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FLORA OF THE CONOWINGO BARRENS OF SOUTHEASTERN PENNSYLVANIA

BY FRANCIS W. PENNELL.

During the summers of 1908 and 1909 the writer was enabled to spend considerable time in the study of the flora of the Conowingo or Serpentine Barrens lying in Chester and Delaware Counties, Pennsylvania. Nearly all the areas in these counties were visited, in most cases repeatedly, and full collections made. The writer has also been able to examine the material in the herbaria of the Academy of Natural Sciences of Philadelphia, the Philadelphia Botanical Club, and the University of Pennsylvania.

The object of this paper is to present accurate data as to the species composing the flora of the barrens. Effort has been made to make the list of species accurate and complete, while less attention for the present has been paid to the ecological grouping and adaptations of the flora. The general conditions of the environment—climate, physiography and soil—will, however, be considered, and a sketch of the flora and its affinities presented.

In the prosecution of this study the writer acknowledges the courtesy of the custodians of the herbaria named, and especially that of S. S. Van Pelt and Witmer Stone, to whose interest he is indebted for much aid in the determination of species. Also to Agnes Chase, of the United States Department of Agriculture, is he indebted for determinations in the genus *Panicum*.

CLIMATE.

The climate of this district, as taken from the reports of the Weather Bureau stations at West Chester and Kennett Square, shows the general condition prevailing throughout the Middle Atlantic States. The average temperature for January is 30° F.; for July 74° F.; the average first killing frost of autumn is on October 19, the last of spring on April 16; the precipitation is relatively even and well diffused throughout the year, reaching a total average annual rainfall of 50 inches. Thus it may be seen that the growing season is of considerable length, warm and well supplied with moisture. The xerophytic character of the Conowingo flora is not the result of the climate.

PHYSIOGRAPHY AND SOIL.

The Conowingo, or Serpentine, Barrens occur as small isolated areas, stretching in a much broken chain near the coastward edge of the Piedmont Plateau from New England to North Carolina. In Pennsylvania they lie in a hilly, much eroded country, and, owing to the chemical stability of serpentine rock, occur usually on crests and as low ridges.

Their geologic structure is striking and has been frequently described.¹ Their soil has been lately described in several publications of the Division of Soils of the U. S. Department of Agriculture.² In these the name Conowingo Barrens is consistently applied, which has led to its adoption in the present paper.

Two types of soil are derived from the weathering of the Serpentine—itself a soft, green, altered igneous rock: the Conowingo Barrens and the Conowingo clay. Of these the latter represents a much decomposed soil of considerable depth and forms a transition between the Conowingo Barrens and the normal mellow soils of the district. The Conowingo Barrens are alone considered here.

“The soil (of the Conowingo Barrens) generally is a light yellow or whitish-looking loam, but in places it is almost black. The top soil occasionally has a depth of 8 or 10 inches, and it is underlain by a yellowish-brown subsoil to a depth of 36 inches. The soil is generally much shallower, and in the case of the barren hills of this formation the rocks are devoid of any trace of soil covering except that caught in the pockets and crevices of the rocks. Frequently even on level or lightly rolling areas the soil may not exceed a few inches in depth. These soils, as seen from the mechanical analyses of samples collected, are not essentially different from many of the productive upland soils, but they are unproductive, and in extreme cases will not produce anything in a natural state except a stunted growth of small pines and knotty oak trees. At the best they are stubborn and unproductive, and although many reasons have been assigned for their sterility none seem altogether satisfactory. Professor Merrill (*Rocks, Rock-weathering, and Soils*, 1897) in speaking of the Chester County Barrens says that these soils are derived from the slow decomposition of peridotites, rocks rich in iron-magnesium silicates, but almost wholly

¹ See (a) *Maryland Geol. Survey*, Cecil Co. Report; (b) *Penna. 2d Geol. Surv.*, Chester Co. Report; (c) *Philadelphia Geol. Folio*, 1909.

² See (a) *Maryland Geol. Survey*, Cecil Co. Report; (b) Harford Co. Report (c) *U. S. Div. of Soils*, Chester Co., Penna., Report.

lacking in lime, potash or other desirable constituents. Hence the soils derived from such rocks are naturally devoid of nutrient matter and can support only a scanty growth of grass and stunted shrubs. The main reason which may be assigned for their unproductiveness is the large amount of magnesia which they contain and their slight depth. The analyses of these soils show that they contain very minute quantities of lime and phosphoric acid.”³

The Conowingo Barrens are rarely, if ever, cultivated; even for pasturage or for timber they are of little practical value. They have thus remained very nearly in their original condition. On all sides, however, they shade into the more tractable clay formation, which is frequently cleared and cultivated.

In Delaware and Chester Counties, as may be seen on the maps, the Barrens lie in two main divisions: to the northeast they are small and scattered (Chester Group), to the southwest they form essentially one long continuous area (State-line Barrens). In the former are some 10 or 12 well-marked exposures, ranging from less than one-half acre (*e.g.*, Sconnettown) to such as the Serpentine Ridge, three to four miles long. These areas lie near together in extreme southern Montgomery, Delaware, southeastern Chester Counties, Pennsylvania, and northwestern Newcastle County, Delaware. They are separated some twenty miles from the nearest point of the State-line Barrens. The latter extends as one ridge, some thirty-five miles long, with a width of one to three miles, trending west-southwest from Little Elk Creek, Chester County, Pennsylvania, through northern Cecil County, Maryland, and over the Susquehanna River into Harford County, Maryland. With this area are allied smaller side areas in southern Lancaster County, Pennsylvania, near the Conowingo Creek.

Most of the field-work of this study is concerned with the Chester group of Barrens, practically every area of which in Delaware and Chester Counties has been visited. The State-line Barrens have been but twice visited, on both occasions in August, and the route traversed from Nottingham Station to Goat Hill near Octoraro Creek. As the barrens in this section are known as the Nottingham Barrens, this more local name will be used in reporting specimens.

The areas from which specimens have been examined are:

³C. W. Dorsey and J. A. Bonsteel, in *Maryland Geol. Surv.*, Cecil Co. Report, p. 237.

CHESTER GROUP:

Delaware County—

1. Fawkes Run (Newtown).
2. Preston Run.
3. Bear Hill.
4. Blue Hill.
5. Middletown Township (Mineral Hill, Barrens of Middletown, Williamson, Lenni, Wawa).

Chester County—

6. Sugartown Barrens and Serpentine Ridge.
7. Cedar Barrens.
8. West Chester Barrens (Fern Hill).
9. Scennelltown and Strode's Mill.
10. Brinton's Quarry.
11. Marshallton (specimens noted collected by B. Long).
12. Unionville.

STATE-LINE GROUP:

13. Nottingham Barrens (Nottingham Station to Goat Hill).
14. A few other specimens, mainly collected by J. J. Carter, are cited from points in southern Lancaster County.

COMPOSITION OF FLORA.

Throughout these areas, and doubtless far beyond on either side, the flora of the Conowingo Barrens is strikingly uniform, yet strikingly in contrast with that of the surrounding district. The latter originally was everywhere mesophytic woodland, on the Barrens the change is made to a xerophytic woodland, and over considerable areas to no woodland at all. Though other xerophytic areas, as notably the South Valley and North Valley Hills to the north or the dry sandy barrens of New Jersey across the Delaware River to the south and east, lie not far away, the flora of the Conowingo Barrens is quite distinct.

Yet the flora of these barrens is not uniform. Situated like islets in the midst of the surrounding vegetation, probably never interconnected, it is interesting to note that species will occur and be quite prevalent or even predominant on one, yet be quite scarce or not present at all on another. This local variation is most pronounced between the floras of the Chester and State-line groups.

In the general sketch now presented only the features common or nearly common to all the main exposures will be given. Local

differences and geographic notes on the component features will be considered later .

The upland barrens are mostly covered by a sparse growth of timber of markedly xerophytic type. *Quercus stellata* is abundant on all barrens, *Quercus marylandica* on most, while with these on the State-line Barrens *Pinus rigida* becomes a predominant tree. Associated with these may occur *Sassafras sassafras*, *Acer rubrum* and *Prunus serotina* (the latter two usually in a stunted condition). The round bushy growth of the thick-leaved oaks, with open park-like spaces between, is the characteristic feature of this woodland.

It is but a step from this type of woodland to that where the open predominates, then to where on the barest ridges there is but scant covering above the rock for any growth whatever. In such exceedingly shallow soil, usually a greenish sand with fine portions of Serpentine and talc rock interspersed, there is a scattered growth of thin grasses, *Aristida dichotoma*, *A. gracilis*, and *Sporobolus vaginæflorus*, with the nearly equally delicate *Polygonum tenue* and *Aster parviceps pusillus*. It is here, locally, that *Talinum teretifolium* is found.

In slightly deeper soil, or on rock-ledges, *Arabis lyrata*, *Asclepias verticillata*, *Juncus secundus* and *Panicum philadelphicum* become predominant plants. Here *Arenaria stricta* is noteworthy as a local plant.

In all these the xerophytic habit is marked, mostly taking the form of reduced, narrow or involute leaves, in *Talinum teretifolium* of succulency; in *Arabis lyrata* the entire growth is made in the relatively moist spring season.

Scarcely less xerophytic is the herbaceous growth in the numerous park-like openings mentioned. Grasses and sedges form the bulk of the vegetation. *Andropogon scoparius* (both brown and purplish forms), *Panicum philadelphicum*, *P. sphærocarpon*, *Aristida dichotoma*, *A. gracilis*, and *Scleria pauciflora* are abundant, while constant, but individually less numerous, are *Sorghastrum nutans*, *Paspalum pubescens*, *Syntherisma filiformis*, *Panicum annulum*, *P. huachucae silvicola*, *P. scribnerianum*, *Aristida purpurascens*, *Sporobolus vaginæflorus*, *Danthonia spicata*, *Eragrostis pectinacea*, *Cyperus filiculmis macilentus*, *Carex triceps hirsuta* and *Carex glaucoidea*.

