FALL 2015

Field Botanists of Ontario Newsletter

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President's Message

It is a pleasure to be writing my first "President's Message" in my new post as president of the FBO. It is a privilege to be in this position at the head of a very fine organization and I look forward to three more years working with the Board in this capacity. Thanks to our past president, Mike McMurtry, for his contributions and consistent leadership over the past three years.

Another eventful season of field botany wrapped up in September with our Annual General Meeting in Peterborough. The AGM field trips were well-attended despite a bout of cool and rainy weather, and there was an excellent turn-out for the banquet, which featured an engaging presentation by Jeff Saarela of the Canadian Museum of Nature. Joan Crowe was presented with the Goldie Award, which is given annually to an individual who has made a significant contribution to the advancement of field botany in Ontario. A presentation by Bill McIlveen highlighted Joan's many achievements, including her numerous field guide publications that many of us are familiar with.

This year, seventeen field trips (including four at the AGM) and two workshops were offered by the FBO in locations across Ontario, from southwestern to eastern Ontario, the Niagara and Bruce Peninsulas, Walpole and Manitoulin Islands, and the Land Between. The field trip program is the mainstay of our organization, offering members (and anyone else) opportunities to discover and explore Ontario's diverse natural areas, expand their knowledge of Ontario flora, hone their plant identification skills, and connect with others interested in botany. The success of our field trip program depends on many volunteers who take time out of their busy schedules to prepare and lead these botanical outings that we all appreciate and enjoy so much. We are fortunate to have the regular support and involvement of so many excellent botanists and specialists in related disciplines, and we are always on the lookout for new trip leaders (suggestions welcome). Many thanks to our 2015 field trip and workshop leaders: Wasyl Bakowsky, Rick Beaver, Bill Crins, Todd Farrell, Albert Garofalo, Bob Gray, Jonathan Harris, Clint Jacobs, Dave Jolly, Karen Kesterloot, Tristan Knight, Tom Lobb, Shelley McCabe, Janine McLeod, Tyler Miller, Mike Oldham, Dawn Renfrew, Eleanor Thomson, and Steve Varga.

Also thanks to our field trip organizers, Sarah Mainguy and Natalie Dunn, for the significant task of coordinating the trips. And thanks to everyone for coming out this year! Stay tuned for more events in the months to come.year!

The FBO board reconvenes in November to begin preparing for next year's activities. Stay tuned for more events in the months to come.

Dan Westerhof

On the cover: Top: Clay bluffs along Ausable River. Photo by Brian Miller. Bottom left: FBO Class of 2015, Botanical Illustration Workshop, Gosling Wildlife Gardens, Guelph Arboretum. Photo by Bill McIlveen. Bottom right: *Fritillaria* drawing, as fruit of the illustration workshop. Artist: McIlveen.

The suggested standard source for scientific and common names is the Database of Vascular Plants of Canada (VASCAN): (http://data.canadensys.net/vascan/search).

Field Botanists of Ontario website: **www.trentu.ca/fbo**

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Field Botanists of Ontario

(FBO) is a non-profit organization founded in 1984 for those interested in botany and conservation in Ontario.

Editor's Note

Field Botanists of Ontario are a versatile bunch when it comes to the study location. It appears that we are as at home in real terrain as we are in laboratory surroundings - as long as we have our plants as object of observation. Also, we are capable of expanding our perspectives and accepting, as bona fide plants, such claimants as lichens and fungi. So, it is no surprise that an event like a very first in the history of the organization workshop on algae was met with great interest. As Bill McIlveen reports, the workshop was, in many ways, a refresher course on these smallest of plants (apart from the easy-to-observe-with-the-naked-eye, in other words larger, macro-algae).

That same correspondent also attended another "first in history" of the FBO workshop. Although it was focused on plants, the event one was not strictly botanical, in the scientific sense. No great physical effort was required to fully participate in it: no walking, no tripping over boulders or logs, no suffering from heat, cold or rain; what sufficed was simply a piece of paper, a pencil, crayon or brush, a place to sit, an observant eye, and a nimble hand. Who knows, may be the workshop will turn out to be for some a starting point in a great career as a botanical illustrator?

In the meantime, the real live plants of "normal" size awaited the participants of two trips in the southwestern corner of the province. The Ausable River valley in itself is a great location for many interesting and uncommon species. But when you add a top-notch botanist as leader, the number of species observed can increase exponentially. You can relish these riches in Brian Miller's account, and double the pleasure by venturing with Andrew Dean into the deep woods of Norfolk County.

If you happen to explore these areas, or elsewhere in southern Ontario, keep an eye on the mundane birch trees. For you may find a brand new species... Merely 30 years old as a new taxon, Murray's Birch is a proof that evolution is happening right in front of our eyes. Details in a most interesting article by Mike Oldham.

Happy searches in 2016 and beyond!

