, sometime small nuts, Filbirds, Walnuts, Pokiberries, ten sorts of Berries . . . [Force 1836-1846:II:31].

18) Podophyllum peltatum (May Apple, Mandrake, Indian Apple, Ground Lemon)

Podophyllum peltatum is a perennial herb common to rich woodlands (Plate E-27). The may apple bears a solitary white flower between two large, deeply lobed, peltate leaves. The fruit matures to a large, ellipsoid, many-seeded berry, which is yellow and edible when ripe (Brown and Brown 1984:483).
It is generally thought that when Captain John Smith mentioned "maracocks," he referred to *Passiflora incarnata*; however, some believe that he was speaking of *P. peltatum* as a quasi-cultivated plant. (See also Section IV.B.4.c.ii.16, above.)

> They plant also Maracocks a wild fruit like a lemmon, which also increase indefinitely. They begin to ripe in September and continue till the end of October [Smith 1986:I:158].

> During somer there are either strawberries which ripen in April; or mulberries which ripen in May and June, Raspises, hurtes [blueberries], or a fruit that the Inhabitants call Maracocks, which is a pleasant wholesome fruit much like a lemond [Smith 1986:I:92].

Zeisberger among the Delaware mentions,

> Wild citrons or May apples grown on stalks not over a foot high. The Indians enjoy eating the fruit, which has a sour but pleasant taste [Zeisberger 1910:57].

> Neer hand is also in August Custard apples and Papawes to make the best Perry English for 100 tun in a place, and all Plums, Hurtleberies, Black Cherries, wilde Anniseed, Persimenas, and other dianty fruits, and roots, are had . . . [Force 1836-1846:II:27].

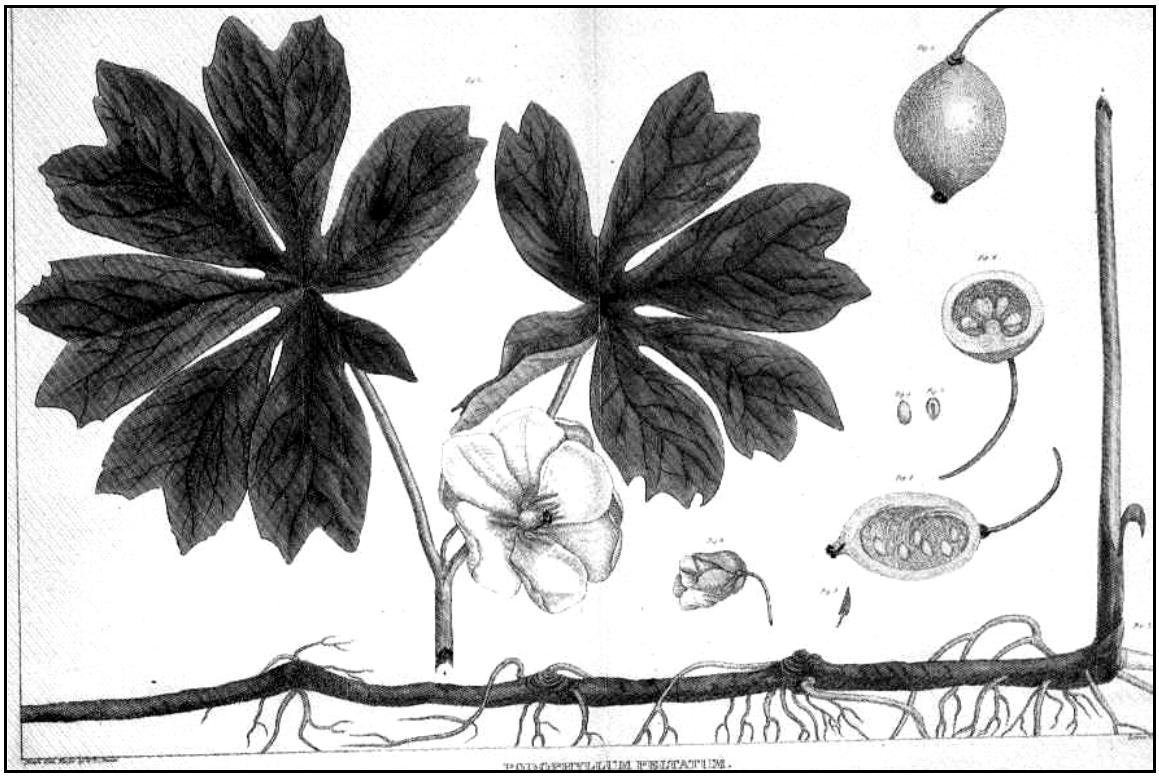

PLATE E-27: *Podophyllum peltatum* (May Apple)
SOURCE: Reveal 1992

P. peltatum has wide medicinal uses as a purgative and anthelmintic, and is valued today for showing promise in the treatment of certain types of cancers (Farnsworth 1974:8, 71; Robinson 1975:268). Millspaugh (1974:17) states that may apple was especially valued by Native Americans, constituting one of their principal remedies.

Bye (1970) suggests that the Iroquois possibly cultivated *P. peltatum* for both food and medicine, and Meijar (1974) suggests that the range of *P. peltatum* in parts of southern Canada was extended by humans through use and propagation. Several reports from the Canadian Herbaria mention that may apple occurs on the sites of old Indian villages (Erichsen-Brown 1979:328).

P. peltatum was also used by the Delaware as a medicine (poison).

> The roots are a powerful poison which, who eats, dies in a few hours' time unless promptly given an emetic . . . In the use of poisonous roots the Indians are well versed, and there are many melancholy examples where they have by their use destroyed themselves or others. If a case of poisoning is taken in time, the effect of the poisonous root may be presvented by inducing vomiting. In case assistance is rendered too late, death follows, as a rule, in a few hours [Zeisberger 1910:47].

Another account describes the following:

> This plant is one of the most beautiful that I can send you. . . . The fruit of this plant which is called citronier in this country is ordinarily as big as a little pullet's egg. It is acid, good to eat, but feverish. The root is a very effective poison which the Savages use when they cannot bear their troubles [Bouvin 1978:219].

Huron Smith among the Menomini observes that a concoction made from *P. peltatum* was not used as a medicine among the tribe, but as an insecticide to kill potato bugs in the garden (1923:62), and that among the Menomini and Meskwaki it is used to treat snakebites, as an emetic, and to combat rheumatism (1923:62, 1928:207).

Waugh describes the use of *P. peltatum* (may apple, mandrake) in treating corn seed prior to planting:

> When all is ready for planting, the corn is soaked in a decoction made of certain herbal ingredients. The moisture causes the corn to germinate slightly, though the utility of the added materials is not so evident. There is possibly some connection with sympathetic magic, the other plants contributing their vitality or otherwise assisting and protecting the corn. Regarding what appeared to be the oldest, or at the most important of these preparations, it was stated by a Cayuga informant that it prevented the worms and birds from bothering. A sort of halo was also said to be sometimes seen around the plants . . . [1916:18-19].

19) Prenanthes alba (White Lettuce, Rattlesnake Root)

Prenanthes alba is a tall, leafy perennial herb that grows from thickened, very bitter roots. The juice is milky. It is common throughout its range in open woods and weedy pastures, usually on rich soils (Brown and Brown 1984:1,062).

> There's the Rattle-Snake-Root, to which no Remedy was ever yet found comparable; for it effectually cures the Bite of the Rattle-Snake, which sometimes has been mortal in Two Minutes. If this Medicine be early applied, it presently removes the Infection, and in Two or Three Hours, restores the Patient to as perfect health, as if he had never been hurt. This operates by violent Vomit; and Sweat [Beverley 1705:139].

Prenanthes alba is also referenced for its curative properties by Millspaugh (1974:94), Densmore (1928:360), Smith (1932:365), and Fenton (1942:521). It was used to treat snake bites and female ailments.

20) Sanguinaria canadensis (Bloodroot, Puccoon Root, Red-Puccoon)

S. canadensis is a woodland wildflower with a thick root from which grows a leaved stalk bearing white or pinkish flowers. The species is common to rich forests and flowers in April (Brown and Brown 1984:485). The root of this plant contains a bright red-orange juice that was used extensively by Native Americans as a pigment. Extracts of the root were also an important medicinal plant (Carver 1974:515; Gunn 1861:756; Smith 1923:44, 1928:234, 1932:377; Speck 1917:311).

Captain John Smith describes the use of *S. canadensis* as a paint source among the natives of Virginia.

> Musquaspenne is a root of the bignesse of a finger, and as red as bloud. In drying it will wither almost to nothing. This they use to paint their Mattes, Targets and such like [Smith 1952:154].

Lawson describes the use of a plant that is probably *S. canadensis* in the mortuary practices of the Santee of South Carolina:

> with a small Root beaten to Powder, which looks as red as Vermillion; the same is mixed with Bear's Oil to beautify the hair, and preserve their Heads from being lousy, it growing plentifully in these parts [Lawson 1952:181, 182].

He also describes its use among the natives of North Carolina and the value of the plant:

> . . . a scarlet Root which they get in the hilly Country, near the Foot of the Ridge of Mountains, and it is no where else to be found. They have this Scarlet Root in great Esteem, and sell it for a very great Price one to another. The Reason of its Value is, because they not only go a long way for it but are in great Danger of the Sinnagers or Iroquois, who are mortal Enemies to all our Indians, and very often take them Captives or kill them before they return from this Voyage. The Tuskeruros and other Indians have often brought this Seed with them from the Mountains; but it would never grow in our Land [Lawson 1952:181].

Smith (1933:68) reports that bloodroot was commonly used as a facial paint.

Densmore (1928:293) refers to bloodroot (*Sanguinaria canadensis*) as a dye plant. The "musquaspenne" mentioned by Smith (1986:I:154) is probably *S. canadensis*.

Hariot (1893:19) lists three unidentifiable dye plants—*S. canadensis* may be among them. (See Section IV.B.4.c.ii.14, above).

References to two valuable dye plants, *S. canadensis* and *Lithospermum caroliniense* (puccoon) (see Section IV.B.4.c.ii.14, above), are often confusing. They have been distinguished here based on geographic range.

21) Sanicula gregaria (Sanicula, Clustered Snakeroot)

Sanicula is an herbaceous, slender plant 30 to 80 centimeters tall, with three to five parted leaves. The bristly fruit are nearly globose. Sanicula is frequent throughout its range, but is less common on the Coastal Plain (Brown and Brown 1984:699).

Harris, among the Algonquian, mentions "Black Snake Root:, an umbelliferous plant (parsley family) of the genus 'Sanicula' so called from the Latin 'sanare' to heal, on account of its medicinal properties" (in Erichsen-Brown 1979:358).

In the following passage, Beverley mentions "Snake-Root," probably referring to *Sanicula gregaria*:

> There's the Snake-Root, so much admired in England for a Cordial, and for being a great Antidote in all Pestilential Distempers [Beverley 1705:139].

Johannes Campanius's notes on the seventeenth-century Delaware also contain a description of snake root:

> They have a cure for the bite of the large poisonous snakes, with which their country abounds, which is truly wonderful; it is a kind of root, which they call snake root; they chew it and mix it with spittle when fasting, and lay it upon the wound; it almost immediately reduces the swelling, and it soon effects a complete cure [Du Ponceau 1834:142].

