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Comments on the vegetation of colonial Maryland

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Abstract

The vegetation of colonial Maryland can be partially reconstructed based on extant specimens of vascular plants collected along the colony's coastal plain during the late seventeenth and early eighteenth centuries, and on a limited number of pollen samples. Reconstruction cannot be complete because the vegetation was not sampled uniformly, exact location data for the early collections were not recorded, and most of the pollen reported from the last five hundred years of deposition in coastal Maryland represents tree and shrub species, the most conservative elements of the native vegetation. In general the collections made by Hugh Jones from 1696 to 1700, and by David Krieg and William Vernon in 1698, suggest a vegetation rich in some herbaceous plants that are now either locally extirpated or rare. From the pollen data as well as extant letters written by the early Maryland naturalists, it is clear that the forests were more extensive and dense than at present, with trees of considerable girth and height; that some arborescent species were apparently more common and widespread than at present; and that while exotic ruderals and some native "weed" species were found by the early naturalists, these categories of plants have increased in abundance since the early 1700s, especially the ragweeds (*Ambrosia* sp.).

Our assessment of the vegetation of colonial Maryland is made by comparing the species of vascular plants currently present in each of the state's major ecological settings on the coastal plain with those represented in the pre-1753 collections and in the pollen record. In all, 653 specific and infraspecific entities are represented in the pre-1753 collections of Maryland plants, or about one-quarter of the state's present-day flora. About 60 of those represent introduced weeds or cultivated plants.

Introduction

From 1634, when Maryland's first settlers arrived near old St. Mary's City on the *Ark* and the *Dove,* until the late 1690s there was little formal botanical study of the colony's flora. This neglect terminated when a group of men in England, most of them associated with the Royal Society, became interested in studying the flora and fauna of the American colonies and bringing to the gardens and estates of Europe exotic plants and animals from all parts of the British Empire. In Maryland, the first efforts to sample the vegetation occurred prior to 1688, for in that year John Ray, the noted English naturalist, published a description of *Tillandsia usneoides* (L.) L. and briefly discussed *Galax urceolata* (L.) Brummitt. In 1691, Leonard Plukenet illustrated these two Maryland species in his *Phytographia,* and by 1696 he was able to publish the descriptions of two more Maryland species. In the same year, the Reverend Hugh Jones arrived in Maryland after a brief education at the University of Oxford in the natural philosophies and an even more abbreviated education in the teachings of the Church of England. Two years later, in 1698, he was followed by a Cambridge Fellow, William Vernon, and a ship's surgeon, Dr. David Krieg, both of whom made extensive collections in the colony. With the departure of Krieg and Vernon in the fall of 1698, botanical efforts waned. Jones collected what he could, but death overtook him in the early winter of 1702 (Frick *et al.* 1987).

The extant collections made by these three naturalists are at the British Museum (Natural History) in London, in the Fielding-Druce Herbarium at the University of Oxford, and in the Lindley Herbarium at the University of Cambridge. We have concentrated our efforts on those in the first two institutions. Ship surgeons Charles Coombs, James Smart and William Brown all arrived in Maryland by 1708, each collecting a small number of specimens found today in the Sloane Herbarium at the British Museum (Natural History). Seeds

and seedlings were sent from Maryland to Peter Collinson of London in the 1720s, and we have examined preserved specimens grown from them at both Oxford and London. A collection of mainly garden specimens was gathered in Maryland by Dr. Andrew Scott, a local physician, in 1736, and it was eventually acquired by Sloane. Seeds of additional species were gathered in Maryland in the late 1740s and these were grown by James Gordon, a gardener who lived near London. We have found only a single specimen (*Napaea dioica*—OXF) that we can attribute to this effort. We have been unable to identify who collected the earliest Maryland specimens that were given to James Petiver, a London apothecary, sometime prior to 1688.

These early collections (Broome *et al.* 1987; Frick *et al.* 1987; Reveal *et al.* 1987a, 1987b) provide a partial record of the vegetation of Maryland at a time less than a century after its European settlement. They represent the most complete record of the colony's primal vegetation. Research by Dr. Grace S. Brush (1982) and her colleagues (Brush & DeFries 1981; Brush *et al.* 1980, 1982) at Johns Hopkins University on the woody plants of earlier and present-day Maryland, especially as detected in soil cores containing pollen grains, has provided an independent record of these plants on Maryland's coastal plain during the period of European settlement. These data and the early colonial specimens give an overview of Maryland's native flora.

Apparently the colonial naturalists collected only on the coastal plain of Maryland—in modern-day Anne Arundel, Calvert, Prince George's and St. Mary's counties on the Western Shore, and Talbot and Dorchester counties on the Eastern Shore. It is possible that Krieg (less likely Vernon) traveled as far north as the Susquehanna River in present-day Harford and Cecil counties. It is also possible that Krieg and Vernon made collections in southeastern Virginia when they left the New World, but there is no evidence that they stopped there. As the geographic attributions accompanying their specimens always refer to Maryland, we can only conclude that species known today only from southeastern Virginia must have occurred in Maryland in the past.

The vegetation that greeted Jones, Krieg and Vernon when they arrived in Maryland was not well recorded by them or by others. Likewise, there is not much information on how or what changes had occurred in the 60-odd years between the foundation of the colony and the arrival of these naturalists (Craven 1925). Of course, vegetation had been cleared to make way for plantations and tobacco farms (Stein 1976), and European man had thus been effecting gradual but significant changes in the woody vegetation (Brush *et al.* 1982). Brush and her colleagues reported that according to Froomer (in an unpublished doctoral dissertation) the entire tobacco crop in 1720 was grown on just 180 km^2 (27.4 mi^2), or 1.4% of the land mass of southern Maryland. What that figure fails to indicate is that by that year, Europeans had profoundly affected much more of the land than just 1.4% of the total because numerous acres had been cleared and then abandoned and allowed to return to a "natural" state. Brush and her coworkers also found that there were "two major changes in land use . . . reflected in the pollen profiles: initial European settlement in 1634 A.D. (1610–1640), and the 'agricultural revival' in 1840 (1820–1860)." The first change is expressed as an increase in ragweed (*Ambrosia*) pollen. We argue that this increase should not be so marked along the Potomac River by 1720 if only 1.4% of the land was subjected to raising tobacco. Such an increase could have resulted only if the revegetation of cleared fields was by a combination of native and exotic weed species. This would have resulted in the general decline of pollen for some species of hardwoods along with an increase in the pollen of other hardwood and shrubby species, as ob-

served by Brush (pers. comm., 1982) and would fall into the pattern of forest destruction described by Jones in the late 1690s (see the full text of Jones' letter in Frick *et al.* 1987).

The result of the field work done by the colonial Maryland naturalists prior to 1753, when Linnaeus published *Species plantarum,* was an amassing of several hundred species of plants and animals that were sent to England for evaluation, study and, in some cases, cultivation. The present study concentrates upon the vascular plants collected during that period. The non-vascular plants, and in particular the numerous lichens, bryophytes and mosses, have been seen but not studied by us, or for that matter, by any other modern systematist.

Information obtained from our studies of herbarium specimens of colonial Maryland vascular plants at the British Museum (Natural History) (BM) and the University of Oxford (OXF), when added to the growing body of information obtained from modern ecological studies, provides the basis for a reasonably comprehensive account of the plants that these colonial naturalists found or might have encountered. These data, added to the limited contemporary descriptions of the flora that we have encountered (see the various letters published in full in Frick *et al.* 1987), have allowed us to reconstruct conceptually the types of habitat and vegetation that these men visited, which ranged from coastal dunes to marshes and swamps to oak-pine forests. We begin with a review of these habitats (following Brown & Brown 1984), noting which species were discovered in each by the early naturalists (noted by an asterisk) and then consider aspects of rarity, weediness and vegetational changes. We provide a listing of all the species attributable to early colonial Maryland—arranged systematically—and an index to the families, with numbers of genera and species encountered in our studies to date. Finally, we also provide an alphabetical listing of the species, with herbarium locations for each.

Colonial Maryland Plant Habitats and Vegetation

1. Beaches and Dunes

That portion of the beach just above the high-tide line is usually devoid of vascular plants other than the occasional sea rocket (*Cakile edentula*), saltwort (*Salsola iberica**) or seabeach amaranth (*Amaranthus pumilus*). These are native species except the saltwort, a European introduction, that probably was collected in waste or disturbed areas in Maryland in the late 1690s rather than on the beach.

On the innermost beaches and dunes there is a considerable number of species. Herbaceous elements include grasses such as American beach grass (*Ammophila breviligulata*) that may be replaced inland by broom sedge (*Andropogon virignicus*), seabeach needle grass (*Aristida tuberculosa*), salt meadow grass (*Spartina patens**), sand grass (*Triplasis purpurea*), beach grasses (*Panicum virgatum, P. amarum*), dune grass (*Dichanthelium acuminatum* var. *implicatum*), sandbur (*Cenchrus tribuloides**) and fescue (*Festuca rubra*). Only a few of these were collected by the early botanists, notably the widespread salt meadow grass and the sandbur, the latter no doubt more as a curiosity than anything else as it is a rather remarkable, if not painful, native plant. Among the sedges found on the beaches and dunes are carices (*Carex arenaria, C. cephalophora*), galingales (*Cyperus strigosus**, *C. filicinus**) and a bulbostylis (*Bulbostylis capillaris**). Only a few of these too are represented among the early colonial collections, the determining factor apparently having been unusualness relative to what was known in England.

The dicotyledonous herbs of the innermost beaches and dunes include pinweed (*Hyperi-*

*cum gentianoides**), jointweed (*Polygonella articulata*), sorrel (*Rumex hastatulus*), seaside evening primrose (*Oenothera humifusa*), old-field toadflax (*Linaria canadensis*), sand spurry (*Spergularia marina*), seabeach sandwort (*Honkenya peploides* subsp. *robusta*), sea purslane (*Sesuvium maritimum*), seaside spurges (*Euphorbia polygonifolia**, *E. humistrata*), lesser horseweed (*Conyza canadensis* var. *pusilla**), thoroughwort (*Eupatorium rotundifolium**), pinweed (*Lechea maritima**), prickly pear (*Opuntia humifusa*) and various species of goldenrod, such as seaside goldenrod (*Solidago sempervirens**), tiny-headed goldenrod (*S. microcephala*) and slender goldenrod (*S. tenuifolia*). Only a few of the herbaceous dicotyledonous species typical of this zone were collected by the early botanists, and most of them are also found in other habitats farther inland, such as around moist bogs. Bogs were once rather common in parts of southern and eastern Prince George's County, for example, but are now essentially gone due to habitat destruction (McAtee 1918). It is possible, therefore, that species such as pinweed, thoroughwort, the spurges and even the goldenrods were found away from the immediate coast.

The shrubby vegetation of the beaches and dunes was more frequently sampled by the early naturalists. In part this was probably due to their desire to collect woody perennials that would be valuable additions to the exotic horticultural flora of England. Another possible reason is that many of the herbaceous species are in flower only for a short period of the year and thus are not usefully collectable most of the time. The shrubs, on the other hand, were often collected without flowers, so a natural bias in the sample can be expected. The shrubby vegetation is dominated by the bay berries (*Myrica cerifera**, *M. pensylvanica**). Other representative species are dwarf sumac (*Rhus copallina**), poison ivy (*Toxicodendron radicans**), false indigo (*Amorpha fruticosa*), sassafras (*Sassafras albidum**) and highbush blueberry (*Vaccinium corymbosum**, which is here defined to include *V. atrococcum*). The more mesic spots, or swales, will support low-tide bush (*Iva frutescens**), high-tide bush (*Baccharis halimifolia**) and button bush (*Cephalanthus occidentalis**).

Overstory species, which are more prevalent on the inner dunes, are often dwarfed or depauperate in these coastal habitats. They may include various species of oak, such as Spanish oak (*Quercus falcata**), willow oak (*Q. phellos**) and post oak (*Q. stellata*), red maple (*Acer rubrum*), black cherry (*Prunus serotina**), serviceberry (*Amelanchier arborea**), loblolly pine (*Pinus taeda*), red cedar (*Juniperus virginiana**) and persimmon (*Diospyros virginiana**). In the more mesic areas one may find sour gum (*Nyssa sylvatica**) or sweet gum (*Liquidambar styraciflua**). Many of these species were collected by Hugh Jones, who seems to have been more interested in the arborescent plants than were Krieg and Vernon. It is interesting that none of these men gathered red maple or loblolly pine, perhaps indicating that these two plants have since become more abundant and weedy as a result of cutting the native forests.

2. Forest Types—Pine

Although the forest of the "Coastal Zone" is generally classified as oak-pine, dominated in part by willow oak and loblolly pine (Brush *et al.* 1980), in some areas it is almost entirely pine. For convenience, the pine and oak types, with their many associations, are treated here as separate categories, although certain species are common to both.

