

The Blazing Star



NEWSLETTER OF THE NORTH AMERICAN NATIVE PLANT SOCIETY

Native Plant to Know

Indian pipes

Monotropa uniflora

by Stephen Johnson and Mary Stark

Over the centuries the plant we call Indian pipes (*Monotropa uniflora*) has had many common names, juggled taxonomic affinities, misunderstood ecological relationships and superseded therapeutic uses. It also inspired an American poet.

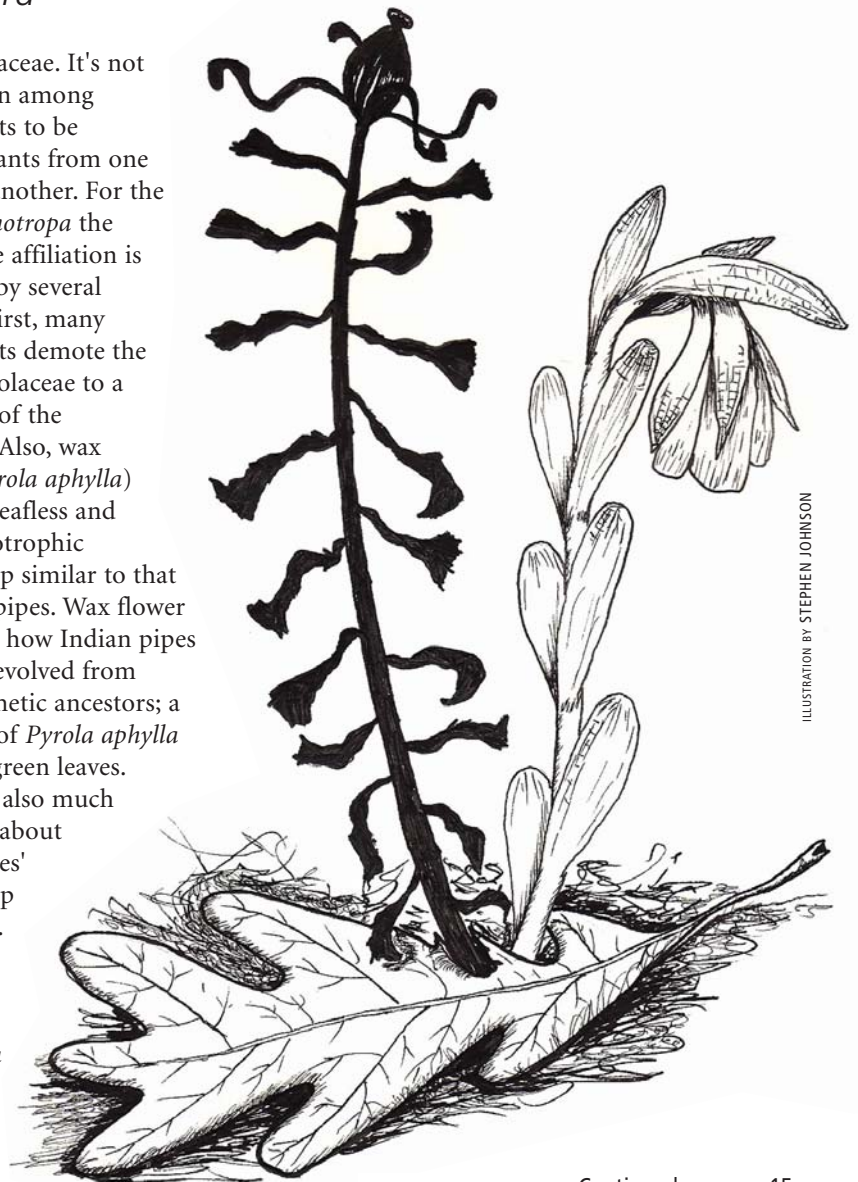
Indian pipes has been variously called corpse flower or death plant, suggesting that its appearance noted the place where a dead body has been buried. Pioneer herbalists may have named it convulsion flower or fits flower since they believed it cured spasms. The name ice plant comes from the apparent melting of the crushed stems when rubbed in one's hands. Whimsical names such as bird's nest and fairy smoke have also been bestowed upon this other-worldly-looking plant.

When shaded in its natural forest habitat, the plant appears to be made out of pure white candle wax. If you happen upon Indian pipes in a sunfleck you will be treated to a diaphanous, crystalline display suggesting one of Peter Carl Faberge's finest amethyst flower pieces for Tsar Nicholas II.

Its taxonomy is in continuous flux. By some it is lumped with the Ericaceae, by others in the Pyrolaceae, and by yet others in its own family the

Monotropaceae. It's not uncommon among taxonomists to be moving plants from one family to another. For the genus *Monotropa* the changeable affiliation is enhanced by several features. First, many taxonomists demote the family Pyrolaceae to a subfamily of the Ericaceae. Also, wax flower (*Pyrola aphylla*) is usually leafless and has a mycotrophic relationship similar to that of Indian pipes. Wax flower also shows how Indian pipes may have evolved from photosynthetic ancestors; a rare form of *Pyrola aphylla* produces green leaves.

There is also much confusion about Indian pipes' relationship with fungi. Some authors relate how *Monotropa* derives nutrition from rotting



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The *Blazing Star* is . . .

The *Blazing Star* is published quarterly (April, August, November, February) by the North American Native Plant Society (NANPS). Contact editor@nanps.org for editorial deadlines and for advertising rates. The views expressed herein are those of the authors and not necessarily those of NANPS.

The North American Native Plant Society is dedicated to the study, conservation, cultivation and restoration of North America's native flora.

Fall 2012

Volume 13, Issue 4

Editor: Irene Fedun

Production: Bea Paterson

Printed by: Guild Printing,
Markham, Ontario

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North American Native Plant Society,
formerly Canadian Wildflower Society,
is a registered charitable society, no.
130720824 RR0001.
Donations to the society are tax-
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NANPS Membership:
CAN\$25/YEAR WITHIN CANADA,
US\$25/YEAR OUTSIDE CANADA

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Highlights of NANPS AGM 2012

The NANPS Annual General Meeting began with a warm welcome from one of our creative and dynamic board members, Janice Keil. She thanked incoming president Paul LaPorte and outgoing president Greg Hagan for the time and energy they have devoted to our organization. We look forward to working again this year with both these capable gentlemen.