22) Urtica gracilis (Wild Nettle), Urtica dioica spp. gracilis (Stinging Nettle)

Urtica gracilis is a tough-stemmed, native perennial herb that grows to 2 meters in height, and is slender and erect, with stinging hairs. There are both European and North American varieties of *Urtica dioica*, both of which are perennial herbs densely covered with stiff, stinging hairs. All species of *Urtica* prefer dry soils, and are common in thickets and waste-places (Brown and Brown 1984:390). In addition to being well documented as a fiber plant among the historic Algonquian tribes (as well as other groups), wild nettles have been recovered archaeologically from textiles recovered from Hopewell rockshelters (Whitford 1941:13).

Many of the ethnographic references to nettle are unclear as to taxonomic classification. (For specific references to the use of nettle species, see *Laportea canadensis* (wood nettle), Section IV.B.4.c.ii.12, above.)

Huron Smith documented the widespread use of *Urtica* species among the Native Americans of the Great Plains (1923:56, 1928:251, 1932:391, 1933:87).

The roots and leaves are used medicinally for their diuretic, astringent, tonic, and pectoral influences (Hutchens 1991:204).

23) Yucca filamentosa (Spanish Bayonet, Adam's Needle)

A member of the lily family, *Yucca filamentosa* is a coarse perennial plant with lanceolate, leathery leaves bearing long, marginal fibers. It is native to the Atlantic coast, from Delaware south to Florida.

In sixteenth-century Virginia, Thomas Hariot, noting marketable commodities, observed a plant used for making a fine cordage:

> There is a kind of grasse in the countrey vppon the blades where of there groweth very good silke in forme of a thin glittering skin to bee stript of. It groweth two foote and a helfe high or better: the blades are about two foot in length, and half inch broad. The like groweth in Persia, which is in the selfe same climate as Virginia, of which very many of the silke workes that come from thence into Europe are made. Here of if it be planted and ordered as in Persia, it cannot in reason be otherwise, but that there will rise in a shorete time great profite to the dealers therein; seeing there is so great vse and vent thereof as well in our countrey as els where. And by the means of sowing & planting it in good ground, it will be farre greater, better, and more plentiful then it is. Although notwithstanding there is great sorte thereof in many places of the countrey growing naturally and wilde [1893:13].

This plant was observed on the small islets in Croatan Sound between Roanoke Island and the mainland (Quinn 1991:325). Various species of "silk grass" are native to this area, but it appears that Hariot was describing *Y. filamentosa* (Speck 1925:61-62; Swanton 1946:247).

Descriptions of the forests of the Delaware Bay region of New Jersey feature a reference to "silk grass" (Force 1836-1846:II:20).

Another account from Virginia explains,

> There is a kind of flax the Indians use to make threads of and strings, we call it silke grasse, i'ts fine to make both Linnen and Stuffe of it; abundance in many places of it groweth [Force 1836-1846:II:10].

5. Wild Fare Discussed by Plant Part

The following section attempts to provide the reader with a brief overview of historically documented plant foods by part (i.e., roots, nuts, seeds, etc.).

a. Roots, Tubers, and Rhizomes

Identification of particular roots, tubers, and rhizomes used as food by the coastal Algonquian cultures has been extremely difficult based on ethnohistoric accounts. Swanton puts it succinctly in the following statement:

> Generally speaking, the identity of the roots used as food is in greater doubt than any other vegetable or animal product mentioned by early writers [1946:270].

Roots were most often observed by European visitors among the Indians as a processed foodstuff, out of context from the whole plant and its growth environment. Aboriginal names are frequently used in the literature, and there are many regional, cultural, linguistic, and interpretive variations (e.g., tuccahoe, tuckahoe, tucaho, and tockawhoughe).

It seems that the plant roots most frequently used as food among the coastal Algonquian cultures include *Peltandra virginica* (tuckahoe or arrow arum, Virginia wakerobin), *Orontium aquaticum* (golden club), *Saggitaria latifolia* (arrowhead), *Ipomoea pandurata* (wild sweet potato), *Dioscorea villosa* (wild yam), *Acornus calamus* (sweet flag), *Smilax pseudo-china* (china-root) and *Smilax laurifolia* (small bamboo), *Angelica atropurpurea* (angelica), and *Apios americana* (ground nut). The accounts of early European explorers and settlers and allegorical data from historic Indian tribes suggest that many wild roots provided a dietary staple during times when agricultural crops were exhausted, and that roots were routinely dried and stored for use during lean times.

Some of the roots mentioned in the early literature have been identified and are discussed in detail by genus earlier in this chapter (see Sections IV.B.4.b and c). Many other native plants not mentioned in the literature for the Middle Atlantic region produce edible roots, such as *Dentaria diphylla* (toothwort), *Viola pubescens* (downy yellow violet), *Erythronium americanum* (trout lily), *Lycopus virginicus* (bugleweed), *Nelumbo lutea* (American lotus), *Arisaema triphyllum* (jack-in-the-pulpit), *Calla palustris* (water arum), *Lilium superbum* (Turk's cap lily), *Medeola virginiana* (Indian cucumber root), and *Helianthus tuberosus* (Jerusalem artichoke).

Table E-2 provides a listing of the edible roots described in early ethnohistories of coastal Algonquian culture.

Table E-2: Roots, Tubers, and Rhizomes Used as Food

Latin Name	Common Name	Description	References
Apios americana	ground nut, wild bean	dried roots ground to flour for bread, boiled roots as vegetable, considered a winter food.	Tantaquidgeon 1972:59
		given as gift to Standish and Alderton by natives on Cape Cod 1620	Cheever 1848:63
Angelica atropurpurea	angelica	root edible, pungent	Clayton 1968:14-15
Angelica venosa	hairy angelica	root used in cookery, fed to hogs to flavor their meat	Rafinesque 1817:192
Arisaema triphylum	Indian turnip, jack-in-the-pulpit	roots edible	Medsger 1966:172-173
Dioscorea villosa	wild yam	Roots boiled as a vegetable. Perhaps the Kaishcupenauk described by Hariot.	Hariot 1893:26
Ipomoea pandurata	wild sweet potato	roots eaten	Hamel and Chiltoskey 1975:21, 51; Hariot 1893:26
Lilium superbum	Turk's cap lily	edible root	Medsger 1966:197
Nelumbo lutea	American lotus	roots eaten as vegetable, sometimes a starvation food, dried for winter use, boiled with meat and hominy	Smith 1928:262, 1933:105; Gilmore 1919:70, 79; Fletcher and La Flesche 1911:341
Orontium aquaticum	golden club	roots edible after drying	Kalm 1966:162
Peltandra virginica	arrow arum	roots used for food	Sturtevant 1954:494; Smith 1986:153-154; Hariot 1893:27-18
Pontederia cordata	pickerel weed	edible roots	Smith 1986:I:264; Force 1836-1846:II:31
Sagittaria latifolia	arrowhead	edible tubers	Kalm 1966:259; Force 1836-1846:II:27, 31; Beverley 1705:181; Smith 1932:353
Smilax laurifolia	bamboo vine	edible roots	Lawson 1952:103-104
Smilax pseudo-china	china-root, china-briar	roots processed by chopping, stamping, straining to make bread or gelatenous spoon meat	Hariot 1893:25-26

b. Fruits and Berries

The native fruits of the Eastern Woodlands were varied and abundant, and were widely used by native peoples at the time of European contact. Visitors from the Old World were greatly impressed with these wild

fruits and enthusiastically described them. Much of the enthusiasm was directed toward native fruits that the Europeans perceived to have great economic potential, such as grapes for wine and wild mulberries, which, it was thought, would fuel a silk industry in North America. The native species were ill-suited for these enterprises, however, and plans for business ventures capitalizing on them did not come to fruition.

> Of Fruits natural to the Country there is great Abundance, but the several Species of them, are produced according to the Difference of the Soil, and the various Situation of the Country: It being impossible that one Piece of Ground, should produce so many different Kids intermix'd. Of the better sorts of the wild Fruits, that I have met with, I will barely give you the Names, not designing a Natural History. And when I have done that, possibly I may not mention one half of what the Country affords, because I never went out of my Way, to enquire after any Thing of this Nature [Beverley 1705:129].

> All wild Fruits, that are palatable, some of which they dry and keep against Winter, as all sorts of Fruits, and Peaches, which they dry and make Quiddonies and Cakes, that are very pleasant, and a little tartish . . . [Lawson 1952:188].

Table E-3 lists the native fruits and berries used as food that were noted by the early writers.

Table E-3: Fruits and Berries as Food

Latin Name	Common Name	Description	References
Amelanchier sp.	shadbush, serviceberry	fruits eaten	Lawson 1952:107
Asimina triloba	paw paw	fleshy fruit edible	Lawson 1952:107; Force 1836-1846:II:27
Diospyros virginiana	persimmon	fruits edible	Smith 1986:I:151-152; Hariot 1588; Purchas 1613, 1625; de Laet 1633; Beverley 1705:130; Kalm 1966:69; Force 1836-1846:II:23
Fragaria virginica	wild strawberry	berries gathered in April from open fields and woodland borders; fruits given as gifts	Smith 1986:I:92; Woods 1865:109; Beverley 1705:131; Hariot 1893:28
Gleditsia triacanthos	honeylocust	honey within pods eaten	Lawson 1952:47, 100; Beverley 1705:136
Morus rubra	red mulberry	fruits eaten	Kalm 1966:66; Smith 1986:I:92; Beverley 1705:130-131; Force 1836-1846:II:20, 23; Lawson 1952:105-106; Smith 1986:I:151
Opuntia humifusa	prickly pear	fruits eaten	Hariot 1893:28; Lawson 1952:107
Passiflora incarnata	maypop	fruits eaten	Beverley 1705:142-143; Lawson 1952:97
Peltandra virginica	arrow arum	berries eaten	Hariot 1893:27-28; Kalm 1966:260-261
Podophyllum peltatum	may apple, mandrake, Indian apple, ground lemon, citrons	fruits eaten	Smith 1986:I:158; Zeisberger 1910:57; Smith 1986:II:27
Phytolacca americana	poke	edible	Force 1836-1846:II:31
Prunus persica	peach	introduced from Europe	Swanton 1946:263-264
Prunus sp.	Plums	fruits eaten	Woods 1865:109; Smith 1986:I:151; Beverley 1705:130; Lawson 1952:108; Force 1836-1846:II:27

Table E-3 (continued)

Latin Name	Common Name	Description	References
Prunus sp.	cherries	fruits eaten	Woods 1865:109; Smith 1986:I:152-154; Beverley 1705:129-130; Lawson 1952:106; Force 1836-1846:II:23, 27
Pyrus coronaria	wild crab apple	fruits eaten	Hariot 1893:28; Smith 1986:I:152
Ribes sp.	"gooseberries"	fruits	Woods 1865:109; Smith 1986:I:154; Beverley 1705:131; Lawson 1952:108-109
Rubus sp.	raspberries, blackberries	fruits eaten, fruits given as gifts	Smith 1986:I:92; Lawson 1952:106; Lawson 1952:107; Woods 1865:106
Sagittaria latifolia	arrowhead	fruits eaten	Beverley 1705:181
Vaccinium macrocarpon	large cranberry	fruits eaten	Beverley 1705:131
Vaccinium sp.	blueberries	fruits eaten	Smith 1986:I:92; Beverley 1705:131; Force 1836-1846:II:27; Lawson 1952:23, 107; Kalm 1966:262
Vitis sp.	grapes	all varieties eaten	Strachey 1967:121; Smith 1986:I:152; Hariot 1893:16; Force 1836-1846:II:20, 23, 26, III:13; Lindeström 1925:223; Beverley 1705:134-136; Lawson 1952:105

c. Nuts

The natural, mixed hardwood forests of the Eastern Woodlands of North America produced an enormous annual wild crop of nuts in the autumn (Keene 1981). Numerous species of hickory, many different kinds of oaks, the native black walnut, American chestnut, chinquapin, hazel, and American beech all produced edible nuts. According to early ethnographic accounts and archeobotanical evidence, this mast played an important role in both the diet and the seasonal settlement patterns of aboriginal peoples up and down the Atlantic seaboard.

