NYFA New York Flora Association

Quarterly Newsletter

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New York Flora Association Newsletter Summer 2017

Editor's Note: We are leading with a somewhat atypical article for this newsletter, but nonetheless one very pertinent to botanists, thanks, Frank Knight. And thanks to Knowlton Foote for filling us in on Indian Pipe in the next article, and to Steve Young for letting us know about the Adirondack Orchid Project, an effort being embraced by the Adirondack Botanical Society. We also have a note from Joe McMullen, our treasurer, outlining the upcoming Atlas sponsorships and a couple of field trip recaps. And lastly, don't forget the Annual Meeting (see page 11). As usual, we encourage submissions to the newsletter of any kind, at any time.

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New York Flora Association

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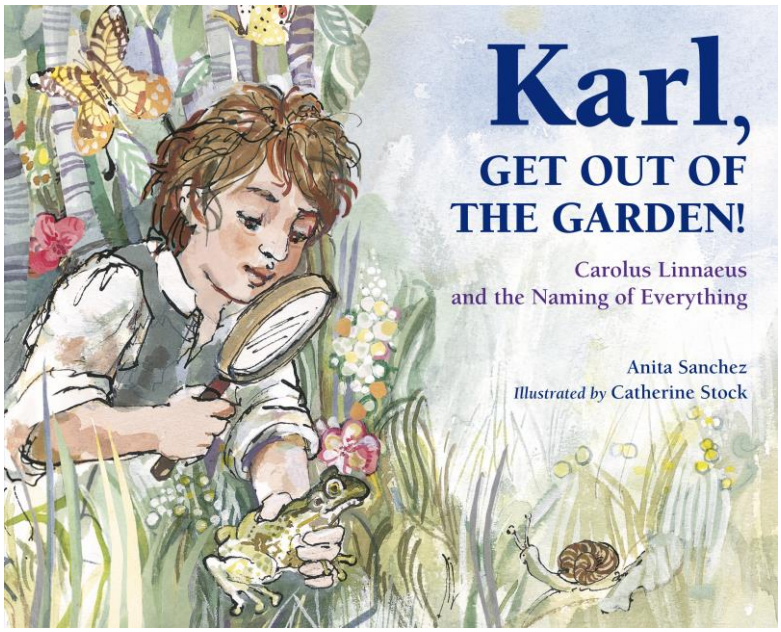
Children's Book Review

By Frank Knight, frankknight@earthlink.net



Karl, Get Out of the Garden! Carolus Linnaeus and the Naming of Everything

By Anita Sanchez and Illustrated by Catherine Stock
Charlesbridge Publishing, Charlesbridge, Watertown, MA
ISBN 978-1-58089-606-1 HC $17.99, E-book editions available
Ages 7-10 . 10 x 8 . 48 pages, Full-color illustrations

Friend and former colleague Anita Sanchez sent me photos she made in Linnaeus' garden in Sweden while researching her latest book, so I eagerly awaited a review copy. What I had not expected was my emotional reaction; I found myself a bit teary-eyed comparing young Linnaeus' (1707-1778) childhood with parallels in my own. Karl was nearly obsessed by the diversity of plants and small animals in his father's garden; mother's admonitions to concentrate indoors on school work went unheeded. Only the threat of apprenticeship to a cobbler convinced Karl that a medical career with its reliance on healing plants was the better alternative.

A similar fascination with all things natural grew as loosened apron strings broadened my horizons from dooryard to nearby natural areas. My challenges, however, were exponentially simpler: I had only to impatiently await in elementary school the adult natural history field guides, based on Linnaeus' work, just coming on the market after WWII. The many species I was finding had exceeded the contents of my children's guides. By marked contrast, Karl had to not only invent, but also gain acceptance for the simple and orderly classification system now bearing his name.

Establishing order from chaos, Linnaeus persisted despite initial resistance from the scientific establishment to gain acceptance for a single genus and (often descriptive) species name for each plant or animal. Karl himself named more than 10,000 species in Sweden and nearby Lapland, in addition to those his students eagerly sent him from their extensive explorations in America and around the world. With good humor, he named a beautiful coneflower (*Rudbeckia*), for a favorite teacher, Olaf Rudbeck, and a weed for one of his early detractors.

The biography of the creator of any monumental concept or invention is fascinating, and both Anita and her Swedish-born illustrator Catherine Stock were up to the task. Anita had championed the ignored or reviled in previous works on dandelions and poison ivy. With many book illustration credits, Catherine drew charming colorful illustrations that help carry the story while child-like sketches of bugs and flowers with Karl's words in script personify this growing influence into adulthood. Words and pictures also jarringly convey Karl's frustration in having to learn the long, descriptive Latin names for each organism after deciding which of many authors' plant name might be relevant, depending on whether the describer's bent was culinary, medicinal or horticultural. The namer's bias, and not the organism itself determined what any living thing might be called.