Dominant overstory members of the pine woodlands are loblolly pine (*Pinus taeda*) and scrub pine (*P. virginiana**), with occasional specimens of pitch pine (*P. rigida*). Understory species include huckleberries (*Gaylussacia baccata**, *G. dumosa**), highbush blueberry (*Vaccinium corymbosum**), bay berries (*Myrica cerifera**, *M. pensylvanica**), dwarf sumac (*Rhus*

*copallina**), poison oak (*Toxicodendron pubescens**), poison ivy (*T. radicans**), Virginia creeper (*Parthenocissus quinquefolia*), sassafras (*Sassafras albidum**), American holly (*Ilex opaca**), sand blackberry (*Rubus cuneifolius*), Chinabrier (*Smilax bona-nox*), sawbrier (*S. glauca**) and the common greenbrier (*S. rotundifolia**). It is interesting that the early Maryland naturalists failed to collect Virginia creeper, which is now so common due to hatitat destruction. Another common species of this forest type today is Japanese honeysuckle (*Lonicera japonica*), a noxious introduced species that did not reach Maryland until the nineteenth century.

Species frequently found in the herbaceous vegetation of the pine forest include netted chain fern (*Woodwardia areolata**), if moisture is sufficient, and bracken fern (*Pteridium aquilinum**). Among the graminoid plants are true grasses such as members of the genus *Paspalum* (*P. floridanum**) and broom-sedge (*Andropogon virginicus*). The sedges include various species of *Carex,* notably *C. emmonsii,* and galingale (*Cyperus retrorsus**). Although orchids are found in this community, only the pink lady's slipper (*Cypripedium acaule**) is still common, at least on the Eastern Shore. Another species, the showy orchid (*Galearis spectabilis**), may be found infrequently. Other low herbs include the pinweeds (*Lechea leggettii, L. racemulosa, Hypericum gentianoides**), the frostweeds (*Helianthemum canadense, H. bicknellii**), and various species belonging to the sunflower family (Asteraceae), such as showy aster (*Aster spectabilis*), thoroughworts (*Eupatorium album**, *E. hyssopifolium**) and hawkweeds (*Hieracium venosum**, *H. subnudum**). Small, non-chlorophyllous plants often are also present in the pine forests. There are the Indian pipe (*Monotropa uniflora**), pinesap (*Hypopitys monotropa*) and pygmy pipes (*Monotropsis odorata*). Related to them, but chlorophyllous, are pipsissewa (*Chimaphila maculata**) and trailing arbutus (*Epigaea uniflora**). Members of Orobanchaceae are occasionally seen, such as one-flowered cancer-root (*Orobanche uniflora**). The low, spreading partridge berry (*Mitchella repens**) of this habitat became a prized addition to the gardens of Europe.

As can be seen, plants from the pine forests are not well represented among the early colonial naturalists' collections, especially when one considers that many of those species are also important components of the oak forest communities to be discussed next. It is likely that pure stands of pine were rare in colonial Maryland, and even mixed pine-oak woodlands were scattered, their distribution being determined then more by edaphic characteristics than by geologic substrate as today (Brush 1982). Modification began in the late 1600s and early 1700s, as noted by Brush and her associates (1982), and we suggest that the expansion of pine since colonial times has resulted from the cutting of native hardwood species coupled with the invasion of weedy pines into old-field sites resulting from heavy overgrazing or cultivation.

3. Forest Types—Oak

The mixed-oak forest of the coastal plain may be divided into a number of smaller, well defined units, namely oak-hickory, oak-gum and oak-pine, depending upon the dominant species present. On well-drained sites, the deciduous oaks are the white (*Quercus alba**), chestnut (*Q. prinus**), Spanish (*Q. falcata**), black (*Q. velutina**), black jack (*Q. marilandica**), post (*Q. stellata*) and willow (*Q. phellos**). The hickories present include *Carya cordiformis**, *C. ovalis** and *C. tomentosa**. An occasional pine may also be found.

In slightly lower, moister locales the willow oak will persist, but will be joined by the water oak (*Q. nigra*), basket oak (*Q. michauxii*), pin oak (*Q. palustris**) and swamp oak (*Q. bicolor*). Associated with these may be sweet gum (*Liquidambar styraciflua**), beech (*Fagus*

*grandifolia**), tulip tree (*Liriodendron tulipifera**), red maple (*Acer rubrum*) and sour or black gum (*Nyssa sylvatica**).

Understory species may be blueberries (*Vaccinium vacillans**, *V. corymbosum**), deer berry (*V. stamineum**), huckleberry (*Gaylussacia frondosa*), sweet-fern (*Comptonia peregrina**), various greenbriers (*Smilax* sp.*), poison ivy (*Toxicodendron* sp.*) and bay berries (*Myrica* sp.*). Other common plants are mountain laurel (*Kalmia latifolia**), lambkill (*K. angustifolia**), possum or swamphaw (*Viburnum nudum*), smooth arrow-wood (*V. recognitum**), southern arrowroot (*V. dentatum*), black haw (*V. prunifolium**), sweet bay (*Magnolia virginiana**), American holly (*Ilex opaca**), dogwood (*Cornus florida**), redbud (*Cercis canadensis**), strawberry bush (*Euonymus americanus**) and pawpaw (*Asimina triloba**).

In the mixed-oak woodlands the herbaceous community includes many species. The following are representative: panic grass (*Dichanthelium sphaerocarpon* var. *isophyllum**), spike grass (*Chasmanthium laxum*), sedges (*Carex muhlenbergii, C. swanii*), wood rush (*Luzula echinata*), path rush (*Juncus tenuis*), false asphodel (*Tofieldia racemosa**), Indian cucumber-root (*Medeola virginiana**), stargrass (*Hypoxis hirsuta**), lady's slipper (*Cypripedium acaule**), crested yellow orchid (*Plantanthera cristata*), rattlesnake plantain (*Goodyera pubescens*), pokeweed (*Phytolacca americana**), sleepy catchfly (*Silene antirrhina**), starry campion (*S. stellata**), one-flowered cancer-root (*Orobanche uniflora**), spring beauty (*Claytonia virginica**), jack-in-the-pulpit (*Arisaema triphyllum**), bloodroot (*Sanguinaria canadensis**), Virginia snakeroot (*Aristolochia serpentaria**), thimbleweed (*Anemone virginiana**), curly heads (*Clematis ochroleuca**), several species of lespedeza (including *Lespedeza procumbens** and *L. virginica**), numerous species of trefoil (including *Desmodium rotundifolium**, *D. canescens** and *D. cuspidatum**), horsemint (*Monarda punctata**), mountain mint (*Pycnanthemum incanum**), beech drops (*Epifagus virginiana*), cleavers (*Galium aparine*), bedstraw (*G. pilosum*), wild ipecac (*Euphorbia ipecacuanhae**), upland boneset (*Eupatorium sessilifolium**), rattlesnake weed (*Hieracium venosum**), elephant's foot (*Elephantopus carolinianus**) and Devil's grandmother (*E. nudatus**). Various ferns and fern-allies also are found, the more common including grape-fern (*Botrychium dissectum**), rattlesnake fern (*B. virginianum**), New York fern (*Thelypteris noveboracensis**), broad beech fern (*T. hexagonoptera**), and ebony spleenwort (*Asplenium platyneuron**).

Although the above listing is not complete, it is obvious that the early Maryland naturalists collected species found in the oak woodlands to a significantly greater degree than they did those from other communities on the coastal plain of Maryland. This was due probably to the greater distribution of these communities relative to others in the late 1690s (Brush *et al.* 1982), and also in part to the fact that several of these species occur not only in the oak woodlands but other habitats as well. The real significance of this sampling is that it demonstrates the richness of the native Maryland flora before it had been influenced by European man.

4. Open Areas and Borders of Woods

The origin of certain open areas on the coastal plain of Maryland that are essentially devoid of overstory and understory species is subject to some speculation, as have been the origins of the balds of the Smoky Mountains and the glades of Garrett County, Maryland. Before the coming of European man, the Amerindians had some areas under cultivation, as described by John Smith. Burning, both purposeful and accidental, may have contributed to the establishment of open areas in which ecological factors then were not conducive to forest redevelopment. Today, a number of weedy species occur in the open

areas and along borders of woods. Most of these species apparently were not present in the late seventeenth century, and it seems likely that the borders of woods were not as extensive then as they are today. Natural open areas were probably present but were limited to edaphically unusual sites much as they are presently. However, given the small, but significant number of plants that are usually confined to such sites and that are not present among the early collections of Maryland plants, it is unlikely that the early naturalists visited many such edaphically induced localities. Those open-area species that they did collect probably could equally have came from old fields that already had resulted from agricultural use (Craven 1925). Also, some of the introduced, ruderal species collected in the late seventeenth and early eighteenth centuries may have been cultivated by the colonists as garden specimens or as medicinals. In any case, it is clear, as will be discussed in more detail, that a number of Old World weeds were already well established in Maryland by 1753.

The more common native species of open areas such as fields and roadsides are foxtail grasses (*Setaria pumila**, *S. italica**), tall red top (*Tridens flavus*), Indian grass (*Sorghastrum nutans*), paspalums (*Paspalum setaceum**, *P. ciliatifolium*), red fescue (*Festuca rubra*), broom sedge (*Andropogon virginicus*), old witch grass (*Panicum capillare**), unicorn root (*Aletris farinosa**), pepper grass (*Lepidium virginicum**), dwarf cinquefoil (*Potentilla canadensis**), five finger (*P. recta*), partridge pea (*Chamaecrista fasciculata**), butterflypea (*Clitoria mariana**), goat's-rue (*Tephrosia virginiana**), wand lespedeza (*Lespedeza intermedia**), roundhead lespedeza (*L. capitata*), bush-clover (*L. hirta**), tick trefoils (*Desmodium paniculatum**, *D. canadensis**, *D. canescens**), common yellow oxalis (*Oxalis stricta**), flowering spurge (*Euphorbia corollata**), ipecac spurge (*E. ipecacuanhae**), evening primrose (*Oenothera biennis*), old-field toadflax (*Linaria canadensis*), butterfly weed (*Asclepias tuberosa**), variegated milkweed (*Asclepias variegata**), whorled milkweed (*A. verticillata**), four-leaved milkweed (*A. quadrifolia**), bracted plantain (*Plantago aristata*), hoary plantain (*P. virginica**), Venus' looking-glass (*Triodanis perfoliata**), horseweed (*Conyza canadensis**), thoroughwort (*Eupatorium hyssopifolium**), camphorweed (*Heterotheca subaxillaris*), hawkweed (*Hieracium subnudum**), black-eyed susan (*Rudbeckia hirta**), blazing star (*Liatris spicata**, *L. graminifolia**, *L. squarrosa*), rosin weed (*Silphium trifoliatum**), aster (*Virgulus concolor**) and golden aster (*Chrysopsis mariana**).

Among the introduced, ruderal species of these open areas are the brome grasses (*Bromus inermis, B. tectorum*), crabgrass (*Digitaria sanguinalis**), pigweed (*Amaranthus hybridus**), lamb's quarter (*Chenopodium album*), Mexican tea (*C. ambrosioides**), yellow rocket (*Barbarea vulgaris*), early winter cress (*B. verna*), pepper grass (*Lepidium campestre*), white sweet clover (*Melilotus alba*), yellow sweet clover (*M. officinalis*), rabbit-foot clover (*Trifolium arvense**), hop clovers (*T. aureum, T. campestris*), scarlet pimpernel (*Anagallis arvensis*), moth mullein (*Verbascum blattaria**), viper's bugloss (*Echium vulgare**), chicory (*Cichorium intybus*), skeleton-weed (*Chondrilla juncea*), bull thistle (*Cirsium vulgare*) and Canadian thistle (*C. arvense*).

5. Saltwater Marshes

In the salt marshes along the coastal plain of Maryland, cord-grass is prevalent and represented by three species: *Spartina cynosuroides**, *S. alterniflora** and *S. patens**. Another common species is reed-grass, *Phragmites australis,* which the early naturalists did not collect. It is possible that this species was not as common then as it is at present.

Other species frequently present in the salt marshes are the bulrushes (*Scirpus robustus**, *S. maritimus*), three-squares (*S. americanus**, *S.*

microcarpus), numerous rushes (including *Juncus biflorus**, *J. canadensis**, *J. gerardii, J. roemerianus*), numerous sedges (including yellow nut grass *Cyperus esculentus**), umbrella sedge (*C. filicinus**), carices (such as *Carex hormathodes, C. albolutescens* and *C. intumescens**), spikerushes (*Eleocharis halophila, E. albida, E. parvula, Fimbristylis castanea**), saltgrass (*Distichlis spicata**), arrow grass (*Triglochin striata*), bitterdock (*Rumex obtusifolius*), glassworts (the native *Salicornia bigelovii* and *S. virginica* and the introduced *S. europaea*), sea-blite (the native *Suaeda linearis* and the introduced *S. maritima* and *Bassia hirsuta*), seabeach orach (*Atriplex patula*), sea lavender (*Limonium carolinianum*), rattlebox (*Ludwigia alternifolia**), sea pink (*Sabatia stellaris**), deer grass (*Rhexia mariana**), whorled milwort (*Polygala verticillata* var. *isocalyx**), water hemp (*Acnida cannabina**), gerardias (*Agalinus maritima, A. purpurea**), swamp rose mallows (*Hibiscus palustris, H. moscheutos**), seashore mallow (*Kosteletzkya virginica*), thoroughwort (*Eupatorium serotinum*), marsh fleabanes (*Pluchea odorata* var. *succulenta**, *P. camphorata**), slender-leaved aster (*Aster tenuifolius**) and awl-leaved aster (*A. subulatus**).