Historical accounts of nut use among the coastal Algonquians are plentiful. Perhaps early writers were interested in these fruits of the North American forests because they were similar to European species (i.e., the black walnut [*Juglans nigra*] to the English walnut [*Juglans regia*]), and because their native hosts placed such importance on mast resources, both as human food and especially as vital fodder for the colonists' swine.

Nuts were harvested in the fall after falling ripe from the trees. Many coastal Algonquian groups practiced forest understory burning as a hunting technique (Banister 1970:43; Day 1953:34; De Vries 1909:15; Lindeström 1925:213-244; Smith 1986:II:164; Strachey 1967:83). This periodic burning would have facilitated nut collection by clearing the forest floor.

Based on the early histories, it seems that nuts constituted storable commodities that were often hoarded for times when other resources were scarce (Lawson 1952:101; Smith 1986:I:152). Stored nutmeats were heavily relied upon during March through June, when other foodstuffs were scarce (Smith 1986:162). Nuts were stored in pits in the ground or in baskets or bags hung inside homes (Cheever 1848:39). Nut shells, especially hickory and walnut, were regularly burned, producing a very desirable, high-heat, smokeless fire.

Nuts were consumed raw, used as a source of oil, combined with other ingredients to make a stew or porridge (Strachey 1967:121), and pulverized and mixed with water to make "hickory milk."

The black walnut and many species of hickory have thick, resilient shells, which are very difficult to break. Wooden mortars and pestles are common in the ethnographic literature (Speck 1927:384); however, stones were also used to grind food. De Vries mentions the use of stone mortars for cracking nuts (1909:137). Hariot states, "they breake them [walnuts] with stones" (1893:27-28). Basin-shaped grinding stones and stone pestles or hammers have been recovered archaeologically, but there is only one clear reference to the use of nutting stones in the early ethnographic literature. Strachey mentions cracking nuts with stones, but offers no description of the tools or the process (1967:108). Stone pestles were mentioned by Banister in the piedmont of Virginia (1970:326).

Hickory milk and walnut milk were prepared by beating nutmeats and mixing them with water. The following passages detail the preparation of nuts by various groups:

> Besides their eating of them after our ordinarie maner, they breake them with stones and pound them in morters with water to make a milk which they use to put into some sorts of their spoonmeate; also among their sodde wheat, peaze, beanes and pompoins which maketh them have a farre more pleasant taste [Hariot 1893:27-28].

> The walnuts, Chesnuts, Acornes, and Cheechinquamens are dryed to keepe. When they need them they breake them betweene two stones, yet some part of the walnut shels will cleave to the fruit. Then doe they dry them again upon a mat over a hurdle. After they put it into a morter of wood, and beat it very small: that done they mix it with water, that the shels may sinke to the bottome. This water will be coloured as milke, which they cal Pawcohiscora, and keepe it for their use [Smith 1986:I:152].

> The kernels of the Hiccories they beat in an Mortar with Water, and make a White Liquor like Milk, from whence they call our Milk Hickory [Beverley 1705:181].

> The Hiccory is of the Walnut-kind, and bears a Nut as they do, of which there are found three sorts . . . These Nuts are gotten in great Quantities, but the Savages, and laid up for Stores, of which the make several Dishes and Banquets. One of these I cannot forbear mentioning; it is this: They take these Nuts, and break them very small betwixt two Stones, till the Shells an kernels are indifferent small; And this Powder you are presented withal in their Cabins, in little wooden Dishes; the Kernel dissolves in your Mouth, and the Shell is spit out. This tastes as well as any Almond. Another Dish is the Soup which they make of these Nuts, beaten, and put into Venison-Broth, which dissolves the Nut and thickens, whilst the Shell precipitates, and remains at the bottom. This Broth tastes very rich [Lawson 1952:101].

Clayton (1968:424) describes walnut milk as "powhicora," and Smith (1986:I:152) records the name "Pawcohiscora" (alternatively "Pawcohiccora") for hickory milk. Clayton describes the boiling of hickory milk to thicken it, whereafter it was served as a kind of "hasty pudding" (1968:424-425).

Nuts were an important source of oil, and extraction of the oil for food and for medicinal purposes was a time-consuming and labor-intensive process. Acorns, while containing useful oils, also contain bitter tannic acid, which was leached from the nuts by repeated boilings in water. The nutmeats could then be prepared into bread. The oil extracted through boiling was called "monohominy," and was stored in gourds for medicinal use (Smith 1986:II:151), or cooked with lye to be mixed with cornmeal as a travel food (Banister 1970:376).

Table E-4 lists the native nuts mentioned ethnohistorically.

Table E-4: Nuts Used as Food

Latin Name	Common Name	Description	References
Carya sp.	hickory	nuts of many species eaten	Hariot 1893:27-28; Beverley 1705:132, 181; Lawson 1952:101; Force 1836-1846:II:34
Castanea dentata	American chestnut	edible nut	Smith 1986:I:153; Hariot 1893:27; Force 1836-1846:II:34; Krugler 1976:36; Lindeström 1925:223, 250; Beverley 1705:131; Lawson 1952:103
Castanea pumila	chinquapin	edible nut	Smith 1986:I:151-153; Lawson 1952:101; Beverley 1705:132; Force 1836-1846:II:27
Corylus americana	hazelnut	nuts not eaten	Beverley 1705:181
Fagus grandifolia	American beech	nuts eaten	Force 1836-1846:II:34; Lawson 1952:96
Juglans nigra	black walnut	nuts eaten	Lindeström 1925:223; Force 1836-1846:II:27, 34; Beverley 1705:132; Lawson 1952:101
Quercus sp.	oak	acorns eaten	Smith 1986:I:151; Hariot 1893:16, 29; Lawson 1952:67-68, 69, 71, 95; Cheever 1848:39; Force 1836-1846:II:27, 30, 34

d. Vegetables: Shoots, Leaves, and Stems

Although the abundance of native herbaceous vegetation could have provided coastal Algonquian peoples with many edible vegetables, the records of the early European writers do not emphasize the use of leaves, stems, and shoots as food. In fact, early ethnographic accounts deny the use of many vegetables by native inhabitants.

Beverley notes that herbs or leaves were never eaten (1705:181), as does Lawson: "Sallads, they never eat any . . ." (1952:236). Smith notes salad vegetables in the landscape, but does not indicate that they were used by Native American populations in Virginia:

> Many herbes in the spring time there are commonly dispersed throughout the woods, good for brothes an sallets, as Violets, Purslin, Sorrell, etc. Besides many we used whose names we know not [Smith 1986:I:153].

> There are also Leekes differing little from ours in England that grow in many places of the countrey, of which, when we came in places where, wee gathered and eate many, but the naturall inhabitants never [Hariot 1893:27].

Beverley mentions the use of "Wild Onions" (1705:181); however, Strachey notes that his Indian hosts in Virginia "could not abyde to eat of them" (Strachey 1967:123).

It appears that while European chroniclers of the New World did not observe the use of leafy vegetables as food, they quickly incorporated native greens into their own diets:

> In Spring, there are severall sorts of herbs, as Cornsallet, Violets, Sorrell, Purslaine, all which are very good and wholsome, and by the English, used for sallets, and in broth [Hall 1967:80].

e. Seeds

The gathering and use of native seeds for food was not heavily documented in early ethnographic accounts. We know from archaeological evidence that wild-gathered seed resources played an important role in the subsistence practices of prehistoric peoples, even in those groups that practiced corn agriculture (Smith 1992a). Early records include observations of the following wild seeds for food: *Apios americana* (wild bean, ground nut) (Hariot 1893:29; Force 1836-1846:II:31, 34); *Arundinaria gigantea* (giant cane) (Smith 1986:I:153); *Orontium aquaticum* (golden club) (Kalm 1966:162); Long oats (?) (Force 1836-1846:II:31); and *Zizania aquatica* (wild rice) (Hariot 1893:29).

V. DISCUSSION

A. PROJECT OVERVIEW

The realm of plants utilized by the aboriginal peoples of the Atlantic seaboard was very vast, and the accounts of early writers feature only a fraction of the vegetative resources that were central to the subsistence, technology, and ideology of coastal Algonquian culture. Of the plants and plant-reliant practices described in early ethnographic accounts, many are unclear as a result of interpretive bias, nomenclature, disinterest on the part of the observer, or concealed/discrete behavior on the part of the observed. These factors leave us with but a biased baseline from which to extrapolate prehistoric ethnobotany in the region.

For the Lenape or Delaware Indians, specifically, ethnohistoric accounts pertinent to human-plant relationships are scant. Most of what we know about subsistence, medicine, construction techniques, and textile production comes from later historical accounts written after the tribe relocated westward in the seventeenth and eighteenth centuries. As the Delawares were displaced through the western frontier, their relationships with plants changed considerably in response to the character of the landscape, available plant resources, and knowledge shared with other native groups they encountered, or information gained from observation of those groups. As a result, the application of later information on the Delaware is potentially misleading in interpreting late prehistoric and contact period plant use for this same group. Nevertheless, some of the documentation for the Oklahoma Delawares has offered potential insight into the traditions of plant use by the tribe. This is especially true in the arena of medicinal plants, where almost nothing is known regarding medicinal plant use among the Delaware save for the descriptions of historic Indian tribes in the North American Midwest.

B. APPLICATION OF STUDY RESULTS TO DATA RECOVERY EFFORTS AT THE PUNCHEON RUN SITE

This study was undertaken in the hopes that it would augment interpretation of prehistoric plant use on Delaware's Coast Plain, and at the Puncheon Run Site (7K-C-51) in Kent County, Delaware, in particular. As plant remains recovered archaeologically have so far failed to yield much analytically significant data in regard to site subsistence, building construction, or other items of material culture, the ethnohistoric record was reviewed in hope that it might provide information from which we could broaden our interpretation of the scant archeobotanical material recovered to date as part of Phase II and Phase III investigations at Puncheon Run.

In the course of this research, it has been recognized that the vicinity of the Puncheon Run project area has undergone significant changes since the first European contact with the area. Agricultural pursuits throughout the Delaware River Valley over the past 350 years have incrementally changed the native landscape of the watershed through the clearing of native hardwood and pine forests and the rigorous cultivation of prime

farmlands. These practices resulted in massive soil erosion, which affected the sedimentation of local waterways. Major alterations to the form and course of the St. Jones River to counteract this siltation and accommodate commercial traffic were also completed. These and other changes in the landscape and waterscape since colonial times have defined a new attitude of the land, which is greatly altered from that which was known by the Woodland occupants of Puncheon Run.