Karl published *Species Plantarum (Species of Plants)* in 1753 with fame and wealth soon following. Four years later at age 50 he was knighted by Sweden's grateful King Adolph Frederick; and then adopted his formal name, Carolus Linnaeus. Twin flower, a dwarf perennial shrub in the honeysuckle family – his childhood favorite – bears his name (*Linnaea borealis*).

Why 18th century Karl's story for 21st century children?

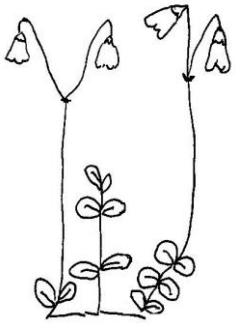
American Literary Naturalist John Burroughs at the dawn of the 20th century lamented that young people found botany a dull study as taught from text books; but outdoors a source of perennial delight. Thanks in part to Burroughs' many thousands of readers, outdoor natural history study became part of many schools' curricula across America. Today with shrinking school-adjacent wild places and fewer educators comfortable teaching outdoors, the need to foster diversity appreciation and stewardship as "perennial delights" is greater than ever.

Tell someone a plant or animal's scientific name and watch eyes glaze and minds tune out. One of many of Linnaeus charmingly inserted script quotes in the text, reminds us: "If you do not know the names of things, the knowledge of them is lost, too." But as DNA-sophisticated as we have become, differing

English local and regional, or even fanciful horticultural variety names will always persist and confuse – all resolved by a single Linnaean system binomial genus and species.

Using simple keys in an illustrated field guide, its author makes learning easier by teaching us to remember the characteristics of the dozen or so plant families we most frequently encounter afield; for example, knowing that any irregularly flowered herb I find with opposite leaves and square stems is likely a mint. Knowing family traits for aster, bean, buttercup, mustard, lily, maple, oak, or rose families provides a shortcut to learning, and remembering, a new species.

Seven pages at the end of the book extend the reader's reach far beyond frequent rereading of Karl's exciting story; these include his legacy, notes on his family's names, notes on the continual updating of scientific classification, a timeline of his life, annotations, resources for young readers, a bibliography, and likely most important, his sense of wonder at everything from whales to beetles to tiny pink flowers to the very end of his long happy life.



Take a look at the circumpolar twin flower in Linnaeus' Coat of Arms, and then seek it in cool upstate woods and bogs spring or early summer!

Indian Pipe, *Monotropa uniflora* L.

by Knowlton Foote (kfoote1@twcny.rr.com)

The history and biology of Indian pipe (*Monotropa uniflora*), a not commonly seen perennial wildflower, is most interesting. The common names Indian Pipe and Ghost Flower give us an idea of its appearance: it looks like a fungus, but is actually a parasitic vascular flowering plant that lives on fungi in the soil. This member of the Heath family (Ericaceae), is native in New York State (Mitchell and Tucker 1997), flowering from June to August. The epithet "Monotropa" comes from the Greek "once turned", and uniflora in Latin refers to its one flower per stem. Its botanical name was given by Linnaeus in 1753.

Range and Habitat

Indian Pipe is a species that needs little light to grow and is found in forests that have a rich leaf compost in areas with deep shade. Forests where it is found include those with a number of our common tree species - beech, birch, maples, oaks, and conifers. Its range is continental: from Alaska in the north, east to Newfoundland, west to Washington state, south to Florida and California, and even into Central America and Asia. Where it is not found is in the arid southwest of the U.S. (Arizona, Nevada, Utah, and South Dakota) (USDA 2017).

Origin of Indian Pipe

Recent research has suggested that Indian Pipe populations in Central America, North America, and Asia are actually distinct from one another. It appears that Indian Pipe originated in Asia (Neyland and Hennigan 2004). The Bering land bridge between Asia and North America was in existence until 3.5 million years ago when the light weight seeds of Indian Pipe could have traveled long distances via wind dispersal.

Description

The flowering stems are 10 to 20 cm tall, with each stem bearing one rather structurally advanced white and translucent flower (Figure 1). The leaves and stem are also white, giving this plant the name of Ghost Flower. The flowering period for each flower is only 1 to 2 weeks. Each flower contains 2 to 4 sepals and 4 to 5 bract-like petals. The end of the petals flare out to give the flower cup a look of an "Indian Pipe." Within each flower are 10 to 12 stamens surrounding a stout style. At the base of each stamen are two nectaries, adding nectar to the base of the floral cup. As a flower emerges, it faces downward. which keeps rainwater from diluting its nectar. As the flower continues to emerge, the stem becomes upright with the flower facing skyward. The color may now be pink, indicating that pollination and possibly fertilization have occurred. Once ripened, numerous seeds are contained in a brown ½ inch long capsule. Seeds are released through slits that open from the lip to the base of the capsule. When the air is dry, the capsule opens to release seeds. When it is wet, the capsule closes, keeping moisture from reaching the seeds.

Pollination Biology

Information on pollination of this wildflower is limited (possibly due to the scarcity of the species). The blooms are pollinated by long- and short-tongued bees, and possibly moths, which go after the nectar at the base of the 10 mm deep floral cup. The stigma is sticky, a factor which may aid in pollination. The composition of the nectar has not been reported as far as I know. Is it a mixture of sucrose, glucose, and fructose like many of our flowering plants?

