Mr. Toole—Ours is clay soil. Whenever we gather anything like the walking fern, or things that seem to depend altogether on leaf mold, we are sure to get a good supply along with it and tuck it in the corners and all around it and see that it is well supported with what it needs, anything that gives us humus. By humus I mean the rotted matter after it has turned black; it need not be direct from the woods, provided you have that style of soil that has a great deal of decayed vegetable matter in it.

Dr. Everett—Do you plant near bushes, or trees, or larger shade?

Mr. Toole—Well, I have planted only near the house, with the exception of under one tree, but then as I have observed, they will do well if they have fairly good shade and if they are kept away from things that will overgrow and overrun them. You need not be confined to the house, but it is well to avoid a place that has a sharp sweep of wind. If not given a fair amount of shade they will live and grow, but still seem to lose their delicacy, they seem to grow more hard and stiff.

Dr. Everett—Don’t you find the need of winter protection?

Mr. Toole—Well, where you have as many trees and shrubs around as is generally the case, you do not need to give any winter protection. The dropping of the leaves around them, if you are not too neat, do not clean them up to much, will afford sufficient protection.

SOME NATIVE FLOWERS WORTHY OF CULTIVATION.

Dr. E. Everett, Madison.

Our native flowers are so numerous and beautiful and so large a number naturalize well, that I can mention only a few of them which will repay a moderate effort to maintain in our gardens.

I shall dwell principally upon how this can be successfully done, and thus be within the reach of any flowerlover.

The first and main condition to keep always in mind, is to give your plant the conditions as to soil, sun, shade, and moist-
Cystopteris fragilis. Kilbourn, Wis. Asplenium Trichomanes.
ure, as near to its natural habitat as possible. Some plants will live anywhere and thrive more or less well, others must have certain conditions or die. The flowers growing in the open in the sun all day as on our prairies, and along the railroads have a thick matting or protection in the wild grass roots and decayed vegetation, which during the growing period and summer's heat, keeps the soil moist, loose, and highly fertilized, and also provides a great protection through our long freezing and thawing winter.

Those plants in complete or partial shade, have the yearly quantity of leaves as a protection and source of fertilization, and an atmosphere of moisture from acres of shade. Thus we observe that a winter's protection is imperative and also a summer's mulch of surface earth or other material and a loose condition of soil for root development, for the maintenance of a fine specimen plant. No watering is necessary except for plants from a moist habitat, or where you cannot give the natural shade. These must have not only moisture but a soil rich in phosphorus and potash, and of sufficient humus.

Try only those plants that the conditions of your garden or grounds will grow well. All others will be vexations, disappointing, and a useless expenditure of time, money and strength. An expert can assimilate conditions and give suitable requirements in substitution, but he knows how to use them, and when not to try the impossible. There are plants like some people, that you cannot provide with an agreeable environment. You have to leave them alone and agree with the poet when he says:

"Full many a flower is born to blush unseen
And waste its sweetness on the desert air."

The most successful method of transplanting the majority of wild flowers, is to remove them in their dormant state at the end of their season's growth. Some, though not so many, do well if moved in the early spring when first appearing. An expert takes them at any time. With the roots remove as much soil as you can, the more the better. Never let the roots be exposed to the air after being taken up; keep the soil firmly packed about them. Prevent the plant from wilting if possible. Set out late in the afternoon shade for a few days. Reshade at the first appearance of wilting. Moisten the soil somewhat after setting out, and in a few days as the plant appears vigorous, soak the ground. The earth for newly set plants should neither be dry nor wet. A good way is to let a
pail or so of water soak away where you will set a plant, and to spread an inch of dry earth over the surface soaked.

Our most beautiful and choice wild flower seems to be of the terrestrial orchids, the Cypripedium, (Ladyslipper, Moccasin flower). The origin of this botanical name is from two Greek words meaning an ancient name for Venus, the Divine Mother of the Romans, and a sock or slipper—Lady Slipper. The Indians of North America called it the Mawcahsum or Makkasin Flower, resembling little Indian moccasins. This name seems most appropriate for this country, and Lady’s Slipper for Europe.

I will mention a few varieties for cultivation: C. Spectabile, or Reginae, C. Parviflorum (small yellow), C. Candidum, (small white). The yellow varieties are the most successful in transplanting. I know of gardens where they have been blooming successfully over ten years. The Spectabile requires more of its native environment or condition. In one garden it has been growing some six years. The plants are in the full sun 1-6 P. M. The stems are not as high as in the woods, though the flowers are quite as large. But plant and bloom are very vigorous. These plants are along a vine covered porch amidst ferns, trilliums, and other wild plants, making a matted shade about 6 inches from the ground that the sunlight never penetrates and hiding the soil from view.