1. Vegetative Landscape

Establishment of Woodland period human occupations at the confluence of the St. Jones River and Puncheon Run was undoubtedly in response to the desirability of the site. It was naturally defensible, occupying a peninsula surrounded by navigable water; it also offered easy travel routes by water, linking site residents with other villages up and down Delaware Bay and its many tributaries. The site offered seasonally abundant wild fare in the form of plants and animals suited to estuarine, floodplain, and Coastal Plain upland environments, and offered a fertile riverine valley habitat suitable for growing food.

Below, the ecological zones of the Puncheon Run Site are generally described, and their potential plant resources and season of availability is broadly discussed:

a. Riverine

Most of the aquatic plant resources used by native peoples on the Atlantic Coastal Plain grow in shallow waters on the margins of freshwater estuaries. More than they provided specific plant resources, the *open* waters of the St. Jones River and Puncheon Run offered the prehistoric residents of the Puncheon Run Site a highway upon which to travel to exploit known plant resources near and far. Additionally, to a people without wheels or beasts of burden, local waterways enabled the transport of harvests home by canoe for consumption or storage.

b. Marshland

During the late prehistoric period, the freshwater marshes of the St. Jones River and Puncheon Run likely supported a great diversity of aquatic plants that were useful to humans. These would have included reeds, sedges, and cattails used in making baskets, tools, and homes, as well as edible aquatic herbs, such as tuckahoe and arrow arum. Acres of *Nelumbo lutea* (American lotus or water chinquapin) once dominated quiet, shallow waters in the vicinity of the Puncheon Run Site.

Today, the configuration, salinity, course, depth, and nature of both the St. Jones River and Puncheon Run are considerably changed as a result of human influence over the past 350 years. Surviving plant species representative of the pre-contact period marshlands at the Puncheon Run Site include *Pontederia cordata* (pickerelweed or tuckahoe), *Nuphar advena* (spatterdock), *Sagittaria* sp. (arrowhead), *Peltandra virginica* (arrow arum), and *Typha latifolia* (narrow-leaved cattail). The fringes of local marshes still support the economically important *Taxodium distichum* (bald cypress) and *Lilium superbum* (Turk's cap lily). According to the ethnohistoric literature, Native Americans concentrated exploitation of marsh resources during the summertime, when herbaceous growth in the form of leaves and stems for use as fiber were at their height, and when the edible roots and tubers of semi-submerged plants were most robust.

c. Floodplain

Fertile floodplain areas were created at the Puncheon Run Site by the naturally meandering St. Jones River. Many of these areas have now been converted to marshes as a result of siltation attributed to historical

farming activities. Research suggests that plant cultivation was invented on just such habitats (see Section 3, below).

d. Coastal Plain Uplands

The native forest cover on Coastal Plain uplands of Kent County, Delaware, consisted of a mixed hardwood forest dominated by oak and hickory species, tulip poplar, and American beech, with a minor component of loblolly pine. The shrub layer in these forests included various viburnums, dogwood, and mountain laurel.

Upland forest resources were critical to Woodland period subsistence, transportation, home building, and manufacturing. Mast from hickory, oak, chestnut, and beech trees provided a seasonally abundant, storable food that was heavily relied upon. On the Coastal Plain, trees such as tulip poplar, cedar, and other species were felled for the construction of dugout canoes. Bark from both deciduous and coniferous tree species was harvested to build smaller, more portable canoes, and to build homes and communal structures. Bark was harvested from living trees in the springtime when the sap is running.

2. Aquatic Resources

Vegetative aquatic resources were no doubt as important to the residents of the Puncheon Run Site, as were the fish and shellfish in the St. Jones River and Puncheon Run. The literature emphasizes the importance of the roots of aquatic herbs to the diet of nearly all coastal Algonquian peoples, and it would be anomalous if the vegetable products of neighboring waters were not heavily utilized at the Puncheon Run Site.

Of particular interest to our investigation of prehistoric subsistence is the probable role of American lotus or water chinquapin (*Nelumbo lutea*) in the diet of the residents of the Puncheon Run Site. As detailed above, *N. lutea* is a showy marsh plant that is common throughout the Mississippi River drainage system. The starchy seeds, shoots, and rhizomes of the American lotus are all edible, and the species was heavily utilized by Native American groups throughout its natural range. On the eastern seaboard, the species is rare, occurring in some few isolated pockets. One such locale was the St. Jones River at Dover, Delaware, in the vicinity of the Puncheon Run Site. The St. Jones lotus beds were quite the attraction during the Victorian era, when folks would come in late August from great distances to marvel at the lilies in bloom. Improvement projects undertaken by the U.S. Army Corps of Engineers in the late nineteenth and early twentieth centuries effectively obliterated the local *Nelumbo* population by so altering the estuarine landscape that the species was no longer suited to it. The only reference to the use of *N. lutea* by the Delaware Indians is from the eighteenth century when the group was migrating westward through regions where the plant is common (Goddard 1978:226). While no direct ethnohistoric information has been located that describes the use of *N. lutea* by Native Americans of the Atlantic coast at the time of European contact, the concomitance of regionally unique lotus beds and human occupation is probably more than a coincidence.

There are two possibilities that could explain the co-occurrence of human occupation and the anomalous vegetative feature: 1) settlement occurred to take advantage of this vegetative anomaly; or, more plausibly, 2) the St. Jones *Nelumbo* were introduced and even propagated by native peoples as a food plant. However, no archeobotanical evidence has emerged thus far in support of the second hypothesis. In light of this lack of archaeological evidence for the prehistoric presence of *Nelumbo*, the possibility that the species was introduced into the watershed between the departure of the Indians and the Victorian boat-tour heyday must be considered as well.

3. Aboriginal Diet

All early ethnohistoric accounts feature corn as the staple crop of the Delawares. Corn was grown in small gardens, sewn in hills of several corn plants each. Beans of several varieties, as well as squashes, were grown between the corn. Native tobacco was also cultivated. The use of wild plant foods was not extensively documented by the early writers who visited the Delawares, but we know that berries and mast were gathered and consumed, or stored for later use, and that the roots of wild plants contributed to the diet (Acrelius 1912:73; Danckaerts 1913:54-56; Lindeström 1925:179-181; Van der Donck 1841:151-152). Ethnohistories from Virginia and the Carolinas describe the growing of quasi cultigens, such as may apple and passionflower plants, within gardens (Beverley 1705:142-143; Meijar 1974; Smith 1986:I:158). This suggests that important food plants were gathered from the wild and were propagated close to home for convenience.

This pattern of subsistence, combining corn culture with the seasonal exploitation of wild food resources, is consistent with other early accounts of coastal Algonquian cultures from Maine to Florida. Conspicuously absent from the literature, however (with the exception of Smith's description of "melden" by Hariot), is the cultivation of small native grains (i.e., the Eastern Agricultural Complex), known to have played a critical role in the foodways of native groups of the region during late prehistoric times (Smith 1992a). Archeobotanical evidence from the Two Guys Site (97S-F-68) in Sussex County has confirmed the cultivation of the sumpweed (*Iva annua*) by Woodland I peoples on Delaware's Coastal Plain (LeeDecker et al. 1996). There is no reason to believe that the cultivation of native grains was not a common activity for all semisedentary populations in the region.

Population estimates for the coastal Delawares at the time of European contact range from a few families to village bands of a few hundred members each. The Puncheon Run Site was a seasonally occupied camp, ostensibly visited for the procurement of specific wild plant and animal resources. It is likely that these resources were focused within the abundant and diverse aquatic environments surrounding the site. Based on the literature, such resources would have been most abundant during the spring and summer months. Fish and shellfish were commonly harvested in spring and early summer, and gardens were often planted at fishing camps. The bounty of plant resources from the freshwater marsh was available during the summer months and into early autumn. After crops were harvested and stored, warm-weather encampments would have moved to larger villages, perhaps to the south toward Delaware Bay (Acrelius 1912:73; De Vries 1909:222; Penn 1912:234; Van der Donck 1841:149-150, 173, 183, 197-198, 209).

Although environmental changes to the landscape as a result of *historical* activities is well understood, we must not underestimate the force of aboriginal land management in changing—even creating—the face of the landscape which greeted the first European chroniclers. The simple act of residing in one place affects the natural landscape; traffic, waste disposal, construction, and food processing all create disturbance to the natural setting. Many Native American encampments and villages occurred on the fringes of woodlands, on floodplains where naturally open edges created by the scouring action of rivers could be occupied and expanded. These locales were probably the site of the earliest plant husbandry in North America, which eventually spawned the domestication of a suite of native plants independent of and long prior to the introduction of corn, beans, and squash from Mesoamerica (Smith 1992c:19-32). Precolonial agriculture itself was a strong force in shaping the land; the establishment of open areas for cultivation, and their maintenance and management all affected the shape of local floral communities. The use of fire-surrounds to direct game for hunting, as well as the burning of fallow fields to control forest succession has been well documented among the Delawares (De Vries 1909:15, 18; Lindeström 1925:213-144). The use of fire by native peoples is acknowledged as a powerful factor in landscape formation.

While recent investigations at the Puncheon Run Site have yielded no archeobotanical evidence confirming the use or cultivation of cultivated grains, native or otherwise, minor quantities of carbonized, wild, ruderal seeds have been recovered through soil flotation. Their presence confirms that the site was maintained in an open, routinely disturbed setting, which is the favored habitat of weedy species. A grinding stone (metate) recovered from within Locus 3 at the eastern end of the site suggests that the grinding of foods, possibly grains, was practiced. The Puncheon Run Site is ideally situated for horticultural ventures. The broad floodplain areas created by the naturally meandering St. Jones River would have been natural sites for the production of native cultigens and, later, for the growing of corn and other crops. Abundant freshwater is also accessible from the site.

While we have no proof that the residents of the Puncheon Run Site gardened during their seasonal stay at the site, agriculture would not have been a novel practice to the peoples of Delaware's Coastal Plain during Woodland times.

4. Food Processing and Storage

The technologies for food processing and storage documented by the early writers are relatively consistent among all the coastal Algonquian groups observed. Indeed, even across North America, the similarities in native food processing and storage are striking. These technologies consisted of drying using natural or artificial heat, and storage in the ground. Foods were strung on cords, sticks, or reeds, or spread over woven mats and dried in the sun or over open fires. They were then stored in grass or bark-lined subterranean pits, which could be concealed when the group migrated seasonally.

Archaeology at the Puncheon Run Site has revealed the presence of numerous subterranean bell-shaped pits, some measuring 6 feet deep. The function of these pits is as yet undefined, although their similarity to plant-food storage pits documented ethnohistorically is certainly suggestive (Cheever 1848:34; Kalm 1966:269; Wilson 1917:89-94). In the absence of agricultural evidence from the Puncheon Run Site, it may be that the storage pits functioned as a repository for wild-harvested marsh resources, such as American lotus, tuckahoe, and arrow arum, which were dried and stored for use during the winter and early spring, when other resources were scarce.

a. Processing

Many wild-gathered and cultivated plants required some degree of processing to prepare foods for storage, to make foods palatable, or to provide variation in the diet. In the case of many plants, significant (and quite complicated) processing was required to make foods edible at all, as was the case with the poisonous fruits of golden club (*Orontium aquaticum*) and the inedible roots of arrow arum (*Peltandra virginica*).