Photosynthesis

Indian Pipe has no photosynthetic leaves. Its whitish leaves and bracts contain no chlorophyll and have few to no stomates for carbon dioxide to enter the plant from the atmosphere. The plant grows under dense overstories where light intensity is insufficient. The rootlets have virtually no root hairs for water and mineral absorption. As a result, this vascular plant species does not carry out photosynthesis! (In fact there some 3,000 species of non-photosynthetic vascular plants in the plant kingdom; many get their energy from another source - fungi).

Seeds

The seeds produced by each flower are petite and numerous, ranging from 0.6 to 0.8 mm in length (Olson 1980). The embryo of each seed consists of only two cells embedded in the endosperm (Olson 1991). Because of their minute size and their ability to be wind borne, the seeds are often referred to as "dust seeds." The reduced structure suggests very specialized germination requirements resulting in very few seedlings. One of the requirements for germination is that specific fungi be present in the soil.

Root System

The root system is a key to understanding the biology of this non-photosynthetic species. Indian Pipe does not have a fibrous root system as is usually seen in vascular plants, instead it is a spherical ball 1.5 to 3 cm in diameter. Figure 2 shows the root ball of an Indian Pipe photographed from a herbarium sheet at the Bailey Hortorium Herbarium at Cornell. Each ball consists of numerous small, fleshy, almost hairless rootlets, with each rootlet ranging in length from 4 mm to 4 cm (Hirce and Finocchio 1972). The root ball is so compact with fungi and rootlets that soil is almost eliminated. Each rootlet in turn is covered uniformly with a white multilayered fungal sheath called the "mantle." From the mantle the fungi send out branches to invade the surrounding soil and the root cap area of the rootlet. This root-fungal interaction is termed a "mycorrhizal association" or simply "mycorrhiza." Mycorrhizal associations are the most prevalent symbiotic systems on earth (Peterson et al. 2004). It is a relationship that benefits both fungi and plants and represents eons of time of evolutionary development.

Mycorrhizae - Their Importance

The forest soil itself contains a vast network of the mycelia of numerous fungal species. It is difficult to see the mycelia in the soil because of their minute thread-like size. Of significant biological importance, these fungi are attached to the roots of plants. Some 80% of all higher vascular plants studied have mycelial fungi in their root systems. The movement between the fungi and plant is bidirectional, the mycelia providing trees with needed water and minerals obtained from the surrounding soil, and the surrounding trees providing fungi with needed energy (sucrose) from photosynthesis.

Mycorrhizae and Indian Pipe

How does Indian Pipe, a non-photosynthetic plant, obtain its energy? Botanists had long believed that Indian Pipe was a saprophyte living on dead or decaying organic material. Nowadays, botanists believe Indian Pipe (and most members of the Ericaceae) have a different growth process. The process starts with photosynthate being produced by nearby trees, which then goes down into the tree's roots and into a fungal-mycorrhizal relationship. The fungi in this relationship are mainly in the Russulaceae family (Yang and Pfeister 2006). The rootlets of Indian Pipe are also in a mycorrhizal relationship sharing the same fungus. The Indian Pipe then parasitizes the mycelium of the Russulacean fungi to intercept the photosynthate that was produced by the surrounding trees. The exact mechanism of nutrient transfer from the mycorrhizal fungi to the roots of Indian Pipe remains uncertain.

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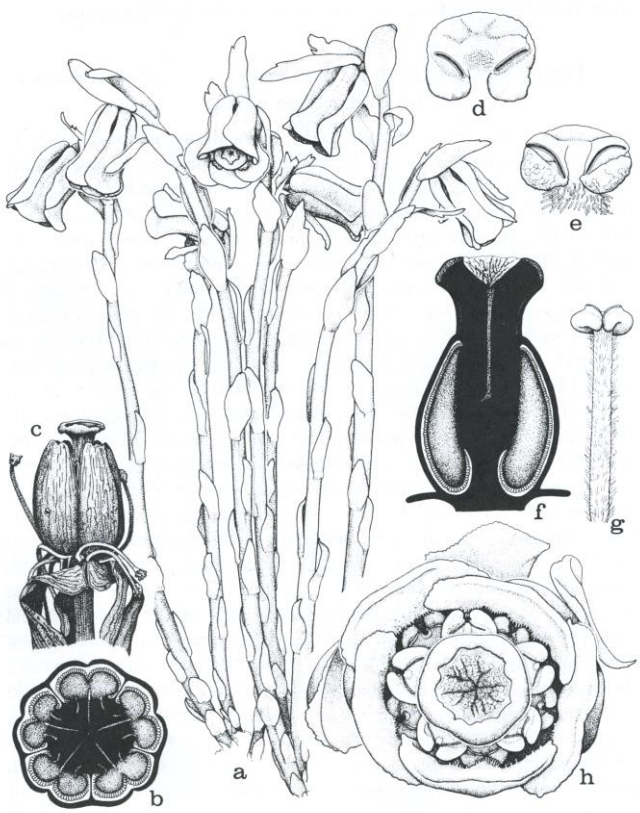

Figure 1. Diagram of *Monotropa uniflora* L. Taken from: Arthur Conquist 1981. An integrated system of classification of flowering plants. Columbia Univ. Press

Figure 2. Photograph of pressed Indian Pipe specimen showing root ball.