The board welcomes the revision of the quorum numbers required to legally pass motions. The problem of quorum has been an invasive alien in our garden for years. Directors have always been diligent at attending meetings but illness, small board size, weather and distance have all played havoc with achieving quorum. The new quorum rule ties the required number of voters to the total board number. Voted in unanimously, quorum now stands at 50% plus one member of the board to pass motions. Thanks to John Oyston for seeing this through. More changes are coming, as Corporations Canada requirements change. Alice Kong gave a synopsis of what we can expect down the road.

I presented salient points of the 2011 Financial Report. The good news is that we are in solid financial shape. Our challenge is to continue with our successful activities and find new ways to spread the word. A lively discussion was held; we look forward to hearing your thoughts and ideas for the future. Please contact drsue@xplornet.ca or leave a voicemail message at 416-631-4438.

We have a wonderful new asset to our organization, Theresa Sharma, who will take on the bookkeeping work of the Treasurer and other tasks for the board and committees as needed. We do not yet have a title for her, but she becomes in essence our first staff.

Volunteer of the Year Awards went to Stacey Shannon and Sue Wells. These two ladies are always working hard behind the scenes, feeding us, driving us and our plants and tables to wherever they need to go along with fulfilling other tasks in a no-fuss, no-muss manner. Thank you Stacey and Sue: you are the grease that keeps our wheels turning!

The Garden/Restoration award recipients were the Loretto Maryholme Spirituality Centre and Project Pawpaw. Sister Mary Mallany and Dan Bissonnette shared inspiring stories of their work.

Congratulations to recipients of the Paul McGaw Conservation Awards: the Bronx River Alliance in New York City, and Sharon Keogh and David Acoma for their long-term restoration work at Mount Ararat, the former home on Lake Rice's south shore of pioneer Catharine Parr Traill. A special thanks to the awards committee for the fine selection of recipients for this year.

NANPS welcomes new Board members Heidi Eisenhauer, Joanne Fallowfield and Adam Mohamed as well as Harold Smith who returns after his mandatory year in exile. We will miss Karen Boniface and Gerda Wekerle who move on to new adventures. A heartfelt thank you! Bravo to Eileen Atkinson for an excellent job of recruiting.

Thank you to everyone who makes our world better through NANPS. I direct you to www.nanps.org for details.

Sue Stephenson, NANPS Treasurer



New board member Joanne Fallowfield

PHOTOGRAPH BY EILEEN ATKINSON

NANPS News

CHANGES TO NANPS MEMBERSHIP FEES

Please note: NANPS has introduced a student membership category for 2013. The one-year student fee will be \$10. The regular one-year membership fee has increased slightly to \$25 but the multiple-year rates still break down to \$20/year. See page 16 for membership form.

One of the new benefits of NANPS membership (starting in 2013) will be that each member may bring a guest to a NANPS event and that guest will pay the same reduced entry fee (if applicable) as the member.

In addition, members will have the option in 2013 of getting *The Blazing Star* electronically (images can be viewed in colour) or in the usual mailed hard copy which remains in black and white. Student members will only receive the newsletter digitally.

Please renew your subscription today and help us protect and restore our native flora.

Wanted: More Seeds

Please continue to collect seeds from native plants for our annual Seed Exchange and send them, separated by species and identified with the source/parentage to NANPS, Box 84, Station D, Etobicoke, Ontario, M9A 4X1. If you have any questions, contact seeds@nanps.org.

NANPS DIRECTORS GET THEIR HANDS DIRTY

by John Oyston

It was a beautiful sunny fall morning when several Directors of the North American Native Plant Society – along with other volunteers from NANPS and Evergreen – got down on their hands and knees in the freshly prepared dirt around the pond at Markham Civic Centre in Markham, Ontario and planted native shrubs.

Markham Civic Centre feels like home to NANPS: we have had our plant sale, Annual General Meeting and Board Meetings there for several years. When a place is your home, you want to make it look beautiful; for NANPS this means that the grounds have to be planted with native plants.

South of the Civic Centre there is a large ornamental pond, which separates the complex from Highway 7. We have wanted to plant native species around the pond for years. In mid-September, the first stage of the planting project became a reality as red osier dogwood (*Cornus sericea*) and black chokeberry (*Photinia melanocarpa*) shrubs were planted along the water's edge.

A joint venture, the project was led by Karen Boniface, a NANPS Director and the Technical Coordinator, Operations Department, City of Markham. Evergreen-Walmart gave an \$8,000 grant, \$15,000 came from the Markham Environmental Advisory Committee for the design by Real Eguchi, \$10,000 worth of equipment and labour was

provided by a Markham/Toronto Region Conservation Authority (TRCA) partnership fund, and \$2,000 came from the Rouge Park. Markham paid for the trucking and disposal of fill and Evergreen helped with the planting and contributed towards the mulch.

At the planting, Deputy Mayor Jack Heath and NANPS Director Harold Smith made brief speeches, and an Evergreen volunteer gave a demonstration. The bed was well prepared by the TRCA, the shrubs were in great condition with good root balls, and there was a bountiful supply of high quality mulch. It was a very pleasant morning's work as everyone helped out to get the 80 shrubs planted in the correct position and mulched.

The project will be completed on June 8th, 2013 with a wildflower planting which will involve many more volunteers from a variety of groups. Save the date and plan to join in!

John Oyston is a NANPS Board Member.



Dogwoods and mulch sit beside the Markham pond awaiting volunteers.

PHOTOGRAPH BY JOHN OYSTON

Seed Bombing Native Plants

by Irene Fedun

Heidi Eisenhauer has been a guerilla gardener since 1998. In an attempt to beautify urban spaces from San Francisco to Toronto, she has created “seed bombs” and dispersed them in abandoned, weedy spaces. But her indigenous plant epiphany came only three years ago.

At a Seedy Saturday at Toronto's Scadding Court, Heidi approached the North American Native Plant Society booth. She was greeted by friendly, helpful people who quickly charmed her into trying native plant seeds on her anarchist seeding forays. She was

usually left to Mother Nature. In Heidi's experience, the recipe for seed bombs that has the highest germination rate is: one part seeds, one part clay, one part coffee grounds, eight parts soil and one part water. Form this mixture into a palm-sized ball and let dry in the shade for 24-48 hours. Of course, there are other successful ways of doing it and the Internet is a great place to get more information. A few useful websites: <http://www.wikihow.com/Make-a-Seed-Bomb>, <http://stuffyocanhave.blogspot.ca/2010/08/seed-bomb-bangles.html> or an entertaining YouTube video on making

along the Humber River a couple of years ago and the patch is now 30-40 plants strong – a happy development for our monarch butterflies.