Ethnohistorically documented plant food processing techniques focus mainly on grinding, pulverizing, and pounding, and on drying. The drying of plant foods as a technique for storage, or to make foods palatable (e.g., golden club berries) was accomplished using heat and smoke from a fire, or the sun. The use of hurdles or racks (for drying, cooking, or smoking foods) made from sticks has been well documented ethnographically (Hariot 1893; Wilson 1917), and appears prominently in the earliest illustrations of native life (Plate E-28).

A variety of wild roots were prepared by drying and pounding into flour (Hariot 1893:181).

> All wild Fruits, that are palatable, some of which they dry and keep against Winter, as all sorts of Fruits, and Peaches, which they dry and make Quiddonies and Cakes, that are very pleasant, and a little tartish. . . . The wild Fruits are dried in the Summer, over Fires, on Hurdles and in the Sun, are

now brought into the Field; as are likewise the Cakes and Quiddonies of Peaches and that Fruit and Bilberries dried, of which, they stew and make Fruit-Bread and Cakes [Lawson 1952:188, 220].

Of these fruits they live a great part of the yeare, which they use in this manner, The walnuts, Chesnuts, Acornes, and Chechinquamens [chinquapins] are dryed to keepe. When they need them they breake them betweene two stones, yet some part of the walnut shels will cleave to the fruit. Then doe they dry them again upon a mat over a hurdle. After they put it into a morter of wood, and beat it very small: that done they mix it with water, that the shels may sinke to the bottome. This water will be coloured as milke, which they cal Peqcohiscora, and keepe it for their use [Smith 1986:I:152].

The fruit they call Putchamins, they cast uppon hurdles on a mat and preserve them as Pruines [Smith 1986:I:152].

PLATE E-28: Squash Segments Drying on a Hidatsa Indian Rack
SOURCE: Wilson 1917

b. Storage

Food storage facilities among the coastal Algonquians consisted of pole-built granaries and subterranean pits. Swanton states that granaries and corncribs were erected by almost all the southeastern tribes (1946:373). The form of most of these facilities was a pole-built structure with an elevated chamber for storing food.

The use of storage pits dug into the earth has been documented ethnohistorically and supported by archaeological evidence. Among the coastal Algonquians, pits were used for the storage of seasonally surplus foodstuffs, the storage of seeds and tubers reserved for planting, and the caching of valuable items.

Some of the most detailed historical accounts of subterranean pits come from the journal of the Pilgrims at Plymouth in 1620 (Cheever 1848). Exploration of the Cape Cod area under Miles Standish and others led to the discovery of storage pits of corn, beans, and other plant products, which the Englishmen stole.

> . . . there was also a heape of sand, made like the former, but it was newly done (we might see how they had padled it with their hands), which we digged vp, and in it we found a little old Basket full of faire Indian Corne, and digged further & found a fine great new Basket full of very faire corne of this yeare, with some 36 goodly eares of corne, some yellow, and some red, and other mixt with blew, which was a very goodly sight; the Basket was round, and narrow at the top, it held about three or foure Bushels, which was as much as two of vs could lift vp from the ground, and was very handsomely and cunningly made; But whilst wee were busie about these things, we set our men Sintinell in a round ring, all but two or three which digged vp the corne. We were in suspence, what to doe with it, and the Ketle, and at length after much consultation, we concluded to take the Ketle and as much of the Corne as we could carry away with vs; and when our Shallop came, if we could find any of the people, and come to parley with them, we would giue them the Ketle againe, and satisfie them for their Corne, so wee tooke all the eares and put a good deale of the loose Corne in the Ketle for two men to bring away on a staffe; besides, they that could put any into their Pockets filled the same; the rest wee buried againae, for we were so lade with Armour that we could carry no more [Cheever 1848:34].

> . . . we marched to the place where we had the corne formerly, which place we called Corne-hill; and digged and found the rest, of which we were very glad: we also digged in a place a little further off, and found a Botle of oyle; wee went to another place, a which we had seene before, and digged, and found more corne, viz. Two or three Baskets full of Indian Wheat, and a bag of Beanes, with a good many of faire Wheate-eares; whilst some of vs were digging vp this, some others found anotherheape of Corne, which they digged vp also, so as we had in all about ten Bushels, which will serue vs sufficienlty for seed [Cheever 1848:34].

> Their larders they dig down in the ground, close to their dwellings, wherein they have their maize, their beans, tobacco and other provisions . . . [Lindeström 1925:253].

> Their corne being ripe, they gather it, and drying it hard in the Sunne, conveigh it to their barnes, which be great holes digged in the ground in forme of a brasse pot, seeled with rinds of trees, wherein they put their corne, covering it from the inquisitive search of their gurmandizing husbands, who would eate up bot their allowed portion, and reserved seede, if they knew where to finde it [Woods 1865:106].

Peter Kalm, writing of the vicinity of Philadelphia in the mid-eighteenth century, describes pit storage:

> After they had reaped the corn, they kept it in holes under ground during winter; they seldom dug these holes deeper than a fathom, and often not so deep; at the bottom and on the sides they put broad pieces of bark. If bark could not be had, the Andropogon bicorne, a grass which grows in great plenty here, and which the English call Indian grass and the Swedes wild grass, supplied the want of the former. The ears of corn were then thrown into the hole and covered to a considerable thickness with this grass, and the whole again covered by a sufficient quantity of earth. Corn was kept extremely well in these holes, and each Indian had several such subterraneous stores, where his corn lay safe, though he traveled far from it [Kalm 1966:269].

John Lawson (1714) describes the above-ground granaries of the Santee Indians of South Carolina:

> They make themselves Cribs after a very curios Manner, wherein they secure their Corn from Vermin, which are more frequent in these warm Climates than Countries more distant from the sun. These pretty Fabrics are commonly supported with eight Feet or Posts about seven Foot high from the

> Ground, well daubed within and without upon Laths, with Loom or Clay, which makes them tight and fit to keep out the smallest Insect, there being a small Door at the gable End, which is made of the same Composition, and to be removed at Pleasure, being no bigger than that a slender Man may creep in at, cementing the Door up with the same Earth when they take the Corn out of the Crib, and are going away from Home, always finding their Granaries in the same Posture they left them: Theft to each other being altogether unpracticed, never receiving Spoils but from Foreigners [Lawson 1952:12].

As is the case with many accounts of plant-related activities during the period of European contact, few details were recorded regarding the construction of Native American storage pits. Fortunately, some ethnographic analogy can be applied from the northern Midwest. In the first years of the twentieth century, Gilbert Wilson conducted a detailed study of the gardening and food storage practices of the Hidatsa Indians in North Dakota. This work drew on the knowledge of an elderly Hidatsa gardener, Maxidiwiac (Buffalo Bird Woman), who was born in 1839 and gardened using traditional methods and materials. Wilson carefully documented the excavation, lining, filling, and concealment of Maxidiwiac's cache pits (storage pits) (Plate E-29). This information is useful in understanding the technology of pit construction and furnishing for the Algonquian cultures of the Atlantic Coastal Plain as well.

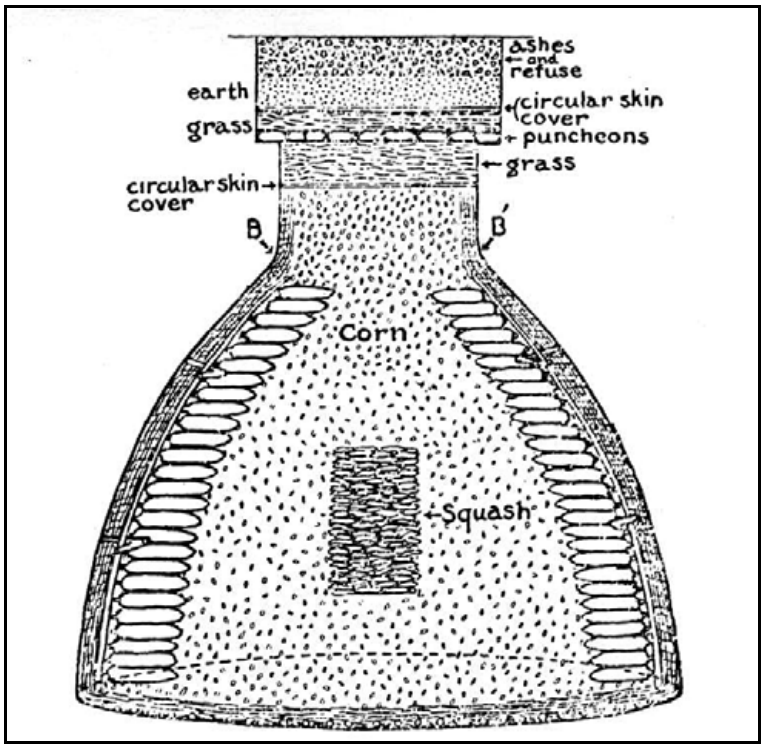

PLATE E-29: Hidatsa Storage Pit
SOURCE: Wilson 1917:87

> A cache pit was shaped somewhat like a jug, with a narrow neck at the top. The width of the mouth, or entrance, was commonly about two feet; on the very largest cache pits the mouth was never, I think, more than two feet eight, or two feet nine inches. . . . Descent into one of these big cache pits was made with a ladder. . . . In one of these smaller pits, when standing on the floor within, my eyes just cleared the level of the ground above, so that I could look around . . . When the cache pit was all dug, it had next to be lined with grass. The grass used for this purpose, and for closing the mouth of the cache pit, was the long bluish kind that grows near springs and water courses on this reservation; it grows about three feet high. . . . This bluish grass was the only kind used for lining a cache pit. We knew by repeated trials that other kinds of grass would mold, and did not keep well. . . . The walls of the cache pit were left bare for the grass lining; but a floor was laid on the bottom. This was rather simply made by gathering dead and dry willow sticks, and laying them evenly and snugly over the bottom of the pit. Over this willow floor, the grass, now thoroughly dried was spread evenly, to a depth of about four inches. Grass was then spread over the walls to a depth of three or four inches, and stayed in place with about eight willow sticks. These were placed vertically against the walls and nailed in place with wooden pins made each from the fork of a dead willow. . . . It will be noticed that the willow flooring of the pit, the willow staying rods, and the wooden pins that held them in place, were all made of dead and dry willows; this was done that everything within the pit might be perfectly dry . . . [Wilson 1917:89-90].

The grass used in lining this pit was thought by Wilson to be a species of *Spartina* (cord-grass) (Plate E-30). The Hidatsa storage pit was filled with a combination of plant foods in a variety of forms; dried corn on the cob, ropes of dried squashes, and loose, shelled corn filled the described pits. Arrangement of foods within the pit was carefully prescribed, ostensibly to protect the stored foods from dampness. The pit was sealed with a disk of buffalo hide covered with the lining grass, and topped with a puncheon cover constructed of split logs. Above the puncheon cover the neck was filled in with grass, a skin cover, and earth. Thus the pit was disguised below ground from enemies and animals, and stored provisions could be left when the village was abandoned during the winter months (Wilson 1917:93-94).