The New Adirondack Orchid Survey

by Steve Young, Adirondack Botanical Society

Chuck Sheviak, the now-retired botanical curator at the New York State Museum and orchid expert, spent many years surveying the orchids of New York State. In recent years he expressed his concern about the declining populations of orchids that he was seeing, especially in the Adirondacks. Where he had always seen large populations of ladies'-tresses there were now none. At the same time some new very large populations of orchids were being found, for instance the discovery of thousands of rose pogonias at the Benson Mine by SUNY ESF student Grete Bader.

This year a new volunteer effort of the Adirondack Botanical Society, with participation of the NY Natural Heritage Program and DEC, has begun to try to understand the abundance and distribution of orchids across the Adirondacks. A kick-off meeting was held on April 28 at The Nature Conservancy Office in Keene Valley and was attended by a dozen people interested in participating in this citizen science project to survey for orchids in the Adirondacks. A project called Adirondack Orchid Surveys was created in iNaturalist and participants have already started to enter data. On June 1st, seven people from the group went to the herbarium at the state museum in Albany to record specimen label data for all of the orchid species in the Adirondacks so that we know where specimens had been collected back into the 1800s.

The primary purpose of the Adirondack Orchid survey is to establish baseline data on the number, locations, and abundance of orchid species within the Adirondacks. Through the survey efforts, data will also be collected on population trends, phenology, natural history, and types and severity of stressors. Secondarily, we will check historical records through herbaria specimens and test survey methods for application to a more comprehensive survey throughout New York State. Additionally, this effort will provide opportunities for participation in field botany, educate the public about our orchid species, and provide management strategies to preserve them.

If you would like to be involved in the effort you can join the iNaturalist project and let Steve Young know at adkflora@gmail.com.

Tierney Rosenstock, Theodora Weatherby, Steve Young, and Ray Curran taking data from herbarium specimens at the state museum.

Yellow lady's slippers (*Cypripedium pubescens*) in the Adirondacks. Photo by Ray Curran.

Botanical Trip to Lucky Star Alvar, June 14, 2017

by Steve Young

An enthusiastic group of 22 NYFA members met at the Lucky Star Ranch northwest of Watertown for an enjoyable day of plant identification in the alvar grasslands and woodlands. Thanks to the past flora work of Don Leopold of ESF and Mike Hough of SUNY Cortland and the courtesy of the Garretts, owners of the ranch, we were able to spend the day botanizing this amazing place. The alvar communities contain an assemblage of plants that are seen nowhere else in the state and we were not disappointed. We saw a number of state rare plants and one that had not been recorded for the site before, False Dragonhead, (*Dracocephalum parviflorum*). Below is the list of plants we saw, photographs of some of them, and also shots of people in the field. It was an excellent day, with beautiful weather, and we thank all the participants for their botanical knowledge and expertise.

One of the very attractive wood lilies (*Lilium philadelphicum*) seen on the trip.

The enthusiastic group at Lucky Star Ranch.

Examining a clump of rough pennyroyal (*Hedeoma hispida*).

False Dragonhead (*Dracocephalum parviflorum*), left and *Cystopteris* in a gryke (right).

Lucky Star Plants 6/14/2017

(list compiled by Michael Hough)