Many of the species found today in Maryland salt marshes were discovered by the colonial naturalists. This is a habitat rich in species, and while many of the coastal marshes have been destroyed due to recent habitat modification, most of the marsh species are still rather widespread. Given the travel constraints that the early naturalists probably faced in attempting to collect in colonial Maryland, it is not surprising that many of their specimens came from this habitat. This is certainly true for persons like Krieg, Smart and Brown, who traveled by ship up and down the Chesapeake Bay, and even for Jones, who had ready access to the marshes along the Patuxent River near Christ Church. Given the richness of the marsh flora, the lateness of flowering for many of its species and the abundance of seed that many produced, this was an exciting habitat to visit.

6. Freshwater Marshes

As in the salt marshes, the dominant species here are sedges and grasses. Representative of the sedge family (Cyperaceae) are bulrushes (*Scirpus americanus**, *S. cyperinus**, *S. validus, S. polyphyllus**), carices (*Carex albolutescens, C. crinita, C. vulpinoidea, C. lupulina*) and spikerushes (*Eleocharis compressa, E. quadrangulata, E. rostellata, E. engelmannii*). Other members of the family less frequently found are threeway sedge (*Dulichium arundinaceum**), umbrella sedges (*Cyperus ovularis**, *C. esculentus**, *C. filicinus**), beak-rushes (*Rhynchospora corniculata, R. macrostachya*) and twig-rush (*Cladium mariscoides*). Examples of the rush family (Junaceae) found in the freshwater marshes are soft rush (*Juncus effusus*) and Canadian rush (*J. canadensis**). Conspicuous members of the grass family (Poaceae) are reed grass (*Phragmites australis*), switch grass (*Panicum virgatum**), panic grass (*Dichanthelium scoparium*), manna grasses (*Glyceria septentrionalis, G. canadensis* var. *laxa**, *Puccinellia pallida*), rue cutgrass (*Leersia oryzoides*), wild rice (*Zizania aquatica*) and water millet (*Zizaniopsis miliacea*). Graminoid plants near the margins of marshes include cat-tails (*Typha angustifolia, T. latifolia, T. domingensis*), bur-reed (*Sparganium eurycarpum*), yellow-eyed grass (*Xyris caroliniana**, *X. jupicai**, *X. torta**), ladies' tresses (*Spiranthes cernua**, *S. praecox, S. vernalis*), and the blue-eyed grasses (*Sisyrinchium angustifolium**, *S. atlanticum*).

Although less numerous, the dicotyledonous plants are represented by such species as lizard's tail (*Saururus cernuus**), mock bishop's weed (*Ptilimnium capillaceum**), eryngo (*Eryngium aquaticum**), common smart-weed (*Polygonum hydropiper*), water smart-weed (*P. punctatum*), halberd-leaved tearthumb (*P. arifolium**), St. John's worts (*Hypericum muti-*

*lum**, *H. canadense**, *Triadenum virginicum**), loosestrife (*Lythrum lineare, L. salicaria*), rattlebox (*Ludwigia alternifolia**), sensitive-joint vetch (*Aeschynomene virginica*), mermaid weed (*Proserpinaca palustris*), sundew (*Drosera intermedia*), pitcher plant (*Sarracenia purpurea**), cardinal flower (*Lobelia cardinalis**), yellow watercrowfoot (*Ranunculus flabellaris*), climbing hempweed (*Mikania scandens**), large marsh pink (*Sabatia dodecandra**), bedstraw (*Galium obtusum*) and buttonweed (*Diodia virginiana*).

Pteridophytes of the freshwater marshes are bog clubmoss (*Lycopodium inundatum*), royal fern (*Osmunda regalis**), shield fern (*Thelypteris thelypteroides**), sensitive fern (*Onoclea sensibilis**) and Virginia chain fern (*Woodwardia virginica*).

The freshwater marshes of the coastal plain tend to be along the more northern shores of the Chesapeake Bay, where the saline influence of the Atlantic Ocean is less pronounced, and inland along its tributaries, where the marsh is not as yet contaminated by salt water. The early naturalists certainly visited this type of habitat in Maryland and collected several of its species. Unfortunately, they tended to avoid members of the Poaceae and therefore failed to record a number of the most significant species of these marshes. It also seems that at least Krieg and Vernon visited freshwater marshes in midsummer rather than in the spring or fall. This too may account for the absence among their collections of some members of the grass family as well as other common species from this habitat.

7. Impoundments and Shallow, Quiet Waters

Species prevalent in these habitats are often floating plants such as duckweed (*Lemna minor*) and water flaxseed (*Spirodela polyrhiza*), or submerged plants with (for the most part) floating leaves such as water weeds (*Elodea canadensis, E. nuttallii, E. densa*), floating heart (*Nymphoides aquatica*), naiad (*Najas gracillima*), water milfoils (*Myriophyllum pinnatum, M. exalbescens, M. heterophyllum**), horned pondweed (*Zannichellia palustris*), mermaid weeds (*Proserpinaca palustris, P. pectinata*), riverweed (*Podostemum ceratophyllum*), eelgrass (*Vallisneria americana**), water starwort (*Callitriche heterophylla*), water pennywort (*Hydrocotyle ranunculoides*), pondweeds (*Potamogeton crispus, P. nodosus, P. pusillus*), bladderworts (*Utricularia gibba, U. cornuta, U. juncea*), mud plantain (*Heteranthera reniformis*), yellow nelumbo (*Nelumbo lutea**) and spatterdock (*Nuphar macrophyllum**).

Plants rooted in shallow water or shores with stems and leaves extending well above the surface are pickerelweed (*Pontederia cordata**), golden club (*Orontium aquaticum**), tuckahoe (*Peltandra virginica**), mud plantains (*Heteranthera reniformis, Alisma plantago-aquatica*), duck grass (*Eriocaulon decangulare**), wapato (*Sagittaria latifolia*), arrowhead (*S. falcata**), lilaeopsis (*Lilaeopsis chinensis*) and water willow (*Justicia americana*).

Colonial Maryland naturalists did not collect many of the vascular plants characteristic of this habitat, and nearly all of those that they did obtain were not in flower, except for a few specimens of shallow-water, emergent species, notably pickerelweed, golden club and tuckahoe, most of which can be found also in microhabitats such as streambanks away from the large, still-water marshes.

8. Swamps and Bog Areas

Numerous swamps dot the landscape of Maryland on both the eastern and western shores of the Chesapeake Bay and its associated drainage basins. These may vary from cypress swamps (Battle Creek, Pocomoke) to white cedar swamps (Cypress Creek) to deciduous swamps.

The broadleaved arborescent species usually present are sour gum (*Nyssa sylvatica**), red maple (*Acer rubrum*), sycamore (*Platanus occi-*

*dentalis**), river birch (*Betula nigra*), sweet gum (*Liquidambar styraciflua**) and the somewhat shrubby sweet bay (*Magnolia virginiana**). Around the margins of such swamps are willow oak (*Quercus phellos**), basket oak (*Q. michauxii*), water oak (*Q. nigra*) and swamp poplar (*Populus heterophylla*), among others.

The overstory of some swamps consists of bald cypress (*Taxodium distichum*) or white cedar (*Chamaecyparis thyoides**) or a mixture of both. In some swamps in southern Maryland, hemlock (*Tsuga canadensis*) may be found. Hugh Jones found white cedar, and possibly collected his specimens near Annapolis in Ann Arundel County (Stieber 1974; Sipple & Klockner 1984) if the tree was not then present in Calvert County to the south.

Understory species include swamp rose (*Rosa palustris*), male-berry (*Lyonia ligustrina**), stagger-bush (*L. mariana**), fetter-bush (*Leucothoe racemosa**), leather leaf (*Chamaedaphne calyculata**), highbush blueberry (*Vaccinium corymbosum**), swamp azalea (*Rhododendron viscosum**), sweet pepper-bush (*Clethra alnifolia**), Virginia willow (*Itea virginica**), common alder (*Alnus serrulata*), swamp haw (*Viburnum nudum*), red chokeberry (*Aronia arbutifolia**), smooth winterberry (*Ilex laevigata**) and black alder winterberry (*I. verticillata**). Also present may be red willow (*Cornus amomum*), red-berried greenbrier (*Smilax walteri*), laurel-leaved greenbrier (*S. laurifolia*), poison sumac (*Toxicodendron vernix**), poison ivy (*T. radicans**), poison oak (*T. pubescens**), muscatine grape (*Vitis rotundifolia*), button bush (*Cephalanthus occidentalis**), spice bush (*Lindera benzoin**) and often bay berries (*Myrica cerifera**, *M. pensylvanica**).

The herbaceous stratum comprises many dicotyledonous species, their presence often determined by the density of the overstory (available light) and the water level, some being only occasional. The composition varies from swamp to swamp, but in general the species usually seen are swamp milkweed (*Asclepias incarnata**), boneset (*Eupatorium perfoliatum**), joe-pye weed (*E. purpureum**), thoroughwort (*E. pilosum**), sclerolepis (*Sclerolepis uniflora*), water horehounds (*Lycopus americanus**, *L. amplectens, L. virginicus**), monkey-flower (*Mimulus ringens**, *M. alatus**), lizard's tail (*Saururus cernuus**), halberd-leaved tear-thumb (*Polygonum arifolium**), swampdock (*Rumex verticillatum*), St. John's wort (*Triadenum virginicum**, *T. tubulosum*), spotted cowbane (*Cicuta maculata**), water drop-wort (*Oxypolis rigidior**), touch-me-not (*Impatiens capensis**), yellow water crowfoot (*Ranunculus flabellaris*), cardinal flower (*Lobelia cardinalis**), water willow (*Decodon verticillatus**), turtle heads (*Chelone glabra**, *C. obliqua*) and purple-stemmed aster (*Aster puniceus**).

Monocotyledonous species found in this habitat include grasses such as rue cut-grass (*Leersia oryzoides*), wild rice (*Zizania aquatica*), manna grasses (*Glyceria canadensis* var. *laxa**, *G. striata*), while the sedges are represented by several genera and many species, notably carices (*Carex comosa**, *C. crinita, C. laxiculmis, C. lupuliformis, C. lupulina, C. tribuloides*), three-way sedge (*Dulichium arundinaceum**), bulrushes (*Scirpus cyperinus**, *S. polyphyllus**), twig rush (*Cladium mariscoides*), soft rushes (*Juncus effusus, J. militaris,* and the rare and perhaps extirpated *J. caesariensis*) and cat-tails (*Typha angustifolia, T. latifolia, T. domingensis*). On the margins of the swamps and bog areas are other monocotyledonous species such as sweet flag (*Acornus calamus*), skunk cabbage (*Symplocarpus foetidus**), bur-reeds (*Sparganium eurycarpum, S. americanum*) and blue flag (*Iris versicolor*).

Members of Orchidaceae are sometimes present on slightly raised spots within the bogs and swamps, or on their margins. Some of these orchids are the white-fringed orchis (*Platanthera blephariglottis*), yellow-fringed orchis (*P. ciliaris**), ragged orchis (*P. lacera**) and various species of ladies' tresses (*Spiranthes cernua**, *S. praecox, S. vernalis*).

The commonness of swamps and bogs on Maryland's coastal plain no doubt accounts for the great number of species from this habitat collected by the naturalists who visited Maryland prior to 1753. This habitat too is being reduced by land reclamation activities, the growth in agricultural and urban land uses, the gradual decline in the water table and the modification of natural drainage systems (Brush & DeFries 1981). The bias toward this habitat, seen in Krieg and Vernon specimens that is reflected in the above listing, is probably because many of its species flower in late spring and summer, and to its ready access along both coasts of the Chesapeake Bay by ship and small boat (the principal means of transportation in colonial Maryland).

9. Introduced Species

Extant herbarium specimens collected in Maryland prior to 1753 indicate that by then many exotic species had already been introduced into America. Some introductions were intentional and were associated with agricultural or horticultural interests. Some were accidental, the result of contamination associated with livestock, seed, fodder or ballast. The record of these introductions is not complete because some species were never collected by the colonial naturalists, or else early specimens were lost or destroyed.

It is useful to compare the Maryland introductions with those reported for Virginia by Gronovius (1739, 1743) as analyzed by Reveal (1983). In the following list of Maryland introductions, the stars (*) indicate introduced species that were also collected in Virginia by John Clayton in the 1730s. We have yet to study Clayton's specimens in detail and are not certain they were always identified correctly. We make comparisons when Linnaeus associated a specific name in Gronovius with a species that is not native of temperate eastern North America.