I am most successful in growing Cypripedia amongst ferns on the north side of the house. This soil is one-third sandy leafmold, 1-6 two year old cow manure, 1-6 one year rooted sod, 1-3 garden soil. This is one foot deep on a clay subsoil. The variety Spectabile does not take kindly to transplanting. It does not seem to have the vitality of the yellow, even in its native haunts. Magnus, a German scientist, in recent investigations on the Fungus—Mycorrhiza, found in the Coralroot Orchid,—Corallorrhiza—says: These spores live in the fleshy roots of the Coral Orchid, and are supposed to keep the plant alive or well nourished. He and Frank also advance the idea, that the smooth and fleshy roots of this species and those of the Cypripedium, are thus fleshy and smooth and in a mass because they do not need the hairy filaments growing from them to secure sufficient nourishment in going far and near. Hence the principal reason these plants live but a short time when transplanted, is that the soil has not the conditions for the fungus—Mycorrhiza. All European botanical gardens as yet fail to produce a bog condition that the Algae will thrive in. The Bog soil is analyzed and reproduced, bog soil is removed.
Adiantum pedatum, Maidenhair fern, Kilbourn, Wis.
intact and still not the results obtained as in its native haunts. This is true of mineral waters. A chemist will analyze a water to every proportion. He will put these exact amounts or ingredients together, yet this artificial mineral water will not have the efficiency of the natural mineral water. Oftentimes it is worthless. This reminds us of what Burns says:

"The best laid plans o' mice and men
Gang aft a-glee."

Such are the disappointments of the ambitious man. But he must keep on, allying science to his ultimate success.

One thing we notice in the haunt of the two Cypripediurns, Pubescens and Specatible, they are never midst underbrush, but under or near trees. Oftentimes I have seen them growing out from the earth in the crotch, where the roots of an oak leave the body of the tree, and on rotted logs, or at their sides on the ground. These plants are from seedlings and this protected situation preserves them. Our Cypripedium are largely dependent upon seed for their perpetuation. I used to put my Moccasin flowers under the shade of bushes, as Lilac, Syringia, Spirea, Roses, Fowering Almond, etc. Every one of them, some two hundred, came to naught in one to three years. They were mostly planted with 6 inches of soil taken out with each plant and sent in by freight in 300 to 500 pound lots. Two heavy sods were sent from Northern Michigan containing 10 C Spectable—they died under a lilac bush. Those that are blooming vigorously are the Pubescens and Spectable under a small elm, and amongst ferns in another location.

As in the woods the upper mass of roots must be 4 in. below the surface. In August or September put on a mulch of one year old lawngress cuttings or decayed vegetation, old chip dirt with no sawdust in it, or rotted oak stumps. For protection during the winter, cover with rye straw 4 to 6 in. after the ground is frozen an inch or two. Remove the straw after the frost has gone from under it and there is no danger of the ground freezing again. A month later cover with an inch of cow manure two years old, covering this with one inch of sand. You will be repaid by a fine specimen of whatever has its abiding place in this retreat. The wild flowers on the north side of my house are soaked every three to five weeks, for hardly any rain comes to this spot. I find that a porch between these plants and the foundation wall of the house is conducive to a more vigorous growth, as the soil under it acts as a reservoir for moisture. While the limestone wall is always moist it

2—Hort.
gives none back. My best blooming C. Pubescens this year were in the sun 9-12 A. M. The plants were very vigorous and had shorter stems, but the blooms were as large as any from the woods, and a deeper, richer, yellow, the whole flower being much thicker in texture.

The varieties of C. can be forced for winter blooming most successfully.

The C. Spectabile or Reginae is truly the queen of the Cypripediums, tall, 2-3 feet high, with its broad light-green leaves crowned by a most beautiful moecasin flower of a clear pure white and a large blotch of bright rosy carmine in its front. You need to see them growing in the open or deeper woods, moist meadows and peaty bogs, to be fully impressed by their beauty and stateliness. You admire and hesitate to remove them, again admire and revel in the sight of all that are in view. Thus you use all your spare time, and say to your long stout transplanting knife, "You Vandal, spare that plant." At last your knife is suddenly plunged into the earth 10 in. and so on, leaving only such plants as you cannot carry away with you. The C. Candidum, growing on boggy or peaty marshes is small and very fragrant. The C. Parviflorum growing with the C. C., is an intergrade of the C. Pubescens and also is very fragrant. These two varieties also transplant very well.