Abies balsamea
Acer nigrum
Acer saccharum
Achillea millefolium
Adiantum pedatum
Agrostis scabra
Alyssum alyssioides
Amelanchier humilis
Amelanchier spicata
Anemone acutiloba
Anemone americana
Anemone virginiana
Antennaria neglecta
Anticlea elegans var. glauca
Aquilegia canadensis
Aralia racemosa
Arctostaphylos uva-ursi
Asclepias syriaca
Asplenium trichomanes
Athyrium angustum
Barbarea vulgaris
Berteroa incana
Bromus ciliatus
Bromus inermis
Bromus kalmii
Campanula rotundifolia
Capnoides sempervirens
Carex appalachica
Carex aurea
Carex backii
Carex blanda
Carex brevior
Carex castanea
Carex cephalophora
Carex conoidea
Carex crawei
Carex eburnea
Carex formosa
Carex gracilescens
Carex gracillima
Carex hitchcockiana
Carex hystricina
Carex interior
Carex intumescens
Carex jamesii
Carex laxiculmis
Carex laxiflora
Carex molesta
Carex normalis
Carex oligocarpa
Carex pedunculata
Carex pensylvanica
Carex radiata
Carex rosea
Carex scoparia
Carex sparganioides
Carex tenera
Carex vulpinoidea
Carex woodii
Carpinus caroliniana
Carya ovata
Castilleja coccinea
Celastrus scandens
Chaenorhinum minus
Circaea lutetiana var. quadrisulcata
Clinopodium acinos
Comandra umbellata
Cornus racemosa
Corydalis aurea
Cynanchum rossicum
Cypripedium arietinum
Cypripedium parviflorum var. makasin?
Cystopteris fragilis
Danthonia spicata
Deschampsia cespitosa
Dracocephalum parviflorum
Drymocallis arguta
Dryopteris marginalis
Echium vulgare
Eleocharis compressa var. compressa
Elymus trachycaulus
Epilobium sp.
Epipactis helleborine
Erigeron pulchellus
Eurybia macrophylla
Fragaria virginiana ssp. virginica
Fraxinus americana
Fraxinus nigra
Galium circaezans
Geranium bicknellii
Geranium carolinianum
Geranium robertianum
Geum canadense
Geum fragarioides
Geum triflorum var. triflorum
Glyceria striata
Gratiola neglecta
Hedeoma hispida
Houstonia longifolia
Hylodesmum glutinosum
Hylotelephium telephium
Hypericum perforatum
Hystrix patula
Inula helenium
Juncus dudleyi
Juncus tenuis
Juniperus communis
Juniperus virginiana
Lepidium virginicum
Leucanthemum vulgare
Lilium philadelphicum
Linaria vulgaris
Lithospermum officinale
Lonicera dioica
Lonicera tatarica
Luzula acuminata
Luzula echinata
Maianthemum canadense
Maianthemum racemosum
Medicago lupulina
Micranthes virginiensis
Mitchella repens
Moehringia lateriflora
Monarda fistulosa
Myosotis verna
Nepeta cataria
Oligoneuron album
Onoclea sensibilis
Oryzopsis asperifolia
Ostrya virginiana
Oxalis stricta
Packera paupercula
Penstemon digitalis
Penstemon hirsutus
Phlox divaricata
Picea glauca
Pilosella caespitosa
Pilosella piloselloides
Pinus strobus
Poa compressa
Poa saltuensis ssp. languida
Polygala senega
Polymnia canadensis
Polypodium virginianum
Polystichum acrostichoides
Populus balsamifera
Portulaca oleracea
Potentilla inclinata
Potentilla recta
Prunella vulgaris
Prunus virginiana
Quercus alba
Quercus macrocarpa
Ranunculus abortivus
Ranunculus aquatilis
Ranunculus caricetorum
Ranunculus fascicularis
Rhamnus alnifolia
Rhamnus cathartica
Rhus aromatica
Ribes americanum
Rosa blanda
Sabulina michauxii var. michauxii
Sambucus canadensis
Sanguinaria canadensis
Sanicula marilandica
Satureja vulgaris
Schedonorus arundinaceus
Schizachne purpurascens
Scutellaria parvula var. parvula
Sedum album
Shepherdia canadensis
Silene antirrhina
Smilacina stellatum
Solanum dulcamara
Solidago altissima
Solidago gigantea
Spiranthes magnicamporum (leaves)
Sporobolus heterolepis
Staphylea trifolia
Stellaria longipes
Symphoricarpos albus
Symphyotrichum cordifolium
Symphyotrichum lanceolatum
Thuja occidentalis
Tilia americana
Toxicodendron radicans
Toxicodendron rydbergii
Tragopogon dubius
Tragopogon pratensis
Trillium grandiflorum
Triodanis perfoliata
Triosteum aurantiacum
Ulmus americana
Ulmus thomasii
Uvularia perfoliata
Veronica arvensis
Viburnum acerifolium
Viburnum lentago
Viburnum rafinesquianum
Vicia cracca
Vicia tetrasperma
Viola pubescens var. pubescens
Zanthoxylum americanum

SAVE THE DATE - NYFA Annual Member's Meeting

August 20, 2017 10 am – 4 pm at the Catskill Interpretive Center, Mt. Tremper, NY

Activities will include the presentation of the 2016 Plant Conservationist Award, botanizing at the center or other nearby sites, the Annual Meeting and 2017 Board of Directors election, Steve's Plant Quiz, and more! Lunch will be provided. RSVP with number attending to nyflora1@gmail.com by August 18. Events are open to NYFA members, past and present. Friends and family welcome! In accordance with the Organization and Bylaws of the New York Flora Association, the Nominating Committee has submitted one new nominee for the board: Ed Fuchs, East Aurora, NY. Ed has had an interest in botany and conservation for most of his adult life. He is a past president and an active member of the Niagara Frontier Botanical Society. For the last 10 years, he's been working at the Clinton Herbarium at the Buffalo Museum of Science, to help curate and manage the collections there. Ed owns Wise Oak Floristics and works for the Buffalo and Erie County Botanical Gardens, where he keeps track of their collections.