Other constant herbs of the dry open barrens are *Juncus secundus*, *Sisyrinchium mucronatum*, *Comandra umbellata*, *Polygonum tenue*, *Cerastium oblongifolium*, *Arabis lyrata*, *Saxifraga virginiana*, *Potentilla pumila*, *Hypericum punctatum*, *Helianthemum majus*, *Viola*

fimbriatula (S). (Serpentine form), *Angelica villosa*, *Sabbatia angularis*, *Asclepias verticillata*, *Kællia flexuosa*, *Houstonia cærulea*, *Lobelia spicata*, *Eupatorium aromaticum*, *Solidago nemoralis*, *Aster ericoides*, *A. parviceps pusillus*, *A. lateriflorus*, *Antennaria neglecta*, *A. plantaginifolia*, and *Senecio balsamita*.

Where the trees are somewhat closer together and over much of the intervening area there is a shrubby growth forming dry upland thicket. *Salix tristis*, *Corylus americana*, *Rhus glabra*, *Ceanothus americana*, *Gaylussacia baccata*, *Vaccinium vacillans* are predominant, while frequent with these are *Quercus ilicifolia*, *Q. prinoides*, *Rosa humilis*, *Rhus copallina*, *Xolisma ligustrina* and *Polycodium stamineum*.

Large areas of the open, and especially about depressions, are covered with an abundant growth of greenbrier, mainly *Smilax rotundifolia*, though accompanied by *S. glauca*. *Juniperus virginiana* is the main tree of such depressions, and the densest growth of *Smilax* usually occurs beneath it. *Acer rubrum* here becomes a tree of considerable size.

In the dry upland thicket and open woodland, and about the edge of these cedar-greenbrier thickets, the vegetation is decidedly more mesophytic, most of the species here being common to the surrounding district. In the woodland occur *Phegopteris hexagonoptera*, *Panicum dichotomum*, *P. boscii*, *Linum virginianum*, *Dasystema flava*, *Gerardia tenuifolia*, *Hieracium venosum*, *Nabalus serpentarius*, *Solidago bicolor* and *Sericocarpus asteroides*. Many other species of the surrounding flora are more or less casual here.

In the greenbrier thicket and about its edge grow many herbs, of which *Andropogon furcatus*, *Scirpus atrovirens*, *Silene stellata*, *Vernonia noveboracensis*, *Eupatorium perfoliatum*, *Solidago rugosa*, *Helianthus giganteus* and *Cirsium muticum* may be mentioned as constant and frequent. Beneath the dense shade of the cedars and greenbrier and on banks of small streamlets *Polystichum acrostichoides*, *Asplenium platyneuron*, *Homalocenchrus virginicus*, *Agrostis perennans*, *Arabis lyrata*, *Saxifraga virginiana* occur with other species of the open dry barrens in ranker growth.

Where depressions exist free from the covering of thicket or trees, especially where, though not wet in summer, complete desiccation seldom occurs, where the soil is largely a greenish sand, but not dry or arid, a peculiar vegetation exists. *Deschampsia cæspitosa* and *Fimbristylis laxa* occur here, with locally *Cassia chamaecrista*, *Cyperus aristatus*, and *Gerardia purpurea parvula*.

Between the upland xerophytic woodland and the surrounding

mesophytic forest the change, sometimes abrupt, is usually gradual. Of the trees *Quercus stellata*, *Q. marylandica* and *Pinus rigida* do not pass beyond the limits of the Serpentine, and over any extended view may be taken to indicate its position. But *Sassafras sassafras*, *Acer rubrum* and *Nyssa sylvatica* pass beyond, *Quercus alba*, *Castanea dentata* and *Quercus velutina* come successively into prominence, though not till the barrens are left does *Liriodendron tulipifera* become a predominant forest tree.

The flora of one other plant-association was noted, though only partially. In the rich swamps at the base of the hills, derived mainly from the washing of the barren soil, there is a varied and abundant vegetation. Mostly this is the normal swamp-flora of the surrounding district, but a few species seem constantly present here which are much less frequently seen elsewhere. Such are *Osmunda spectabilis*, *Spiraea latifolia*, *Sanguisorba canadensis* and *Heliopsis helianthoides*.

The local variations of this flora are considerable. The isolation of the different areas, the meagre size of some, the nearness of some to one or another barren of a different type, all tend to modify the flora. Yet the above characteristic species remain remarkably constant.

Because of its large continuous area the State-line Barrens probably better illustrate the complete flora of the type than any other. *Pinus rigida*, *Sporobolus heterolepis*, *Ascyrum hypericoides*, *Pieris mariana*, *Galium boreale*, and *Eupatorium pubescens* were found here only, while *Quercus marylandica*, *Cassia chamæcrista*, and *Acerates viridiflora* present here are very local in the Chester group.

The distance separating the two groups of barrens makes the distinction between them the most important variation in the flora. It is impossible from the meagre information as to the Nottingham flora to speak with certainty of what plants present in the Chester Group are absent in the State-line group. The following species of the former have not been noted in the latter, *Atheropogon curtispendus*, *Deschampsia cæspitosa*, *Cyperus aristatus*, *Carex bicknellii* and *Scutellaria parvula ambigua*.

In the Chester Group the variation is mostly in accessory non-characteristic species. The only general division which can be made is between the relatively deeper-soiled barrens of Delaware County and the bare rocky ridges frequent in southeastern Chester County. On the latter only occur *Atheropogon curtispendus*, *Talinum teretifolium* and *Arenaria stricta*, on the former *Quercus marylandica* and likely *Lilium philadelphicum*.

Many other notable species occur irregularly or in but one or two areas. Of commoner species *Phlox subulata* is a conspicuous instance. Of scarcer species may be mentioned *Pinus virginiana*, *Aristida oligantha*, *Sphenopholis obtusata pubescens*, *Aletris farinosa*, *Meibomia rigida*, *Sarothra gentianoides*, *Viola pedata lineariloba*, *Gentiana crinita*, *Phlox pilosa*, *Scutellaria parvula ambigua*, *Gerardia purpurea parvula*, *Castilleja coccinea*, *Lonicera sempervirens*, *Lacinaria spicata*, *Aster patens* and *Antennaria neodioica*.

GEOGRAPHICAL AFFINITIES OF THE FLORA.

The following list shows 217 species composing the characteristic flora of the Conowingo Barrens, while some 77 others were collected occasionally. Of the characteristic species 17 in this section of the Piedmont area are quite or nearly confined to these barrens, while 48 others occur mainly here. The remaining species belong to the normal flora of the district, and their distribution will be less considered.

Many of the species occurring mainly on the Conowingo Barrens occur also on other barren (xerophytic) formations of the district, as the South Valley Hill (shale) and the North Valley Hill (quartzite and sandstone). Among such may be mentioned *Panicum philadelphicum*, *P. depauperatum*, *P. scribnerianum*, *P. sphærocarpon*, *Aristida gracilis*, *Juncus secundus*, *Smilax glauca*, *S. rotundifolia*, *Sisyrinchium mucronatum*, *Quercus ilicifolia*, *Q. stellata*, *Q. prinoides*, *Comandra umbellata*, *Polygonum tenue*, *Lespedeza capitata*, *L. virginica*, *Angelica villosa*, and *Senecio balsamitæ*. A common dry light soil accounts for such distribution.

Across the Delaware River in New Jersey, also in southern Delaware, lie the sand barrens of the Atlantic Coastal Plain. From here have evidently been derived a number of coastal (Carolinian) species. Besides all the above list of xerophytes, *Pinus virginiana*, *P. rigida*, *Aristida oligantha*, *A. purpurascens*, *Scleria triglomerata*, *Quercus marylandica*, *Cassia chamæcrista*, *Strophostyles umbellata*, *Asclepias verticillata*, *Phlox subulata*, *Eupatorium aromaticum* are species present to both floras. Other less characteristic species showing coastal influence are *Typha angustifolia*, *Panicum commonsianum*, *P. addisonii*, *Juncus aristulatus*, *Aletris farinosa* and *Pieris mariana*. *Fimbristylis laxa*, though not found in New Jersey, likewise seems to imply a coastward southern influence.

Distinctive species in the characteristic Conowingo flora showing a northern or Alleghanian influence are *Sporobolus heterolepis*, *Deschampsia cæspitosa*, *Atheropogon curtipendulus*, *Carex glaucoidea*, *C.*

bicknellii, *Lilium philadelphicum*, *Quercus ilicifolia*, *Arenaria stricta*, and *Galium boreale*. Of these *Sporobolus heterolepis*, *Deschampsia cæspitosa*, *Carex bicknellii* and *Galium boreale* here reach their most southerly recorded stations in the Eastern States.

The species in this district restricted to the Conowingo Barrens are *Panicum annulum*, *Sporobolus heterolepis*, *Sphenopholis obtusata pubescens*, *Deschampsia cæspitosa*, *Atheropogon curtispendus*, *Fimbristylis laxa*, *Carex bicknellii*, *Quercus marylandica*, *Talinum teretifolium*, *Cerastium oblongifolium*, *Arenaria stricta*, *Asclepias verticillata*, *Phlox subulata*, *Scutellaria parvula ambigua*, *Gerardia purpurea parvula*, and *Aster parviceps pusillus*. Of these most are wide-ranging and have been considered.

Of those remaining, *Panicum annulum*, *Sphenopholis obtusata pubescens*, and *Scutellaria parvula ambigua* seem very local here and occur in areas widely remote over most of the Eastern States. *Talinum teretifolium*, *Cerastium oblongifolium* and *Aster parviceps pusillus* in the East, at least, are practically confined to magnesian (*i.e.*, Serpentine) soil. *Aster parviceps pusillus*, common here, is only known from the Serpentine Barrens of a small area in southern Pennsylvania and adjacent West Virginia. *Cerastium oblongifolium* and *Talinum teretifolium* range west to Minnesota and Colorado, and toward the western part of their range are adapted to other xerophytic habitats. The range of *Gerardia purpurea parvula* is not as yet understood.

I. LIST OF SPECIES COMPOSING THE FLORA OF THE CONOWINGO BARRENS.

* Nearly or quite restricted in Delaware and Chester Counties to Conowingo Barrens.