Chris Zoladeski

Field Trip Reports

Botanical treasures of the Ausable River Valley

22 September, 2012

By Brian Miller

We began our day near the west end of Fossil Road on the north side of the Ausable River. Fossil Road connects to Sylvan Road about one kilometer north of Townsend Line. Nearby are the Rock Glen Conservation Area and the small community of Arkona. Our beginning location was near the south end of a heavily forested stretch of the Ausable River valley that winds for several kilometres to the north. The extent of forest cover along this stretch is evident on aerial images. This stretch of the river is also a dividing line between Lambton and Middlesex counties.

Our trip leader for the day was Dr. Anton (Tony) Reznicek, a research scientist and curator of vascular plants at the University of Michigan Herbarium. Dr. Reznicek is also co-author of Michigan Flora Online (2011) and the associated Field Manual of Michigan Flora (Voss and Reznicek, 2012). His authoritative knowledge combined with the exceptional flora of the Ausable River Valley made for a very intriguing day. Reznicek began with an overview of the valley by describing the rich calcareous bottomland woods, bluffs of limestone, shale and clay, and narrow meadows containing prairie flora that border the river. He also described how the natural features of the valley are in relatively good condition and that an interesting mix of northern and southern species is present.

We headed down a path into the river bottom woods passing by a large clay pit. The first notable species we encountered was Broad-glumed Brome (*Bromus latiglumis*), which differs from two similar woodland brome grasses (Hairy Brome *B. pubescens*, and

Bars and banks of the Ausable River. Photo: B. Miller.

Beak Grass (*Diarrhena obovata*). Photo: B. Miller.

Nottoway Brome *B. nottowayanus*) by the presence of auricles at its sheath summit and its later blooming period. Reznicek pointed out another uncommon grass, River-bank Wild Rye (*Elymus riparius*), which differs from the common Virginia Wildrye (*E. virginicus*) by its arching spikes and straight glumes that are not bowed out at the base. We also observed the distinct looking Bottle-brush Grass (*Elymus hystrix*), Leafy Satin Grass (*Muhlenbergia frondosa*) with its smooth internodes, and White Cutgrass (*Leersia virginica*). Reznicek explained that the rhizomes of *L. viriginica* are scaly and brittle, which is a possible adaptation for dispersal along rivers. Other species typical of floodplains were observed, including: the abundant Black Maple (*Acer saccharum* spp. *nigrum*), Gray's Sedge (*Carex grayi*), Tall Coneflower (*Rudbeckia laciniata*), Great Angelica (*Angelica atropurpurea*), a sunflower lookalike – False Sunflower (*Heliopsis helianthoides*) with fertile ray flowers and a true sunflower, Thin-leaved Sunflower (*Helianthus decapetalus*) with sterile ray flowers. At the river's edge, Reznicek pointed out the aptly named Riverbank Sedge (or Emory's Sedge) (*Carex emoryi*) and explained that this species is most abundant along the banks of larger rivers like the Thames and Grand in southern Ontario and is often associated with the rarer Hairy-fruited Sedge (*Carex trichocarpa*).

We made our way to some open clay and limestone riverside bluffs that forced us to tread carefully. Indian Grass (*Sorghastrum nutans*) grew on some of the ledges, as did Smooth Sumac (*Rhus glabra*) and Climbing Bittersweet (*Celastrus scandens*). Seldom seen seedlings of Sycamore (*Platanus occidentalis*) were present at the base of the clay bluffs along the river's edge. A highlight for many in this section was the rare Neglected (or Cooper's) Milk-vetch (*Astragalus neglectus*) with its conspicuous inflated pods and clump forming growth habit. Reznicek explained that a large proportion of this species' global range is in southern Ontario and that it frequently grows on limestone pavements.

Before long we were into a new section of woods that was terraced slightly above the river. We first encountered Bladdernut (*Staphylea trifolia*), Jumpseed (*Persicaria virginiana*) and a fruiting specimen of Bristly Greenbrier (*Smilax hispida*). More woodland grasses were examined, such as the large Stout Woodreed (*Cinna arundinacea*)

and a *Brachyelytrum* species whose lemma hairs could not be measured in the field to distinguish between the more widespread Northern Shorthusk (*B. aristosum*) and the mostly Carolinian Southern Shorthusk (*B. erectum*). Typical woodland forbs were observed, such as the Large Tick-trefoil (*Hylodesmum glutinosum*), Bluestem Goldenrod (*Solidago caesia*), Michigan Lily (*Lilium michiganense*), Early Meadow-rue (*Thalictrum dioicum*) and White Rattlesnake-root (*Nabalus albus*) with its cinnamon pappus. We also observed these less common forbs: Poke Milkweed (*Asclepias exaltata*), Carpenter′s Square Figwort (*Scrophularia marilandica*), Moonseed (*Menispermum canadense*), American Germander (*Teucrium canadense*) growing under a Slippery Elm (*Ulmus rubra*), a Blue-eyed Grass with the largest flowers in its genus (*Sisyrinchium angustifolium*) and a tall southern variation of Canada Goldenrod called *Solidago canadensis* var. *hargeri*. This form of Canada Goldenrod has very small flower heads and stem pubescence throughout.