In addition to a new Director, whose three-year term will commence at the Annual Meeting, the Nominating Committee is recommending that the following current Directors whose terms expire in 2017 return for another three-year term: Molly Marquand, Joseph McMullen, Steven Daniel, and Sean Robinson. Write-in candidates are also accepted. Please cast your ballots by mail, email, or other form of technology, prior to, or in person, at the NYFA Annual Meeting.

Upcoming New York Flora Atlas Sponsorship Program

by Joe McMullen, Treasurer, New York Flora Association

The New York Flora Atlas is a tremendously popular resource of the New York Flora Association. It is free to everyone and is used by individuals around the world. Volunteer efforts by NYFA board members David Werier and Andy Nelson have kept the Flora Atlas vibrant and current over the years.

In other states, similar Plant Atlas programs are supported by state agencies or universities. That is not the case in New York. For years the NY Flora Atlas has been solely supported and funded by the NYFA. The annual hosting cost alone for the Atlas is $2,750 and that hosting cost has been paid by the NYFA, as supported by its membership. While we greatly appreciate the support we receive from our membership, additional support from the users of the Flora Atlas is warranted.

NYFA membership fluctuates annually with between 200 to 250 members paying $20 in dues. While we do receive some appreciated donations from our members, membership revenues are usually less than $4000 annually. So, at an annual hosting cost of $2,750, the Flora Atlas consumes about 70% of our annual membership revenues.

Meanwhile, usage analytics indicate that the Flora Atlas was used by approximately 26,000 individuals in 2016. It was used by people from all over the world. In the first quarter of 2017, the NY Flora Atlas was accessed numerous times by individuals from Canada, United Kingdom, India, China, Australia, and several other countries.

When a valuable product is paid for by a couple hundred members, but used free of charge by over twenty six thousand, something needs to change. What we are proposing is an annual sponsorship program to help support the Flora Atlas.

Through this program, those who benefit from the Flora Atlas or believe in its purpose would have an opportunity to provide support, and in return receive recognition for this support on the Flora Atlas and NYFA websites. There will be several levels of annual sponsorship available, starting at a fairly nominal amount.

We hope that the funds from this program will not only offset the Flora Atlas annual hosting costs, but provide monies to keep the information in the Atlas up-to-date and to further enhance it. Details of the program will be forthcoming later this year.

Field Trip: Tug Hill Botany Weekend

by Anne Johnson

A group of botanists met up on the Tug Hill to do some exploring on the weekend of June 24th and 25th. The field trip was advertised as "In the Footsteps of Hotchkiss". Neil Hotchkiss is the author of the 1932 NYS Museum publication " A Botanical Survey of the Tug Hill Plateau", which contains a discussion of the plants and plant communities as well as an enticing list of plants collected throughout the region. The weather was perfect for our trip, neither too hot nor too cold, and for once not raining.

On the first day we enjoyed perusing a wet meadow replete with lush stands of buckbean (*Menyanthes trifoliata*) and alpine bulrush (*Trichophorum alpinum*) (Fig. 1) before we entered the darker cedar swamp to its north, where we were able to find a good population of broad-lipped twayblade (*Neottia convallarioides*) (Fig. 2) as well as many showy lady's slippers (*Cypripedium reginae*), bog candles (*Platanthera dilatata*), other orchids and other interesting plants (Figs. 3-7). Unfortunately, quite a few of the showy lady's slippers had been chomped off at flower height by deer. After enjoying the fen and another wet meadow across the road (one that contained balsam willow (*Salix pyrifolia*)), and eating a bit of lunch, we reconvened at Parkers and ventured into an alder thicket to search for Hotchkiss's 1927 collection of auricled twayblade (*Neottia auriculata*). We were unable to find any on our short search, though some of us were pleased to encounter a number of just opened Jacob's Ladder (*Polemonium vanbruntiae*) plants. Afterwards Michael Hough brought us over to another road for a look at the rare wild sweet William (*Phlox maculata* ssp. *maculata*), and some more (though unopened) *Polemonium*. On this roadside we were able to compare (and smell, or not smell) Lake Huron bog orchid and northern green bog orchid (*Platanthera huronensis* and *P. aquilonis*).

Figure 1. The meadow bordering the cedar woods east of Parkers.

Figure 2. Broad-lipped twayblade (*Neottia convallarioides*).

Figures 3 and 4. Showy lady's slipper (*Cypripedium reginae*), left and Swamp thistle (*Cirsium muticum*) buds, right.

Figures 5 and 6. Marsh cinquefoil (*Comarum palustre*), left and Cottongrass (*Eriophorum viridi-carinatum*), right.

Figure 7. Tufted hairgrass (*Deschampsia cespitosa*) in the meadow.

The second day we had planned a walk up Inman Gulf, but due to this year's rains, the creek was running much too fast to venture safely down it, so we opted instead to head back up on the hill to explore Page and Monteola via the old Glenfield and Western railroad bed (Fig. 8). We visited the poor fen diagrammed by Hotchkiss in his publication (Figs. 9 and 10) and spent time in the large Page meadows where we encountered masses of *Carex cryptolepis* as well as occasional hybrids (with *C. flava*?). In closing, this author would like to say she was extremely grateful for the tire changing abilities and help freely given by field trip participants at the end of a long day high up on the top of the Tug Hill.