Sadly, not everyone appreciates the efforts of seed bombers. Asters (Asteraceae) are especially under-appreciated. It seems that a lot of people think of them as weeds and pull them out where Heidi and others have seeded them.

Heidi collects her seeds from her own plants. She used to have a native plant garden with 30-40 species when she lived in a house. Now that she's in a condo she can't grow as many plants but that hasn't stopped her. In fact,



PHOTOGRAPH BY HEIDI EISENHAUER

Ready to mix



PHOTOGRAPH BY HEIDI EISENHAUER

Recipe makes 13 seed bombs

an instant convert. Now, whenever anyone posts an upcoming guerilla gardening event on social media, Heidi gently reminds participants to avoid the wildflower mixes sold at garden centres that invariably contain non-natives, and go for native seed mixes or single species that are available from organizations like NANPS.

What exactly is seed bombing? Here's a Wikipedia definition: “Seed bombing or aerial reforestation is a technique of introducing vegetation to land by throwing or dropping compressed bundles of soil containing live vegetation (seed balls).” Watering

seed bombs http://www.youtube.com/watch?v=kOh_o9_4eok&feature=youtu.be.

The summer of 2012, as we all know, was hot and dry in Toronto, most of southern Ontario and neighbouring parts of the continent. Even some native plants struggled to survive, never mind reproduce lavishly. But Heidi did have great success with the eastern columbines (*Aquilegia canadensis*) she planted in the Junction (the seeds came from “a monster plant” growing on her condo deck). Other guerilla gardeners seeded common milkweed (*Asclepias syriaca*)

she's keeping track of which natives do well in different-sized pots on her deck. She even has three woody species, all of which are quite content: the tree-like nannyberry (*Viburnum lentago*), a gray dogwood (*Cornus racemosa*) and a sandcherry (*Prunus pumila*), “a gorgeous plant” that Heidi is babysitting until NANPS can find a permanent home for it. There were lots of caterpillars on the nannyberry in mid-summer, species unknown. Also lots of butterfly visitors to the third-storey condo garden even when the flowers were not in bloom!

At a one-year Urban Agriculture



Seed bombs packaged as gifts

program at the San Francisco League of Urban Gardeners, Heidi learned the basics of seed saving. She also relies on the advice of fellow NANPSters, reads seed-saving books and peruses the Internet to find out the germination requirements of native plant seeds. Social media are a great source of information and inspiration; Heidi returns the favour by promoting the use of indigenous seeds.

This fall, Heidi lead a hands-on workshop on building seed bombs.

She did a brief talk about responsible planting and gave a plug for natives and then everyone got down and dirty.

This activity is especially fun and beneficial for kids. Studies have shown that environmental education that encourages kids to plunge in and get involved with nature, whether catching frogs, building tree forts or making seed bombs, leaves them with a deep appreciation for the natural world and a desire to protect and conserve the environment.

(Read the compelling article by David Sobel entitled *Look, Don't*

Touch in the July/August 2012 issue of *Orion*, www.orionmagazine.org.)

For now, Heidi is developing single-species seed bombs like her highly successful columbine. But she'd love to create special packages for specific conditions and regions such as a woodland package for the Greater Toronto Area or a full sun package for

southwestern Ontario.

Guerilla gardeners like Heidi not only beautify formerly ugly, depleted spaces but also provide food and shelter for insects, birds and other creatures. They give the word "bombing" a whole new, and wonderfully restorative, meaning.

Irene Fedun is the editor of The Blazing Star.



Milkweeds seed-bombed four years ago

Silver Memories

NANPS Honorary President James A. French has produced a lively compendium of articles, reminiscences, photographs, illustrations and cartoons celebrating the first quarter century in the life of the Canadian Wildflower Society later renamed the North American Native Plant Society.

In the booklet entitled *Silver Memories: A Personal History*

Dedicated to the Society on its 25th Anniversary, Jim shares his fond memories...from the first issue of *Wildflower* magazine to the purchase of Shining Tree Woods to the Temagami Art Camp and beyond. He also invited members of the society to contribute their thoughts on their involvement with CWS/NANPS to this publication: the resulting anecdotes are heartwarming and funny.

Jim Hodgins (editor of the now-departed *Wildflower*) supplied a list of NANPS Numerous Firsts starting, of course, with the formation in 1985 of the Canadian Wildflower Society, "the first national native plant gardening and field botany society in Canada."

To receive your copy send \$12 (includes postage and handling) to *Bulletins Plus*, 2395 South Bay Road, RR2, Lakefield, Ontario K0L 2H0.

Landscape ordinances: Video illustrates the intricacies for neighbours and bureaucrats

by Joy Buslaff

Some like to argue for argument's sake, but most of us do not enjoy the sport of debate, nor are we gifted with the verbal agility of Robin Williams, the laser wit of Oscar Wilde, the strategic insight of Bobby Fischer, or the eidetic memory of a Dr. Sheldon Cooper. Even having a brilliant



ILLUSTRATION BY KIM DU

mind and prepared rhetoric doesn't guarantee one's voice and physical bearing can hold sway comparable to that of Gregory Peck as Atticus Finch. Yet, we without credentials in botany or law may be pressed into service as community defenders of ecological landscapes. To support such trials, I give you exhibit A, the video series titled *Landscaping: Pride, Science, and Law*. All are accessible on YouTube.com.

I produced the three-part program for citizens and officials who are creating or updating lawn and weed ordinances for public health and safety and environmental protection. The first installment, of eight minutes length, illustrates how the home landscape has been influenced over time and why many of us have chosen to grow naturalized landscapes.

Subsequent segments – Science (11

minutes) and Law (12 minutes) – unravel the tangled subjects of green plants and red tape. Although designed to enlighten governing bodies, the contents can also be entertaining, taken as an overview of the merits of landscaping with native plants.

I was prompted to compose this program after being bullied by an official at a 2011 village meeting where I, a former editor for *Wild Ones* with some knowledge of land-use policies, had been invited by the chair of the Planning Commission to speak. This commission was deliberating the

enforcement of a simplistic mowing-height regulation in order to quiet a conflict between neighbours (strangers to me) over one seldom-mowed lawn. I volunteered to contribute to the

authorship of a state-of-the-art ordinance based on Wisconsin Department of Natural Resources advisories, but was abruptly blindsided with disparagement by three commissioners. One of them, a retired police officer and newcomer to the village, told me I had no right to say anything and that “we will make you mow.”