† Common to surrounding country, but much more frequent on Conowingo Barrens.

‡ Frequent on Conowingo Barrens, but much less common than in surrounding district.

— Those species of the surrounding flora found as mere stragglers on the Conowingo Barrens, also noteworthy introduced species are listed at the end.

Unless otherwise credited, all records are represented by specimens of the writer's collecting.

†1. OSMUNDA SPECTABILIS L.

Frequent in rich shaded swamps.

Delaware.—Williamson.

2. *PTERIDIUM AQUILINUM* (L.) Kuhn.
Frequent on dry upland, open or about edges of thicket.
Delaware.—Bear Hill; Williamson; Lenni; Wawa.
Chester.—Sugartown Barrens; West Chester.
3. *ASPLENium PLATYNEURON* (L.) Oakes.
Frequent on dry or rocky barrens, or open woodland.
Delaware.—Fawkes Run; Preston Run; Bear Hill; Wawa.
Chester.—Sugartown Barrens; Cedar Barrens; West Chester; Sconnelltown; Brinton's Quarry; Unionville.
4. *POLYSTICHUM ACROSTICHOIDES* (Michx.) Schott.
Frequent on shaded banks and in border-woodland.
Delaware.—Fawkes Run; Bear Hill; Barrens of Middletown.
Chester.—Cedar Barrens.
- ‡5. *DENNSTÆDTIA PUNCTICULOBA* (Michx.) Moore.
Frequent in border-woodland.
Delaware.—Williamson.
Chester.—Cedar Barrens; Unionville.
- †6. *PINUS VIRGINIANA* Mill.
A few trees in one locality, on dry open barrens.
Chester.—Serpentine Ridge.
- †7. *PINUS RIGIDA* Mill.
Only on State-line Barrens, where abundant on dry upland.
Chester.—Nottingham Barrens.
8. *JUNIPERUS VIRGINIANA* L.
Frequent mainly in depressions of upland, greenbrier thickets.
Chester.—Cedar Barrens; West Chester; Unionville.
— Nottingham Barrens.
9. *TYPHA ANGUSTIFOLIA* L.
Scarce; in a quarryhole and pool.
Delaware.—Williamson; Lenni.
10. *ANDROPOGON SCOPARIUS* Michx.
Abundant on dry open barrens. Two forms, but hardly separable. A brownish, much tufted and branched form, and a glaucous, purplish, less tufted, and branched, taller and more wand-like form—both forms abundant and growing together, the latter seemingly

more restricted to the Conowingo Barrens. Not distinguished in records.

Delaware.—Fawkes Run; Preston Run; Mineral Hill; Barrens of Middletown; Williamson; Lenni; Wawa.

Chester.—Sugartown Barrens; Serpentine Ridge; Cedar Barrens; West Chester; Brinton's Quarry; Marshallton (B. Long); Unionville.
— Nottingham Barrens.

11. *ANDROPOGON FURCATUS* Muhl.

Frequent in depressions of dry barrens and about edges of thicket.

Delaware.—Fawkes Run (S. S. Van Pelt); Williamson.

Chester.—Sugartown Barrens; Brinton's Quarry.

— Nottingham Barrens.

12. *SORGHASTRUM NUTANS* (L.) Nash.

Common on dry open barrens.

Delaware.—Fawkes Run; Preston Run; Bear Hill; Mineral Hill; Williamson.

Chester.—Sugartown Barrens; Cedar Barrens; West Chester; Brinton's Quarry.

13. *PASPALUM PUBESCENS* Muhl.

Common on dry open barrens.

Delaware.—Preston Run; Lenni.

Chester.—Sugartown Barrens (E. B. Bartram); Serpentine Ridge; Cedar Barrens; West Chester.

14. *SYNTHERISMA FILIFORMIS* (L.) Nash.

Common on dry open barrens, especially in partial shade.

Delaware.—Fawkes Run; Wawa.

Chester.—Sugartown Barrens (E. B. Bartram); Serpentine Ridge; Cedar Barrens; Unionville.

†15. *PANICUM PHILADELPHICUM* Bernh.

Abundant on dry open barrens.

Delaware.—Fawkes Run; Mineral Hill; Middletown Barrens; Williamson; Wawa.

Chester.—Sugartown Barrens; Serpentine Ridge; Cedar Barrens; West Chester; Brinton's Quarry; Unionville.

‡16. *PANICUM DICHOTOMIFLORUM* Michx.

Frequent in moist to dry border-woodland.

Delaware.—Middletown Barrens.

Chester.—Cedar Barrens.

‡17. *Panicum anceps* Michx.

Frequent on open grassy border-land.

Delaware.—Preston Run; Williamson; Lenni.

‡18. *Panicum depauperatum* Muhl.

Frequent or locally abundant on dry barrens or edges of thickets. Apparently more common in Chester than in Delaware County.

Chester.—Sugartown Barrens; Serpentine Ridge; Cedar Barrens; West Chester; Unionville.

— Nottingham Barrens.

†19. *Panicum linearifolium* Scribn.

Known only from the following specimens.

Delaware.—"Newtown" (B. H. Smith); "Del. Co." (Dr. Geo. Smith).

20. *Panicum dichotomum* L.

Frequent in dry barren or border-woodland.

Delaware.—Fawkes Run; Middletown Barrens.

21. *Panicum barbuiatum* Michx.

Frequent in dry barren or border-woodland.

Delaware.—Fawkes Run; Wawa.

Chester.—Cedar Barrens.

*22. *Panicum annulum* Ashe.

Frequent on dry barren banks and edges of thicket.

Delaware.—Fawkes Run; Preston Run; Bear Hill; Mineral Hill; Middletown Barrens; Williamson; Lenni; Wawa.

Chester.—Sugartown Barrens; Cedar Barrens; West Chester; Unionville.

— Nottingham Barrens.

23. *Panicum huachucae silvicola* Hitchc. and Chase.

Frequent on dry barrens, and edge of thicket.

Delaware.—Fawkes Run; Blue Hill; Williamson; Wawa.

Chester.—West Chester; Unionville.

†24. *Panicum scribnerianum* Nash.

Frequent on dry open barrens and sandy banks.

Delaware.—Bear Hill; Blue Hill; Mineral Hill; Williamson; Lenni.

Chester.—Serpentine Ridge; West Chester; Scennelltown; Unionville.

— Nottingham Barrens.

†25. *Panicum sphærocarpon* Ell.

Abundant on dry open barrens.

Delaware.—Fawkes Run; Preston Run; Bear Hill; Blue Hill; Mineral Hill; Middletown Barrens; Williamson; Lenni; Wawa.

Chester.—Sugartown Barrens; Serpentine Ridge; Cedar Barrens; West Chester; Brinton's Quarry.

— Nottingham Barrens.

‡26. *Panicum boscii* Poir.

Frequent in dry or rocky border-woodland.

Delaware.—Williamson; "Del. Co." (Dr. Geo. Smith).

‡27. *Panicum clandestinum* L.

Frequent in moist border-land and edges of thicket.

Delaware.—Middletown Barrens; Williamson.

Chester.—Sugartown Barrens.

28. *Homalocenchrus virginicus* (Willd.) Britton.

Common in shade of woodland.

Delaware.—Fawkes Run; Middletown Barrens; Williamson; Wawa.

Chester.—Cedar Barrens; Unionville.

29. *Homalocenchrus oryzoides* (L.) Poll.

Frequent in rich swamps.

Delaware.—Williamson.

Chester.—Serpentine Ridge; West Chester; Unionville.

30. *Aristida dichotoma* Michx.

Abundant on dry open barrens.

Delaware.—Fawkes Run; Preston Run; Mineral Hill; Middletown Barrens; Williamson; Lenni; Wawa.

Chester.—Sugartown Barrens; Serpentine Ridge; West Chester; Scennelltown; Brinton's Quarry; Unionville.

†31. *Aristida oligantha* Michx.

Scarce; on dry open barrens.

Delaware.—Fawkes Run.

Chester.—Cedar Barrens.

†32. *ARISTIDA GRACILIS* Ell.

Common on dry open barrens.

Delaware.—Fawkes Run; Preston Run; Middletown Barrens; Williamson; Wawa.

Chester.—Sugartown Barrens; Cedar Barrens; West Chester; Unionville.

†33. *ARISTIDA PURPURASCENS* Poir.

Frequent on dry open barrens.

Delaware.—Preston Run; Mineral Hill; Middletown Barrens; Williamson; Lenni; Wawa.

Chester.—Cedar Barrens; West Chester; Unionville.

34. *MUHLENBERGIA SYLVATICA* Torr.

Frequent in dry woodland and edges of greenbrier.

Delaware.—Fawkes Run; Williamson.

Chester.—Unionville.

†35. *MUHLENBERGIA FOLIOSA* Trin.

Frequent or local on border of greenbrier thicket and in partial shade.

Delaware.—Middletown Barrens; Williamson.

36. *SPOROBOLUS VAGINÆFLORUS* (Torr.) Wood.

Common on dry open barrens.

Delaware.—Preston Run; Middletown Barrens; Williamson; Lenni; Wawa.

Chester.—Sugartown Barrens; Cedar Barrens; West Chester; Scennelltown; Unionville.

*37. *SPOROBOLUS HETEROLEPIS* A. Gray.

Dry open barren, on State-line Barrens only. Reported also from southern Lancaster County, Pleasant Grove (J. J. Carter) and New Texas (T. C. Porter), probably on contiguous Serpentine Barrens.

Chester.—Nottingham Barrens.

38. *AGROSTIS PERENNANS* (Walt.) Tuckerm.

Common in moist to desiccated woodland.

Delaware.—Fawkes Run; Middletown Barrens; Williamson; Wawa.

Chester.—Sugartown Barrens; Unionville.

39. *AGROSTIS HYEMALIS* (Walt.) B. S. P.

Occasional on dry barren.

Chester.—Cedar Barrens.