Among the earliest spring flowers appear the Hepatica Tri-loba, white and lavender. The Bloodroot, (Sanguninaria), is another, pushing up its white flowers and twisting and folding them up for the night. They will grow almost anywhere, better in a shady location. These two force easily. The Dicentra Cucullaria (Dutchman’s Breeches) are unique, and coming early are very acceptable. They will grow best in partial shade. Dodecatheon Media (American Cowslip, Shooting Star) resembles Cyclamen. It responds to cultivation quickly, and will thrive in any soil or location, but best in a rich light loam, or in deeply upturned sod. I have stems 18 in. high, the size of a lead pencil. As they die down early, they will give space to other plants. I saw a fine effect in Lincoln Park, Chicago, in a circular bed of alternate rows of Shooting Stars and the dwarf Delphinium. They were very large and fine and just past their zenith as the Delphinium came out.

The Trillium (Wake-Robin, Woodily Birthroot), is amongst the characteristic and beautiful flowers of our American woods. It does best in rich moist wood mold, or give them a rich soil in partial shade, but they must have a loose moist soil and
Onoclea sensibilis. Sensitive fern, Kilbourn, Wis.
planted 6 inches deep. Trilliums are amongst the relatively few plants that are very showy and yet not coarse. They should be more commonly used. They are easily forced. The T. Grandiflorum, is the largest flowering variety. In Michigan a monstrous form is found, some 18 in. high. Grandiflorum is highly prized in Europe, and is imported in quantities to those private gardens for which England is so famous.

A few dozen make a fine showing for May and June. To produce the finest flowers, they should be gathered when the buds are full grown, but not open. Cut as long stems as possible, keep at a temperature not over 60 and fully supplied with water. They will expand to a larger size than if grown in the woods. They are easily forced. Seeds will produce blooming plants in 2–3 years.

Aquilegia (wild Columbine). The exquisite variety A. Canadensis was transplanted from the Virginia Colony to England for the gardens of Hampton Court by a kinsman of Tradescant, gardener and herbalist to Charles I. Dancing in red and yellow petticoats to the rhythm of the breeze, along the ledge of overhanging rocks—how attractive to the bumblebee. They seem more beautiful in Nature's garden than anywhere else. They naturalize well, but needing new plants yearly, and a winter's protection. A. Coerulea (Rocky Mountain Columbine), blue and white is very beautiful, showy and hardy. It is worthy the best position in our rock garden, and in choice mixed borders where the soil is free and deep. It is not perennial in all soils; therefore, let some plants go to seed yearly. Colombines are most effective in separate masses, and of one kind. In partial shade in sheltered nooks this variety in California grows some 6 ft. On the mountains of Colorado shorter, but a larger flower.

Tallest and most prolific of bloom among our native lilies and the most variable in color, size, and form, is the Lillium Superbum (Turk’s Cap, Turban Lily). Its identity is sometimes nearly merged into its Canadian Sister, L. Canadense. The Turk's Cap L. is not bell shaped at maturity like the L. C., it should be open much farther, until the six points of its perianth curve so far backward as to expose the stamens for nearly their entire length. One of the purple-dotted divisions of the flower measures 2½–4 in. in length. These flame colored lilies are 3–7 on a stalk, but under skillful cultivation, 40 will crown a stem 9 ft. high. L. Canadensis is a lighter yellow, its stem is shorter, and fewer buds. These lilies naturalize most successfully. The culture of lilies is important, but the ar-
rangement and grouping are even more so. They need a rich loamy soil, with some sand and leaf mold or peat. They should be planted 6–8 in. deep. A summer’s mulch of decayed lawn or other grass. Protection during the winter is imperative. Two-year old cow manure, chip dirt, or rotted oak stumps. Peat is better. These lilies are best grouped among shrubs where their brilliancy is heightened by a back-ground of green. Another effect most charming is along borders. But lilies are beautiful anywhere. Their stateliness and grace, with their brilliant and delicately colored flowers, strongly appeal to the eye, and to the imagination as well.

Liatris, (Blazing Star, Button or Snakeroot) is a hardy perennial. They respond readily to cultivation. Their handsome showy wand like spikes, 1–4 ft. high, of rose red purple flowers, are most effective amidst white and yellow, as the native Aster, Golden Rod, Boltonia Asteroides.

They are propagated by division in the spring, or seed in the autumn, varieties best for cultivation are the Squarrosa, Scariosa, Spicata and Pyenostachya, (Kansas Gay Feather). They are indigenous to North America. Fifteen or more species have been found all of which will thrive in our gardens.

Other successful plants I will give a list of, Corydalis Glauca, biennial allied to the Dutchman’s breeches with finely cut foliage of a similar character. They grow anywhere on the rocks or in rich soil, always seeding. I have them coming up variously in my garden.