Keep in mind that my native-plant landscape was not, nor had it ever been, a point of contention. In fact, none of my newfound adversaries even knew what property I owned. After this utterly bewildering altercation, I suffered weeks of insomnia and digestive distress the likes of which I've never experienced before, perceiving the whims of a few small-town tyrants as a potential threat to the decades-old, naturalized landscape of our former home (we

have rented out the property since 2002). Frustrated by their ignorance and impertinence, I clawed at my mind for some way to shine a light on their boorish behavior and pre-empt the ratification of any irrational dictates. I also dreamed of finally expressing the value of science-based landscaping in an unfettered public forum.

For about a month, I was consumed with the task of turning my thoughts into a documentary. A lifetime in publishing made the flow of words and images conceivable, however, formulating the counter-arguments to both the remembered and imagined brutish voices in my head proved emotionally wrenching. A forced introduction to audio recording technology added to the challenge.

After uploading the files to YouTube, I sent emails to village officials and the village attorney, telling them of my unpleasant meeting experience; my resolve to litigate, if necessary, to defend our landscape; and referring them to the video. In what way my message has contributed, or will contribute, to the status of village policy, I can't say. It's been about a year, and I've heard nary a murmur. It may well be that the Planning Commission just gave up even bothering with the subject, which was my number one recommendation to them.

You are welcome to air my videos in public forums and embed them in websites. For off-line use, it's possible to download YouTube videos using various software programs, browser plugins, or mobile apps. Sadly, YouTube no longer offers an automatic “enable download” feature, or I would activate that convenience for you.

I like to believe that the accessibility and content of this presentation will have value for those writing ordinances and those playing Clarence Darrow in their neighbourhood's courtroom of public opinion.

BURDEN OF PROOF

Problematic:

“Where there is a disagreement between the municipality and the property owner in regard to the appropriateness of a plant species, it shall be the property owner’s responsibility to show proof of the appropriateness of the plant species through a trained professional in botany or a similar field.”



Preferable:

“If a complaint is filed by a citizen or the municipality against a property, the burden of proof lies with the complainant to establish that a health or safety hazard exists.”

PHOTOGRAPH BY JOY BUSLAFF

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Joy Buslaff is the former editor of Wild Ones Journal. Her videos can be seen at: [Youtube.com/user/quarryjoy/](https://www.youtube.com/user/quarryjoy/) featured.

Joy maintains a blog, homemadewilderness.com, where she posts and organizes videos about ecological landscaping and organic gardening as they are published. This article was originally published in Wild Ones Journal, www.wildones.org, and is reprinted with permission.

Answers to Seedhead Quiz from summer 2012 *Blazing Star*

From top left clockwise: Sky blue aster (*Aster oolentangensis*), pale purple coneflower (*Echinacea pallida*), grey-headed coneflower (*Ratibida pinnata*) and butterfly milkweed (*Asclepias tuberosa*).

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Hawthorns

by Bill Moses

My first objective in writing this article is to help the reader identify a hawthorn tree. My second aim is to describe the benefits and pleasure I am deriving from the study of hawthorns which, I believe, are transferable to any area of botany (and to nature in general). My final objective is to condition the reader to be aware of, take note of and perhaps adopt a hawthorn tree. I'm not talking about bringing one home but rather about picking one out in a quiet, rural place and visiting it on a regular basis. In my view, this does wonders for your soul.

THE TAXONOMY

Starting with the basics, hawthorns are a member of the rose family (Rosaceae). Their scientific name at the genus level is *Crataegus*. Hawthorns at this taxonomic level are readily identifiable primarily because of their thorns. It is at the species level that identification becomes more challenging. In relation to this problem, Henry Kock in his book *Growing Trees from Seed* stated that "only a few have tried to make sense of it". He then goes on to make reference to five species (in Ontario). *Shrubs of Ontario* by James Soper and Margaret Heimburger lists eight species and John Laird Farrar's *Trees in Canada* lists 12. In his handout notes at a recent hawthorn workshop hosted by the Field Botanists of Ontario, Dr. Jim Phipps (a world-renowned hawthorn expert) makes reference to 31 species in Ontario. Amazingly, only two of those noted are not native to North America. In fact, our continent boasts about 150 of the northern hemisphere's approximately 200 species. (In Canada we have about 50 species.) You can see that I'm being

careful not to give exact numbers. The problem with hawthorns is that superficially they tend to look alike and when you do a detailed analysis you might start to think that no two individual trees are alike. Charles Sargent (1841-1927), a *Crataegus* expert and director of the Arnold Arboretum at Harvard University, described over 800 hawthorns in North America (as opposed to the current more accepted number of 150).

How different should two plants be before they can be considered separate species? This is a problem not only

assessments of taxonomic problems will always be made and therefore we can expect scientific names to change on an ongoing basis.

Thanks to the complexity of the hawthorn genus and the fact that little work has been done to "make sense" of hawthorns, we can only expect many changes to come. However, the idea that any particular hawthorn plant is likely a hybrid is gradually going out of favour, at least among those who have seriously looked into the matter. Until better guidelines and more scientific information become available, it is reasonable, for example,



A hawthorn gloriously in bloom!

PHOTOGRAPH BY BILL MOSES

pertinent to hawthorns. Botanists tend to become known as "splitters" or "lumpers". Splitters will say that what is currently considered to be one species should actually be split into two (or more). Lumpers will say that some two or more species should be lumped into one. As the knowledge of, and techniques related to, plant biology improve and become more readily available, more accurate

to state that there must be three significant differences between two plants before they can be called two different species. (This still leaves the debate as to what constitutes a significant difference.)

MY PASSION FOR HAWTHORNS

My interest in hawthorns stems from my volunteer role at the Inglis Falls Arboretum in Owen Sound, Ontario. We are currently constructing

a Tree and Shrub Walk which will eventually showcase all the woody plants native to Grey and Bruce Counties. The Owen Sound Field Naturalists' Checklist of Vascular Plants (which we are using as guide) lists 15 native species of hawthorn within the two counties. Over the past year, I have taken up the challenge of developing some skill in identifying hawthorns, locating as many as I can of the 15 listed species in Grey and Bruce, and then introducing them into the Tree and Shrub Walk.