- *40. *DESCHAMPSIA CÆSPITOSA* (L.) Beauv.
 Frequent in moist sandy soil.
Delaware.—Fawkes Run; Crum Creek (J. W. Harshberger); Williamson.
Chester.—Serpentine Ridge; Cedar Barrens; West Chester.
- ‡41. *DANTHONIA SPICATA* (L.) Beauv.
 Frequent on dry open border-land.
Delaware.—Wawa.
Chester.—Unionville.
- *42. *ATHEROPOGON CURTIPENDULUS* (Michx.) Fourn.
 Local, occasionally abundant, on dry open barrens.
Chester.—West Chester; Brinton's Quarry; Marshallton (B. Long); Unionville.
- ‡43. *TRIDENS FLAVUS* (L.) Hitchc.
 Frequent on dry open border-land.
Delaware.—Mineral Hill; Williamson; Lenni.
Chester.—Cedar Barrens; Unionville.
44. *ERAGROSTIS PECTINACEA* (Michx.) Steud.
 Common on dry open barrens.
Delaware.—Preston Run; Bear Hill; Mineral Hill; Middletown Barrens; Williamson; Lenni.
Chester.—Sugartown Barrens; Serpentine Ridge; Cedar Barrens; Brinton's Quarry; Unionville.
 — Nottingham Barrens.
- *45. *SPHENOPHOLIS OBTUSATA PUBESCENS* (Scribn. and Merr.) Scribn.
 Collected but once, over 40 years ago.
Delaware.—"Newtown" (Dr. Geo. Smith), probably Fawkes Run.
- †46. *CYPERUS ARISTATUS* Rottb.
 Occasional on damp depressions or banks.
Chester.—Serpentine Ridge (S. S. Van Pelt); Cedar Barrens (S. S. Van Pelt); West Chester (J. W. Harshberger).
47. *CYPERUS STRIGOSUS* L.
 Frequent in moist depressions, quarry-holes.
Chester.—Serpentine Ridge; Cedar Barrens; West Chester; Brinton's Quarry; Unionville.

48. *CYPERUS FILICULMIS MACILENTUS* Fernald.
 Frequent on dry open barren.
Delaware.—Middletown Barrens; Williamson; Lenni; Wawa.
Chester.—Serpentine Ridge; Cedar Barrens; West Chester; Brinton's Quarry.
49. *ELEOCHARIS TENUIS* (Willd.) Schultes.
 Abundant on wet sandy depressions.
Delaware.—Mineral Hill; Williamson.
Chester.—Serpentine Ridge; Cedar Barrens; West Chester.
- *50. *FIMBRISTYLIS LAXA* Vahl.
 Common on moist sandy depressions.
Delaware.—Preston Run; Mineral Hill (B. Heritage); Middletown Barrens; Williamson; Wawa.
Chester.—Sugartown Barrens (E. B. Bartram); Serpentine Ridge; Cedar Barrens; West Chester; Marshallton (B. Long); Unionville.
 — Nottingham Barrens.
- †51. *SCIRPUS ATROVIRENS* Muhl.
 Frequent in moist soil.
Delaware.—Williamson.
Chester.—West Chester; Brinton's Quarry.
 — Nottingham Barrens.
52. *RHYNCHOSPORA GLOMERATA* (L.) Vahl.
 Occasional in moist soil.
Chester.—Serpentine Ridge; Cedar Barrens.
- †53. *SCLERIA TRIGLOMERATA* Michx.
 Frequent on dry open barren, and edges of greenbrier thicket.
Delaware.—Williamson.
Chester.—Sugartown Barrens; Unionville.
 — Nottingham Barrens.
- †54. *SCLERIA PAUCIFLORA* Muhl.
 Abundant on dry open barrens.
Delaware.—Mineral Hill; Williamson; Lenni (J. H. Redfield); Wawa.
Chester.—Sugartown Barrens; Serpentine Ridge; Cedar Barrens; West Chester; Unionville.
 — Nottingham Barrens.
Lancaster.—Texas (Dr. Geo. Smith).

- *55. *SCLERIA PAUCIFLORA CAROLINIANA* (Willd.) Wood.
 One collection seen.
 "Serpentine on West Chester Road" (C. E. Smith).
- ‡56. *CAREX LURIDA* Wahl.
 Frequent in Serpentine swamps.
Chester.—Serpentine Ridge; Unionville.
 — Nottingham Barrens.
57. *CAREX HYSTRICINA* Muhl.
 In a moist quarry-hole.
Delaware.—Williamson.
58. *CAREX TRICEPS HIRSUTA* (Willd.) Bailey.
 Common on dry open Barrens.
Delaware.—Bear Hill; Mineral Hill; Williamson; Lenni; Wawa.
Chester.—Sugartown Barrens; Cedar Barrens; West Chester;
 Brinton's Quarry; Unionville.
- †59. *CAREX GLAUCODEA* Tuckerm.
 Frequent on dry open barrens.
Delaware.—Mineral Hill; Williamson.
Chester.—Serpentine Ridge (S. S. Van Pelt); Cedar Barrens (S. S. Van Pelt); Unionville.
Lancaster.—New Texas (J. J. Carter).
- ‡60. *CAREX VULPINOIDEA* Michx.
 Frequent in moist soil.
Delaware.—Williamson.
Chester.—Cedar Barrens.
- †61. *CAREX RETROFLEXA* Muhl.
 Local or frequent on moist depressions or banks.
Delaware.—Williamson.
62. *CAREX SCOPARIA* Schkuhr.
 Frequent on dry barrens.
Delaware.—Williamson.
- *63. *CAREX BICKNELLII* Britton.
 Occasional on dry open barrens.
Delaware.—Bear Hill; Williamson.
Chester.—Cedar Barrens.

- ‡64. *JUNCUS EFFUSUS* L.
 Frequent in Serpentine swamps.
Delaware.—Williamson.
Chester.—West Chester.
- ‡65. *JUNCUS TENUIS* Willd.
 Frequent along paths, etc., in border-woodland.
Delaware.—Williamson.
Chester.—Cedar Barrens.
 — Nottingham Barrens.
- †66. *JUNCUS SECUNDUS* Beauv.
 Abundant on dry open barrens.
Delaware.—Fawkes Run (C. E. Smith); Preston Run; Mineral Hill; Williamson; Wawa.
Chester.—Sugartown Barrens; Serpentine Ridge; Cedar Barrens; West Chester; Sconnelltown.
 — Nottingham Barrens.
67. *JUNCUS MARGINATUS* Rostk.
 Occasional in moist sandy soil.
Delaware.—Williamson.
Chester.—Sugartown Barrens.
 — Nottingham Barrens.
68. *JUNCUS ARISTULATUS* Michx.
 One specimen seen.—A coastal species scarce so far inland.
Delaware.—"Del. Co." (Dr. Geo. Smith).
- ‡69. *JUNCUS ACUMINATUS* Michx.
 Frequent in moist soil.
Chester.—Unionville.
 — Nottingham Barrens.
70. *JUNCOIDES CAMPESTRE* (L.) Kuntze.
 Frequent in dry barren open or woodland.
Delaware.—Fawkes Run.
Chester.—West Chester.
71. *CHAMÆLERIUM LUTEUM* (L.) A. Gray.
 Occasional in border-woodland.
Delaware.—Williamson.
Chester.—Cedar Barrens (S. S. Van Pelt).

†72. *LILIUM PHILADELPHICUM* L.

Frequent or local on edges of greenbrier thicket.

Delaware.—Williamson; Wawa.

Chester.—Cedar Barrens.

— Nottingham Barrens.

73. *ALETRIS FARINOSA* L.

Occasional on dry open barren and banks.

Chester.—Unionville.

— Nottingham Barrens.

†74. *VAGNERA RACEMOSA* (L.) Morong.

Frequent in border-woodland.

Delaware.—Lenni; Wawa.

†75. *SMILAX HERBACEA CRISPIFOLIA*, subsp. nov.

Stem ascending, recumbent at apex, at length slightly elongated, provided with slender tendrils. Leaves ovate or oval, acute at apex, truncate or slightly cordate at base, 5–6 cm. long, firm in texture, usually with crisped or wavy margins, pale-green above, slightly glaucous and glabrous beneath, 7-nerved, on petioles one-quarter to one-third the length of the blades. Leaves of the branches mostly narrower. Umbel 15–25 flowered. Pedicels 8–10 mm. long. Peduncle stout, in fruit exceeding the subtending leaf. Berries blue or purplish-blue, glaucous, 7–8 mm. in diameter.

Differs from *S. herbacea* L. in its little elongated, not freely climbing stem, in its firmer leaves, truncate at base, and in its smaller berries.

Dry soil, southeastern Pennsylvania to Virginia.

Type.—Serpentine, Mineral Hill, Delaware County, Penna., F. W. Pennell 594, coll. Sept. 6, 1908, in Herb. Acad. Nat. Sci. Phila.

Common on dry open barrens and edges of greenbrier.

Delaware.—Mineral Hill; Williamson; Wawa.

Chester.—Sugartown Barrens; Cedar Barrens; Unionville.

— Nottingham Barrens.

†76. *SMILAX GLAUCA* Walt.

Common on dry open barrens, mostly about margin of greenbrier thicket.

Delaware.—Fawkes Run; Bear Hill; Mineral Hill; Wawa.

Chester.—Sugartown Barrens; Cedar Barrens; West Chester; Brinton's Quarry; Unionville.

— Nottingham Barrens.

†77. SMILAX ROTUNDIFOLIA L.

Abundant in depressions of barrens, frequently climbing high on *Juniperus virginiana*.

Delaware.—Fawkes Run; Bear Hill; Mineral Hill; Wawa.

Chester.—West Chester; Sconnelltown.

— Nottingham Barrens.

†78. SISYRINCHIUM MUCRONATUM Michx.

Common on dry open barren.

Delaware.—Mineral Hill; Wawa.

Chester.—Sugartown Barrens (E. B. Bartram); Serpentine Ridge; Cedar Barrens; West Chester.

†79. GYRSTACHYS GRACILIS (Bigel.) Kuntze.

Occasional on dry open barren.

Delaware.—Williamson.

Chester.—Brinton's Quarry.

80. LEPTORCHIS LOESELII (L.) MacM.

Occasional on moist shaded banks.