We made our way back to our cars to have lunch and to travel to a different section of the Ausable River Valley. Along the way we observed three sedges: Wood's Sedge (*Carex woodii*) with its basal bladeless sheaths, the thread-like leaves of Bristle-leaved Sedge (*C. eburnea*), and the bright green leaves of Spreading Sedge (*C. laxiculmis* var. *copulata*), in contrast to the glaucous leaves of var. *laxiculmis*). We had lunch next to the Ausable River in a narrow patch of prairie-like meadow occupied by Big Bluestem (*Andropogon gerardii*), Fresh Water Cordgrass (*Spartina pectinata*), Tall Sunflower (*Helianthus giganteus*), Sneezeweed (*Helenium autumnale*), Spotted Joe-pye-weed (*Eutrochium maculatum*), Northern Bedstraw (*Galium boreale*) and Smooth Blue Aster (*Symphyotrichum laeve*). Reznicek mentioned this would be good habitat to view the rare Rigid Sedge (*Carex tetanica*) during the spring. In the same habitat we observed two provincial rarities: Riddell's Goldenrod (*Solidago riddellii*) with its characteristically folded narrow leaves, and Tuberous Indian-plantain (*Arnoglossum plantagineum*) with its lower and basal plantain-like leaves. Reznicek explained that the former is at its northeastern range limit in the Ausable River Valley and that the latter has a very restricted range in Ontario. It is found along the Maitland and Ausable Rivers, at one location along the Thames River in a seep, and more commonly in fens on the Bruce Peninsula.

Before heading to our next location we had a quick look at some roadside flora. Reznicek pointed out Gattinger's Panic Grass (*Panicum gattingeri*), which looked similar to the more common Witch Grass (*Panicum capillare*) but with a smaller inflorescence. He explained that *P. gattingeri* is not a tumbleweed the way *P. capillare* is; however, both species are more weedy than the closely related Wood Panic Grass (*P. philadelphicum*) and Tuckerman's Panic Grass (*P. tuckermanii*). More interesting flora was observed along the road, including: Yellow Pimpernel (*Taenidia integerrima*), Seneca Snakeroot (*Polygala senega*) and more occurrences of *Solidago riddellii* and *Arnoglossum plantagineum*.

From Fossil Road, we headed a few kilometres north to Elm Tree Drive and followed the new road to its westerly end. We walked a narrow trail down the valley toward a remote section of rich river bottom woods. We were delighted to see two provincially rare forbs along the way: Broad-leaved Gromwell (*Lithospermum latifolium*) and Green Violet (*Hybanthus concolor*). The floodplain woods at the bottom of the valley contained many Black Walnut (*Juglans nigra*), Black Maple (*Acer nigrum*) and Chinquapin Oak (*Quercus muehlenbergii*). Several other plants characteristic of floodplain woods were present, such as False Sunflower (*Heliopsis helianthoides*), Smooth Goldenrod (*Solidago gigantea*), Canada Moonseed (*Menispermum canadense*), American Bladder-nut (*Staphylea trifolia*) and the Purple Joe-pye-weed (*Eutrochium purpureum*). Reznicek explained that *E. purpureum* differs from the much more common Spotter Joe-pye Weed (*E. maculatum*) by its wider leaves, fewer florets per head, slightly dome-shaped inflorescence and unspotted stem. A Giant Hyssop (*Agastache* sp.) was pointed out; identification of this species as either Catnip Giant Hyssop (*A. nepetoides,* uncommon) or Purple Giant Hyssop (*A. scrophulariifolia*, rare) was uncertain in the field because it was done flowering. Later examination by Reznicek confirmed the ID as *A. nepetoides* and he commented that this species is uncommon and usually restricted to the Lake Erie shore. Other highlights in this section were a couple of provincially rare grasses: Slender Satin Grass (*Muhlenbergia tenuiflora*) and Beak Grass (*Diarrhena obovata*). Reznicek described the *Muhlenbergia* as a very slender plant with leaves that come off from the stem at right angles. It is usually found in rich woods along rivers in southwestern Ontario. He described the *Diarrhena* as one of the rarest river bottom grasses in Canada and the dense patch that we were admiring may be the largest patch of this species in Canada. This patch of grass with its wide shiny leaves and unique inflorescence grew close to the river's edge.

Before heading out of the valley to conclude the day, we had a look at the adjacent river and some of its vegetated bars. Reznicek offered a final interesting thought about the river bars and banks during low water periods. He suggested that these locations may have been the original habitat of some of our native weedy annuals, such as Witch Grass, Amaranth (*Amaranthus*) species, Goosefoot (*Chenopodium*) species, Love Grass (*Eragrostis*) species and Yellow Nutgrass (*Cyperus esculentus*).