I started out on this hawthorn adventure by reading everything and anything related to hawthorns. I found myself engaged in something comparable to a multi-level computer game where one gradually absorbs enough knowledge to move to another level of understanding. It soon became pretty easy to see that the study of hawthorns could provide a lifetime of interest and satisfaction. I have found that learning about hawthorns cannot be rushed. I believe that one's subconscious works away at making sense of it all, even while one sleeps. One has to be patient. Going back over all the literature enhances this process. What is not making sense the first time will gradually become more clear.

And then there is the necessary field



PHOTOGRAPH BY BILL MOSES

In ancient English a hawe was an enclosure commonly fenced with thorn trees, hence the name hawthorn. This photograph demonstrates how impressive a hawthorn's thorns can be.

work. My approach has been to keep records on particular plants, GPS their locations, take pictures and notes, and collect and preserve plant material. I find my time is most efficiently spent studying roadside hawthorns. I keep their locations on Google Earth and program my GPS for each location which allows me to efficiently move from one plant to the next. Again, the more time one spends looking at

hawthorns, the more their subtle differences are absorbed. After a while one can look at a hawthorn in winter and say, "For now, I am going to say that this plant is a *submollis* (*Crataegus submollis* or Quebec hawthorn, locally known as downy hawthorn)." I must then come back when the plant is in bloom to see if the number of stamens and the colour of the anthers checks out

(10 stamens and white anthers). In fact, one can observe these characteristics before the flower opens (known as the popcorn stage, for obvious reasons). Even when your suspicions are confirmed by this evidence, there are still many factors to be considered such as plant size and habit, thorn colour, size and curvature, twig colour, leaf shape, size, pubescence and venation, presence of glands, flowering sequence, and all sorts of flowering and fruiting characteristics.

I would not ask that readers should become as obsessed with hawthorns as I appear to be, although I do hope you have a similar passion. A project not based entirely on memorizing facts can provide valuable exercise for your mind, and will improve your powers of observation and your ability to take proper notes. As well, it will enhance your tolerance for not knowing all of the answers about something and still being able to feel good about yourself!

IDENTIFYING HAWTHORNS

Of course, if you want to identify a particular plant, you naturally turn to

Continued on page 10



PHOTOGRAPH BY BILL MOSES

PHOTOGRAPH BY BILL MOSES



Strictly speaking the fruit of the hawthorn is a pome. (An example of a berry, strangely enough, would be the tomato.) Delicious pies, tarts and jams can be made from hawthorn pomes.

an identification key. There are several complications in doing this with hawthorns. One is the regular changes in scientific names. Another is the fact that gathering the required information means visiting the plant at least twice a year and probably more. And then there's the possibility that the ID key may not include the hawthorns from your local area. Yet another complication is the need to become familiar with botanical terms like adaxial, abaxial, proximal, distal, ovate, obovate, not to mention the many descriptions of pubescence: appressed, villous, stellate and so on. Once you become familiar with these terms you can apply them to other plants.

Even if you're not induced by this article to take a serious interest in hawthorns I hope you'll try this. Pick out two hawthorn trees close to your home for study. Not too close together because they'd likely be the same species. Observe these two plants over

Although its curative powers are legion, hawthorn is not often sold commercially because it is so easy to obtain. Readers interested in natural medicine should definitely explore this aspect of hawthorn lore.

a year. How are they the same? How are they different? Picking out the trees will be the first challenge.

Learning of my interest in hawthorns a friend told me of a field full of hawthorns near his house. I went to have a look and they turned out to be the invasive buckthorn (*Rhamnus cathartica*). At this time of year (first week in October) hawthorns have lost most of their leaves but buckthorn being a non-native still has lots of green leaves. (Many non-natives are genetically wired for the weather of their origin. Native trees know when keeping their leaves becomes a lost cause and dump them. Non-natives think they are still back home.) Old apple trees (*Malus* spp.) are another look-alike but neither apple trees nor buckthorns have thorns. Once pointed out, hawthorns are easy to spot even at a distance. Their bark is usually a light grey. At flowering time, their flowers

are spectacular and in the fall their fruit makes them stand out as well. Due to the strange spring weather in 2012, it was a poor year for flowers and especially for fruiting. One learns patience in this pursuit!

Some hawthorns are easy to identify. The dotted hawthorn (*Crataegus punctata*) is one of the most common (at least in my area) and has fairly distinct features. It is sometimes yellow-fruited. Finding one will steer you in the right direction. It would be helpful to find someone who knows a bit about hawthorns to help you get started. Either way, be assured that it is possible to have fun with this thorny subject (haw, haw, haw).

Bill Moses volunteers at the Inglis Falls Arboretum in Owen Sound. He is an image reviewer for the Evergreen Native Plant Database, and a Land Steward for



PHOTOGRAPH BY BILL MOSES

the Bruce Trail Conservancy (Stonehouse property) and, on an informal basis, for the Nature Conservancy of Canada (Cuzen property, aka Galbraith). Bill is also the Website Editor for the Owen Sound Field Naturalists.

Haw-eaters are Ontarians born and raised on Manitoulin Island.

A Kansas Tallgrass Prairie

by Stephen Johnson

Konza prairie or, more correctly, Konza Prairie Biological Station (KPBS) is a 3,487-hectare (8,616-acre) native prairie located in the Flint Hills region of eastern Kansas. Flint however is a misnomer – the rocky outcrops that define the region are really a mineral called chert. The hills are flat-topped and rolling, the results of erosion by glacial water; the chert protruding from the hilltops is a silica-rich, sedimentary and slate-like rock emerging from fossil-rich, yellow-white limestone.

If you drive along I-70 at 70 miles per hour (110 kilometres) you'll pass Konza and only see a wide vista of grass. In fact, depending on what time of year you pass it you'll see a blackened plain, a rolling golf course of short grass or, by late summer, grass obliterating the view because it's so tall. Early September shows a hint that the prairie is more than grass when tall yellow-flowered members of the aster family become visible.

Get out of your car and look up close and you'll find many charming native flowers blooming from March to September. While the prairie appears as a monotonous vista of grass most of the diversity comes from the wildflowers, what scientists refer to as forbs. In addition to the grasses, two other plant families are well-represented: the Asteraceae and Fabaceae.