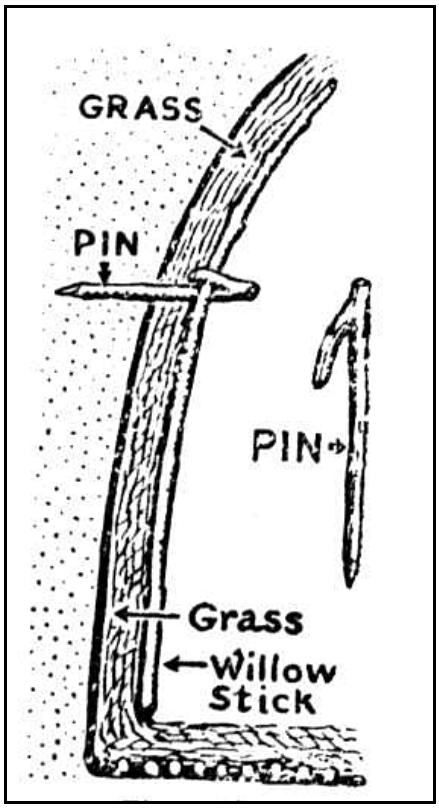

PLATE E-30: Detail of Hidatsa Storage Pit
SOURCE: Wilson 1917:90

5. Material Culture

Few durable items of material culture were associated with plant food procurement, production, processing, or storage. On the Coastal Plain of Delaware, stone was a scarce commodity, and most tools related to plant procurement and husbandry were constructed of plant and animal products. These artifacts were by their nature perishable, and left limited archaeological evidence.

The gathering of wild plants would have been accomplished using baskets and bags made of skins, bark, reeds/sedges, or grasses, constructed with plant-derived cordage. Agricultural implements documented for the coastal Algonquian cultures include digging sticks and shell or bone hoes hafted on wooden handles. Processing equipment included tree-trunk mortars and dumbell pestles, grinding stones used for making cornmeal, stones used for cracking nuts, and reeds fashioned into knives.

The material items associated with food processing and storage are equally ephemeral; these include wooden drying racks with spits made of reed, wood, or cordage; or mats or baskets for supporting foods as they dried in the sun or over a fire. Storage pits were probably lined with grasses or sedges, wood, bark, woven mats, and animal skins.

C. FURTHER RESEARCH

The final phase of archeobotanical work at the Puncheon Run Site will involve the synthesis of all flotation-recovered plant remains studied to date, delineation of vegetative resource zones at the site based on a 1998 field survey of extant vegetation, and the overlaying of this data with the results of this literature survey to establish what plant resources would have been available prehistorically from different microenvironmental zones at the site, and how they may have been procured, processed, and used by site inhabitants during the Woodland I and Woodland II periods.

REFERENCES CITED

Acrelius, Israel
1912 From the "Account of the Swedish Churches in New Sweden," 1759. In *Narratives of Early Pennsylvania, West New Jersey and Delaware, 1630-1707,* edited by Albert C. Myers, pp. 51-81. Charles Scribner's Sons, New York.

Aller, Wilma F.
1954 Aboriginal Food Utilization of Vegetation by the Indians of the Great Lake Region as Recorded in the Jesuit Relations. *Wisconsin Archaeologist* 35:59-73.

Anderson, Edgar
1952 *Plants, Man and Life*. Little Brown and Co., Boston.

Asch, David, and Nancy Asch
1977 Chenopod as Cultigen: A Re-evaluation of Some Prehistoric Collections from Eastern North America. *Midcontinental Journal of Archaeology* 2:3-45.

1978 The Economic Potential of *Iva annua* and Its Prehistoric Importance in the Lower Illinois Valley. In *The Nature and Status of Ethnobotany*, edited by Richard I. Ford, pp. 300-341. Anthropological Papers No. 67. Museum of Anthropology, University of Michigan, Ann Arbor.

1985 Prehistoric Plant Cultivation in West-Central Illinois. In *Prehistoric Food Production in North America*, edited by Richard I. Ford, pp. 149-203. Anthropological Papers No. 75. Museum of Anthropology, University of Michigan, Ann Arbor.

Banister, John
1970 *John Banister and His Natural History of Virginia, 1678-1692*. Edited by Joseph and Nesta Ewan. University of Illinois Press, Urbana.

Barlowe, Arthur
1589 Arthur Barlowe's Discourse on the First Voyage. In *The Principal Navigations, Voiages and Discoveries of the English Nation*, by Richard Hakluyt, pp. 728-733. George Bishop and Ralph Newberie, London. Reprinted in 1991 in *The Roanoke Voyages, 1584-1590*, edited by David B. Quinn, vol. 1, pp. 91-116. Cambridge University Press for the Hakluyt Society, London.

Bartram, William
1958[1792] *The Travels of William Bartram*. Edited by Francis Harper. Yale University Press, New Haven.

Bassett, John Spencer (editor)
1901 *The Writings of Colonel William Byrd of Westover in Virginia*. Burt Franklin, New York.

Betts, Edwin Morris
1944 *Thomas Jefferson's Garden Book*. American Philosophical Society, Philadelphia.

Beverley, Robert
1705 *The History and Present State of Virginia in Four Parts.* Printed for R. Parker, London.

Boucher, Pierre
1964 *Historie Véritable et Naturelle des Moeurs et Productions du Pays de la Nouvelle-France, Vulgairement Dite le Canada, 1663*. Reprinted by the Société Historique de Boucherville, Boucherville, Quebec.

Bouvin, Bernard
1978 *La flore du Canada en 1708. Etude d'un manuscrit de Michel Sarrazin et Sebastien Vaillant*. Provencheria 9. Institute Recherche Biosystematique Agric. Canada, Ottawa.

Bragg, G. Daniel
1980 *Dover, A Pictorial History*. Dover Public Library, Dover, Delaware.

Brooklyn Botanic Garden
1964 Dye Plants and Dyeing. Handbook No. 46. *Plants & Gardens* 20(3). Brooklyn Botanic Garden, Brooklyn, New York.

Brown, M.L., J.L. Reveal, C.R. Broome, and G.F. Frick
1986 *Aspects of the Ecological and Vegetational History of Colonial Maryland*. Unpublished manuscript.

Brown, Russell G., and Melvin L. Brown
1972 *Woody Plants of Maryland*. University of Maryland, College Park.

1984 *Herbaceous Plants of Maryland*. University of Maryland, College Park.

Burrage, Henry S. (editor)
1906 *Early English Voyages, Chiefly from Hakluyt, 1534-1648*. Charles Scribner's Sons, New York.

Bushnell, Jr., D
1908 Research in Virginia. *American Anthropologist*, new series, 10:531-548.

Bye, Roger A., Jr.
1970 *The Ethnobotany and Economic Botany of Onondaga County, N.Y.* Unpublished thesis, Oake Ames Library, Harvard University, Boston.

Callahan, Errett
1981 *Pamunkey Housebuilding: An Experimental Study of Late Woodland Construction in the Powhatan Confederacy*. Ph.D. Dissertation, Catholic University of America, Washington, D.C.

Calvert Papers, The
1889 *The Calvert Papers, Number 1*. Publication No. 28. Maryland Historical Society Fund, Baltimore.

Carlson, Gustav G., and Volney H. Jones
1940 Some Notes on Uses of Plants by the Comanche Indians. *Papers of the Michigan Academy of Science, Arts and Letters* 25:527-542.

Carrier, Lyman
1923 *The Beginnings of Agriculture in America*. McGraw-Hill, New York.

Carver, J.
1974 *Travels Through the Interior Part of North America, in the Years 1766, 1767, and 1768.* Coles Publishing Co., Toronto.

Catesby, Mark
1743 *The Natural History of Carolina, Florida, and Bahama Islands*. Volume 2. London.

Cheever, George B. (editor)
1848 *The Journal of the Pilgrims at Plymouth in New England in 1620.* Reprinted from original. John Wiley, New York.

Clayton, John
1968[1687] Another Account of Virginia. Edited by Edmund Berkeley and Dorothy S. Berkeley. *Virginia Magazine of History and Biography* 76:415-436.

Conover, G.S.
1879 Early History of Geneva. *Geneva Courier* March. Geneva, New York.

Custer, Jay F. (editor)
1986 *Late Woodland Cultures of the Middle Atlantic Region*. University of Delaware Press, Newark.

Custer, Jay F.
1994 *Stability, Storage and Culture Change in Prehistoric Delaware: The Woodland I Period (3000 B.C - A.D. 1000).* Prepared for the Delaware State Historic Preservation Office, Division of Historical and Cultural Affairs, Dover.

Dankaerts, Jaspar
1913 *Journal of Jasper Danckaerts, 1679-1680.* Edited by Bartlett B. James and J. Franklin Jameson. Charles Scribner's Sons, New York.

Dankers, Jaspar, and Peter Sluyter
1966[1867] *Journal of a Voyage to New York and a Tour in Several of the American Colonies 1679-80*. Henry C. Murphy, Brooklyn, New York.

Day, Gordon
1953 The Indian as an Ecological Factor in the Northeastern Forest. *Ecology* 34(2):329-346.

de Candolle, A.
1885 *Origin of Cultivated Plants*. New York.

de Laet, Joannes
1633 *Novus Orbis.* Leyden.

Densmore, Frances
1928 *Uses of Plants by the Chippewa Indians*. Forty-fourth Annual Report of the Bureau of American Ethnology, Smithsonian Institution, Washington, D.C.

De Soto, Don Ferdinando
1851 *The Discovery and Conquest of Terra Florida.* Reprinted from the Edition of 1611. Edited, with Notes and Introduction and a Translation of a Narrative of the Expedition by Luis Hernandez de Biedma, Factor to the same, by William B. Rye of the British Museum, London.

De Vries, D.P.
1909 From the "Korte historiael ende journaels aenteyckeninge," by D.P. DeVries, 1633-1643 (1655). In *Narratives of New Netherlands, 1609-1664*, edited by J. Franklin Jameson, pp. 186-234. Charles Scribner's Sons, New York.

Du Ponceau, Peter S.
1834 *Description of the Province of New Sweden, Now Called, by the English Pennsylvania, in America*. McCarty & Davis, Philadelphia.

Erichsen-Brown, Charlotte
1979 *Medicinal and Other Uses of North American Plants.* Dover Publications, New York.

Eyre, F.H. (editor)
1980 *Forest Cover Types of the United States and Canada.* Society of American Foresters, Washington, D.C.

Farnsworth, Norman R.
1974 *The Lynn Index. A Bibliography of Phytochemistry*. Organized and edited by N.R. Farnsworth, R.M. Blomster, M.W. Quimby, and J.W. Schermerhorn. Published by Norman R. Farnsworth, University of Illinois, Chicago.

Fenton, William N.
1942 *Contacts Between Iroquois Herbalism and Colonial Medicine*. Annual Report for 1941, pp. 503-526. Smithsonian Institution, Washington, D.C.

Flagler, C.A.F.
1908 Survey of the St. Jones River, Delaware, from Its Mouth to Dover, with an Estimate of Cost Improvement. House Document No. 116. 60th Congress, 2nd Session, St. Jones River, Delaware.

Fletcher, Alice C., and Francis La Flesche
1911 The Omaha Tribe. *Twenty-seventh Annual Report of the Bureau of American Ethnology*, pp. 17-654. Smithsonian Institution, Washington, D.C.