Delaware.—Middletown Barrens.

Chester.—Cedar Barrens.

81. POPULUS GRANDIDENTATA Michx.

Occasional in woodland.

Delaware.—Williamson.

Chester.—Unionville.

— Nottingham Barrens.

82. SALIX HUMILIS Marsh.

Frequent or local on dry open barren.

Delaware.—Williamson.

Chester.—Unionville.

83. SALIX TRISTIS Ait.

Frequent or local on dry open barrens.

Delaware.—Williamson; Wawa.

Chester.—Nottingham Barrens.

84. COMPTONIA ASPLENIFOLIA (L.)

Occasional on dry open barren.

Delaware.—Middletown Barrens; Wawa.

85. *CORYLUS AMERICANA* Walt.
Common on dry barren, edges of woodland and thicket.
Delaware.—"Crum Creek" (J. W. Harshberger); Lenni.
Chester.—Sugartown Barrens; West Chester.
86. *ALNUS RUGOSA* (Du Roi) Spreng.
Frequent on dry edges of woodland or in Serpentine swamp.
Delaware.—Middletown Barrens; Williamson.
- †87. *CASTANEA DENTATA* (Marsh.) Borkh.
Frequent in border-woodland.
Delaware.—Fawkes Run.
88. *QUERCUS PALUSTRIS* Du Roi.
Local in moist woodland, borderland.
Delaware.—Fawkes Run.
Chester.—Sugartown Barrens; Cedar Barrens.
- †89. *QUERCUS ILICIFOLIA* Wang.
Frequent or local on dry open barren.
Delaware.—Fawkes Run.
Chester.—Cedar Barrens; West Chester.
— Nottingham Barrens.
- *90. *QUERCUS MARYLANDICA* Mench.
Locally abundant on dry barren.
Delaware.—Middletown Barrens; Williamson; Lenni; Wawa;
"Crum Creek" (J. W. Harshberger).
Chester.—Nottingham Barrens.
91. *QUERCUS ALBA* L.
Frequent in border-woodland.
Delaware.—Fawkes Run.
Chester.—Unionville.
- †92. *QUERCUS STELLATA* Wang.
Abundant on dry barren.
Delaware.—Fawkes Run; Blue Hill; Mineral Hill; Middletown
Barrens; Williamson.
Chester.—Sugartown Barrens; Serpentine Ridge; Cedar Barrens;
West Chester; Unionville.
— Nottingham Barrens.

93. *QUERCUS PRINUS* L.
Occasional in woodland.
Delaware.—Fawkes Run.
Chester.—Sugartown Barrens.
- †94. *QUERCUS PRINOIDES* Willd.
Frequent on dry open barren.
Delaware.—Fawkes Run; Preston Run; Bear Hill; Mineral Hill; Williamson.
Chester.—Cedar Barrens; Unionville.
— Nottingham Barrens.
- †95. *COMANDRA UMBELLATA* (L.) Nutt.
Frequent or local on dry open barren.
Delaware.—Williamson.
Chester.—Sugartown Barrens.
- †96. *POLYGONUM TENUE* Michx.
Common on dry open barren, rock exposures.
Delaware.—Fawkes Run; Blue Hill; Mineral Hill; Middletown Barrens; Williamson; Lenni; Wawa.
Chester.—Sugartown Barrens; Serpentine Ridge; Cedar Barrens; West Chester; Sconnelltown; Brinton's Quarry; Unionville.
— Nottingham Barrens.
- *97. *TALINUM TERETIFOLIUM* Pursh.
Local on dry open barren, rock-exposures.
Chester.—Sugartown Barrens; Serpentine Ridge; Cedar Barrens; West Chester; Sconnelltown.
— Nottingham Barrens.
Lancaster.—New Texas (J. J. Carter).
98. *SILENE STELLATA* (L.) Ait. f.
Frequent on dry edges of greenbrier and rocky places.
Delaware.—Middletown Barrens; Williamson; Wawa.
Chester.—West Chester; Unionville.
— Nottingham Barrens.
- *99. *CERASTIUM OBLONGIFOLIUM* Torr. [including *C. arvense villosum* Hollick and Britton].
Abundant on dry open barrens, banks and edges of greenbrier.
In the material examined I have been unable to detect any constant

difference between *C. arvense oblongifolium* (Torr.) Hollick and Britton and *C. arvense villosum* Hollick and Britton [= *C. arvense velutinum* (Raf.) Britton]. The latter seems a condensed form of the drier situations, intergrading perfectly with the normal form. On the other hand, *C. oblongifolium* Torr with us seems quite distinct from *C. arvense* L. Records include forms which have been passing for both varieties.

Delaware.—Fawkes Run; Bear Hill; Blue Hill; Mineral Hill; Middletown Barrens; Williamson; Wawa.

Chester.—Sugartown Barrens; Serpentine Ridge; Cedar Barrens; West Chester; Sconnelltown [= "Strode's Serpentine" (Dr. Wm. Darlington) type of *C. villosum*]; Brinton's Quarry; Unionville.

— Nottingham Barrens.

Lancaster.—Pleasant Grove (A. A. Heller and J. K. Small); New Texas (J. J. Carter).

*100. *ARENARIA STRICTA* Michx.

Local on dry open barren, rock exposures.

Delaware.—"Middletown" (I. Burk)—locality likely incorrect.

Chester.—West Chester; Unionville.

— Nottingham Barrens.

101. *SYNDESMON THALICTROIDES* (L.) Hoffmg.

Frequent in dry woodland.

Delaware.—Mineral Hill; Williamson; Wawa.

102. *THALICTRUM REVOLUTUM* D. C.

Occasional on dry open barren.

Leaflets abundantly glandular-puberulent in the Nottingham specimens, slightly so or nearly smooth beneath in the Delaware County specimens.

Delaware.—Williamson (B. Long); "Elwyn" (Dr. J. B. Brinton).

Chester.—Nottingham Barrens.

103. *SASSAFRAS SASSAFRAS* (L.) Karst.

Abundant on dry barrens.

Delaware.—Fawkes Run; Blue Hill; Mineral Hill; Wawa.

Chester.—Sugartown Barrens; Brinton's Quarry.

†104. *ARABIS LYRATA* L.

Common on dry open barrens, banks and depressions.

Delaware.—Bear Hill; Mineral Hill; Middletown Barrens (-), Williamson; Lenni; Wawa.

Chester.—Sugartown Barrens (E. B. Bartram); Serpentine Ridge; Cedar Barrens; West Chester; Sconnelltown; Brinton's Quarry; Unionville.

— Nottingham Barrens.

105. *SAXIFRAGA VIRGINIENSIS* Michx.

Frequent on dry open barren, banks and edges of woodland.

Del.—Middletown Barrens; Williamson; Wawa.

†106. *SPIRÆA LATIFOLIA* Borkh.

Frequent in Serpentine swamps.

Delaware.—Williamson (Dr. J. B. Brinton, Jos. Crawford).

Chester.—Cedar Barrens; West Chester; Unionville.

— Nottingham Barrens.

107. *RUBUS FRONDOSUS* Bigel. (?)

Common, especially on edge of dry barren.

Delaware.—Bear Hill; Williamson.

Chester.—Unionville.

— Nottingham Barrens.

108. *POTENTILLA PUMILA* Poir.

Common on dry open barren.

Delaware.—Fawkes Run; Blue Hill; Mineral Hill; Williamson.

Chester.—Sugartown Barrens; Cedar Barrens; West Chester.

†109. *SANGUISORBA CANADENSIS* L.

Frequent in rich Serpentine swamps.

Delaware.—Fawkes Run (B. H. Smith, S. S. Van Pelt); Williamson.

Chester.—Nottingham Barrens.

110. *ROSA HUMILIS* Marsh.

Frequent on dry open barren and margin of greenbrier.

Delaware.—Fawkes Run; Bear Hill; Middletown Barrens; Wawa.

Chester.—Sugartown Barrens; Cedar Barrens; West Chester; Brinton's Quarry; Unionville.

— Nottingham Barrens.

111. *ARONIA NIGRA* (Willd) Britton.

Occasional on dry open barren.

Delaware.—Fawkes Run; Wawa.

112. *CASSIA NICTITANS* L.
Frequent on dry open barren.
Delaware.—Fawkes Run; Williamson; Lenni.
Chester.—Unionville.
113. *CASSIA CHAMÆCRISTA* L.
Local on dry open barren, banks and depressions.
Delaware.—Williamson.
Chester.—Nottingham Barrens.
114. *BAPTISIA TINCTORIA* (L.) R. Br.
Common on dry open barren.
Delaware.—Fawkes Run; Williamson; Wawa.
Chester.—Sugartown Barrens; Cedar Barrens; Unionville.
— Nottingham Barrens.
- ‡115. *CROTALARIA SAGITTALIS* L.
Occasional on dry open barren.
Delaware.—Williamson; Lenni.
Chester.—Nottingham Barrens.
116. *STYLOSANTHES BIFLORA* (L.) B. S. P.
Occasional on dry open barren or sandy bank.
Delaware.—Mineral Hill (I. Burk); Lenni.
117. *MEIBOMIA PANICULATA* (L.) Kuntze.
Common on edges of greenbrier or on banks.
Delaware.—Preston Run; Bear Hill; Mineral Hill; Williamson;
Lenni.
Chester.—Sugartown Barrens; Unionville.
118. *MEIBOMIA DILLENII* (Darl.) Kuntze.
Frequent on margin of thicket.
Delaware.—Fawkes Run; Williamson; Lenni.
Chester.—West Chester; Brinton's Quarry.
119. *MEIBOMIA RIGIDA* (Ell.) Kuntze.
Occasional on dry sandy barren.
Delaware.—Williamson; Lenni.
120. *MEIBOMIA MARYLANDICA* (L.) Kuntze.
Frequent or local on dry sandy barren.
Delaware.—Williamson; Lenni.