Asters range from the short-statured curly-cup gumweed (*Grindelia squarrosa*) to the giant, mid-slope Maximilian sunflower (*Helianthus maximiliani*) named in honour of the prince-naturalist Maximilian Alexander Philip von Wied-Neuwied. Another typically diminutive aster was prairie groundsel (*Packera* or *Senecio plattensis*). The taxonomy of the aster

family (as with most plant families) is in constant flux. Prairie groundsel was the favourite of the sadly departed (but in life always punning) Kansas State University plant taxonomist Dr. Theodore Barkley. Ted preferred to be called a seneciologist.

The bean family (Fabaceae) is extremely important ecologically since its members, in association with various soil nitrogen-fixing bacteria, provide virtually all the water-soluble nitrogen to every other prairie plant. They range from the driest rocky uplands with dwarf blue indigo



The pom-poms of catclaw sensitive brier (Mimosa nuttallii)

(*Baptisia australis* var *minor*) to a plethora of midslope species such as the robust dotted gayfeather (*Liatris punctatus*) and the catclaw sensitive brier (*Mimosa* or *Schrankia nuttallii*), named for the intrepid 19th century Scottish botanist Thomas Nuttall. Along wetland margins the tall Illinois bundleflower (*Desmanthus illinoisensis*) looks like a hybrid of white-flowered mimosa and a

miniature hemlock tree. The strikingly twisted and intertwined fruits appear to have been blasted by ionizing radiation.

Nuttall spent much of the year 1819 travelling along the Arkansas River. He encountered and described for the first time many species native to tallgrass prairie; 12 on Konza still bear his authorship. One forb, plains coreopsis (*Coreopsis tinctoria*), was used by native peoples in a hot beverage. Another, ground plum (*Astragalus crassicaarpus*), is strange at first sight since its fruits look alternately like a

cluster of grapes or a clutch of bird eggs. These grape-like fruits were eaten by the Lakota. A plant named in Nuttall's honour and native to Konza is of a far more diabolical nature: Nuttall's death camass (*Zigadenus nuttallii*) is toxic in all of its parts. Shunned by bison and deer, even its pollen is lethal to honeybees although native bees suffer no ill effects from death camass' pollen or nectar.

The prairie is owned by the Nature Conservancy and managed by Kansas State University and named, like the state itself, for the Kansa Indians that once called this place home. It is large enough to get lost on; I know because I did. KPBS is in northeastern Kansas and as such sits on the western edge of the tallgrass prairie; this is where eastern and western flora

intermingle. Here the great eastern deciduous forest finally peters out into short-statured oak trees (*Quercus* spp.) lining valley creeks in what is called gallery forest.

While I was a graduate student at Kansas State University in the early 1990's I would witness controlled burns of the prairie conducted under the management practices of KPBS. In mid-March, weather permitting, the

PHOTOGRAPH BY STEPHEN JOHNSON

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burns would leave the earth blackened. I saw the grass recover and the first flower appear in late March, prairie violet (*Viola pedatifida*). By April and through June when the grasses are short, a profusion of short-statured wildflowers erupted such as cream wild indigo (*Baptisia bracteata* var *leucophaea*), a favourite site for night-time bivouacking for many kinds of jumping spiders. Also present are antelope horn milkweed (*Asclepias viridis*) and tiny gems like bastard toadflax (*Commandra umbellata*) and the diminutive June grass (*Koeleria cristata*). Where grass cover was minimal and chert was often exposed, I found one of my favourite prairie flowers, catclaw sensitive briar with its large pompom-pink, bumble bee-attracting flowers. Beware that you don't let bare flesh rub against it; you'll quickly find out why it's called catclaw. In uplands where competitive grass growth is minimal, other attractive flowers such as the yellow, frilly-flowered fringed puccoon (*Lithospermum incisum*) typically occur near the sky-blue flowered pitcher's sage (*Salvia pitcheri*).

The diversity on Konza is stunning and divided by affinities. There are eastern associates in the lowlands that usually become seasonal wetlands. The dominant plant there is freshwater cordgrass (*Spartina pectinata*), a species that grows all the way to the borders of New England salt marshes. With it is sporadic wild petunia (*Ruellia humilis*) one of five *Ruellia* species in the North Carolina flora and a plant capable of growing in virtually any prairie habitat including the border of *Spartina* wetlands soon after a fire. Like most *Spartina* species, the eventual mid- to late-summer growth is so dense that virtually nothing can grow beneath it; only the annual bedstraw (*Galium aparine*) grows there and is usually going to seed by the time cordgrass shades it out. On the border of the wetland, often outcompeting wild petunia, grows common milkweed (*Asclepias*

syriaca), a magnet for butterflies, bees, spiders and even Cope's gray treefrog.

Other wetland valleys may have the near doppelganger of common milkweed, prairie milkweed (*Asclepias sullivantii*), which has fewer, larger and pinker flowers than its common cousin. Other wetland borderers are



PHOTOGRAPH BY STEPHEN JOHNSON

A typical mid-summer scene on Konza's upland with prairie coneflower (*Ratibida columnifera*) and Indian turnip (*Pediomelum esculentum*)

cardinal flower (*Lobelia cardinalis*), Illinois bundle flower (a good source of plant fibres for woven baskets) and Indian hemp dogbane (*Apocynum cannabinum*). Apparent by late summer is rosinweed (*Silphium integrifolium*), the possible source of Kansa Indian chewing gum, and the native food, Jerusalem artichoke (*Helianthus tuberosus*) which neither hails from the Middle East nor is an artichoke. These wetlands are also a magnet for some unexpected wildlife. Once while sweeping for insects that frequented or used freshwater cordgrass, I encountered a "face" among the usual grasshoppers... except that grasshoppers do not have vertebrate-type faces! It spooked the dickens out of me at first and then I realized it was a Cope's gray treefrog. Herpetologists at Kansas State were adamant that treefrogs never left the gallery forests for prairie adventures. My goosebumped experience revealed a different story. Then on another

excursion while searching wetlands for any new natural history stories, I saw a small red eye staring up at me. It was a male ornate box turtle buried up to its neck in marsh muck, retreating for a cool mud bath against summer heat.

Another seasonal phenomenon representing a confluence of long,

freely flapping leaves and cyclonic winds happens in the wetlands. The leaves of freshwater cordgrass are long, tapered and serrated along their margins. These serrations can cut flesh giving this species of cordgrass the grisly name of ripgut. The length and serrations also allow the leaves to grapple the stems of neighbouring plants, most often common milkweed, wrap the milkweed stems in almost a celtic basket weave and remain tied. I found this out when walking through the wetlands and feeling numerous restraints relaxing with the sound of a snapping cordgrass leaf.