Aristolochiaceae

Aristolochia clematitis L.; Europe [Identification tentative]

Ranunculaceae

Clematis dioscoreifolia Levl. & Vaniot; eastern Asia
**Clematis vitalba* L.; Europe

Berberidaceae

Berberis vulgaris L.; Europe

Moraceae

Morus alba L.; Asia

Chenopodiaceae

Chenopodium ambrosioides L.; tropical America
Chenopodium botrys L.; Eurasia
Salsola paulsenii Litwin.; eastern Asia
Suaeda maritima (L.) Dum.; Europe

Caryophyllaceae

Cerastrum vulgare L.; Eurasia
Dianthus armeria L.; Europe

Polygonaceae

**Polygonum convolvulus* L.; Europe

Clusiaceae

**Hypericum androsaemum* L.; Europe

Malvaceae

Sida spinosa L.; tropics

Cucurbitaceae

Citrullus lanatus (Thunb.) Matsum. & Nakai; Europe, South Africa

Brassicaceae

Arabidopsis thaliana (L.) Heynh.; Europe
Cardamine hirsuta L.; Europe
**Draba verna* L.; Europe

Resedaceae

Reseda luteola L.; Europe

Fabaceae

Ononis spinosa L. ssp. *antiquorum* (L.) Arcangeli; Europe
Pisum sativum L. var. *arvense* (L.) Poiret; Europe
Trifolium arvense L.; Europe

Euphorbiaceae

Euphorbia lathyris L.; Europe
Euphorbia nutans Lag.; Europe

Vitaceae

Vitis labrusca L.; Europe

Solanaceae

Nicotiana tabacum L.; tropical America

Boraginaceae

Echium vulgare L.; Europe
Heliotropium europaeum L.; Europe
Lappula squarrosa (Retz.) Dum.; Europe

Scrophulariaceae

Melampyrum lineare Desv.; Europe
Verbascum blattaria L.; Europe
Verbascum lychnitis L.; Europe
**Veronica arvensis* L.; Europe

Caprifoliaceae

Viburnum opulus L.; Europe

Asteraceae

Achillea ageratum L.; Europe
Artemisia absinthium L.; Europe
Artemisia vulgaris L.; Europe
Bidens tripartita L.; Europe
**Hieracium venosum* L.; Europe
Lactuca serriola L.; Europe
Sonchus arvensis L.; Europe

Commelinaceae

**Commelina communis* L.; Asia

Cyperaceae

Cyperus difformis L.; South America
Fimbristylis spadicea (L.) Vahl; South America

Poaceae

Agrostis canina L.; Europe
Agrostis stolonifera L.; Eurasia
Alopecurus geniculatus L.; Europe
Cynodon dactylon (L.) Pers.; Europe
**Digitaria sanguinalis* (L.) Scop.; Europe
Echinochloa crusgalli (L.) Beauv.; Europe
Eleusine indica (L.) Gaertn.; Europe
**Eragrostis cilianensis* (All.) Link ex Mosher; Europe
Panicum milaceum L.; Eurasia
Phleum pratense L.; Eurasia
**Setaria italica* (L.) Beauv.; Eurasia
Setaria pumila (Poiret) Schultes in Schultes & Schultes; Eurasia
Stipa pennata L.; Europe
Triticum aestivum L.; Eurasia

Cannaceae

Canna indica L.; Africa and India

Orchidaceae

Herminium monorchis (L.) R. Br. in Aiton; Europe

These 60 introduced species of vascular plants discovered in Maryland before 1753 represent about 9% of the reported entities of the colony. However, several of them probably were cultivated and not actually escaped and weedy. These included medicinal plants such as *Aristolochia clematitis, Chenopodium ambrosioides* and *Artemisia absinthium*; agriculturally important species such as watermelon (*Citrullus lanatus*), tobacco (*Nicotiana tabacum*) and wheat (*Triticum aestivum*); and horticultural subjects such as *Clematis dioscoreifolia, Berberis vulgaris, Hypericum androsaemum, Viburnum opulus, Achillea ageratum* and *Canna indica.* Some other species probably were associated only with livestock, notably several of the grasses. The European orchid, *Herminium monorchis,* is known currently in England only from its southern coast, and yet was apparently found growing in Maryland. The species is not otherwise known to occur in North America, and it is not known who made the Maryland collection. Not included here are several of the garden specimens collected by Scott (Frick *et al.* 1987). *Canna flaccida* Salisbury was found by him, and although a native of the southeastern United States, we believe the species was cultivated rather than naturalized or native. The same might be said for *Spigelia marilandica,* a medicinal species we discuss in the following section.

10. Rare, Threatened and Endangered Species

Many changes have occurred in the composition of the vegetation of Maryland's coastal plain since the start of the eighteenth century. Herbarium specimens gathered in that period, and somewhat later, indicate that some of the species that are now considered rare, threatened or endangered in the state (Broome *et al.* 1980; Boone 1984a) once were fairly common. However, the vegetation of the coastal plain itself has been heavily impacted over the nearly three centuries since the first collections were made. Many plants found by Jones, Krieg, Vernon and others are now lacking from that part of Maryland, but may be seen more westwardly in the Piedmont or in the mountains of western Maryland. Additionally, a few species have been discovered in the early Maryland collections which are otherwise unknown from the state. These

species are included herein and are mentioned in more detail below.

The following rare species collected in Maryland before 1753 are represented by extant specimens in the Sloane Herbarium at the British Museum (Natural History) (BM) and in the Fielding-Druce Herbarium at the University of Oxford (OXF) among the special collections of William Sherard, Jacob J. Dillenius and Charles Du Bois (see Reveal *et al.* 1987a). Those included here are considered to be at least rare currently by Broome *et al.* (1980) and Boone (1984a).

Actaea pachypoda Elliott (white bane-berry)—No stations reported for the coastal plain; infrequent in northern and western counties. H.S. 37:26.1; H.S. 37:43.3 (BM).

Aesculus pavia L. (dwarf red buckeye)—Probably introduced from farther south; no known native Maryland station (Brown & Brown 1972; Little 1979). H.S. 37: 52.1 (BM); Du Bois (OXF). The latter appears to be a garden specimen raised from seed sent to Europe from Maryland.

Aletris obovata Nash (stargrass)—Probably not native to Maryland, but included here on the basis of a specimen annotated with a Maryland-based polynomial. The species is native to the southeastern United States. H.S. 316:37 (BM).

Amianthium muscaetoxicum (Walter) A. Gray (fly-poison)—Local and rare on the coastal plain; local and infrequent in the mountains to the west. H.S. 37:134.4 (BM).

Aquilegia canadensis L. (columbine)—Local and rare on the coastal plain; local and scattered in the mountains to the west. H.S. 74:86.1; H.S. 249:74 (BM).

Arethusa bulbosa L. (dragon's mouth)—Probably extirpated in Maryland; last collected in Prince George's Co. in 1918. The species is considered to be endangered in Maryland, and is vulnerable and declining in all other states throughout its range. H.S. 37:40.6; H.S. 74:67.1; H.S. 93:198; H.S. 159:24 (BM).

Asclepias incarnata L. var. *pulchra* (Ehrh.) Persoon (milkweed)—Not now known to occur in Maryland and perhaps not found in the colony (Reveal *et al.* 1987a). The specimen at OXF was annotated with a Maryland-based polynomial, and the variety is found only from southern Virginia southward. Du Bois (OXF).

Astragalus canadensis L. (Canadian milk-vetch)—Local and rare on the coastal plain; infrequent in the mountains to the west. Sherard (OXF).

Calopogon tuberosus (L.) Britton, Sterns & Poggenb. (swamp pink)—Rare in Maryland; infrequent to locally common elsewhere from southern Canada to Florida mainly in sphagnous bogs, meadows, savannas and wet grassy shores. H.S. 37:10.1; H.S. 74:86.2; H.S. 88:48; H.S. 92:101; H.S. 159:24 (BM); Sherard (OXF).

Camptosorus rhizophyllus (L.) Link (walking fern)—Rare in coastal areas but more frequent westward; apparently declining due to overcollecting. H.S. 37:99.5; H.S. 37: 129.6; H.S. 74:29.1; H.S. 246:20.2 (BM); Du Bois (OXF).

Castilleja coccinea (L.) Sprengel (Indian paintbrush)—Rare on the coastal plain, but more common in the Piedmont and mountains, especially in Garrett Co. Widespread and often local throughout its range in eastern North America. H.S. 37:26.4; H.S. 37:32.7; H.S. 37:69.3; H.S. 74:46.5; H.S. 158:224; H.S. 246:13.1 (BM); Du Bois; Sherard (OXF).

Chamaedaphne calyculata (L.) Moench (leather-leaf)—Locally infrequent in bogs and swamps along the coastal plain, where currently known only from a single station in Anne Arundel Co.; a second location was reported from Caroline Co. (Broome *et al.* 1980). It is possible that the specimens reported here were all collected near Annapolis. This is a circumboreal species. H.S. 37:91.6; H.S. 37:91.7; H.S. 74:12.2; H.S. 94:128; H.S. 246:5.2 (BM); Du Bois; Sherard (OXF).

Chamaelirium luteum (L.) A. Gray (devil's bit)—Infrequent in coastal areas, but more common in the Piedmont and mountains of the state, and rather widespread in eastern temperate North America. H.S. 37:11.4; H.S. 37: 131.5; H.S. 74:60.1 (BM); Du Bois (OXF).

Chenopodium gigantospermum Aellen (maple-leaved goosefoot)—Infrequent and local on the coastal plain; last found from Maryland in Wicomico Co. in 1894 (Broome *et al.* 1980). Du Bois (OXF).

Crotalaria rotundifolia Walter ex J. F. Gmelin var. *vulgaris* Windler (rabbit-bells)—Previously unknown from Maryland; currently known only as far north as southeastern Virginia. This new state record remains to be confirmed by more recent specimens, as it is possible it was collected in Virginia. Sherard annotated the specimen (see no. 196 in Reveal *et al.* 1987a). H.S. 310:146 (BM); Sherard (OXF).

Cyperus plukenetii Fernald (Plukenet's umbrella-sedge)—Local and infrequent on the coastal plain, occurring from New York southward (where more common) to Florida, thence westward to Texas. H.S. 37:77.2; H.S. 74:22.1; H.S. 92:54 (BM).

Cypripedium reginae Walter (showy lady's-slipper)—Local and endangered throughout its range, with a native population still extant in Harford Co. on the coastal plain. Boone (1984a) reported no specimens of this species have been collected in Maryland since 1950, but Brown and Brown (1984) reported it from Garrett Co. The report of a population in Baltimore Co. by Broome *et al.* (1980)

is an error (Boone 1984b). H.S. 37:108.1; H.S. 93:198 (BM); Sherard (OXF).

Desmodium ochroleucum M. A. Curtis ex Canby (tick-trefoil)—Local and infrequent throughout its range, which extends from Maryland and Delaware southward to Georgia and Tennessee, but in Maryland known only from the coastal plain. It has been collected in Calvert and Caroline counties. The collections cited here may have come from Calvert Co. H.S. 37:20.2; H.S. 37:21.5 (BM).

Galax urceolata (Poiret) Brummitt (wandflower)—Extirpated on the coastal plain and currently known in Maryland only from the western part of the state (Reed 1965; Nesom 1983; this species is best known under the name *G. aphylla* L., see Brummitt 1972). H.S. 91:35 (BM); Sherard (OXF).

Helianthemum bicknellii Fernald (frostweed)—Local and rare on the coastal plain where it has been found in Cecil, Baltimore and Anne Arundel counties. The species is rare throughout its range from New England to North Carolina on the coastal plain, thence westward onto the Great Plains. H.S. 37:129.2; H.S. 316:37 (BM); Du Bois (OXF).

Helonias bullata L. (swamp-pink)—Rare (if not extirpated) on the coastal plain and reportedly last seen in the wild there in 1956 in Anne Arundel Co. (Kolb 1956) at a site now destroyed. As the species is occasionally transplanted, it is possible that this recent occurrence resulted from an introduction. Otherwise known from Maryland only from a colonial collection made prior to 1704, on which Sherard based a description of the species. Sherard (OXF).

Lilium philadelphicum L. (wood lily)—Rare and local on the coastal plain; infrequent in the more western and northern counties. No doubt selectively collected for its horticultural potential. H.S. 37:28.2; H.S. 74:65.2; H.S. 246:24.4; H.S. 316:38 (BM); Du Bois (OXF).

Ludwigia virgata Michx. (wand-stemmed false loosestrife)—Previously unknown from Maryland, and currently known only from southeastern Virginia southward to Florida. This new state record remains to be confirmed by new collections. We believe this to be a Maryland collection on the basis of the Sherard polynomial (see no. 195 in Reveal *et al.* 1987a). Sherard (OXF).

Matelea carolinensis (Jacq.) Woodson (angle-pod)—Infrequent on the coastal plain and in the midlands of the state; extending from Maryland and Delaware southward to Florida. H.S. 32:89; H.S. 37:49.6; H.S. 37:110.1*; H.S. 74:69.3; H.S. 249:86 (BM); Sherard (OXF).

Melothria pendula L. (melonette)—Rare in Maryland, with a vouchered collection only from a station at College Park, Prince George's Co., and otherwise reported only from a single station on the Eastern Shore. The species once extended as far north as Pennsylvania, where it is now probably extirpated; more common and frequent to the south. H.S. 37:3.4; H.S. 249:86 (BM); Du Bois (OXF).

Mitella diphylla L. (coolwort)—Rare to infrequent on the coastal plain, but more common in the mountains to the west. H.S. 158:197; H.S. 249:72 (BM).

Monarda clinopodia L. (horsemint)—Rare on the coastal plain where the species reaches its southern limit in this habitat; more common in the mountains to the west and then southward. H.S. 93:106 (BM).