121. *MEIBOMIA OBTUSA* (Muhl.) Vail.
Frequent on dry open barren.
Delaware.—Mineral Hill; Williamson.
Chester.—West Chester; Unionville.
— Nottingham Barrens.
122. *LESPEDEZA REPENS* (L.) Bart.
Occasional on dry sandy barren.
Delaware.—Mineral Hill; Williamson.
123. *LESPEDEZA PROCUMBENS* Michx.
Occasional on dry sandy barren.
Delaware.—Williamson.
- ‡124. *LESPEDEZA FRUTESCENS* (L.) Britton.
Occasional on dry open barren.
Delaware.—Mineral Hill; Lenni.
- †125. *LESPEDEZA VIRGINICA* (L.) Britton.
Common on dry open barren.
Delaware.—Williamson; Lenni; Wawa.
Chester.—Sugartown Barrens; West Chester; Unionville.
126. *LESPEDEZA HIRTA* (L.) Hornem.
Frequent on dry open barren, and margin of greenbrier.
Delaware.—Preston Run; Mineral Hill; Lenni.
Chester.—West Chester.
- †127. *LESPEDEZA CAPITATA* Michx.
Frequent on dry open barren.
Delaware.—Fawkes Run; Preston Run; Bear Hill; Middletown Barrens; Williamson.
Chester.—Unionville.
- †128. *STROPHOSTYLES UMBELLATA* (Muhl.) Britton.
Local, frequent on the State-line Barrens.
Chester.—Nottingham Barrens.
129. *LINUM VIRGINIANUM* L.
Frequent in dry woodland.
Delaware.—Fawkes Run; Bear Hill; Wawa.
Chester.—Unionville.

130. *LINUM MEDIUM* (Planch.) Britton.
Occasional on dry open barren.
Delaware.—Wawa.
Chester.—West Chester.
131. *LINUM FLORIDANUM* (Planch.) Trel.
Occasional on dry open barren.
Delaware.—Bear Hill.
Chester.—Sugartown Barrens.
132. *POLYGALA VERTICILLATA* L.
Occasional on dry open barren.
Delaware.—Fawkes Run; Preston Run; Wawa.
Chester.—Sugartown Barrens; West Chester.
133. *POLYGALA SANGUINEA* L.
Occasional on dry open barren.
Chester.—Sugartown Barrens; Serpentine Ridge.
134. *POLYGALA SENEGA* L.
One specimen seen.
Delaware.—“Newtown” (Dr. Geo. Smith).
135. *RHUS COPALLINA* L.
Occasional or local on dry barren.
Chester.—Cedar Barrens; West Chester.
— Nottingham Barrens.
136. *RHUS GLABRA* L.
Common about edges of thicket and woodland.
Delaware.—Bear Hill; Middletown Barrens; Williamson School (I. A. Keller).
Chester.—Brinton’s Quarry.
137. *ACER RUBRUM* L.
Common on dry barren, depressions and border-woodland.
Delaware.—Fawkes Run; Bear Hill; Mineral Hill; Middletown Barrens; Williamson; Wawa.
Chester.—Sugartown Barrens; Brinton’s Quarry.
138. *CEANOTHUS AMERICANUS* L.
Common on dry barren.
Delaware.—Fawkes Run; Preston Run; Mineral Hill; Middletown Barrens; Williamson; Lenni; Wawa.

Chester.—Cedar Barrens; West Chester; Brinton's Quarry; Unionville.

—Nottingham Barrens.

139. *VITIS ÆSTIVALIS* Michx.

Frequent on margin of or in greenbrier thicket.

Delaware.—Bear Hill; Middletown Barrens; Williamson; Lenni.

Chester.—West Chester; Unionville.

140. *ASCYRUM HYPERICOIDES* L.

Local, only on State-line Barrens.

Chester.—Nottingham Barrens.

141. *HYPERICUM PUNCTATUM* Lam.

Frequent on dry open barren or depressions.

Delaware.—Bear Hill; Williamson.

Chester.—Sugartown Barrens; Serpentine Ridge; Cedar Barrens; West Chester; Brinton's Quarry; Unionville.

142. *SAROTHTA GENTIANOIDES* L.

Occasional on dry open barrens.

Delaware.—Fawkes Run.

Chester.—Cedar Barrens; West Chester.

†143. *HELIANTHEMUM MAJUS* (L.) B. S. P.

Frequent on dry open barrens.

Delaware.—Fawkes Run; Preston Run; Williamson; Wawa.

Chester.—Sugartown Barrens; West Chester; Unionville.

—Nottingham Barrens.

144. *LECHEA MINOR* L.

Occasional on dry open barren.

Chester.—Sugartown Barrens; West Chester.

—Nottingham Barrens.

145. *LECHEA RACEMULOSA* Lam.

Occasional on dry open barren.

Chester.—Cedar Barrens.

—Nottingham Barrens.

146. *LECHEA LEGGETII* Britton and Hollick.

Occasional on dry open barren.

Delaware.—Williamson; Wawa.

Chester.—Sugartown Barrens (E. B. Bartram).

147. *VIOLA PEDATA LINEARILOBA* D. C.

Occasional on dry open barren.

Chester.—West Chester.

†148. *VIOLA FIMBRIATULA* Sm.

Apparently more or less intermediate between this and *V. sagittata* Ait., combining the pubescence of the former with the leaf-outline of the latter. Apparently quite uniform, and constant in characters. As neither *V. fimbriatula* Sm. nor *V. sagittata* Ait. occur, except sparingly, in this district, the idea of direct or recent hybridism is excluded.

Common on dry open barren and banks.

Delaware.—Fawkes Run; Preston Run; Bear Hill; Blue Hill; Middletown Barrens; Williamson; Wawa.

Chester.—Sugartown Barrens; Serpentine Ridge; Cedar Barrens; West Chester; Brinton's Quarry; Unionville.

— Nottingham Barrens.

149. *KNEIFFIA LINEARIS* (Michx.) Spach.

Frequent on dry open barren and banks.

Delaware.—"Crum Creek" (J. W. Harshberger); Williamson (J. B. Brinton); Wawa.

Chester.—Cedar Barrens.

150. *KNEIFFIA FRUTICOSA* (L.) Raimann.

Frequent on dry open barren and banks.

Delaware.—"Media" (J. B. Brinton).

Chester.—Serpentine Ridge; West Chester.

151. *ZIZIA CORDATA* (Walt.) D. C.

Frequent on dry open barren and edges of thicket.

Delaware.—Williamson.

Chester.—Unionville.

†152. *ANGELICA VILLOSA* (Walt.) B. S. P.

Frequent on dry open barren.

Delaware.—Mineral Hill; Williamson; Wawa.

Chester.—Cedar Barrens (S. S. Van Pelt); Unionville.

— Nottingham Barrens.

†153. *NYSSA SYLVATICA* March.

Occasional in woodland.

Delaware.—Williamson (J. W. Harshberger).

Chester.—Unionville.

154. *AZALEA NUDIFLORA* L.
Frequent on edges of thicket.
Delaware.—Mineral Hill; Williamson; Wawa.
Chester.—West Chester.
155. *PIERIS MARIANA* (L.) Benth. and Hook.
On dry open barren.
Chester.—Nottingham Barrens.
156. *XOLISMA LIGUSTRINA* (L.) Britton.
Frequent on dry barrens.
Delaware.—Middletown Barrens.
Chester.—Cedar Barrens.
— Nottingham Barrens.
157. *GAYLUSSACIA BACCATA* (Wang.) C. Koch.
Common on dry open barren.
Delaware.—Fawkes Run; Mineral Hill; Williamson; Wawa.
Chester.—Sugartown Barrens; Cedar Barrens; West Chester;
Unionville.
— Nottingham Barrens.
158. *POLYCODIUM STAMINEUM* (L.) Greene.
Frequent on dry barrens, edges of woodland or thicket.
Delaware.—Mineral Hill; Middletown Barrens; Williamson; Wawa.
Chester.—Sugartown Barrens; Cedar Barrens; West Chester;
Unionville.
— Nottingham Barrens.
159. *VACCINIUM ATROCOCIMUM* (Gray) Heller.
Frequent on edges of thicket or depressions.
Delaware.—Williamson; Wawa.
Chester.—Sugartown Barrens; West Chester.
160. *VACCINIUM PENNSYLVANICUM* Lam.
Occasional on dry open barren.
Delaware.—Fawkes Run.
161. *VACCINIUM VACILLANS* Kalm.
Common on dry open barren, borders of woodland, and in woodland.
Delaware.—Fawkes Run; Mineral Hill; Williamson; Wawa.
Chester.—West Chester; Unionville.

‡162. *LYSIMACHIA QUADRIFOLIA* L.

Frequent on dry border-woodland or open.

Chester.—Sugartown Barrens; Cedar Barrens.

163. *DIOSPYROS VIRGINIANA* L.

Occasional or local in woodland.

Chester.—West Chester.

— Nottingham Barrens.

‡164. *SABBATIA ANGULARIS* (L.) Pursh.

Frequent on dry open barren, edges of thicket and in moist soil, varying greatly in size according to habitat.

Delaware.—Preston Run (A. Jahn); Mineral Hill (I. Burk); Middletown Barrens; Wawa.

Chester.—Cedar Barrens; West Chester; Brinton's Quarry; Unionville.

— Nottingham Barrens.

165. *GENTIANA CRINITA* Froel.

Local, on dry open barren. Plants dwarfed. Flowers small for the species, paler blue.

Delaware.—Williamson.

166. *ASCLEPIAS PURPURASCENS* L.

Frequent or local on edge of greenbrier thicket.

Delaware.—Williamson.

Chester.—Sugartown Barrens.

*167. *ASCLEPIAS VERTICILLATA* L.

Common on dry open barren, ledges of rock, and on banks.

Delaware.—Fawkes Run; Preston Run; Bear Hill; Mineral Hill; Middletown Barrens; Williamson; Lenni.

Chester.—Sugartown Barrens; Serpentine Ridge; Cedar Barrens; West Chester; Scanneltown; Brinton's Quarry; Marshallton (B. Long); Unionville.

— Nottingham Barrens.

‡168. *ACERATES VIRIDIFLORA* Ell.

Local on dry open barren.