Uphill from the wetlands, the soil becomes mesic (neither wetland nor too dry). Here is where the profusion of the iconic prairie grasses big bluestem (*Andropogon gerardii*) and Indian grass (*Sorghastrum nutans*) grow. In the springtime you find prairie larkspur (*Delphinium carolinianum* var *virescens*) and purple prairie clover (*Dalea purpurea*) as well.

But when you progress high enough you find yourself in something more truly reminiscent of the American west. Here among broken chert and extreme dryness are tall specimens of prairie coneflower (*Ratibida columnifera*), a species that is common in the mountains of northern New Mexico, white prairie clover (*Dalea candida*) and the teacup-plate-sized flowers of Missouri evening primrose (*Oenothera macrocarpa*) that glow brilliant orange at sunset. Up here you find grasses too short to compete with the prairie icons such as side-oats gramma (*Bouteloua curtipendula*) with its bright orange anthers. Diminutive plants such as dwarf blue indigo (*Baptisia australis* var *minor*) grow alongside spectacular towering penstemons. At the highest, driest promontories grows shell-leaved penstemon (*Penstemon grandiflora*) with its large, hot-pink, unmottled floral tubes. Neighbouring it in a dry but distinct zone just downhill is *Penstemon cobeae* with big, white-with-purple, blotched floral tubes. A rare find that transports an observer to the west is the tiny nipple cactus (*Escobaria missouriensis*) which is virtually impossible to find when not in flower.

On the hilltops I witnessed some interesting avian displays. One sunset evening I watched hundreds of nighthawks hunting in a valley, a column of them riding and spiraling through thermal updrafts. The white mid-wing bars looked like military insignia on World War I aircraft. Permeating the scene were periodic electric buzzes, the bird's rather strange call. Stranger still for someone who had just come from the Virginia Barrier Islands was the sight of an oddly inland shorebird relative, the upland stilt preferentially using the wooden posts of Konza's bison fence enclosure as a lookout.

Other western plant species are located in the western parts of Konza. I was lucky enough to get stuck on stickleaf (*Mentzelia oligosperma*) – that is to say, my shirt sleeve got caught

and I stopped to take a picture. *Mentzelia* is primarily a southwestern genus with two other species in Kansas. I was even luckier in one of my peregrinations west of Konza to find the more spectacular star-like flowered sand lily (*M. nuda*). Another spectacular westerner I found on western Konza is white prickly poppy (*Argemone polyanthemos*) with flowers that resemble a fried egg sitting on a small dinner plate.

In 1992 soon after I arrived, Konza boasted 523 plant species. In my constant search for plants unknown to me I found a previously undocumented westerner, showy milkweed (*Asclepias speciosa*). A single specimen perched high on a dry, rocky promontory, bringing the 1993 KPBS plant list to a total of 524 species. In further hilltop searches I never found another but since then I have seen magnificent specimens of showy milkweed in northern New Mexico.

I also spent much time searching for orchids. As expected, the diversity of this

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Tree Benefits Estimator

Have you ever wondered how much energy your large shade-giving tree was saving you by minimizing your need for air conditioning in the summer? Or perhaps you've wanted to do your part to reduce air pollution but didn't know which species of tree to plant that would do the best job. In Ontario we now have a handy online tool that can provide this information and so much more about the environmental benefits offered by our urban trees.

The Ontario Residential Tree Benefits Estimator was developed by LEAF (Local Enhancement and Appreciation of Forests) in partnership with Dr. Andrew Millard of Ryerson University's UFRED Group. It was made possible with funding from the Ontario Power Authority's Conservation Fund which funds new and innovative electricity conservation projects.

As we all know, each tree plays a valuable role in urban ecosystems. By shading our buildings and streets, trees reduce energy costs. They sequester carbon dioxide, filter pollutants and reduce stormwater volumes. Trees also increase property values. Now you can find out just how much they really do for us.

To use LEAF's new tool, measure the diameter of your tree (or proposed tree) at breast height (known as DBH). Then visit www.yourleaf.org. You'll be asked a few simple questions: species of tree (or if you don't know that, deciduous or coniferous), city you live in, side of house and approximate distance from house of your tree. The program will calculate not only the environmental benefits of your tree but also the replacement value at its current age and at 40 years of age.

Eileen Atkinson did this exercise with her red oak (*Quercus rubra*) which has a DBH of 52 centimetres (20 inches) growing on the east side of her house in Markham. She discovered that this year alone her tree saved 82 kilowatt hours of electricity, sequestered 109 kilograms (240 pounds) of CO₂, avoided 12 kilograms (26 pounds) of CO₂, mitigated 10,985 litres (2,416 gallons) of stormwater and removed one kilogram (2.2 pounds) of air pollution. Over the tree's 75-year life expectancy the energy savings will be 4,780 kilowatts which translates into \$583. Over its lifetime the tree can also be expected to sequester 6,385 kilograms (14,076 pounds) of CO₂ and remove 82 kilograms (180 pounds) of air pollution. At its current age the oak has a whopping replacement value of \$10,169.

To plant a tree in Toronto and Markham through LEAF's subsidized programs or to learn how to take care of your existing trees so that they provide energy conservation and environmental benefits for years to come, visit www.yourleaf.org.

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group is low but I eventually found a sizable population of spring ladies-tresses (*Spiranthes vernalis*) just uphill from the cordgrass wetlands. I discovered that *S. vernalis* produced a rosette of leaves in March beneath the sparse dead litter of the previous year's grass growth. This rosette was killed by the annual spring fire but it regrew quickly to photosynthesize before the current year's growing grasses shaded it out. Later in a limestone outcrop far away from any wetland I saw Great Plains ladies tresses (*Spiranthes magnicamporum*). These were the only orchids found on Konza, but as in the case of *Asclepias speciosa*, who can say what minute windborne seed might have been carried in to germinate for later discovery. Ted Barkley suggested to me that the edges of the gallery

PHOTOGRAPH BY STEPHEN JOHNSON



Stephen's plant hunter moment: showy milkweed (*Asclepias speciosa*)

forest should pose good habitat where I might find large yellow lady's slipper orchid (*Cypripedium pubescens* var *pubescens*). I spent a lot of time looking but never found it.