All photos are by Carol Johnson, except the *Neottia*, which was taken by Steven Daniel.

Figure 8. The old Glenfield and Western RR bed as it passes through Whetstone Gulf Reservoir.

Figure 9. The poor fen west of Page, looking South. Apparently little changed (see below).

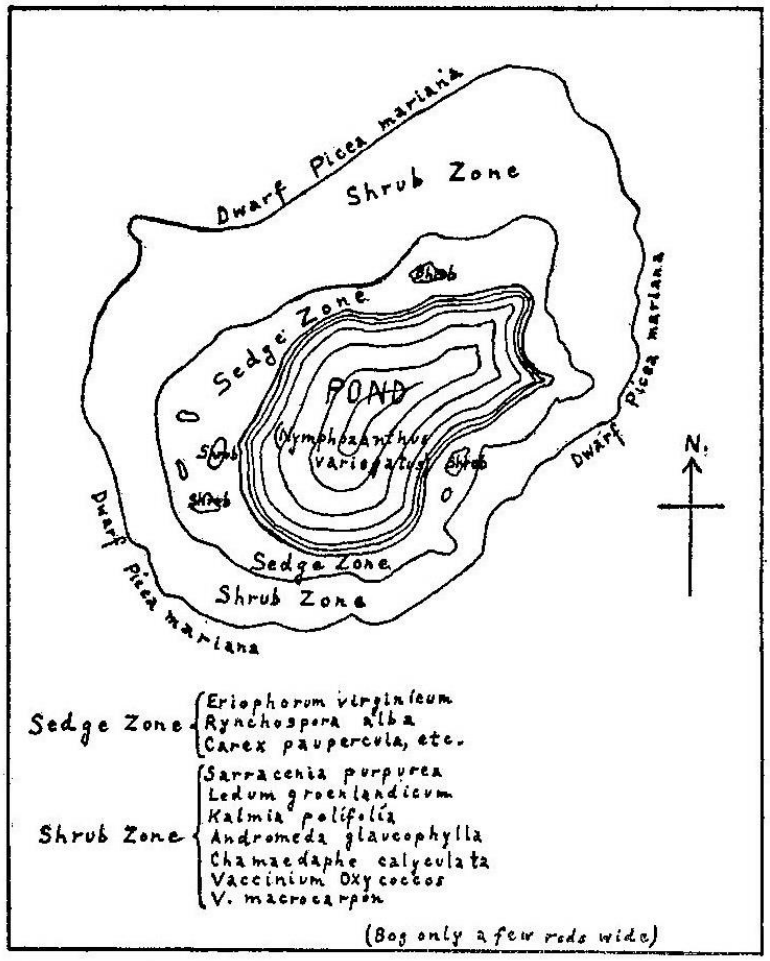

Figure 7 Map of a bog west of Page, showing zonation of the plant associations, and invasion of the sedge meadow by shrubs.

Figure 10. The poor fen west of Page as diagrammed by Hotchkiss in NYS Museum Bulletin No. 287.

2017 Grasses of New York Workshop Review

by Louise Barteau

On June 9-11, at the NY Flora Association/Bailey Hortorium Herbarium sponsored Grasses of NY workshop, David Werier, a Botanical and Ecological Consultant based in Willseyville, NY, shared his expertise in grasses and field identification of grasses with 17 students from a variety of plant and conservation professions and backgrounds.

Friday evening included lab and microscope time at Cornell's Bailey Hortorium and an introduction to grass morphology. The emphasis was on being able not only to name the grass species and/or genus, but to be able to defend that identification with facts. These facts include morphological details of the roots, stems, leaves, ligules, and inflorescences, sometimes in combination with information about habitat and phenology.

On Saturday morning the field session started at South Hill, a 356-acre Cornell University natural area. David introduced each grass species with an emphasis on field characteristics that can help identify genus and species in the field. As we moved from roadside old field to oak hickory forest, we identified *Dactylis*

glomerata, Schedonorus arundinaceus, Anthoxanthum odoratum, Poa pratensis, Holcus lanatus, Glyceria striata, Miscanthus sacchariflorus; Poa compressa, Calamagrostis canadensis, Phalaris arundinacea, Leersia virginica, and *Brachyelytrum aristosum*; at the power line opening, and on the open hilltop we saw *Dichanthelium lanuginosum, Dichanthelium linearifolium, Danthonia spicata*; then back in the forest – *Poa trivialis*. At the swampy forest habitat site we found *Glyceria acutiflora*, in a wet swale we found *Agrostis stolonifera*, and at a roadside pipe discharge the salt loving *Puccinellia distans*.