Napaea dioica L. (globe mallow)—Extirpated in Maryland; infrequent from Pennsylvania west to Minnesota south to Virginia, Ohio, and Iowa. A garden specimen grown at Oxford from seed sent by James Gordon at Mile End, and one time gardener to Lord Petre at Thorndon Hall in Essex, who apparently received them from Maryland in the 1740s. The specimen is annotated "Aleca Marilandia, folio Papayi 5 petis [*sic*] albo." Also added to the label is "semina non maturavit Oxonii Aug. Floret., a que Gordon—que ex Marilandia habit." The phrase name was never published. Identity confirmed by S. R. Hill. General (OXF).

Obolaria virginica L. (pennywort)—Infrequent and local on the coastal plain, but probably not rare. H.S. 37:120.1; H.S. 159:17 (BM).

Oenothera parviflora L. (small-flowered evening primrose)—Local and infrequent on the coastal plain where, except for a station in southern Virginia, the species reaches its southern limit. Du Bois (OXF).

Oenothera fruticosa L. var. *ambigua* Nutt. (Fraser's evening primrose)—Rare on the coastal plain, but more common in the mountains to the west. H.S. 37:133.2 (BM); Du Bois (OXF).

Orbexilum pedunculatum (Miller) Rydb. (Samson's snakeroot)—Known in Maryland only from the early collections cited below; currently found only as far north as southeastern Virginia. According to Petiver (1699), Hugh Jones collected the species. Its presence in Maryland remains to be confirmed by more recent collections as it is possible it was cultivated for its medicinal value. H.S. 37: 103.5; H.S. 74:39.1; H.S. 92:100; H.S. 159:268 (BM); Du Bois, Sherard (OXF).

Panax quinquefolius L. (ginseng)—Rare and local on the coastal plain, but more common (although still local and infrequent) in the mountains to the west. Sherard (OXF).

Phlox pilosa L. (phlox)—Rare on the coastal plain and last collected there in Montgomery Co. in 1929. It is unlikely that the colonial naturalists ever reached present-day Montgomery Co., but we do not know where these specimens might have been collected. H.S. 37:6.4; H.S. 37:120.2; H.S. 94:2; H.S. 264:20 (BM); Sherard (OXF).

Platanthera peramoena A. Gray (purple fringeless orchid)—Rare and local on the coastal plain, and last collected in Anne Arundel Co. in 1912 and in Prince George's Co. in the 1920s; it is occasionally found in the northern and western counties. H.S. 37:128.2 (BM).

Pogonia ophioglossoides (L.) Juss. (pogonia)—Rare on the coastal plain, but more common inland and in states to the north. H.S. 37:40.7; H.S. 37:50.7; H.S. 37:67.3; H.S.

37:113.4; H.S. 74:67.2; H.S. 329:87 (BM); Du Bois; Sherard (OXF).

Pyrrhopappus carolinianus (Walter) DC. (Carolina false dandelion)—Local and infrequent on the coastal plain, where it reaches its northern limit. Sherard (OXF).

Rhododendron serrulatum (Small) Milais (rhododendron)—Known in Maryland only from the Krieg collection cited below; currently found only as far north as southeastern Virginia. This new state record remains to be confirmed. Du Bois (OXF).

Rhynchosia tomentosa (L.) Hook. & Arn. (rhynchosia)—Rare in Maryland, where according to Fernald (1950) the species reaches its northernmost limit, although we have seen no Maryland collections except these colonial specimens. H.S. 37:22.1; H.S. 37:46.6; H.S. 37:106.1; H.S. 74:38.1; H.S. 92:105; H.S. 159:278; H.S. 246:27.1 (BM); Du Bois; Sherard (OXF).

Rubus odoratus L. (thimbleberry)—Rare on the coastal plain, but more common in the mountains to the west. H.S. 246:14.2 (BM).

Sabatia difformis (L.) Druce (sabatia)—Local on the coastal plain. H.S. 37:32.1 (BM).

Sagittaria falcata Pursh (arrowhead)—Rare and infrequent on the coastal plain where it reaches its northern limit. H.S. 316:34 (BM); Du Bois (OXF).

Salvia urticifolia L. (nettle-leaved sage)—Rare in Maryland, where known only from colonial collections; more common elsewhere, especially to the south. H.S. 37:7.3; H.S. 37:84.1; H.S. 37:84.4 (BM); Du Bois; Sherard (OXF).

Sarracenia purpurea L. var. *venosa* (Raf.) Fernald (lesser pitcher plant)—Rare and local on the coastal plain due mainly to overcollecting and habitat destruction. H.S. 37: 36.1; H.S. 37:112.1; H.S. 37:112.2; H.S. 74:63.1; H.S. 246:31.1 (BM); Du Bois (OXF).

Schwalbea americana L. (chaff-seed)—Exceedingly rare and probably endangered throughout its range, the var. *americana* ranges from Virginia (where last collected in the 1730s) northward to New England (Reveal & Broome 1981, 1982). The species was last collected in Maryland in 1893 (Broome *et al.* 1980). H.S. 37:9.1; H.S. 37:45.1; H.S. 37:132.5 (BM).

Scirpus etuberculatus (Steudel) Kuntze (Canby bulrush)—Exceedingly rare and local although not reported as such by Broome *et al.* (1980). Fernald (1943) reported a single station in Maryland (near Salisbury on the Eastern Shore). Du Bois (OXF).

Solidago odora Aiton (sweet goldenrod)—Rare and apparently exceedingly local on the coastal plain, and infrequent elsewhere throughout its range, which extends from New England to Florida. The rarity of the species may be due to its reported medicinal value. H.S. 37:30.1; H.S. 74:82.2; H.S. 158:131; H.S. 283:21; H.S. 316:39 (BM); Du Bois (OXF).

Spigelia marilandica (L.) L. (Indian-pink)—Apparently extirpated on the coastal plain of Maryland if the species was ever native. The northernmost limit of its range was once considered to be Pennsylvania (Curtis 1789; Griffith 1833), but that was based on specimens Bartram raised in his garden. Two specimens are reported from Maryland, the one mentioned here and a specimen at Harvard University's Herbaria (GH) that Asa Gray annotated "Maryland" (Rogers 1986). The specimen from northern Virginia reported by Holm (1892), like those from Pennsylvania and Maryland, were probably the result of past introductions as this species was well known as a medicinal plant even in colonial times (Garden 1771). Rogers considered the native distribution of *S. marilandica* to be South Carolina south to northern Florida and west to the edge of the Great Plains. Sherard (OXF).

Tillandsia usneoides L. (Spanish moss)—This was the first vascular plant described from Maryland (Frick *et al.* 1987); it is now thought to be extirpated. H.S. 91:63; H.S. 100:9 (BM).

Trifolium reflexum L. (buffalo clover)—Apparently extirpated in Maryland, where it was last collected on an island in the Potomac River in 1902 (Broome *et al.* 1980; Reveal & Broome 1981). The species is more frequent to the south and west of Maryland, but local and rare to the north. H.S. 37:11.6; H.S. 310:116 (BM); Du Bois; Sherard (OXF).

Triphora trianthophora (Swartz) Rydb. (nodding pogonia)—Rare and local throughout its native range, and last collected in Maryland in 1958. Probably more common than is currently known, this inconspicuous saprophyte has been found only in Montgomery and Cecil counties H.S. 37:42.5; H.S. 37:114.2; H.S. 37:122.8 (BM); Sherard (OXF).

Zizagenus leimanthoides A. Gray (death camus)—Infrequent on the coastal plain from Maryland and Delaware north to New York, and on the Piedmont from Virginia and South Carolina south to Georgia and Louisiana. H.S. 37:123.6 (BM).

The Vegetation of Colonial Maryland

The vegetation of Maryland has changed considerably since the arrival of European man, whose coming entrained the disappearance of great forests, extirpation of assorted herbs, and the introduction of an array of exotic weedy species. What has happened in Maryland is not unique to this state, but is seen throughout the middle Atlantic region.

When Captain John Smith, the first explorer to come up the Chesapeake Bay, arrived in 1608, he failed to describe the plant life of

the region in sufficient detail to compare the vegetation then with what is present today. Even the colonists who settled in southern Maryland in 1634 wrote little of the native plants. It was not until the Reverend Hugh Jones came up the Patuxent River to Calvert County more than half a century later that a person somewhat skilled in the natural sciences took an interest in and reported on the native vegetation. By then, however, there was already cause for him to fear that the vast Maryland forests would soon be gone:

> All the low land is verry wooddy like one continued Forest, no part clear but what is cleared by the English. And tho we are pretty closely seated, yett we cannot see our next neighbours house for trees. Indeed in a few years we may expect it otherwise, for the tobacco trade destroyes abundance of timber, both for makeing of hogsheads & building of tobacco houses, besides cleareing of ground yearly for planting.

His fears were valid and, in fact, the changes he was seeing had already affected the native vegetation.

Originally, the coastal plain of Maryland was densely wooded. The trees were large, numerous, and taxonomically diverse within limits of climate and geology. The swamps and estuaries were richly diverse, especially in birds, and the diversity of the plants there has not changed, only the numbers—the swamps and estuaries are slowly being filled and disappearing. There is no indication that the variety of forest species has changed greatly as a result of European man. To be sure, chestnut is no longer a major component, but that is a phenonemon of the present century. We can find no evidence that any arborescent species has been extirpated in Maryland as a result of European man. However, some woody species apparently are no longer present on the coastal plain, although they are still found elsewhere in Maryland. An example is *Rubus odoratus.* Conversely, we did not find a single early collection of red maple, *Acer rubrum,* nor was it mentioned by Jones (Frick *et al.* 1987), although the plant is now common on the coastal plain.

Extirpation is most readily noticeable among the herbaceous members of the coastal plain vascular plant flora. The extent to which species have been lost locally since the arrival of Europeans cannot be wholly determined. The early naturalists did not systematically collect all herbaceous species that occurred on the coastal plain, and even today no complete census is available. Still, it is clear from what was found in the past and what is known to be present currently, that a number of herbaceous species have been extirpated.

The vegetation of Maryland has changed greatly since the early Holocene (Whitehead 1973; Bernabo & Webb 1977), or during the last 10,000 years. This change has resulted from a northward and inland movement of the earlier coastal flora, which, during the latter part of the Pleistocene, extended well to the east of the present coastline, onto what is now the continental shelf in the Atlantic Ocean. During the height of the last (Wisconsin) glacial period (*ca.* 100,000 to 10,000 years ago), the Chesapeake Bay was not present, so in addition to the large land surface of the continental shelf, much of the lower Susquehanna River, an area now covered by water, was a marshy and forested region. Near the end of the Wisconsin Ice Age, the vegetation that then occupied the coastal plain migrated northward and inland into the mountains so that plants that were then on the coastal plain are today found in the high mountains of western Maryland or even northward as far as the lower reaches of the boreal forests of New England and southern Canada. At present, isolated fragments of this past vegetation may be found on the coastal plain, and we do not know today to what extent such remains existed when early naturalists visited Maryland. Some species, such as the Indian paintbrush (*Castilleja coccinea*) and the wandflower (*Galax*

urceolata), are now missing from the coastal plain but are represented in the early collections, yet, isolated groves of hemlock (*Tsuga canadensis*) on the Eastern Shore and in Calvert County testify that some isolated habitats have survived to the present.

The agricultural expansion in southern Maryland from 1820 to 1860 resulted in some 40% of the land being cut and cleared (Brush *et al.* 1982). This is reflected in the pollen record by a pronounced increase in ragweed pollen (Brush and DeFries 1981). It is likely that during this period of intensive land use many of the rare native herbaceous species known to Jones, Krieg and Vernon suffered extirpation. The woodlands were cut to make way for new agricultural lands, and those areas that had been allowed to grow back after being cut a century before contained an unnatural array of mixed native and exotic species. In the following era of urban expansion, especially around the District of Columbia prior to the 1940s, ensued an extirpation of species of unusual habitats. Whereas a century earlier the woodlands were cut, in the present century marshes were drained, swamp forests cut away, and springs capped or diverted. It was at this time, to judge from the herbarium records, that many herbaceous species such as orchids and wetland plants were extirpated (compare Shreve [1910] and McAtee [1918] with Broome *et al.* [1980], Boone [1984a] and Sipple and Klockner [1984]).

Although the activities of Europeans have had a significant effect on the native flora of Maryland, those of the Amerindians did also. They too had a progressive agriculture, grazed animals, hunted, and lived on the natural resources of the land. Without doubt fires burned, unchecked, across the great forests of coastal Maryland, removing the ever dwindling vestiges of the montane and boreal forests that dominated the region during the glacial era. These factors, when they happened before European settlement, altered the composition of the native flora in ways we shall never be able to reconstruct. Nonetheless, one thing can be stated with some confidence: whenever the flora was altered prior to the advent of European man, the plants that were left to replace what had been lost were still native species. After the arrival of European man, what often replaced the native plants lost by the actions of man or nature were exotic species from Europe, Africa or Asia—in short, weeds. As more and more weedy species were introduced, more and more they reduced the available places and resources for native plants to survive.

The flora of Maryland today is the result of ages of evolution and a few decades of destruction. The forests of the coastal plain have all been cut, at least once, by European man. We can look at Jones' specimens, and those of the other early naturalists, and get a hint of what they saw, but we cannot see the habitats they explored or the plant communities they found. It is only the "trees" that are left for the "forest" is gone.