Force, Peter (compiler)
1836-1846 *Tracts and Other Papers Relating Principally to the Origin, Settlement, and Progress of the Colonies in North America from the Discovery of the Country to the Year 1776*. 4 vols. Printed by P. Force, Washington.

Fulton, Cecil C., Jr. (editor)
n.d. *It Happened in Dover, Delaware. Some Excerpts from the Diaries, Memoirs, etc., of J. Alexander Fulton, Esq. And other Records Relating to Various Incidents in Dover's Past 1865-1900*. Ms. on file, Dover Public Library, Dover, Delaware.

Gerard, William R.
1907 Virginia's Indian Contributions to English. *American Anthropologist*, new series, 9(1):87-112.

Gilmore, Melvin R.
1919 Uses of Plants by the Indians of the Missouri River Region. *Thirty-third Annual Report of the Bureau of American Ethnology*, pp. 42-154. Smithsonian Institution, Washington, D.C.

1933 *Some Chippewa Uses of Plants*. University of Michigan Press, Ann Arbor.

Goddard, Ives
1978 Delaware. In *Northeast*, edited by Bruce G. Trigger, pp. 213-239. Handbook of North American Indians, vol. 15, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Graves, H.S.
1919 *The Use of Wood for Fuel*. Bulletin 753. United States Department of Agriculture, Washington, D.C.

Grieve, Maude
1971[1931] *A Modern Herbal*. 2 vols. Dover Publications, New York.

Gunn, John D.
1861 *New Domestic Physician or Home Book of Health. A complete guide for families, pointing out in familiar and plain terms the causes, symptoms, treatment and cure of diseases incident to man, women and children with directions for using medicinal plants.* Moore, Wilstach and Keys, Cincinnati.

Hakluyt Society Publications
1850 *Divers Voyages Touching the Discovery of America and the Islands Adjacent.* Edited by John Winter Jones of the British Museum, London. Collected and published by Sir Richard Hakluyt, London.

Hall, Clayton Colman
1967 A Relation of Maryland, 1635. In *Narratives of Early Maryland, 1633-1684*, edited by Clayton Coleman Hall. Barnes and Noble, New York.

Hamel, Paul B., and Mary U. Chiltoskey
1975 *Cherokee Plants and Their Uses—A 400 Year History*. Herald Publishing Co., Sylva, North Carolina.

Hariot, Thomas
1588 *A Briefe and True Report of the New Found Land of Virginia.* London. Reprinted in 1991 in *The Roanoke Voyages 1584-1590*, edited by David B. Quinn, vol. 1, pp. 317-387. Cambridge University Press for the Hakluyt Society, London.

1893 *Narrative of the First English Plantation of Virginia*. Reprint. Bernard Quaritch, London.

Harrington, Mark R.
1913 A Preliminary Sketch of Lenape Culture. *American Anthropologist* 15(2):208-235.

Hart, Jeff
1992 *Montana Native Plants and Early Peoples*. Montana Historical Society Press, Helena.

Heckewelder, John G.E.
1876(1843) *An Account of the History, Manners, and Customs of the Indian Nations, Who Once Inhabited Pennsylvania and the Neighboring States.* American Philosophical Society, Philadelphia.

Heiser, Charles B., Jr.
1949 The Enigma of Weeds. *Frontiers* 13:148-150.

1951 The Sunflower Among the North American Indians. *Proceedings of the American Philosophical Society* 95:432-448.

1979 *The Gourd Book*. University of Oklahoma Press, Norman.

Hellson, John C.
1974 *Ethnobotany of the Blackfoot Indians*. Mercury Series. National Museums of Canada, Ottawa.

Hennepin, Father Louis
1903 *A New Discovery of a Vast Country in America*. Bently et al., London (1698). AC McClurg, Chicago.

Herrick, James W.
1977 *Iroquois Medical Botany*. PhD. Thesis, State University of New York, Albany.

Hilton, William
1911 Relations of Discovery. In *Narratives of New York*, edited by Salley, pp. 37-61. New York.

Holmgren, Noel H., P. Holmgren, R. Jess, K. McCauley, and L. Vogel
1998 *Illustrated Companion to Gleason and Cronquist's Manual*. The New York Botanical Garden, Bronx, New York.

Hutchens, Alma R
1991 *Indian Herbalogy of North America*. Reprint. Shambhala Press, Boston.

Irving, Washington
1848 The Life and Voyages of Christopher Columbus; to which are added those of His Companions. Author's revised edition, vol. I. New York.

Johannessen, Sissel
1984 Paleoethnobotany. In *American Bottom Archaeology*, edited by C. Bareis and J. Porter, pp. 197-214. University of Illinois Press, Urbana.

Johnston, Alex
1987 *Plants and the Blackfoot*. Lethbridge Historical Society, Lethbridge, Alberta.

Kalm, Pehr (Peter)
1966 *The America of 1750: Peter Kalm's Travels in North America; The English Version of 1770*. Edited by Adolph B. Benson. 2 vols. Dover Publications, New York.

Keene, Arthur
1981 *Prehistoric Foraging in a Temperate Forest*. Academic Press, New York.

Krugler, John D. (editor)
1976 *To Live Like a Princes, A Short Treatis Sett Downe in a Letter Written by Robert Wintour to his Worthy Friend Concerning the New Plantation Now Erecting*. Enoch Pratt Free Library, Baltimore, Maryland.

Lafitau, Joseph Francois
1977 Moer des sauvage ameriquains, comparées auz moeur des premiers temps. Saugrain, Paris. 2 vols. Champlain Society, University of Toronto Press, Toronto.

Lane, Sir Ralph
1589 Ralph Lane's Discourse on the First Colony. In *The Principal Navigations, Voiages and Discoveries of the English Nation*, by Richard Hakluyt, pp. 737-747. Reprinted in 1991 in *The Roanoke Voyages, 1584-1590*, edited by David B. Quinn, vol. 1, pp. 255-294. Cambridge University Press for the Hakluyt Society, London.

Lawson, John
1952 *Lawson's History of North Carolina 1714.* Edited by Frances Latham Harriss. Garrett & Massie, Inc., Richmond.

Le Page du Pratz, Antoine S.
1758 *Historie de la Louisiane*. 3 volumes. Paris.

1975 *The History of Louisiana*. A facsimile reproduction of the 1774 English translation published by T. Becket, London, with an Introduction by J. Tregle. Louisiana State University Press, Baton Rouge.

Lee, David S.
1984 Maryland's Vanished Birds and Mammals: Reflections of Ethics Past. In *Threatened and Endangered Plants and Animals of Maryland: Proceedings of a symposium held September 3-4, 1981, at Towson State University, Towson, Maryland*, edited by A.W. Norden, D.C. Forester, and G.H. Fenwick. Maryland Natural Heritage Program Special Publication 84-I. Maryland Department of Natural Resources, Annapolis.

LeeDecker, Charles H., Brad Koldehoff, and Cheryl Holt
1996 *Excavation of The Two Guys Site 7S-F-68, Sussex County, Delaware*. Archaeological Series No. 138. Delaware Department of Transportation, Dover.

Leibknecht, William, Richard Hunter, Ian Burrow, Michael Tompkins, Patricia Madrigal, Brooke Blades, Glen Mellin, Frank Dunsmore, Susan Fehrenbach, Brian Seidel, and Joseph Schuldenrein
1997 *Puncheon Run Connector, Parent Agreement #728, Dover, Kent County, Delaware, Phase I and II Archaeological Data Recovery (First Phase), the Puncheon Run Site (7K-C-51), the Hickory Bluff Prehistoric Site (7K-C-411), the Dawson House Site (7K-C-414), the Nixon Mill Site (7K-C-413).* Draft report prepared for the Delaware Department of Transportation, Dover.

Leighton, Ann
1986 *Early American Gardens: For Meate or Medicine*. University of Massachusetts Press, Amherst.

Lindeström, Peter
1925 *Geographia Americanae, with an Account of the Delaware Indians, Based on Surveys and Notes Made in 1654-1656.* Translated and edited by Amandus Johnson. The Swedish Colonial Society, Philadelphia.

Little, Elbert
1980 *The Audubon Field Guide to North American Trees.* Alfred A. Knopf, New York.

Lorant, Stefan (editor)
1946 *The New World*. Duell, Sloan and Pearce, New York.

Louis Berger Group, Inc., The [Berger]
1998 *Archaeological Treatment Plan for the Puncheon Run Prehistoric Site (7K-C-51), Puncheon Run Connector, Kent County, Delaware*. Statewide Archeological Resource Project. Prepared for Delaware Department of Transportation, Dover, by Louis Berger & Associates, Inc., Washington, D.C.

McAvoy, William A.
1998 Botanist, Delaware Natural Heritage Program, Smyrna. Personal communication to Justine McKnight. July 9.

McCary, Ben C.
1964 An Indian Dugout Canoe, Reworked by Early Settlers, found in Powhatan Creek, James City Country, Virginia. *Quarterly Bulletin of the Archaeological Society of Virginia* 19:14-19.

McIntosh, Charles
1855 *The Book of the Garden. Practical Gardening*. Edinburgh, London.

Massachusetts Historical Society Collections
1806 Volume I, Boston, Massachusetts.

Medsger, Oliver Perry
1966 *Edible Wild Plants*. Collier Books, New York.

Meijar, William
1974 *Podophyllum peltatum* a Potential New Cash Crop Plant of Eastern North America. *Economic Botany* 28:1.

Michelson, Truman
1912 Preliminary Report on the Linguistic Classification of Algonquian Tribes. *Twenty-eighth Annual Report of the Bureau of American Ethnology,* pp. 221-290b. Smithsonian Institution, Washington, D.C.

Miller, George
1908 Report of Assistant Engineer, Engineer Office, U.S. Army, March 21. House Document No. 116. 60th Congress, 2nd Session, St. Jones River, Delaware.

Millspaugh, Charles
1974[1892] *American Medicinal Plants, an Illustrated and Descriptive Guide to Plants Indigenous to and Naturalized in the United States Which Are Used in Medicine*. Dover Publications, New York.

Moerman, Daniel E.
1998 *Native American Ethnobotany*. Timber Press, Portland, Oregon.

Munson, P.
1986 Hickory Silvaculture: a Subsistence Revolution in the Prehistory of Eastern North America. Paper presented at the Conference on Emergent Horticultural Economies of the Eastern Woodlands, Southern Illinois University, Carbondale.

Nabokov, P., and R. Easton
1989 *Native American Architecture*. Oxford University Press, Oxford.

O'Donnell (editor)
1968 A Description of the New Netherlands by Adriaen Van der Donck. Together with Remarks on the Character and Peculiar Customs of the Savages or Natives of the Land. *Collections of the New York Historical Society,* 2nd ser., 1(5):125-242.

Panshin, Alexis, and Carl deZeeuw
1980 *Textbook of Wood Technology*. Volume 1, 4th edition. McGraw-Hill, New York.

Peattie, D.C.
1991 *A Natural History of Trees of Eastern and Central North America*. Houghton Mifflin Co., Boston.

Penn, William
1912 Letter from William Penn to the Committee of the Free Society of Traders, 1683. In *Narratives of Early Pennsylvania, West New Jersey and Delaware, 1630-1707*, edited by Alber C. Myers, pp. 217-244. Charles Scribner's Sons, New York.