Petalostemon varieties; candidum and purpurinum are best known, 1–2 ft. high. They are perennials seen along railroads, and prairies.

They thrive in any soil, but are found in a loose gravelly earth. Their roots are long, many and fibrous.

Solomon’s Seal, (true and false), Spring Beauties Bellwort, Valerian. Violets, many varieties but I am very fond of the Pedata, Striata, Viola Pubescens, yellow (downy) Blanda, sweet and white, Lanceolata, Baptisia, (blue and white), Wild Geranium or cranesbill. Tradescantia Virginica, (spider-wort). Anemones; Canadensis, Rue; Phil; Wood Quinquefolia. Lobelia syphilitica, Lobelia Cardinalis, Mertensia Virginica, Jack in the Pulpit.

Mints: Canadensis, the only native mint. Mountain Mint, Monarda Didyma and Fistulosa.

Enfatorium; Purpureum and Album; Marsh Marigold.

Gentian: white and blue (closed and open). Meadow Rue, Mandrake.
Onoclea sensibilis with fruit (Sensitive fern), Kilbourn, Wis.
Summer Meeting.

Sarsaprilla, Shin Leaf, Tansy; Princess Pine, Helenium Autumnale, Vervain, blue and white; Yarrow, white and pink; Spikenard, Asralia Racemosa.

Blue Flag, Iron Weed (Veronica Novaboracens); Avena Trifolium, Evening Primrose (Oneothena Biennis).

Aster, (Starwort, Michaelmass Daisy). There are few classes of plants that afford better material than the native aster for hybridization; it responds most readily to cultivation. There are some 200 species, about 150 of which are in America. Some species grow in the Himalayas, 15,000 feet above the sea. This aster is seen more in our gardens now that an increasing demand is abroad for native flora, especially perennials. In England particularly, have they been valued for a century or more. There is a quiet beauty about the better varieties, with their varying color, form bud and bloom. They are most decorative for cutting. They and the golden rod are the best known and appreciated of our native flowers, adding greatly to the beauty of our autumn landscapes. Every garden should have a few varieties that do not spread rapidly. I know from sad experience that some varieties will spread all over one's grounds in 2 or 3 seasons. These beautiful, vigorous perennials are generally blueish and white, and most showy in masses, planted in half neglected places, in copses and among groups of shrubs. They should not be as high as the surrounding shrubbery. Golden rod, mixed in, makes a beautiful autumn effect in the open woods, as does cosmos in the more exposed places. None of these plants require staking, care, or winter protection, and they have no diseases—most valuable considerations. By annually dividing, manuring the ground, and giving plenty of room, their blooming is longer and grander. You maintain a better bloom each succeeding year by not allowing the seed to mature. I will mention a few good varieties: A. Longifolius is most showy, growing in the pyramidal form, completely covered with bright, rose-colored flowers, until frost; B. Shortii is tall, and has large blue flowers. Ericoides, white, one of the earliest and prettiest, a great favorite in England, needs the full sun, and where the roots can penetrate deeply. Amelius, variety Bessarabicus (a Russian Starwort), one of the best and largest purple species, comes in August and September. Horizontalis, rosy lilac; Turbanallus, a soft lavender; Grandiflorus, a violet blue; Paniculata; Patens or Purple Daisy, purple blue early in August into October; Tarmicoides, white; the Nova Rubra, bright rose colored: the Nova Angliae, large bluish-purple, yellow
center, is most familiar to us. Every garden should have this grand variety. This aster and Novi-Belgii are the best for pot culture, especially the latter, which gives a large flower, and a longer period of bloom. Cuttings and offshoots in the early spring make large plants by autumn; eight to twelve inch pots should be used; their chief need is quantities of water. These asters grow in a variety of soils, which can be easily observed. A most hardy perennial aster is the popular Stokes Blue, Cyannae. This variety is a native of our southern states, but in order to be appreciated it had to be reintroduced from Europe, having been known there since 1764.

Solidago. (Golden Rod). Few American wild flowers are better known than Golden Rod and Asters. They play an important part in beautifying our autumn scenes. The species is very large and is found in every variety of soil and location. You see them everywhere, even in swamps and barren stretches of sand. Beginning to bloom in July, they continue until November when most of our trees have lost their foliage. It is a gross feeder and impoverishes any good border, even exterminating valuable plants. They are best amongst shrubery or in a copse. The best varieties S Altissima, S. Canadensis, S. Grandiflora, S. Nutans, S. Multiflora, S. Rigida, S. Sempervivens, S. Speciosa, S. Patula, S. Rigosa, S. Juncea, S. Lanceolata. I have the Canadensis and Speciosa growing 8 ft. high. They improve by transplanting.