Delaware.—Williamson; Lenni.

Chester.—Unionville.

— Nottingham Barrens.

*169. PHLOX SUBULATA L.

Locally abundant on dry open barren.

Delaware.—Fawkes Run; Preston Run (S. S. Van Pelt); Bear Hill; Mineral Hill; Middleton Barrens.

Chester.—Sugartown Barrens; Serpentine Ridge; West Chester; Sconnelltown; Brinton's Quarry; Unionville.

— Nottingham Barrens.

Lancaster.—Fulton Township (J. J. Carter).

*170. SCUTELLARIA PARVULA AMBIGUA (Nutt.) Fernald

Scarce, on dry open barren.

Delaware.—"Serpentine on West Chester Road" (Dr. Geo. Smith; "Del. Co." (C. E. Smith).

Chester.—West Chester.

Lancaster.—Fulton Township (J. J. Carter)

‡171. PRUNELLA VULGARIS L.

Occasional on dry open barren, or edges of woodland.

Delaware.—Wawa.

Chester.—Cedar Barrens.

172. KOELLIA FLEXUOSA (Walt.) MacM.

Common on dry open barren, depressions and desiccated soil.

Delaware.—Fawkes Run; Preston Run; Bear Hill; Blue Hill; Mineral Hill; Middletown Barrens; Williamson.

Chester.—Sugartown Barrens; Cedar Barrens; West Chester; Sconnelltown; Brinton's Quarry; Unionville.

— Nottingham Barrens.

173. DASYSTOMA PEDICULARIA (L.) Benth.

Occasional in dry woodland.

Delaware.—Fawkes Run; Mineral Hill.

Chester.—Unionville.

*174. GERARDIA PURPUREA PARVULA, subsp. nov.

Stem 1–6 dm. tall, minutely scabrous above, sparingly branched. Branches spreading. Leaves linear, scabrous above, those of the stem 1–3 cm. long, 1–2 mm. broad, mostly with small clusters in their axils. Pedicels 3–4 mm. long. Calyx-tube campanulate, 3 mm. high, its lobes narrowly lanceolate, 1–1.2 mm. long. Corolla pale rose-purple, about 20 mm. long. Capsule globose, 4–5 mm. in diameter.

Differs from *Gerardia purpurea* L. of the Atlantic Coastal Plain in its smaller size, smaller and paler corollas, and smaller capsules.

Serpentine Barrens of southeastern Pennsylvania.

Type.—Serpentine, Wawa, Delaware County, Penna., F. W. Pennell 2689, coll. Sept. 25, 1910, in Herb. Acad. Nat. Sci. Phila.

Locally frequent in depressions, or edges of woodland.

Delaware.—Wawa.

Chester.—Sugartown Barrens; Serpentine Ridge; Cedar Barrens.
— Nottingham Barrens.

‡175. GERARDIA TENUIFOLIA Vahl.

Frequent in dry border-woodland.

Delaware.—Fawkes Run.

Chester.—Sugartown Barrens.

176. HOUSTONIA CERULEA L.

Common on dry to moist open barren.

Delaware.—Mineral Hill; Williamson; Wawa.

Chester.—Cedar Barrens; West Chester; Unionville.

‡177. MITCHELLA REPENS L.

Frequent in dry border-woodland.

Delaware.—Middletown Barrens.

Chester.—Sugartown Barrens.

178. GALIUM PILOSUM Ait.

Frequent on dry open barren.

Delaware.—Mineral Hill.

Chester.—Sugartown Barrens; West Chester; Unionville.

‡179. GALIUM BOREALE L.

Along border and in greenbrier thicket on State-line Barrens.

Chester.—Nottingham Barrens.

180. LONICERA SEMPERVIRENS L.

Occasional in greenbrier thicket.

Chester.—Cedar Barrens (A. Jahn).

181. LOBELIA SPICATA Lam.

Common on dry open barren.

Delaware.—Bear Hill; Blue Hill; Williamson; Wawa.

Chester.—Sugartown Barrens; Serpentine Ridge; Cedar Barrens;
West Chester; Brinton's Quarry; Unionville.

182. HIERACIUM VENOSUM L.

Frequent in dry woodland.

Delaware.—Fawkes Run; Wawa.

Chester.—Sugartown Barrens; Unionville.

‡183. *HIERACIUM GRONOVII* L.

Frequent in dry border-woodland.

Delaware.—Bear Hill; Mineral Hill; Williamson.

‡184. *NABALUS SERPENTARIUS* (Pursh) Hook.

Frequent in dry woodland.

Delaware.—Williamson; Wawa.

Chester.—Sugartown Barrens; West Chester; Unionville.

‡185. *AMBROSIA ARTEMISIAEFOLIA* L.

Occasional on dry open barren, probably here introduced.

Delaware.—Williamson.

Chester.—Sugartown Barrens; Cedar Barrens; West Chester; Unionville.

186. *VERNONIA NOVEBORACENSIS* (L.) Willd.

Frequent on moist open or on moist banks.

Delaware.—Williamson.

Chester.—Cedar Barrens; West Chester; Unionville.

187. *VERNONIA GLAUCA* (L.) Willd.

On a grassy bank.

Delaware.—Lenni.

188. *EUPATORIUM PUBESCENS* Muhl.

Local, on dry open barren.

Chester.—Nottingham Barrens.

189. *EUPATORIUM PERFOLIATUM* L.

Frequent in moist soil, Serpentine swamps, or occasionally on dry open barren.

Delaware.—Bear Hill; Middletown Barrens; Williamson.

Chester.—West Chester; Unionville.

‡190. *EUPATORIUM AROMATICUM* L.

Common on dry open barren and border of woodland.

Delaware.—Fawkes Run; Bear Hill; Mineral Hill; Williamson; Wawa.

Chester.—Sugartown Barrens; Cedar Barrens; West Chester.

— Nottingham Barrens.

191. *LACINARIA SPICATA* (L.) Kuntze.
Local, on dry open barren.
Delaware.—Williamson.
- ‡192. *SOLIDAGO CÆSIA* L.
Frequent in dry border-woodland.
Delaware.—Williamson; Lenni; Wawa.
193. *SOLIDAGO BICOLOR* L.
Common on border of woodland and in dry woodland.
Delaware.—Fawkes Run; Mineral Hill; Middletown Barrens; Williamson; Lenni.
Chester.—Sugartown Barrens; West Chester.
194. *SOLIDAGO RUGOSA* Mill.
Common on dry barren, especially about edge of thicket.
Delaware.—Preston Run; Bear Hill; Middletown Barrens; Williamson; Lenni.
Chester.—Sugartown Barrens; West Chester; Unionville.
195. *SOLIDAGO ASPERA* Ait.
On dry barren.
Delaware.—Lenni.
196. *SOLIDAGO JUNCEA* Ait.
Occasional or local on dry barren.
Chester.—West Chester (E. B. Bartram).
— Nottingham Barrens.
197. *SOLIDAGO NEMORALIS* Ait.
Common on dry open barren.
Delaware.—Fawkes Run; Preston Run; Bear Hill; Mineral Hill; Middletown Barrens; Williamson; Lenni; Wawa.
Chester.—Sugartown Barrens; Cedar Barrens; West Chester; Brinton's Quarry; Unionville.
— Nottingham Barrens.
- ‡198. *SOLIDAGO ALTISSIMA* L.
Occasional on moist open.
Delaware.—Williamson.
Chester.—Brinton's Quarry.
- ‡199. *EUTHAMIA NUTTALLII* Greene.
In moist places along streams or about border of woodland.

Delaware.—Middletown Barrens.

Chester.—Sugartown Barrens; Unionville.

200. SERICOCARPUS ASTEROIDES (L.) B. S. P.

Frequent in dry woodland.

Delaware.—Wawa.

Chester.—Sugartown Barrens; West Chester; Unionville.

— Nottingham Barrens.

201. ASTER UNDULATUS L.

Frequent in dry woodland or thicket.

Delaware.—Fawkes Run; Preston Run; Middletown Barrens; Williamson; Lenni.

202. ASTER PATENS Ait.

Local on dry open barren or banks.

Delaware.—Mineral Hill; Lenni.

†203. ASTER LÆVIS L.

Common or local on dry open barren, edges of woodland and thicket.

Delaware.—Fawkes Run; Preston Run; Bear Hill; Middletown Barrens; Williamson; Wawa.

Chester.—Sugartown Barrens (E. B. Bartram); West Chester; Brinton's Quarry; Unionville.

204. ASTER DUMOSUS L.

Local, on dry barren.

Chester.—Sugartown Barrens.

205. ASTER ERICOIDES L.

Common on dry open barren.

Delaware.—Fawkes Run; Preston Run; Mineral Hill; Williamson; Lenni; Wawa.

Chester.—Sugartown Barrens (E. B. Bartram); Sconnelltown; Brinton's Quarry; Unionville.

*206. ASTER PARVICEPS PUSILLUS (Gray) Fernald.

Frequent on dry open barren or rock exposures.

Delaware.—Middletown Barrens; Williamson.

Chester.—Serpentine Ridge; Cedar Barrens; West Chester; Brinton's Quarry; Unionville.

— Nottingham Barrens.

207. *ASTER LATERIFLORUS* (L.) Britton.

Common on dry open barren, edges of woodland or thicket.

Delaware.—Fawkes Run; Preston Run; Mineral Hill; Middletown Barrens; Williamson; Lenni; Wawa.

Chester.—Sugartown Barrens; Cedar Barrens; West Chester; Brinton's Quarry; Unionville.

208. *ANTENNARIA NEODIOICA* Greene.

Local on dry open barren.

Chester.—West Chester.

209. *ANTENNARIA NEGLECTA* Greene.

Frequent on dry open barren.

Delaware.—Williamson; Wawa.

Chester.—Sugartown Barrens; Unionville.

210. *ANTENNARIA PLANTAGINIFOLIA* (L.) Richards.

Frequent on dry open barren or in woodland.

Delaware.—Fawkes Run; Mineral Hill; Wawa.

Chester.—Sugartown Barrens; Cedar Barrens; West Chester.