Perry, Myra Jean
1975 *Food Use of "Wild" Plants by Cherokee Indians*. M.S. Thesis, University of Tennessee.

Pillsbury, G.B.
1937 Report of the Board of Engineers for Rivers and Harbors, War Department, The Board of Engineers for Rivers and Harbors, Washington, January 11. House Document No. 18. 75th Congress, 1st Session, St. Jones River, Delaware.

Pinkerton, John
1812 *General Collection of the Best and Most Interesting Voyages and Travels in All Parts of the World, Many of Which Are for the First Translated into English Digested on a New Plan*. Longman, Hurst, Rees, and Orme, London.

Potter, Stephen, and Gregory Waselkov
1994 "Whereby We Shall Enjoy Their Cultivated Places". In *Historical Archaeology of the Chesapeake*, edited by Paul Shackel and Barbara Little. Smithsonian Institution, Washington D.C.

Purchas, Samuel
1613 *Pilgrimage*. London.

1625 *Purchas His Pilgrimage. Or Relations of The World and The Religions Observed in All Ages and Places discovered*. London.

Quinn, David Beers (editor)
1991 *The Roanoke Voyages, 1584-1590: Documents to Illustrate the English Voyages to North America Under the Patent Granted to Walter Raleigh in 1584.* 2 vols. Cambridge University Press for the Hakluyt Society, London.

Rafinesque, C.S.
1817 *Flora Ludoviciana, or, A Flora of the State of Louisiana*. Translated, revised, and improved from the French of C.C. Robin. C. Wiley & Co., New York.

Reveal, James L.
1992 *Gentle Conquest. The Botanical Discovery of North America with Illustrations from the Library of Congress*. Starwood Publishing, Inc., Washington, D.C.

Robinson, Trevor
1975 *The Organic Constituents of Higher Plants*. Cordus Press, North Amherst, Massachusetts.

Rogers, Dilwyn
1980 *Lakota Names and Traditional Uses of Native Plants by Sicangu (Brule) People in the Rosebud Area, South Dakota*. Rosebud Educational Society, St. Francis, South Dakota.

Roundtree, Helen C.
1989 *The Powhatan Indians of Virginia*. University of Oklahoma, Norman.

Rousseau, Jacques
1937 *La Botanique Canadienne à l'époque de Jacques Cartier*. Tr. in text by the author.

1945 Le Folklore Botanique de Caughnawaga. *Contributions de l'Institut Botanique de l'Université de Montréal* 55:7-72.

Salwen, Bert
1978 Indians of Southern New England and Long Island, Early Period. In *Northeast*, edited by Bruce G. Trigger, pp. 160-176. Handbook of North American Indians, vol. 15, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Sauer, J.
1952 A Geography of Pokeweed. *Annals of the Missouri Botanical Garden* 39:113-125.

Small, John Kunkel
1933 *Manual of Southeastern Flora*. New York.

Smith, Bruce
1985 The Role of Chenopodium as a Domesticate in Pre-Maize Garden Systems of the Eastern United States. *Southeastern Archaeology* 4(1).

1992a Prehistoric Plant Husbandry in Eastern North America. In *The Origins of Agriculture*, edited by C. Wesley Cowan and Patty Jo Watson, pp. 101-121. Smithsonian Institution Press, Washington, D.C.

1992b In Search of Choupichoul, the Mystery Grain of the Natchez. In *Rivers of Change, Essays on Early Agriculture in Eastern North America*, edited by Bruce D. Smith, pp. 249-262. Smithsonian Institution Press, Washington, D.C.

1992c The Floodplain Weed Theory of Plant Domestication in Eastern North America. In *Rivers of Change, Essays on Early Agriculture in Eastern North America*, edited by Bruce D. Smith, pp. 19-33. Smithsonian Institution Press, Washington, D.C.

Smith, Huron H.
1923 Ethnobotany of the Menomini Indians. *Bulletin of the Public Museum of the City of Milwaukee* 4:1-174.

1928 Ethnobotany of the Meskwaki Indians. *Bulletin of the Public Museum of the City of Milwaukee* 4:175-326.

1932 Ethnobotany of the Ojibwe Indians. *Bulletin of the Public Museum of the City of Milwaukee* 4:327-525.

1933 Ethnobotany of the Forest Potawatomi Indians. *Bulletin of the Public Museum of the City of Milwaukee* 7:1-230.

Smith, James
1870 *An Account of the Remarkable Occurrences in the Life and Travels of Col. James Smith, During His Captivity with the Indians in the Years 1755, 1756, 1757, 1758, 1759.* Ohio Valley Historical Series No. 5. R. Clarke, Cincinnati.

Smith, John
1986[1608] *A True Relation. The Complete Works of Captain John Smith (1580-1631).* 3 vols. Edited by Philip Barbour. University of North Carolina Press, Chapel Hill.

Smith, Samuel
1765 *The History of the Colony of Nova Caesaria, or New Jersey*. James Parker, Burlington, New Jersey.

Speck, Frank G.
1917 *Medicine Practices of the Northeastern Algonquians*. Proceedings of the Nineteenth International Congress of Americanists, pp. 303-321. Washington.

1925 *The Rappahannock Indians of Virginia*. Indian Notes and Monographs, v(3):25-83. Museum of the American Indian, Heye Foundation, New York.

1927 *Ethnography of the Powhatan Tribes*. Indian Notes and Monographs, Museum of the American Indian, Heye Foundation, New York.

Speck, Frank G., and R.W. Dexter
1951 Utilization of Animals and Plants by the Micmac Indians of New Brunswick. *Journal of the Washington Academy of Sciences* 41:250-259.

1952 Utilization of Animals and Plants by the Malecite Indians of New Brunswick. *Journal of the Washington Academy of Sciences* 42:1-7.

Spelman, Henry
1872 *Relation of Virginia, 1609*. Chiswick Press, London. Reprinted in 1884 in *Captain John Smith, Works, 1608-1631*, edited by Edward Arber, pp. ci-cxiv. Birmingham, England.

Strachey, William
1967 *The Historie of Travell into Virginia Britania* (1612). Works issued by the Hakluyt Society, 2nd series, No. 103. Nendeln Liechtenstein, Kraus Reprint 1967.

Sturtevant, Edward L.
1919 Sturtevant's Notes on Edible Plants. *New York Department of Agriculture's Twenty-seventh Annual Report*, vol. 2, part II. J.B. Lyon Company, Albany, New York. Reprinted 1972, Dover Publications, New York.

Sturtevant, W.C.
1954 *The Mikasuki Seminole: Medical Beliefs and Practices*. Ph.D. Thesis, Yale University, Connecticut.

1965 Historic Carolina Algonkian Cultivation of Chenopodium or Amaranthus. *Southeastern Archaeological Conference Bulletin* 3:64-65.

Swanton, John R.
1911 *Indian Tribes of the Lower Mississippi Valley and Adjacent Coast of the Gulf of Mexico*. Bulletin 43. Bureau of American Ethnology, Smithsonian Institution, Washington, D.C.

1928 Religious Beliefs and Medical Practices of the Creek Indians. *Forty-second Annual Report of the Bureau of American Ethnology*, pp. 473-672. Smithsonian Institution, Washington, D.C.

1946 *The Indians of the Southeastern United States*. Bulletin 137. Bureau of American Ethnology, Smithsonian Institution, Washington, D.C.

Tantaquidgeon, Gladys
1942 *A Study of Delaware Indian Medicine Practice and Folk Beliefs*. Pennsylvania Historical Commission, Harrisburg.

1972 *Folk Medicine of the Delaware and Related Algonkian Indians*. Anthropological Papers No. 3. Pennsylvania Historical Commission, Harrisburg.

Tehon, L.R.
1951 *The Drug Plants in Illinois*. Circular No. 44. Illinois State Natural History Survey, Champaign.

Trigger, Bruce G. (editor)
1978 *Northeast*. Handbook of North American Indians, vol. 15, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

United States Geological Survey [USGS]
1993 *Dover, DE*. 7.5-Minute Quadrangle. United States Geological Survey, Washington, D.C.

United States House of Representatives
1896 Preliminary Examination of St. Jones River, Delaware. Letter from the Secretary of War with a letter from the Chief of Engineers, Report of Examination of St. Jones River, Delaware. House Document No. 85. 54th Congress, 2nd Session.

United States Patent Office Reports
1853 Reports of the Agricultural Section of the United States Patent Office, 1837-1861. United States Patent Office, Washington, D.C.

Van der Donck, Adriaen
1841 A Description of the New Netherland. Together with Remarks on the Character and Peculiar Customs of the Savages or Natives of the Land. *Collections of the New York Historical Society*, 2d ser., 1(5):125-242.

Waugh, F.W.
1916 *Iroquois Foods and Food Preparation*. Canada Department of Mines, Ottawa.

Whalley, Lucy
1982 Plant Remains from the Stirling Component. In *The Bbb Motor Site: An Early Mississippian Occupation*, edited by Thomas E. Emerson and Douglas K. Jackson, pp. 335-349. FAI-270 Archaeological Mitigation Project Report 38. Department of Anthropology, University of Illinois, Urbana-Champaign.

Whitford, A.C.
1941 *Textile Fibers Used in Eastern Aboriginal North America*. Anthropological Papers vol. 38, pt. 1. American Museum of Natural History, New York.

Wilson, Gilbert L.
1917 *Buffalo Bird Woman's Garden*. Minnesota Historical Society Press, St. Paul.

Wood, William
1865 *New England's Prospect*. Publications of the Prince Society, Established May 25, 1858, Boston.

Woys Weaver, William
1997 *Heirloom Vegetable Gardening*. Henry Holt and Company, New York.

Wright, Louis B. (editor)
1947 *The History and Present State of Virginia*, by Robert Beverley, (1705), 2 vols. Published for the Institute of Early American History and Culture by University of North Carolina Press, Chapel Hill.

Yanovsky, Elias
1936 *Food Plants of the North American Indians*. Miscellaneous Publications No. 237. United States Department of Agriculture, Washington, D.C.

Yarnell, Richard
1964 *Aboriginal Relationships between Cultural and plant Life in the Upper Great Lakes Region*. Anthropological Paper No. 23. Museum of Anthropology, University of Michigan, Ann Arbor.

1972 Sunflower, Sumpweed, Small Grains, and Crops of Lesser Status. Chapter prepared for the Handbook of North American Indians. Ms. on file, Department of Anthropology, National Museum of Natural History, Smithsonian Institution, Washington, D.C.

1978 Domestication of Sunflower and Sumpweed in Eastern North America. In *The Nature and Status of Ethnobotany*, edited by Richard I. Ford, pp. 285-299. Anthropological Papers No. 67. Museum of Anthropology, University of Michigan, Ann Arbor.

1987 A Survey of the Prehistoric Crop Plants in Eastern North America. *Missouri Archaeologist* 47:47-60.

Zawacki, April Allison, and G. Hausfater
1969 *Early Vegetation of the Lower Illinois Valley*. Illinois Valley Archaeological Program Research Papers, vol. 1. Reports of Investigations No. 17. Illinois State Museum, Springfield.

Zeisberger, David
1910 [1779] History of the Northern American Indians. Edited by Archer B. Hulbert and William N. Schwarze. *Ohio State Archaeological and Historical Quarterly* 19:1-189. (Nos. 1 and 2, 1976).