Bryant’s reference to the golden rod in his beautiful lines in the “Death of the Flowers,” is particularly applicable to the latest S. to bloom, S. Petiolaris.

“The wind flower, the violet, they perished long ago.
And the wild rose and the orchis dies, amid the summer glow;
But on the hill the golden rod, and the aster in the wood
And the yellow sunflower by the brook, in autumn beauty stood,
Till fell the frost from the clear cold heaven as falls the plague on men,
And the brightness of their smile was gone, from upland, glade, and glen.”
Asplenium marginale, Kilbourn, Wis.
DISCUSSION.

Mr. Tiplady—You have mentioned enough of the native perennials for any one to take a list from. I would like to ask you, Doctor, what you find best for a ground cover? It is very important for shrubbybery and tall growing specimens of all kinds to have a ground cover of some kind, in order to cover up the bare ground, and I would like to know what is the best thing for that purpose?

Dr. Everett—I think a very pretty thing is Corydalis, I do not know the common name of it; it comes early and blooms all the season and it takes a hard frost to kill it. I think it is a very beautiful thing, something in the form of the gypsophila.

Mr. Tiplady—I would like to say for the information of the members here that for a ground cover I find that Nepeta glechoma and Lysimachia nummularia are two of the best ground covers that we have. The first mentioned is called, as a local term in England, Ground Wave, and the other one I speak of is called, locally, Creeping Jennie, and it is also of a semi-aquatic nature.

Mr. Toole—in regard to the lysimachia, I always advise people that they had better not get it around their grounds or lawns, unless they have something that they want to cover up, but in the ordinary garden it is an abominable weed.

Mr. Tiplady—The lysimachia is one of the most useful little things we have. For instance, where a drive runs along the shady side of a residence where grass will not grow, it can be used as an edging. Also in formal garden work where the beds are divided by old-fashioned stepping stones, the lysimachia can be used with good effect.

Mr. Moyle—I am willing to admit to the gentleman from Lake Geneva that this plant is a valuable one, yet, like Mr. Toole, I want to warn people against planting it. It is like Creeping Charley, that is the plant that you find in the back yard and everywhere. If you have a lot of rock that you want to cover, that is the thing to plant, but an ordinary man with a small garden does not want to plant the thing, because it is a terrible pest; it will cover everything, fences and stones and everything that comes along.

The President—I would like one of our friends from Lake Geneva to give us a brief history of this Victoria Regia; it would be interesting, I think, to the audience that do not know the plant so well.
Mr. Tiplady—The Victoria Regia, this wonderful giant water lily, is a specimen from the Botanical Gardens at St. Louis. Along with the specimens of the leaves we have a box of water lily flowers, two of which I find are the Victoria Regia. It grows wild in the Amazon River and was shown as a specialty at Kew Gardens when I was there in 1885. The leaf turned up on its edges might assume an artificial aspect, or foreign, but there is nothing artificial about that turning up of the leaf at all, that is perfectly natural, and the under side of the leaf is covered with air globules; from what examination I have made of it, they give the leaf buoyancy enough to carry a child. I saw two boards spread across the leaf at the gardens at Kew, on these two boards was a chair and on that chair was a little girl about six or eight years old.

I also noticed Victoria Regia growing in Lincoln Park in an outside pond artificially heated. This pond had a pipe running around it, supplying heat to the water. Of course I do not expect very many of my listeners here now will ever attempt to grow Victoria Regia; it is a cinch you cannot grow it in a washtub, but where these come from they can grow it; they have plenty of room and plenty of experienced help, which is necessary in growing this wonderful lily. Mr. Strombeck, of Lincoln Park, has had some seeds of the Victoria Regia in the tank in the greenhouse and I happened to be with him when he was examining those seeds after three years of submersion, and out of 25 or 30 seeds he found only three germinated, and others showing signs of germination, which goes to show that at least three years are necessary for the germination of the seed.

THE MISSOURI BOTANICAL GARDEN,
William Trelease, Director,
St. Louis, Mo., September 4, 1900.

Mr. Cranefield:
I am delighted to learn from your favor of the 31st, addressed to Mr. Irish, that the Nymphaeas and Victorias added to the success of your Baraboo exhibit.

I trust that your official records may show clearly that the exhibit was made by the Superintendent of Tower Grove Park, St. Louis,—adding, of course, if you wish to,—through the interest of the Missouri Botanical Garden; but I should like to make sure that the credit for the plants is placed with the Park.

Very sincerely yours,

WM. TRELEASE.

Mr. F. Cranefield, Secretary.