We trekked out of the valley to our cars and thanked our trip leader for sharing his incredible knowledge. It was an exciting day of botanizing and much was learned.

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Putty-root (*Aplectrum hyemale*). Photo: A. Dean.

Shining Tree Woods' Magnolias

1 June, 2014

By Andrew Dean

Shining Tree Woods, owned and stewarded by the North American Native Plant Society (NANPS), is located in Norfolk County, nearby the hamlet of Cultus, Ontario. NANPS purchased the property in 1994, which is an exceptional Carolinian forest habitat, and remains relatively undisturbed. At roughly 50 acres in size, Shining Tree Woods is named after the resident Cucumber Magnolia (*Magnolia acuminata*) trees, and is one of eight known sites in Canada where Cucumber Magnolia is naturally regenerating. Peter Kelly, current Executive Director at NANPS, co-led the outing with Bill Draper, a seasoned veteran in the Ontario botany kingdom. Shining Tree Woods is located in the Norfolk Sand Plain physiographic region, which extends through much of the western and central portions of the Long Point area, and is characterized by low relief, with silty sand and gravelly substrates (Chapman and Putnam 1984).

The property is broadly characterized by upland Sugar Maple (*Acer saccharum*) forest and Soft or Silver Maple (*Acer saccharinum*) swamp. Several rare vascular plant species had previously been identified during an inventory in the early 1990s.

The outing began by exploring deciduous thicket and regenerating forest habitat, formerly in agricultural production. Common opportunistic species were observed such as Hairy Vetch (*Vicia villosa*), Field Horsetail (*Equisetum arvense*), Cleavers (*Galium aparine*), Fragrant Bedstraw (*Galium triflorum*), Late Goldenrod (*Solidago gigantea*), Lady Fern (*Athyrium filix-femina*), Arrow-leaved Aster (*Symphyotrichum urophyllum*), Virginia Stickseed (*Hackelia virginiana*), and Pin Cherry (*Prunus pensylvanica*). Our first diagnostic tutorial was differentiating Field Horsetail from Meadow Horsetail (*Equisetum pratense*), a much less common species and easily confused with the former. Both species have leaf sheaths longer than the stem sheaths. The leaf sheaths on Field Horsetail will come to triangular points with black dots on the tips, whereas the leaf sheaths on Meadow Horsetail lack the black dots. As well, Meadow Horsetail branches horizontally, whereas Field Horsetail most commonly has upswept branching. Similarly, Bill discussed two commonly confused species, Curly-styled Wood Sedge (*Carex rosea*) and Straight-styled Wood Sedge (*Carex radiata*), which can easily be differentiated by the leaf blade width. Of particular interest in this

Amongst Cucumber Magnolia. (Inset: Magnolia leaves). Photo: A. Dean

portion of the property was Wild Yam (*Dioscorea villosa*), a deciduous vine, which grows in a variety of disturbed and regenerating habitats, and can superficially resemble Carrion Flower (*Smilax herbacea*). A mystery plant was located by one of the keen sets of eyes in the botany brethren, and remains unidentified (to the best of my knowledge) on FBO's 2014 Facebook webpage.

Next stop was the upland Sugar Maple (*Acer saccharum*) forest, with a vast continuous carpeting of rich ground flora. Several moist depressions were noted throughout. Commonly encountered species included Stoneroot (*Collinsonia canadensis*), Smooth Sweet-cicely (*Ozmorhiza longistylis*), Hairy Sweet-cicely (*Ozmorhiza claytonii*), the greenish-yellow flowered Yellow Mandarin (*Prosartes lanuginosa*), False Solomon's Seal (*Maianthemum racemosum*), Wild Licorice (*Galium circaezans*), Wood Millet (*Milium effusum*), and Peduncled Sedge (*Carex peduncalata*). Less commonly encountered species were Woodland Poa (*Poa alsodes*), Cucumber Magnolia, and Black Gum (*Nyssa sylvatica*). Botanists were keen on locating the reported Putty-root (*Aplectrum hyemale*), which was suspected to be in bloom at the time. A few basal leaves heralded its observation and diligence was soon to be rewarded. As members meandered through the upland habitats towards the maple swamp, several Putty-roots were discovered in the fullest of bloom, which were strikingly beautiful, and surely the pinnacle of the outing for myself and several others. Bill then hosted another sedge tutorial on differentiating White Bear Sedge (*Carex albursina*) from Loose-flowered Sedge (*Carex laxiflora*). The former species has a terminal bract that is wider than the terminal pistillate spike, whereas the terminal bract is not wider than the terminal pistillate spike in the latter species.