There was so much to see I clearly couldn't have found every known plant on the Konza Prairie Biological Station in my time in graduate school and perhaps not even in a decade or more of constant exploration. The dynamic prairie under considerate management will always be gaining new species and losing others.

Stephen Johnson received his PhD at Kansas State in 1994. To this day he is grateful that he was never struck by lightning during his tenure on the Konza Prairie.

New & Noted

The Pawpaw Grower's Manual for Ontario

by Dan Bissonnette

2012, The Naturalized Habitat Network of Essex County and Windsor, P.O. Box 292, Essex, Ontario N8M 2Y3, www.naturalizedhabitat.org, laminated soft cover, 48 pages, ISBN 978-1-77136-050-0.

Readers of *The Blazing Star* were treated to a treatise on the pawpaw (*Asimina triloba*) in the summer issue of our NANPS newsletter. You probably found yourself hungering for this "custard on a tree". Here's your chance to learn even more, including how to grow and enjoy this fruit in Ontario.

Dan Bissonnette has done an admirable job of explaining how and why to grow the "poor man's banana" in *The Pawpaw Grower's Manual for Ontario*. Bemoaning "the lack of awareness, neglect and indifference that have dogged the pawpaw for more than a century", Dan believes it's crucial that we preserve this species and help it thrive.

After describing the tree's

characteristics and providing historical and geographic context, he plunges into the many ecological attributes of this slender, mid-sized tree. (For example, the zebra swallowtail butterfly caterpillar relies on the pawpaw for its sustenance.) This is followed by the plant's life cycle, opportunities for establishing the pawpaw in Ontario and detailed information on planning, planting, maintenance, health management and harvesting.

Dan has great ambitions for the pawpaw. As a locally grown, organic food with high nutritional value, this fruit of the many colourful names (from possumhaw to Hoosier banana and many more) has serious agricultural potential. (In fact, the pawpaw helped feed starving people during the Great Depression in the 1930's.) Dan points out that establishing it as a food crop in Ontario would have many spinoff benefits: opportunities to extend natural habitat on farms, adopt sustainable practices, reconnect with



our natural heritage and contribute to our regional identity. Residents who can grow and harvest their own fruit "will experience a sense of self-sufficiency, pride and empowerment."

To whet our appetites, the manual provides tips on storing and preparing

the fruit, including a few suggestions for culinary creations. Pawpaw rum cake, anyone?

Sources and full nutritional details provided at the end.

How could you possibly resist planting a couple of pawpaws – named Tree of the Year in 2000 by *Better Homes and Gardens* magazine – with this handy little manual as your guide?

Dan Bissonnette received the North American Native Plant Society 2012 Restoration Award for his efforts to restore and raise awareness about the pawpaw in Ontario.

Review by Irene Fedun

leaves but they do not implicate a symbiotic partnership with mycotrophic fungi. Others label Indian pipes as a saprophyte only indirectly associated with fungal breakdown of leaf litter. In fact, *Monotropa* is what is called an epiparasite and forms part of a triumvirate of tree/fungus/Indian pipes. The plant interjects itself into an existing symbiotic linkage between fungus and tree and is called a “cheater” by some. The one necessary part of the relationship is that Indian pipes only parasitizes fungi of the genus *Russula* or a few other members of the family Russulaceae. It is also part of the mycorrhizal relationship, at least the anatomical features of the relationship, that sets *Monotropa* and its close relatives apart from both the Ericaceae and Pyrolaceae; the fungal net around the roots of *Monotropa* has particular sets of penetrating hyphae which gives the relationship of fungi to *Monotropa* the term Monotropoid.

On glacially derived mineralized soil, Indian pipes typically appears in late summer or early autumn in the vicinity of white or red oaks (*Quercus* spp.) and in the company of several *Russula* species. However, we have seen Indian pipes growing under dense pine tree cover (*Pinus* spp.), and obviously very acidic soil in Minnesota. Apparently soil pH is not a factor in growth; the only critical factor is the presence of a *Russula* species mycorrhizally associated with native trees. In dry years Indian pipes may not appear.

Deer are not attracted to Indian pipes because the plants contain several cardiac glycosides. But how can a non-photosynthetic plant make these carbon-rich glycoside molecules? While much of the carbon available to *Monotropa* comes from the tree by way of *Russula*, it seems that *Monotropa* has another trick up its botanical sleeve. To a small degree, *Monotropa* is capable of carbon fixation; it performs phosphoenolpyruvate (PEP) carboxylase activity. PEP carboxylase is a four-carbon (C4) atmospheric carbon-capturing molecule usually associated with tallgrass prairie dominant grasses. This presence of PEP carboxylase may also help to distinguish the Monotropaceae from the Pyrolaceae and the Ericaceae which are both primarily three-carbon plants. The flowers, typically hidden, are equally diaphanous. In fact, the only visible non-white tissue paper features are the amber anthers. The relatively large flowers are chiefly visited by bumble bees, although hover flies and paper wasps also come by to drink their nectar.

Humans have had an interesting relationship with Indian pipes. In the 19th century boiled concoctions of *Monotropa* were considered treatments for epilepsy (hence the name convulsion root) or eye problems. Also that century, naturalists such as the indefatigable polymath Constantine Samuel Rafinesque and many physicians prescribed Indian pipes for eye troubles. Sap from crushed stems was drizzled directly into painful,

swollen eyes.

In the 1940's, Harvard botanist Merritt Lincoln Fernald, citing a previous attempt by a Nova Scotian to cook the plant for food, tried it himself expecting it to taste something like boiled asparagus. Instead, he had this reaction: “Our single experiment was not gratifying in its result.”

Indian pipes was one of poet Emily Dickinson's favourite forest flowers from childhood. A devoted plant collector in her youth, she created an interesting pressed flower collection which included Indian pipes. Before she died, a friend painted a watercolour of Indian pipes for Dickinson. She told her friend: “That without suspecting it you should send me the preferred flower of life, it seems almost supernatural, and sweet glee I felt at meeting it, I could confide to none.”

Whether you view it as a “preferred flower of life”, an epiparasite or a “cheater”, *Monotropa uniflora* may continue to flourish as long as trees abound in association with the critical fungi, the Russulaceae. But as we saw during the severe drought of 2012, it also takes sufficient rainfall to spark life into the triumvirate and bring forth the tiny Faberge jewel of the forest.

Mary Stark came to an appreciation of plants through literature. Stephen Johnson enjoys studying intricate symbiotic plant relationships such as the one involving Indian pipes.



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