Summary of the Vascular Plant Species Collected in Colonial Maryland

Collections of Maryland vascular plants made by naturalists prior to 1753 are documented by extant specimens in the Sloane Herbarium at the British Museum (Natural History) in London (BM) and in the Fielding-Druce Herbarium at the University of Oxford (OXF). In addition, works treating the early flora of Maryland that were published prior to 1753 discussed numerous species of vascular plants that can be identified only from the accompanying illustrations. In our papers (Broome *et al.* 1987; Frick *et al.* 1987; Reveal *et al.* 1987a, 1987b) we give detailed accounts of the collectors, their specimens, and the associated literature. The following listings

summarize our findings insofar as the systematic record is concerned.

The distribution of Maryland plant specimens among the many volumes in the Sloane Herbarium is discussed by Dandy (1958). A few of his references to "Krieg," especially those regarding specimens in H.S. 158 and H.S. 159, are in error as we have discussed (Broome *et al.* 1987). The sorts of difficulties that we encountered in trying to identify marked Maryland specimens associated with Petiver also plagued us in treating ones associated with other collectors such as William Brown. We were unable to identify all specimens examined, and certainly we did not locate all the Maryland collections scattered among the various volumes. Likewise, one volume (H.S. 127) largely devoted to graminoid genera was not fully examined by us for Maryland specimens. Also, we did not visit the Lindley Herbarium at the University of Cambridge, where additional Vernon specimens are housed, nor do we report here on Krieg and Vernon specimens obtained by Sir Joseph Banks and now incorporated in the general herbarium at the British Museum (Natural History). Finally, we have been unsuccessful in our attempts to relocate the "two bundles" of specimens given to the royal governor Francis Nicholson by William Vernon prior to the latter's departure in late 1698. We know that the plants were sent to England, and were received (Frick *et al.* 1987), but their fate is uncertain.

In the catalogue that follows, the family arrangement for the fern allies and ferns follows that of Lellinger (1985), and that for the arrangement for the fern-allies and ferns follows one being developed by Hollis G. Bedell and Reveal, theirs being strongly influenced by Cronquist (1981) and Armen Takhtajan (1986). Within the families, the genera and species are arranged alphabetically. Immediately following this catalogue is an alphabetical listing of the families, with a family number and the numbers of genera, species, and infraspecific entities; this can be used as a ready index to our family arrangement. Following that is an alphabetical listing of all species followed by notations indicating the locations of the relevant Maryland specimens that we have examined. Unless otherwise indicated, only the typical subspecies or variety is found among the Maryland collections. Our nomenclature has been influenced by the recent checklists published by Kartesz and Kartesz (1980) and the Soil Conservation Service (1982).

Lycopodiophyta

1. Lycopodiaceae

Lycopodium alopecuroides L.

Polypodiophyta

2. Ophioglossaceae

Botrychium dissectum Sprengel
Botrychium virginianum (L.) Schwartz
Ophioglossum pusillum Raf.

3. Osmundaceae

Osmunda cinnamomea L.
Osmunda claytoniana L.
Osmunda regalis L. var. *spectabilis* (Willd.) A. Gray

4. Sinopteridaceae

Adiantum pedatum L.
Pellaea ×*atropurpurea* (L.) Link (pro sp.)

5. Polypodiaceae

Polypodium virginianum L.
Pteridium aquilinum (L.) Kuhn var. *latiusculum* (Desv.) Underw. ex A. Heller

6. Thelypteridaceae

Thelypteris hexagonoptera (Michx.) Weatherby
Thelypteris noveboracensis (L.) Nieuwl.
Thelypteris phegopteris (L.) Slosson
Thelypteris simulata (Davenp.) Nieuwl.
Thelypteris palustris Schott var. *pubescens* (Laws.) Fernald

7. Aspleniaceae

Asplenium platyneuron (L.) Britton, Sterns & Poggenb.
Camptosorus rhizophyllus (L.) Link

8. Woodsiaceae

Athyrium filix-femina (L.) Roth var. *angustum* (Willd.) Lawson

Athyrium filix-femina (L.) Roth var. *asplenioides* (Michx.) Farwell
Cystopteris fragilis (L.) Bernh.
Matteuccia struthiopteris (L.) Todaro var. *pensylvanica* (Willd.) Morton
Onoclea sensibilis L.

9. Dryopteridaceae

Dryopteris carthusiana (Vill.) H. F. Fuchs
Polystichum acrostichoides (Michx.) Schott

10. Blechnaceae

Woodwardia areolata (L.) T. Moore

Pinophyta

11. Pinaceae

Pinus virginiana Miller

12. Cupressaceae

Chamaecyparis thyoides (L.) Britton, Sterns & Poggenb.
Juniperus virginiana L.

Magnoliophyta

13. Magnoliaceae

Liriodendron tulipifera L.
Magnolia virginiana L.

14. Annonaceae

Asimina triloba (L.) Dunal

15. Aristolochiaceae

Aristolochia clematitis L.
Aristolochia serpentaria L.
Asarum canadensis L.

16. Lauraceae

Lindera benzoin (L.) Blume
Sassafras albidum (Nutt.) Nees

17. Saururaceae

Saururus cernuus L.

18. Nelumbonaceae

Nelumbo lutea (Willd.) Persoon

19. Nymphaeaceae

Nuphar macrophyllum (Small) E. O. Beal

20. Ranunculaceae

Actaea pachypoda Elliott
Anenome quinquefolia L.
Anenome virginiana L.
Anemonella thalictroides (L.) Spach
Aquilegia canadensis L.
Aruncus dioicus (Walter) Fernald
Cimicifuga racemosa (L.) Nutt.
Clematis dioscoreifolia Levl. & Vaniot
Clematis ochroleuca Aiton
Clematis virginiana L.
Clematis vitalba L.
Hepatica nobilis Schreb. var. *obtusa* (Pursh) Steyerm.

21. Berberidaceae

Berberis vulgaris L.

22. Podophyllaceae

Podophyllum peltatum L.

23. Papaveraceae

Sanguinaria canadensis L.

24. Clusiaceae

Hypericum androsaemum L.
Hypericum canadense L.
Hypericum crux-andreae (L.) Crantz
Hypericum gentianoides (L.) Britton, Sterns & Poggenb.
Hypericum hypericoides (L.) Crantz var. *multicaule* (Michx.) Fosberg
Hypericum mutilum L.
Hypericum perforatum L.
Hypericum punctatum Lam.
Triadenum virginicum (L.) Raf.

25. Sarraceniaceae

Sarracenia purpurea L. var. *venosa* (Raf.) Fernald

26. Tiliaceae

Tilia heterophylla Vent.

27. Cistaceae

Helianthemum bicknellii Fernald
Lechea maritima Leggitt ex Britton, Sterns & Poggenb.
Lechea tenuifolia Michx.
Lechea thymifolia Michx.

28. Malvaceae

Hibiscus moscheutos L.
Napaea dioica L.
Sida spinosa L.

29. Moraceae

Morus alba L.
Morus rubra L.

30. Urticaceae

Boehmeria cylindrica (L.) Swartz
Laportea canadensis (L.) Webb
Pilea pumila (L.) A. Gray

31. Euphorbiaceae

Acalypha gracilens A. Gray
Acalypha rhomboidea Raf.
Acalypha virginica L.
Euphorbia commutata Engelm.
Euphorbia corollata L.
Euphorbia dentata Michx.
Euphorbia ipecacuanhae L.

Euphorbia lathyris L.
Euphorbia maculata L.
Euphorbia nutans Lag.
Euphorbia polygonifolia L.

32. Violaceae

Viola bicolor Pursh
Viola brittoniana Pollard
Viola canadensis L.
Viola cucullata Aiton
Viola palmata L.
Viola papilionacea L.
Viola pensylvanica Michx.
Viola primulifolia L.
Viola pubescens Aiton

33. Passifloraceae

Passiflora lutea L.

34. Cucurbitaceae

Citrullus lanatus (Thunb.) Matsum. & Nakai
Melothria pendula L.

35. Salicaceae

Populus tremuloides Michx.
Salix humilis Marshall
Salix nigra Marshall

36. Brassicaceae

Arabidopsis thaliana (L.) Heynh. in Hall & Heynh.
Arabis canadensis L.
Arabis lyrata L.
Cardamine bulbosa (Schreb. ex Muhl.) Britton, Sterns & Poggenb.
Cardamine douglassii (Torr.) Britton
Cardamine hirsuta L.
Cardamine pensylvanica Muhl. ex Willd.
Dentaria laciniata Muhl. ex Willd.
Draba verna L.
Lepidium virginicum L.
Sibara virginica (L.) Rollins

37. Resedaceae

Reseda luteola L.

38. Clethraceae

Clethra alnifolia L.

39. Ericaceae

Chamaedaphne calyculata (L.) Moench
Epigaea repens L.
Gaylussacia baccata (Wangenh.) K. Koch
Gaylussacia dumosa (Andr.) Torr. & Gray
Kalmia angustifolia L.
Kalmia latifolia L.
Leucothoe racemosa (L.) A. Gray
Lyonia ligustrina (L.) DC.
Lyonia mariana (L.) D. Don
Rhododendron canescens (Michx.) Sweet
Rhododendron serrulatum (Small) Milais
Rhododendron viscosum (L.) Torr.
Vaccinium arborea Marshall
Vaccinium corymbosum L.
Vaccinium stamineum L.
Vaccinium vacillans Torr.

40. Pyrolaceae

Chimaphila maculata (L.) Pursh

41. Monotropaceae

Monotropa uniflora L.

42. Diapensiaceae

Galax urceolata (Poiret) Brummitt

43. Primulaceae

Lysimachia ciliata L.
Lysimachia lanceolata Walter
Lysimachia quadrifolia L.
Samolus parviflorus Raf.

44. Polygonaceae

Polygonum arifolium L.
Polygonum convolvulus L.
Polygonum lapathifolium L.
Polygonum sagittatum L.
Polygonum scandens L.
Polygonum tenue Michx.
Polygonum virginianum L.

45. Phytolaccaceae

Phytolacca americana L.

46. Chenopodiaceae

Chenopodium ambrosioides L.
Chenopodium botrys L.
Chenopodium gigantospermum Aellen
Salsola iberica Sennen & Pau
Suaeda maritima (L.) Dum.

47. Amaranthaceae

Acnida cannabina L.
Amaranthus albus L.
Amaranthus hybridus L.

48. Portulacaceae

Claytona virginica L.

49. Molluginaceae

Mollugo verticillata L.

50. Caryophyllaceae

Cerastrum vulgatum L.
Dianthus armeria L.
Paronychia canadensis (L.) Wood
Silene caroliniana Walter var. *pensylvanica* (Michx.) Fernald
Silene stellata (L.) Aiton f.
Stellaria pubera Michx.

51. Platanaceae

Platanus occidentalis L.

52. Hamamelidaceae

Hamamelis virginiana L.
Liquidambar styraciflua L.

53. Fagaceae

Castanea pumila (L.) Miller
Fagus grandifolia Ehrh.
Quercus alba L.
Quercus falcata Michx.
Quercus marilandica Muenchh.
Quercus palustris Muenchh.
Quercus phellos L.
Quercus prinus L.
Quercus velutina Lam.

54. Juglandaceae

Carya cordiformis (Wangenh.) K. Koch
Carya ovalis (Wangenh.) Sargent
Carya tomentosa (Poiret) Nutt.

55. Myricaceae

Comptonia peregrina (L.) Coulter
Myrica cerifera L.
Myrica pensylvanica Loiseleur

56. Hydrangeaceae

Hydrangea arborescens L.

57. Iteaceae

Itea virginica L.

58. Saxifragaceae

Heuchera americana L.
Mitella diphylla L.
Saxifraga virginiensis Michx.

59. Penthoraceae

Penthorum sedoides L.

60. Droseraceae

Drosera brevifolia Pursh

61. Rosaceae

Agrimonia parviflora Aiton
Amelanchier arborea (Michx. f.) Fernald
Amelanchier obovalis (Michx.) Ashe
Aronia arbutifolia (L.) Elliott
Crataegus crus-galli L.
Crataegus tomentosa L.
Fragaria virginiana Duchesne
Physocarpus opulifolius (L.) Maxim.
Porteranthus trifoliatus (L.) Britton
Potentilla canadensis L.
Potentilla norvegica L.
Prunus serotina Ehrh.
Prunus virginiana L.
Rubus hispidus L.
Rubus odoratus L.