The maple swamp, with organic substrates (i.e., at least 30 cm of organics over mineral soils), was dominated by Freeman's Maple (Acer x *freemanii*), which are characteristic of the wettest habitats. Commonly encountered species included Skunk Cabbage (*Symplocarpus foetidus*), Interrupted Fern (*Osmunda claytoniana*), Crested Shield Fern (*Dryopteris cristata*), Cinnamon Fern (*Osmunda cinnamomea*), Royal Fern (*Osmunda regalis*), and Naked Miterwort (*Mitella nuda*). Dwarf Ginseng (*Panax trifolius*) was reported from the property, but was not found. A Louisiana Waterthrush (*Parkesia motacilla*) was identified by song within this habitat, a rare wood warbler found in southern Ontario, preferring wooded ravines with streams, wooded swamps, and large tracts of mature deciduous or mixed forest (MNRF 2000).

The journey back to the vehicles was welcomed with Sassafras (*Sassafras albidum*), Drooping Sedge (*Carex prasina*), Tower Mustard (*Arabis glabra*), and Sheep Sorrel (*Rumex acetosella*) in the various habitats explored throughout the day.

Special thanks to NANPS and Peter Kelly for generously hosting the outing and Bill Draper for imparting a portion of his extensive botanical knowledge.

REFERENCES:

Chapman, L.S. and D.F. Putnam 1984. The Physiography of Southern Ontario. Ontario Geological Survey, Special Volume 2, Ontario Ministry of Natural Resources. Toronto.

Ontario Ministry of Natural Resources and Forestry (MNRF). 2000. Significant Wildlife Habitat Technical Guide – Appendix G.

Botany through illustration

17 May, 2015

By Bill McIlveen

There is probably no better way for training one's ability to observe details of the structure of a plant (hence its identity) than to accurately draw it. The FBO had never organized such event before but we were pleased to offer the very first botanical illustration workshop this year. It was held at the Arboretum of the University of Guelph. The J.C. Taylor Centre was an ideal venue for the workshop that was led by Karen Kesterloot of the Guelph School of Art.

The first activity that we were asked to do was to try to make a drawing of a leaf or some such object. We were instructed to make the drawing by only looking at the object and not at the drawing we were creating. We followed the line made by the edge of the leaf for example, using our eyes to follow every curve of every lobe or every tooth or feature. This exercise was to demonstrate the importance of using the left side of the brain. Normally, we rely very heavily on the right side of the brain which focuses on the visual and processes information details in an intuitive manner. The left hemisphere is more analytical in processing the information arriving from our eyes. Although I could appreciate the intent of the exercise, I realized just how hard-wired my observation skills were skewed to towards my right hemisphere.

The second exercise was to make an accurate drawing of a simple leaf. We learned about keeping proportions correct as well keeping the shape and outline accurate. A useful point is to use the negative space (the part of the drawing where the object is absent) as well as the positive space when making an illustration.

After lunch, we were given some instructions on the use of pencils, pens, pastels, and smudge sticks. We took that new knowledge out to the Gosling Wildlife Gardens which are conveniently located just outside the Nature Centre. There were many different plants available for us to draw and colour for ourselves. Even though the participants at the workshop would generally consider themselves to be amateurs or novices at drawing plants, everyone produced very pleasing results.

Karen Kesterloot on proportions. Photo: B. McIlveen.

For the last part of the workshop, Karen demonstrated a variety of techniques using water colours that aspiring botanical illustrators might find useful. Of necessity, the instructions imparted for the day were of a condensed variety. The instructor though was more than capable and was obviously well acquainted with the intent of the workshop. It is hoped that there will be future workshops of this type. It is highly recommended that FBO members take advantage of such opportunities to learn some extra botanical skills.