In the afternoon, the class went to Six Mile Creek, a rich forested conservation area within Ithaca city limits. Six Mile Creek provides drinking water for the City of Ithaca and is also an illegal but popular swimming location. Beginning at the gate with a description of the differences of *Elymus* species, the class went on to encounter *Elymus riparius, Arrhenatherum elatius, Festuca subverticillata, Sphenopholis intermedia, Poa alsodes, Bromus ciliatus, Dichanthelium latifolium, Danthonia compressa, Brachyelytrum erectum, Bromus pubescens, Elymus hystrix, Muhlenbergia frondosa, Poa nemoralis*, and *Microstegium vimineum*. A special side trip led us to a small population of the NYS endangered *Poa sylvestris.* Throughout the afternoon field session, David Werier continued to stress a process for thinking about grasses in the field - what genus of grass might this be - and then - how do we narrow it down to the correct species by using field characteristics. The class also saw a large patch of yellow green Broad Beech Fern (*Phegopteris hexagonoptera*), and along the trail, sickle pod rock cress (*Borodinia canadensis*, formerly *Boechera canadensis* and *Arabis canadensis*.)

On the way to a pleasant collegial dinner at the Taste of Thai in downtown Ithaca, we discussed three small native "weeds" in the Unitarian Church front yard; *Muhlenbergia schreberi,* wire-stemmed Muhly, *Parietaria pennsylvanica*, and *Plantago rugelii.* In the parking lot, David pointed out *Bromus tectorum*, Downy cheat grass, a common non-native invasive brome. After dinner, for those that couldn't get enough, another lab session was held.

Sunday morning also began in the lab, where David had provided extensive herbarium specimens from his collection for identifying and seeing the micro-characteristics that are not as readily visible in the field. For the remaining field session the class headed to Upper Buttermilk Falls State Park, where we encountered *Oryzopsis asperifolia* and *Patis racemosa* for the first time. During this field session, David continued to encourage the students to use a process to identify species, many of which we had encountered earlier in the class. For example, while looking at several *Poa* species the review included which *Poa* is clumped (*P. alsodes*), which has a scabrous upper sheath (*P. trivialis*), which has a flattened stem (*P. compressa*), and which is long rhizomatous, has a relatively short ligule, and a hairy lemma margin *(P. pratensis*), all characteristics that can be seen in the field and help to identify which Poa is which.

The class reviewed *Glyceria striata*, *Brachyelytrum erectum*, *Festuca subverticillata*, and *Sphenopholis intermedia* in the forest before moving out onto a gravel bank in the creek where the class tried to sort out emergent *Dichanthelium*, *Elymus*, *Phalaris*, and *Leersia* species. With each review species David patiently reminded us of the field characteristics that sort out *Festuca* from *Sphenopholis*, *Brachyelytrum* from *Dichanthelium*, *Bromus* from *Elymus*, *Elymus* from *Phalaris*, and *Schedonorus* from *Festuca*.

The class ended with a quick stop by the side of the road to see the highly invasive species *Brachypodium sylvaticum* (nodes retrorsely pubescent, inflorescence lax and arching, soft fuzzy leaves, wintergreen scented roots) where students were encouraged to identify and report its further spread.

The careful preparation, patient teaching, and extensive resources made available by David Werier made this grass workshop a superior learning experience. Many thanks to David Werier, the NY Flora Association, and the Bailey Hortorium for making this workshop possible.

The list on the next page shows the grasses we learned.

Dactylis glomerata
Schedonorus arundinaceus
Anthoxanthum odoratum
Poa pratensis
Holcus lanatus
Glyceria striata
Miscanthus sacchariflorus
Poa compressa
Calamagrostis canadensis
Phalaris arundinacea
Leersia virginica
Brachyelytrum aristosum
Dichanthelium lanuginosum
Dichanthelium linearifolium
Danthonia spicata
Poa trivialis
Glyceria acutiflora
Agrostis stolonifera
Puccinellia distans
Elymus riparius
Arrhenatherum elatius
Festuca subverticillata
Sphenopholis intermedia
Poa alsodes
Bromus ciliatus
Dichanthelium latifolium
Danthonia compressa
Brachyelytrum erectum
Bromus pubescens
Elymus hystrix
Muhlenbergia frondosa
Poa nemoralis
Microstegium vimineum
Poa sylvestris
Muhlenbergia schreberi
Bromus tectorum
Oryzopsis asperifolia
Patis racemosa
Brachypodium sylvaticum

Workshop participants: Top row from left to right: Frank Parisio, Nick Radford, Chris Graham, David Werier, Allyson Evans, Selma Rosenthal, Anna Stalter, Matt Bilz; Bottom row from left to right: Kyle Webster, Aaron Iverson, Elizabeth Spencer, Brigitte Wierzbicki, Louise Barteau, Amanda Weise, Whitney Carleton, Becky Sibner. Missing from photo are Steve Olson and Megan Klein.

Showy Orchid (*Galearis spectabilis*). Carol Gates took this picture on May 24 of this year. She says "It was found 2 years ago on a NYFA or ADK Botanical Society trip with Michael Burgess from SUNY Plattsburgh that we all found the *Galearis* leaves while bushwhacking on Poke-o-Moonshine. Michael deserves the credit for identifying it".

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