62. Caesalpiniaceae

Cercis canadensis L.
Chamaecrista fasciculata (Michx.) Greene
Senna hebecarpa (Fernald) Irwin & Barneby
Senna marilandica (L.) Link

63. Fabaceae

Amphicarpa bracteata (L.) Fernald
Astragalus canadensis L.
Baptisia tinctoria (L.) R. Br.
Centrosema virginianum (L.) Benth.
Clitoria mariana L.
Crotalaria rotundifolia Walter var. *vulgaris* Windler
Desmodium canadense (L.) DC.
Desmodium canescens (L.) DC.
Desmodium ciliare (Muhl. ex Willd.) DC.
Desmodium cuspidatum (Muhl. ex Willd.) DC. ex Loudon
Desmodium glabellum (Michx.) DC.
Desmodium glutinosum (Muhl. ex Willd.) Wood
Desmodium marilandicum (L.) DC.
Desmodium nudiflorum (L.) DC.
Desmodium nuttallii (Schindler) Schubert
Desmodium ochroleucum M. A. Curtis ex Canby
Desmodium paniculatum (L.) DC.
Desmodium rigidum (Elliott) DC.
Desmodium rotundifolium DC.
Desmodium viridiflorum (L.) DC.
Lespedeza hirta (L.) Hornem.
Lespedeza intermedia (S. Wats.) Britton
Lespedeza ×*nuttallii* Darl. (pro sp.)
Lespedeza procumbens Michx.
Lespedeza repens (L.) Barton
Lespedeza stuevei Nutt.
Lespedeza virginica (L.) Britton
Ononis spinosa L. ssp. *antiquorum* (L.) Arcangeli
Orbexilum pedunculatum (Miller) Rydb.
Pisum sativum L. var. *arvense* (L.) Poiret
Rhynchosia tomentosa (L.) Hook. & Arn.
Robinia pseudoacacia L.
Strophostyles helvola (L.) Elliott
Strophostyles umbellata (Muhl. ex Willd.) Britton
Stylosanthes biflora (L.) Britton, Sterns & Poggenb.
Stylosanthes riparia Kearney
Tephrosia virginiana (L.) Persoon
Trifolium arvense L.
Trifolium reflexum L.

64. Haloragaceae

Myriophyllum heterophyllum Michx.

65. Lythraceae

Decodon verticillatus (L.) Elliott

66. Onagraceae

Circaea lutetiana L. ssp. *canadensis* (L.) Aschers. & Magnus
Ludwigia alternifolia L.
Ludwigia hirtella Raf.
Ludwigia palustris (L.) Elliott
Ludwigia virgata Michx.
Oenothera fruticosa L.
Oenothera fruticosa L. var. *ambigua* Nutt.
Oenothera parviflora L.

67. Melastomataceae

Rhexia mariana L.
Rhexia virginica L.

68. Nyssaceae

Nyssa sylvatica Marshall

69. Cornaceae

Cornus florida L.

70. Santalaceae

Comandra umbellata (L.) Nutt.

71. Celastraceae

Celastrus scandens L.
Euonymus americanus L.

72. Aquifoliaceae

Ilex laevigata (Pursh) A. Gray
Ilex opaca Aiton
Ilex verticillata (L.) A. Gray

73. Rhamnaceae

Ceanothus americanus L.

74. Vitaceae

Vitis labrusca L.

75. Linaceae

Linum virginianum L.

76. Polygalaceae

Polygala cruciata L.
Polygala curtissii A. Gray
Polygala cymosa Walter
Polygala incarnata L.
Polygala lutea L.
Polygala mariana Miller
Polygala nuttallii Torr. & Gray
Polygala polygama Walter
Polygala senega L.
Polygala verticillata L. var. *isocycla* Fernald

77. Hippocastanaceae

Aesculus pavia L.

78. Anacardiaceae

Rhus copallina L.
Rhus typhina L.
Toxicodendron pubescens Miller
Toxicodendron radicans (L.) Kuntze
Toxicodendron vernix (L.) Kuntze

79. Oxalidaceae

Oxalis florida Salisbury
Oxalis stricta L.
Oxalis violacea L.

80. Geraniaceae

Geranium maculatum L.

81. Balsaminaceae

Impatiens capensis Meerb.

82. Araliaceae

Aralia nudicaulis L.
Aralia spinosa L.
Panax quinquefolius L.
Panax trifolius L.

83. Apiaceae

Chaerophyllum procumbens (L.) Crantz
Cicuta maculata L.
Cryptotaenia canadensis (L.) DC.
Eryngium aquaticum L.
Oxypolis rigidior (L.) Raf.
Ptiliminium capillaceum (Michx.) Raf.
Sanicula canadensis L.
Sium suave Walter
Thaspium barbinode (Michx.) Nutt.
Thaspium trifoliatum (L.) A. Gray
Zizia aptera (A. Gray) Fernald

84. Loganiaceae

Spigelia marilandica L.

85. Rubiaceae

Cephalanthus occidentalis L.
Galium circaezans Michx.
Galium lanceolatum Torr.
Houstonia caerulea L.
Houstonia purpurea L.
Mitchella repens L.

86. Apocynaceae

Apocynum cannabinum L.

87. Asclepiadaceae

Asclepias incarnata L.
Asclepias incarnata L. var. *pulchra* (Ehrh.) Persoon
Asclepias quadrifolia Jacq.
Asclepias rubra L.
Asclepias syriaca L.
Asclepias tuberosa L.
Asclepias variegata L.
Asclepias verticillata L.
Matelea carolinensis (Jacq.) Woodson

88. Gentianaceae

Gentiana saponaria L.

Gentiana villosa L.
Obolaria virginica L.
Sabatia angularis (L.) Pursh
Sabatia difformis (L.) Druce
Sabatia dodecandra (L.) Britton, Sterns & Poggenb.
Sabatia stellaris Pursh

89. Oleaceae

Chionanthus virginicus L.
Fraxinus americana L.
Fraxinus pensylvanica Marshall

90. Caprifoliaceae

Triosteum angustifolium L.
Triosteum perfoliatum L.

91. Viburnaceae

Viburnum acerifolium L.
Viburnum opulus L.
Viburnum prunifolium L.
Viburnum recognitum Fernald

92. Valerianaceae

Valerianella radiata (L.) Dufr.

93. Scrophulariaceae

Agalinis purpurea (L.) Pennell
Agalinis setacea (Walter) Raf.
Agalinis tenuifolia (Vahl) Raf.
Aureolaria pedicularia (L.) Raf.
Aureolaria virginica (L.) Pennell
Buchnera americana L.
Castilleja coccinea (L.) Sprengel
Chelone glabra L.
Gratiola neglecta Torr.
Gratiola virginiana L.
Melampyrum lineare Desr.
Mimulus alatus Aiton
Mimulus ringens L.
Pedicularis canadensis L.
Pedicularis lanceolata Michx.
Penstemon laevigatus Aiton
Schwalbea americana L.
Scrophularia marilandica L.
Verbascum blattaria L.
Verbascum lychnitis L.
Veronica arvensis L.
Veronicastrum virginicum (L.) Farwell

94. Orobanchaceae

Orobanche uniflora L.

95. Bignoniaceae

Bignonia capreolata L.
Campsis radicans (L.) Seem.

96. Acanthaceae

Ruellia caroliniensis (Walter ex J. F. Gmelin) Steudel ssp. *ciliosa* (Pursh) R. W. Long

97. Plantaginaceae

Plantago rugelii Dcne.
Plantago virginica L.

98. Solanaceae

Nicotiana tabacum L.
Physalis heterophylla Nees
Physalis heterophylla Nees var. *ambigua* (A. Gray) Rydb.
Physalis pubescens L.
Physalis pubescens L. var. *grisea* Waterfall

99. Polemoniaceae

Phlox maculata L.
Phlox pilosa L.
Phlox subulata L.

100. Boraginaceae

Cynoglossum virginianum L.
Echium vulgare L.
Hackelia virginiana (L.) I. M. Johnston
Heliotropium europaeum L.
Lappula squarrosa (Retz.) Dum.
Mertensia virginica (L.) Persoon
Onosmodium virginianum (L.) A. DC.

101. Verbenaceae

Phryma leptostachya Nees
Verbena hastata L. var. *scabra* Moldenke
Verbena urticifolia L.

102. Lamiaceae

Agastache nepetoides (L.) Kuntze
Collinsonia canadensis L.
Cunila origanoides (L.) Britton
Hedeoma pulegioides (L.) Persoon
Lycopus americanus Muhl. ex Barton
Lycopus virginicus L.
Monarda clinopoda L.
Monarda punctata L.
Prunella vulgaris L. var. *lanceolata* (Barton) Fernald
Pycnanthemum flexuosum (Walter) Britton, Sterns & Poggenb.
Pycnanthemum incanum (L.) Michx.
Pycnanthemum pycnanthemoides (Leavenw.) Fernald
Pycnanthemum torrei Benth.
Salvia lyrata L.
Salvia urticifolia L.
Scutellaria elliptica Muhl. ex Sprengel
Scutellaria hyssopifolia L.
Scutellaria serrata Andr.
Stachys hyssopifolia Michx.
Teucrium canadensis L.
Trichostema dichotomum L.

103. Campanulaceae

Campanula rotundifolia L.
Lobelia cardinalis L.

Lobelia inflata L.
Lobelia nuttallii J. A. Schultes
Lobelia puberula Michx.
Lobelia siphilitica L.
Lobelia spicata Lam. var. *leptostachys* (A. DC.) Mackenzie & Bush
Triodanis perfoliata (L.) Nieuwl.

104. Asteraceae

Achillea ageratum L.
Achillea millifolium L.
Ageratina altissima (L.) King & Robinson
Ageratina aromatica (L.) Spach
Ambrosia artemisiifolia L.
Ambrosia trifida L.
Antennaria plantaginifolia (L.) Richard
Antennaria solitaria Rydb.
Artemisia absinthium L.
Artemisia vulgaris L.
Aster divaricatus L.
Aster dumosus L.
Aster dumosus L. var. *subulifolius* Torr. & Gray
Aster infirmus Michx.
Aster linariifolius L.
Aster puniceus L.
Aster subulatus Michx.
Aster tenuifolius L.
Aster umbellatus Miller
Aster undulatus L.
Baccharis halimifolia L.
Bidens bipinnata L.
Bidens frondosa L.
Bidens laevis (L.) Britton, Sterns & Poggenb.
Bidens tripartita L.
Brickellia eupatorioides (L.) Shinners var. *corymbulosa* (Torr. & Gray) Shinners
Cacalia atriplicifolia L.
Chrysogonum virginianum L.
Chrysopsis mariana (L.) Elliott
Cirsium muticum Michx.
Conoclinum coelestinum (L.) DC.
Conyza canadensis (L.) Cronq.
Conyza canadensis (L.) Cronq. var. *glabra* (A. Gray) Cronq.
Conyza canadensis (L.) Cronq. var. *pusilla* (Nutt.) Cronq.
Coreopsis tinctoria Nutt.
Coreopsis verticillata L.
Elephantopus carolinianus Willd.
Elephantopus nudatus A. Gray
Erechtites hieraciifolia (L.) Raf.
Erigeron pulchellus Michx.
Eupatorium album L.
Eupatorium album L. var. *glandulosum* (Michx.) DC.
Eupatorium capillifolium (Lam.) Small
Eupatorium fistulosum Barratt ex Hook.
Eupatorium hyssopifolium L.
Eupatorium perfoliatum L.
Eupatorium pilosum Walter
Eupatorium purpureum L.
Eupatorium rotundifolium L.
Eupatorium sessilifolium L.
Gamochaeta purpurea (L.) Cabrera
Gnaphalium obtusifolium L.
Helenium autumnale L.
Helianthus angustifolius L.
Helianthus divaricatus L.
Helianthus microcephalus Torr. & Gray
Helianthus tuberosus L.
Heliopsis helianthoides (L.) Sweet
Hieracium ×*marianum* Willd. (pro sp.)
Hieracium subnudum (Monn.) Froel.
Hieracium venosum L.
Iva frutescens L.
Krigia virginica (L.) Willd.
Lactuca biennis (Moench) Fernald
Lactuca floridana (L.) Gaertn.
Lactuca serriola L.
Liatris graminifolia (Walter) Willd.
Liatris spicata (L.) Willd.
Mikania scandens (L.) Willd.
Pluchea camphorata (L.) DC.
Pluchea odorata (L.) Cass. var. *succulenta* (Fernald) Cronq.
Prenanthes alba L.
Prenanthes altissima L.
Pterocaulon virgatum (L.) DC.
Pyrrhopappus carolinianus (Walter) DC.
Rudbeckia fulgida Aiton
Rudbeckia hirta L.
Rudbeckia laciniata L. var. *digitata* (Miller) Fiori
Senecio aureus L.
Senecio obovatus Muhl. ex Willd.
Sericocarpus asteroides (L.) Britton, Sterns & Poggenb.
Sericocarpus linifolius (L.) Britton, Sterns & Poggenb.
Smallanthus uvedalia (L.) Mackenzie ex Small
Solidago bicolor L.
Solidago caesia L.
Solidago canadensis L. var. *scabra* Torr. & Gray
Solidago hispida L.
Solidago odora Aiton
Solidago puberula Nutt.
Solidago rigida L.
Solidago rugosa Miller
Sonchus arvensis L.
Verbesina occidentalis (L.) Walter
Vernonia glauca (L.) Willd.
Vernonia noveboracensis (L.) Michx.
Virgulus concolor (L.) Reveal & Keener
Virgulus ericoides (L.) Reveal & Keener
Virgulus patens (L.) Reveal & Keener

Virgulus patens (L.) Reveal & Keener var. *gracilis* (Hook.) Reveal & Keener

105. Alismataceae

Sagittaria falcata Pursh

106. Hydrocharitaceae

Vallisneria americana Michx.

107. Ruppiaceae

Ruppia maritima L.

108. Araceae

Arisaema triphyllum (L.) Schott
Arisaema triphyllum (L.) Schott var. *pusillum* Peck
Orontium aquaticum L.
Peltandra virginica (L.) Kunth
Symplocarpus foetidus (L.) Salisbury ex Nutt.

109. Commelinaceae

Commelina communis L.
Commelina virginica L.