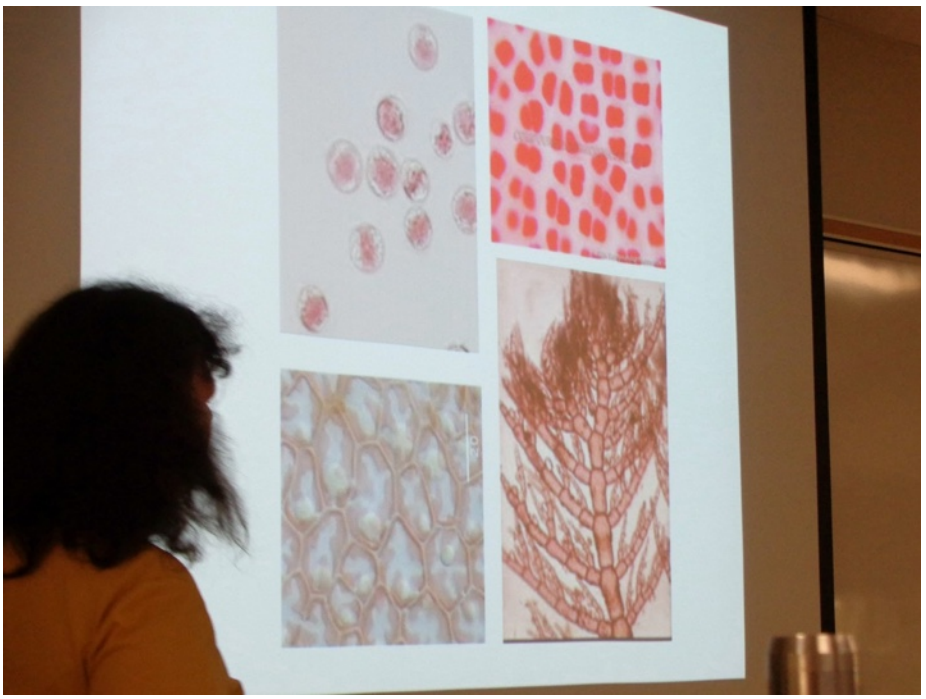
The small plant workshop

14 June, 2015

By Bill McIlveen

Although generally tiny, algae have a profound impact on the existence of all forms of life on the planet including the lives of humans. Algae, in the form of cyanobacteria, first appeared in the geological record about 3.4 billion years ago. At that time, there was no free oxygen. Over the next billion years or so, the combined action of these primitive organisms released enough oxygen to form an oxygen-rich atmosphere. Such an atmosphere was necessary before most of the animal and other life forms could exist.

The amount of carbon fixed annually at a global level is estimated to be 110-115 billion tonnes. Of this, about 50 percent of the fixation is carried on by algae. They therefore represent a force to be reckoned with in sequestering carbon that we humans so thoughtlessly release into the atmosphere. Some of the carbon is actually being more or less permanently locked up in deep sea sediments when the algae die and settle to the bottom of the ocean. By contrast, efforts to remove CO_2 by planting trees can only have a minor impact. Consider that an average tree may live about one hundred years and store a certain amount of carbon in its woody tissues. Sooner or later that tree dies or is harvested. At that time, the woody tissue gets burned or starts to break down ("*the slow smokeless burning of decay*" as eloquently mentioned by Robert Frost in his poem, "The Woodpile"). Inevitably, the carbon is simply re-released into the air as carbon dioxide once more. This all happens in the blink of an eye in the geological scale of things. The more permanent fixing of carbon, particularly by the coralline algae seems like a better option



Dawn Refrew on algae. Photo: B. McIlveen.

to combatting CO_2. And we have hardly yet examined the potential of algae as a biofuel.

But what are algae? Usually we consider them to be a special form of 'plant'. Shortly after I had taken my first course in phycology, the group of organisms that we call the 'blue-greens' were properly recognized as bacteria. They were claimed by the bacteriologists and many regard them to be such and with good justification since they lack nuclei and organelles associated with higher forms of life. More recently, the taxonomists have started to clarify the classification of these organisms. Excluding the blue-greens for the moment, the rest of the six algae groups are recognized as a polyphyletic group with no common ancestor. The 'red algae' and the 'brown algae', for example, evolved independently, just as the vascular plants had arisen as another group. What had happened was that symbiogenesis had occurred independently - several different times. A particular bacterial type organism had lived in such close association (i.e., mutualism) with one of the cyanobacteria that the two became permanently associated. The cyanobacteria became the chloroplast. This is also the case for the vascular plants as well. So in a sense, the botanists were able to have some claim once more on the cyanobacteria.

With that very brief background concerning the importance of algae, the FBO was very pleased to offer the first opportunity to members to learn about these organisms in thirty years of existence. A workshop was arranged at the University of Guelph as an introduction to the topic. The leaders for the day were Shelly McCabe and Dawn Renfrew.

A very general introduction was made by Dawn Renfrew. This covered part of the information noted above. The next section was by Shelly McCabe. She listed a number of symbiotic relationships involving algae. These were mostly of a mutualistic character and her points of discussion included:

- Algae living in the fur of sloths;
- Corals with symbiotic algae;
- Lichens (algae transfer 90% of the photosynthate to the fungal partner);
- Cyanobacteria present in shallow mineralized pools;
- Red snow algae, algae that are wind-blown, and some that live in clouds; and
- Deep water has higher diversity depending upon position and lake circulation.