211. *GNAPHALIUM POLYCEPHALUM* Michx.

Frequent on dry open barren.

Delaware.—Fawkes Run; Preston Run; Williamson.

Chester.—West Chester; Unionville.

†212. *HELIOPSIS HELIANTHOIDES* (L.) Sweet.

Frequent in Serpentine swamp.

Delaware.—Williamson.

Chester.—West Chester; Brinton's Quarry.

— Nottingham Barrens.

†213. *HELIANTHUS GIGANTEUS* L.

Common in moist depressions, greenbrier thickets, or on banks.

Delaware.—Mineral Hill; Middletown Barrens; Williamson; Wawa.

Chester.—Cedar Barrens; West Chester; Unionville.

— Nottingham Barrens.

214. *HELIANTHUS DIVARICATUS* L.

Local or frequent on dry open barren or banks.

Delaware.—Williamson.

†215. *SENECIO BALSAMITÆ* Muhl.

Common on dry open barren.

Delaware.—Fawkes Run; Mineral Hill; Williamson; Wawa.

Chester.—Sugartown Barrens; Serpentine Ridge; Cedar Barrens; West Chester; Sconnelltown; Brinton's Quarry; Unionville.

— Nottingham Barrens.

216. *CIRSIIUM DISCOLOR* (Muhl.) Spreng.

Occasional on dry open barren or edge of thicket.

Delaware.—Mineral Hill; Williamson; Lenni.

Chester.—West Chester.

†217. *CIRSIIUM MUTICUM* Michx.

Frequent in moist depression, greenbrier thicket.

Delaware.—Mineral Hill; Williamson.

Chester.—West Chester.

— Nottingham Barrens.

II. OCCASIONAL SPECIES OF THE CONOWINGO BARRENS, MOSTLY
STRAGGLERS FROM SURROUNDING FLORA.

1. *ASPLENIUM FILIX-FŒMINA* (L.) Bernh.

Delaware.—Williamson.

2. *DRYOPTERIS NOVEBORACENSIS* (L.) A. Gray.

Delaware.—Fawkes Run.

3. *DRYOPTERIS MARGINALIS* (L.) A. Gray.

Chester.—Cedar Barrens.

4. *PHEGOPTERIS HEXAGONOPTERA* (Mx.) Fée.

Delaware.—Williamson; Wawa.

5. *TYPHA LATIFOLIA* L.

Delaware.—Williamson.

6. *ANDROPOGON VIRGINICUS* L.

Delaware.—Lenni.

7. *PASPALUM CIRCULARE* Nash.

Delaware.—Lenni.

8. *PANICUM CAPILLARE* L.

Chester.—Cedar Barrens.

9. *PANICUM GATTINGERI* Nash.

Chester.—Cedar Barrens.

10. PANICUM VIRGATUM L.
Delaware.—Lenni.
11. PANICUM MICROCARPON Muhl.
Delaware.—Williamson.
12. PANICUM LINDHEIMERI Nash.
Delaware.—Middletown Barrens.
13. PANICUM TENNESSEENSE Ashe.
Delaware.—Middletown Barrens.
14. PANICUM COMMONSIANUM Ashe.
Delaware.—Wawa (C. S. Williamson).
15. PANICUM ADDISONII Nash.
Chester.—Brinton's Quarry.
16. PANICULARIA NERVATA (Willd.) Kuntze.
Delaware.—Williamson.
17. CYPERUS DIANDRUS Torr.
Chester.—West Chester; Unionville.
18. DULICHIMUM ARUNDINACEUM (L.) Britton.
Delaware.—Williamson.
19. ELEOCHARIS PALUSTRIS GLAUDESCENS (Willd.) A. Gray.
Chester. West Chester.
20. SCIRPUS CYPERINUS (L.) Kunth.
Chester.—Nottingham Barrens.
21. TRADESCANTIA VIRGINICA L.
Chester.—Cedar Barrens.
22. SALOMONIA COMMUTATA (R. and S.) Britton.
Delaware.—Williamson.
23. HYPOXIS HIRSUTA (L.) Coville.
Chester.—West Chester.
24. PERAMIUM PUBESCENS (Willd.) MacM.
Delaware.—Middletown Barrens.

25. *ACHROANTHES UNIFOLIA* (Michx.) Raf.
Chester.—Nottingham Barrens.
26. *CARPINUS CAROLINIANA* Walt.
Chester.—Cedar Barrens.
27. *QUERCUS RUBRA* L.
Delaware.—Williamson; Lenni.
28. *QUERCUS VELUTINA* Lam.
Chester.—Unionville.
29. *BÆHMERIA CYLINDRICA* (L.) Sev.
Delaware.—Williamson.
30. *POLYGONUM SCANDENS* L.
Delaware.—Lenni.
31. *POLYGONUM SAGITTATUM* L.
Delaware.—Williamson.
Chester.—Unionville.
32. *POLYGONUM ARIFOLIUM* L.
Delaware.—Williamson.
33. *BENZOIN BENZOIN* (L.) Coulter.
Delaware.—Williamson.
34. *RUBUS OCCIDENTALIS* L.
Chester.—Unionville, yellow fruit.
35. *RUBUS VILLOSUS* Ait.
Delaware.—Blue Hill.
36. *AMELANCHIER CANADENSIS* (L.) Medic.
Chester.—Unionville.
37. *FALCATA COMOSA* (L.) Kuntze.
Delaware.—Williamson.
38. *OXALIS VIOLACEA* L.
Chester.—Cedar Barrens.
39. *OXALIS STRICTA* L.
Delaware.—Williamson.

40. EUPHORBIA MACULATA L.
Delaware.—Wawa.
41. EUPHORBIA NUTANS Legg.
Delaware.—Lenni.
42. EUPHORBIA COROLLATA L.
Delaware.—Mineral Hill; Lenni.
43. RHUS TYPHINA L.
Delaware.—Wawa.
44. CELASTRUS SCANDENS L.
Delaware.—Williamson.
45. IMPATIENS BIFLORA Walt.
Delaware.—Williamson.
46. VIOLA PALMATA L.
Delaware.—Mineral Hill.
47. PARSONSIA PETIOLATA (L.) Rusby.
Chester.—Sugartown Barrens.
48. SANICULA MARYLANDICA L.
Chester.—Unionville.
49. CORNUS ALTERNIFOLIA L. f.
Chester.—“Willistown Barrens” (C. S. Williamson).
50. PYROLA AMERICANA Sweet.
Chester.—Unionville.
51. PYROLA ELLIPTICA Nutt.
Delaware.—Williamson.
Chester.—Unionville.
52. CHIMAPHILA MACULATA (L.) Pursh.
Chester.—Unionville.
53. CHIMAPHILA UMBELLATA (L.) Nutt.
Chester.—Unionville.
54. KALMIA LATIFOLIA L.
Delaware.—Williamson.

55. *EPIGÆA REPENS* L.
Chester.—Unionville.
56. *POLYCODIUM CANDICANS* (C. Mohr) Small.
Chester.—Sugartown Barrens (E. B. Bartram).
57. *APOCYNUM MILLERI* Britton.
Delaware.—Mineral Hill.
58. *ASCLEPIAS SYRIACA* L.
Delaware.—Wawa.
59. *PHLOX PILOSA* L.
Delaware.—Williamson.
60. *TRICHOSTEMA DICHOTOMUM* L.
Delaware.—Wawa.
61. *SCUTELLARIA PILOSA* Michx.
Chester.—Unionville.
62. *SCUTELLARIA INTEGRIFOLIA* L.
Delaware.—Mineral Hill.
Chester.—Cedar Barrens.
63. *CUNILA ORIGANOIDES* (L.) Britton.
Delaware.—Fawkes Run.
64. *CHELONE GLABRA* L.
Delaware.—Williamson.
65. *LEPTANDRA VIRGINICA* (L.) Nutt.
Chester.—West Chester.
66. *DASYSTOMA FLAVA* (L.) Wood.
Chester.—Cedar Barrens.
67. *CASTILLEIA COCCINEA* Spreng.
Delaware.—Williamson.
68. *GALIUM TRIFLORUM* Michx.
Delaware.—Williamson.
69. *GALIUM ASPRELLUM* Michx.
Delaware.—Williamson.

70. *SAMBUCUS CANADENSIS* L.
Chester.—Unionville.
1. *VIBURNUM PRUNIFOLIUM* L.
Delaware.—Williamson.
72. *LACTUCA SPICATA* (Lam.) Hitchc.
Delaware.—Williamson; Lenni.
73. *NABALUS ALBUS* (L.) Hook.
Delaware.—Williamson.
Chester.—Sugartown Barrens.
74. *ASTER CORDIFOLIUS* L.
Delaware.—Williamson.
75. *ASTER PUNICEUS* L.
Delaware.—Fawkes Run.
Chester.—Unionville.
76. *ERECHTITES HIERACIFOLIA* (L.) Raf.
Delaware.—Williamson.
77. *CIRSIUM PUMILUM* (Nutt.) Spreng.
Delaware.—Middletown Barrens.

III. SOME PROMINENT INTRODUCED SPECIES.

1. *SYNTHESISMA LINEARIS* (Kroek.) Nash.
Occasional on dry open barren.
Delaware.—Mineral Hill.
Chester.—Marshallton (B. Long).
2. *ANTHOXANTHUM ODORATUM* L.
Common on dry open barren.
Chester.—Serpentine Ridge.
3. *ERAGROSTIS PILOSA* (L.) Beauv.
Occasional on banks, etc.
Delaware.—Lenni.
4. *POA PRATENSIS* L.
Common on dry open barren.
Chester.—Cedar Barrens; West Chester; Unionville.

5. *FESTUCA OCTOFLORA* Walt.

On dry sandy exposures.

Delaware.—Blue Hill.

6. *STENOPHYLLUS CAPILLARIS* (L.) Britton.

Probably introduced, on railroad ballast and barren ground.

Delaware.—Williamson (A. MacElwee).

Chester.—Marshallton (B. Long).

7. *ARENARIA SERPYLLIFOLIA* L.

On dry sandy banks.

Chester.—Sconnelltown.