110. Xyridaceae

Xyris caroliniana Walter
Xyris jupicai Richard
Xyris torta J. E. Smith

111. Eriocaulaceae

Eriocaulon decangulare L.

112. Juncaceae

Juncus biflorus Elliott
Juncus canadensis J. Gay
Juncus dichotomus Elliott
Juncus marginatus Rostk.
Juncus tenuis Willd.
Luzula multiflora (Ehrh. ex Hoffm.) Lej.

113. Cyperaceae

Bulbostylis capillaris (L.) Clarke
Carex comosa Boott
Carex folliculata L.
Carex gynandra Schwein.
Carex intumescens Rudge
Carex scoparia Schkuhr. ex Willd.
Cyperus compressus L.
Cyperus diandrus Torr.
Cyperus difformis L.
Cyperus esculentus L.
Cyperus filicinus Vahl
Cyperus filiculmis Vahl
Cyperus lancastriensis Porter ex Gray
Cyperus ovularis (Michx.) Torr.
Cyperus plukenetii Fernald
Cyperus polystachyos Rottb.
Cyperus refractus Engelm. ex Boeck.
Cyperus retrofractus (L.) Torr.
Cyperus retrorsus Chapman
Cyperus rivularis Kunth
Cyperus strigosus L.
Dulichium arundinaceum (L.) Britton
Eleocharis tenuis (Willd.) J. A. Schultes
Eriophorum virginicum L.
Fimbritstylis autumnalis (L.) Roemer & Schultes
Fimbristylis castanea (Michx.) Vahl
Fimbristylis spadicea (L.) Vahl
Rhynchospora alba (L.) Vahl
Rhynchospora capitellata (Michx.) Vahl
Rhynchospora chalarocephala Fernald & Gale
Scirpus americanus Persoon
Scirpus cyperinus (L.) Kunth
Scirpus etuberculatus (Steudel) Kuntze
Scirpus polyphyllus Vahl
Scirpus robustus Pursh

114. Poaceae

Agrostis canina L.
Agrostis stolonifera L.
Alopecurus geniculatus L.
Aristida dichotoma Michx.
Aristida purpurascens Poiret
Cenchrus tribuloides L.
Cynodon dactylon (L.) Persoon
Dichanthelium clandestinum (L.) Gould
Dichanthelium dichotomum (L.) Gould
Dichanthelium dichotomum (L.) Gould var. *ensifolium* (Baldwin) Gould & Clark
Dichanthelium latifolium (L.) Harvill
Dichanthelium sphaerocarpon (Elliott) Gould var. *isophyllum* (Scribn.) Gould & Clark
Digitaria filiformis (L.) Koeler
Digitaria sanguinalis (L.) Scop.
Distichlis spicata (L.) Greene
Echinochloa crusgalli (L.) Beauv.
Echinochloa walteri (Pursh) A. Heller
Eleusine indica (L.) Gaertn.
Elymus virginicus L.
Eragrostis capillaris (L.) Nees
Eragrostis cilianensis (All.) Link ex Mosher
Erianthus giganteus (Walter) F. T. Hubb
Glyceria canadensis (Michx.) Trin. var. *laxa* (Scribn.) A. S. Hitchc.
Gymnopogon ambiguus (Michx.) Britton, Sterns & Poggenb.
Panicum anceps Michx.
Panicum capillare L.
Panicum miliaceum L.
Panicum virgatum L.
Paspalum floridanum Michx.
Paspalum laeve Michx.
Paspalum setaceum Michx.
Phleum pratense L.

Schizachyrium scoparium (Michx.) Nash
Setaria geniculata (Lam.) Beauv.
Setaria italica (L.) Beauv.
Setaria pumila (Poiret) Schultes in Schultes & Schultes f.
Spartina alterniflora Loiseleur
Spartina cynosuroides (L.) Roth
Spartina patens (Aiton) Muhl.
Stipa pennata L.
Triticum aestivum L.

115. Bromeliaceae

Tillandsia usneoides (L.) L.

116. Pontederiaceae

Pontederia cordata L.

117. Cannaceae

Canna flaccida Salisbury
Canna indica L.

118. Smilacaceae

Smilax glauca Walter
Smilax herbacea L.
Smilax hispida Muhl. ex Torr.
Smilax rotundifolia L.

119. Dioscoreaceae

Dioscorea villosa L.

120. Hypoxidaceae

Hypoxis hirsuta (L.) Coville

121. Melanthaceae

Aletris farinosa L.
Aletris obovata Nash
Amianthium muscaetoxicum (Walter) A. Gray
Chamaelirium luteum (L.) A. Gray
Helonias bullata L.
Tofieldia racemosa (Walter) Britton, Sterns & Poggenb.
Uvularia perfoliata L.
Veratrum viride Aiton
Zigadenus leimanthoides A. Gray

122. Convallariaceae

Polygonatum biflorum (Walter) Elliott
Smilacina racemosa (L.) Desf.

123. Liliaceae

Lilium philadelphicum L.
Medeola virginiana L.

124. Iridaceae

Sisyrinchium albidum Raf.
Sisyrinchium angustifolium Miller
Sisyrinchium mucronatum Michx.

125. Orchidaceae

Arethusa bulbosa L.
Calopogon tuberosus (L.) Britton, Sterns & Poggenb.
Cypripedium acaule Aiton
Cypripedium calceolus L. var. *parviflorum* (Salisbury) Fernald
Cypripedium calceolus L. var. *pubescens* (Willd.) Correll
Cypripedium reginae Walter
Galearis spectabilis (L.) Raf.
Herminium monorchis (L.) R. Br. in Aiton
Isotria verticillata (Muhl. ex Willd.) Raf.
Platanthera ciliaris (L.) Lindley
Platanthera ×*clavellata* (Michx.) Leur (pro sp.)
Platanthera lacera (Michx.) G. Don
Platanthera peramoena A. Gray
Pogonia ophioglossoides (L.) Juss.
Spiranthes cernua (L.) Richard
Spiranthes lacera (Raf.) Raf.
Triphora trianthophora (Swartz) Rydb.

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Acanthaceae (96)	1	1	
Alismataceae (105)	1	1	
Amaranthaceae (47)	2	3	
Anacardiaceae (78)	2	5	
Annonaceae (14)	1	1	
Apiaceae (83)	10	11	
Apocynaceae (86)	1	1	
Aquifoliaceae (72)	1	3	
Araceae (108)	4	4	1
Araliaceae (82)	2	4	
Aristolochiaceae (15)	2	3	
Asclepiadaceae (87)	2	8	1
Aspleniaceae (7)	2	2	
Asteraceae (104)	44	94	5
Balsaminaceae (81)	1	1	
Berberidaceae (21)	1	1	
Bignoniaceae (95)	2	2	
Blechnaceae (10)	1	1	
Boraginaceae (100)	7	7	
Brassicaceae (36)	7	11	
Bromeliaceae (115)	1	1	
Caesalpiniaceae (62)	3	4	
Campanulaceae (103)	3	8	
Cannaceae (117)	1	2	
Caprifoliaceae (90)	1	2	
Caryophyllaceae (50)	5	6	
Celastraceae (71)	2	2	
Chenopodiaceae (46)	3	5	
Cistaceae (27)	2	4	
Clethraceae (38)	1	1	
Clusiaceae (24)	2	9	
Commelinaceae (109)	1	2	

Convallariaceae (122)	2	2	
Cornaceae (69)	1	1	
Cucurbitaceae (34)	2	2	
Cupressaceae (12)	2	2	
Cyperaceae (113)	9	35	
Diapensiaceae (42)	1	1	
Dioscoreaceae (119)	1	1	
Droseraceae (60)	1	1	
Dryopteridaceae (9)	2	2	
Ericaceae (39)	8	16	
Eriocaulaceae (111)	1	1	
Euphorbiaceae (31)	2	11	
Fabaceae (63)	17	39	
Fagaceae (53)	3	9	
Gentianaceae (88)	3	7	
Geraniaceae (80)	1	1	
Haloragaceae (64)	1	1	
Hamamelidaceae (52)	2	2	
Hippocastanaceae (77)	1	1	
Hydrangeaceae (56)	1	1	
Hydrocharitaceae (106)	1	1	
Hypoxidaceae (120)	1	1	
Iridaceae (124)	1	3	
Iteaceae (57)	1	1	
Juglandaceae (54)	1	3	
Juncaceae (112)	2	6	
Lamiaceae (102)	13	21	
Lauraceae (16)	2	2	
Liliaceae (123)	2	2	
Linaceae (75)	1	1	
Loganiaceae (84)	1	1	
Lycopodiaceae (1)	1	1	
Lythraceae (65)	1	1	
Magnoliaceae (13)	2	2	
Malvaceae (28)	3	3	
Melanthaceae (121)	8	9	
Melastomataceae (67)	1	2	
Molluginaceae (49)	1	1	
Monotropaceae (41)	1	1	
Moraceae (29)	1	2	
Myricaceae (55)	2	3	
Nelumbonaceae (18)	1	1	
Nymphaeaceae (19)	1	1	
Nyssaceae (68)	1	1	
Oleaceae (89)	2	3	
Onagraceae (66)	3	7	1
Ophioglossaceae (2)	2	3	
Orchidaceae (125)	10	16	1
Orobanchaceae (94)	1	1	
Osmundaceae (3)	1	3	
Oxalidaceae (79)	1	3	
Papaveraceae (23)	1	1	
Passifloraceae (33)	1	1	
Penthoraceae (59)	1	1	
Phytolaccaceae (45)	1	1	
Pinaceae (11)	1	1	
Plantaginaceae (97)	1	2	
Platanaceae (51)	1	1	
Poaceae (114)	23	40	1
Podophyllaceae (22)	1	1	
Polemoniaceae (99)	1	3	
Polygalaceae (76)	1	10	
Polygonaceae (44)	1	7	
Polypodiaceae (5)	2	2	
Pontederiaceae (116)	1	1	
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Primulaceae (43)	2	4	
Pyrolaceae (40)	1	1	
Ranunculaceae (20)	8	12	
Resedaceae (37)	1	1	
Rhamnaceae (73)	1	1	
Rosaceae (61)	10	15	
Rubiaceae (85)	4	6	
Ruppiaceae (107)	1	1	
Salicaceae (35)	2	3	
Santalaceae (70)	1	1	
Sarraceniaceae (25)	1	1	
Saururaceae (17)	1	1	
Saxifragaceae (58)	3	3	
Scrophulariaceae (93)	15	22	
Sinopteridaceae (4)	2	2	
Smilacaceae (118)	1	4	
Solanaceae (98)	2	3	2
Thelypteridaceae (6)	1	5	
Tiliaceae (26)	1	1	
Urticaceae (30)	3	3	
Valerianaceae (92)	1	1	
Verbenaceae (101)	2	3	
Viburnaceae (91)	1	4	
Violaceae (32)	1	9	
Vitaceae (74)	1	1	
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Summary

The flora of colonial Maryland was dominated by rich forests and woodlands comprising a wealth of tall and massive hardwood trees and elegant conifers. Shrubs were common on the forest margins, in the open meadows and swampy regions along the coast, and along the many streams penetrating the interior of the colony. Wildflowers were locally common at numerous sites, and graminoid species were most frequent in the swamps, meadows and natural openings that dotted the coastal plain. By the last decade of the seventeenth century the ravages of European man were underway. Early letter writers tell of forests being cut away to make room for homes and fields, and of the gradual decline of flowers and animals as European man expanded his domination of the land. The collections of specimens made by the early Maryland naturalists show the flora's growing weediness caused by the introduction of plants from across the Atlantic. This same record of change is found in the pollen deposits dating from 1634 to the present time.

A number of species once found (or apparently found) in Maryland are no longer native to the state, being known only from colonial collections. Others were collected subsequently but have long since disappeared from Maryland. The great forests that were so dense that Krieg could not catch butterflies and Jones could not see the neighboring houses have largely disappeared, leaving but small patches of stunted remains to suggest what once was present. The many swamps and rivers where the early naturalists apparently collected heavily are being altered by dredging and other modernizing processes. The water-bound forests of *Taxodium* and *Chamaecyparis* are now restricted to local parks and preserves. Had Jones reflected upon these, as he did upon the upland forests, he could have predicted this as well.

The native flora of Maryland is more protected now than in the days of Hugh Jones, David Krieg and William Vernon thanks to the concern of the state's citizens. Passage of the Endangered Species Act of 1973, and a host of other environmentally significant state and national legislation has resulted in cleaner air and water, and the protection of many areas with unique ecological features. We cannot fully understand the past, but perhaps we can provide for the future.

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Notes Added in Proof:

Isely (Notes on Leguminosae: Papilionoideae of the southeastern United States. Brittonia 38: 352–359. 1986) did not accept *Crotalaria rotundifolia* (Walter) Gmelin var. *vulgaris* Windler, preferring not to distinguish between the widespread var. *vulgaris* and the localized var. *rotundifolia*. He also pointed out that the correct spelling of *Strophostyles helvola* (L.) Elliott, as used by us, is *S. helvula*.

Perry and McNeill (The nomenclature of *Eragrostis cilianensis* (Poaceae) and the contribution of Bellardi to Allioni's *Flora pedemontana*. Taxon 35: 696–701. 1986) demonstrated that the correct author citation for *Eragrostis cilianensis* is (All.) Vign. ex Janchen, not (All.) Link ex Mosher.