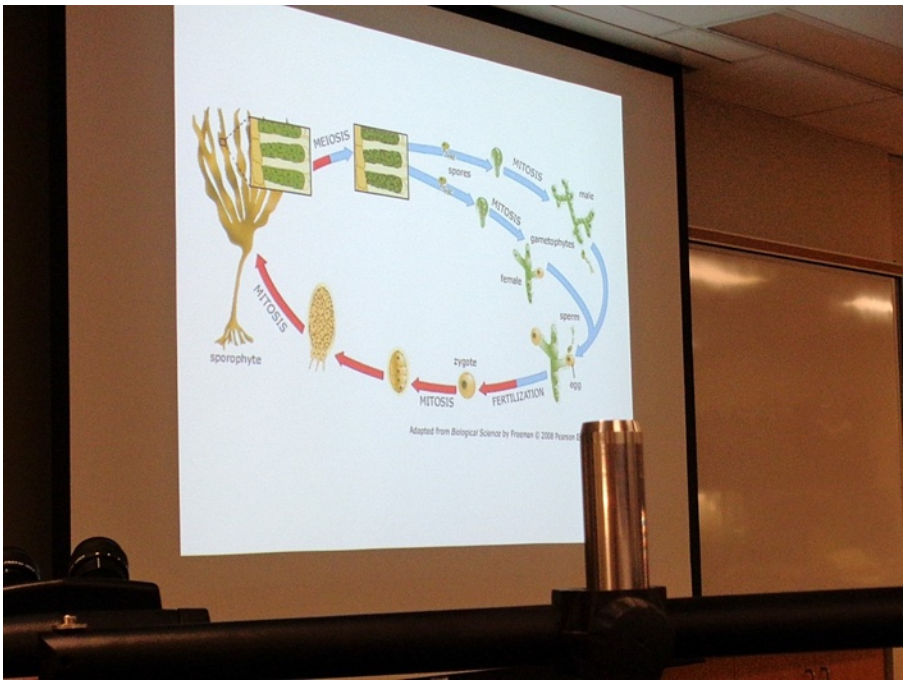
Dawn Renfrew then reviewed the main methods for identifying algae – whether the species is a single cell, or forms colonies including single or multiple filaments or a leafy structure (though algae do not

A "brown alga" (*Macrocystis integrifolia*) and a "red alga" (*Polyneura latissima*). Photo: B. McIlveen.

have true tissue differentiation of vascular plants). Different chemicals and different pigments occur in the various groups. As well, different groups show different types of alternation between the diploid and haploid generations.

In the afternoon, participants had the opportunity to look at different types of algae under the microscope. They had the possibilities for examining both preserved and fresh material. They were introduced to some basic microscopy methods such as cutting thin sections for viewing the red and the brown algae. Examples of macro marine algae are shown in preserved samples in figures on the previous page.

Participants all enjoyed the day and for most, this was the first exposure to the group. All things considered, the workshop was judged to be a great success and further workshops were discussed. It seems desirable that future workshops should be designed to help participants learn to identify any of their own collections.



Life cycle of algae. Photo: B. McIlveen.

Botanical roots

Murray's Birch (Betula murrayana B.V. Barnes & Dancik) in Ontario, Canada

by Michael J. Oldham

In 1985, Burton Barnes and Bruce Dancik described in the Canadian Journal of Botany a new species of birch from southeastern Michigan which they named *Betula murrayana* after Frank Murray, manager of the forest properties at the University of Michigan (Barnes and Dancik 1985). Frank Murray discovered two individuals of an unusual birch which he was unable to identify and brought this to the attention of Burton Barnes, an expert on the genus at the University of Michigan. Barnes and Dancik studied the unusual birch which was intermediate in appearance between Yellow Birch (*Betula alleghaniensis*) and Bog Birch (*B. pumila*), but did not appear to be *Betula* x *purpusii* the well-known hybrid between the two. This hybrid is not uncommon in swamps and edges of bogs and lakes in southeastern Michigan (Dancik and Barnes 1972).

The relatively infertile birch hybrid, *Betula* x *purpusii*, is known to have a chromosome number of 2n = 70, while the unusual unknown birch was fertile and had a chromosome number of 2n = 112. Barnes and Dancik (1985) determined that the unusual birch represented an undescribed polyploid species which arose from an unreduced gamete of *Betula* x *purpusii* (n = 70) and a reduced gamete of Yellow Birch (n = 42).

In the early 1980s one of the two original Murray's Birch trees unexpectedly died and only a single tree remains at the type locality for the species in Washtenaw County, Michigan. Until recently this single individual was the only known Murray's Birch tree not in a cultivated setting. Several cuttings from the original trees have produced plants at the University of Michigan's Matthaei Botanical Garden and at the Holden Arboretum in Kirtland, Ohio (Voss and Reznicek 2012, Ashburner and McAllister 2013).

In 1987 Pru Barnes (niece of birch expert, Kenneth Ashburner, who recently co-authored a worldwide monograph on the genus *Betula*) visited Ontario to collect birch seed for her uncle in England. Pru visited several locations in the St. Williams, Norfolk County, area and collected seeds from a variety of birch trees (primarily *B. alleghaniensis* and *B. pumila*) from several sites. The seeds collected

Betula murrayana shoots from a tree in cultivation at the Ness Botanic Gardens which originated from seed collected in Norfolk County, Ontario. Photo: H. McAllister.

included some from a tree that was thought to possibly be a Yellow Birch hybrid. The collected seed gave rise to two plants of *B.* x *purpusii*, which had 2n=70 as expected, and the *'B. alleghaniensis* possibly hybrid' gave rise to a single seedling. This seedling was raised at the Ness Botanic Gardens, University of Liverpool, England, from the possible hybrid and was initially thought to be a small-leaved form of Yellow Birch until a chromosome count done in 2011 by Hugh McAllister gave 2n = 112 and identified the seedling as Murray's Birch (H. McAllister pers. comm. Jan. 2013). The single tree in cultivation at Ness Botanic Gardens produces viable seed which comes true and is self-compatible. Seedlings from this tree are now being distributed to other botanic gardens (Ashburner and McAllister 2013).

It is not known if the original tree near St. Williams from which seeds were collected in 1987 is still alive or if others are present in the area. Searches to date to try and rediscover Murray's Birch in Ontario have been unsuccessful, though one hybrid-like tree has been found and is being studied by Mary Gartshore (pers. comm. June 1015).

The presence of additional populations of Murray's Birch was predicted by Barnes and Dancik (1985) in the original paper describing the species when they stated that "it is highly likely that it will be found elsewhere in the Great Lakes – St. Lawrence Valley area". Currently the only natural populations known are the original population in Washtenaw County, Michigan, and the Norfolk County, Ontario, population, making this one of the rarest tree species in the World. *Betula murrayana* has been recognized as Critically Endangered in the recent Red List of Betulaceae (Shaw et al. 2014) and is listed as Endangered in the 1997 IUCN Red List of Threatened Plants (Walter and Gillett 1998).

Murray's Birch is a fairly small tree, to about 15 m tall and 20 cm in diameter, with tight shiny reddish to greyish bark. It is similar to a small Yellow Birch but differs in its generally reddish-brown bark and leaves which are 5-11 cm long with only 7-10 pairs of lateral veins. The leaves are singly serrate (vs. usually irregularly doubly serrate) and are ovate with an acute or slightly acuminate apex and cuneate base. The hybrid *Betula* x *purpusii* is also similar but has smaller leaves (typically 4-6 cm). See Burnes and Dancik (1985) and Voss and Reznicek (2012) for more information on identification and Michigan Flora Online (Reznicek et al. 2011) for photographs of the species in Michigan. The photos above were taken by Hugh McAllister and are of shoots from the tree at the Ness Botanic Gardens that originated from Norfolk County seed.

Field botanists in southern Ontario should be on the lookout for *Betula murrayana* in open, swampy woods and bog, fen, and lake margins.

Acknowledgements

Hugh McAllister of the Ness Botanic Gardens, University of Liverpool, in England brought the true identification of the St. Williams birch seedling to my attention and provided photographs. Tony Reznicek, University of Michigan, and Mary Gartshore, Walsingham, provided additional information on *Betula murrayana*.

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Field Botanists of Ontario
Revenue and Expense Statement
January 1, 2013 - December 31, 2013

	2013
Bank Balance Beginning	$15,102.12
Revenue	
Life Memberships	$950.00
Field Trips	$3,135.00
Annual General Meeting	$1,447.00
Donations	$1,562.00
US Exchange	$0.00
Bank Credit	$0.58
Bank Interest	$0.00
Newsletter Advance Repayment	$254.70
Memberships	$3,481.75
Winter Meeting 2011	$0.00
Total Revenues	$10,831.03
Expenses	
Field Trips	$366.36
Field Trip Refunds	$0.00
Field Trip Honoraria	$800.00
AGM Honoraria	$400.00
AGM Expenses	$1,277.49
Newsletter Expenses	$1,198.83
Newsletter Honorarium	$200.00
Membership Expenses	$42.32
Executive	$61.52
Liability Insurance	$1,023.84
Bank Charges	$92.36
Returned Cheque	$0.00
FON Membership	$50.00
Newsletter Advance	$0.00
Talbot Land Trust Donation	$1,000.00
Total Expenses	$6,512.72
Bank Balance Ending	$19,420.43
Gain	$4,318.31
W. Draper Treasurer	

06 September 2014

To: The President and Members,
Field Botanists of Ontario

Financial Review (Unaudited)
Field Botanists of Ontario

I have reviewed the financial statements and books of record of the Field Botanists of Ontario, as prepared by your Treasurer Bill Draper, for the year ending 31 December 2013.

In the course of this review, I examined the bank statements, bank deposit records, donated cheques, board expenses and all receipts.

It is my conclusion that the accounts balance with the bank statements and are accurately described in the Revenues and Expense Statement for 2013.

All questions arising from my review of the accounts have been explained by the Treasurer to my complete satisfaction.

I have verified the accounts and am satisfied that the statements as presented do accurately reflect the financial position of the Club for the year ending 31 December 2013.

George Bryant,
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