

Wild Flower

Journal of the North Carolina Native Plant Society



Fagus grandifolia, American beech

*Winter 2009
Volume XXI*



WildFlower, the journal of the North Carolina Native Plant Society, welcomes article submissions from members and others. Articles contributing to knowledge about native plants, the environment and related issues will be accepted as space is available. Articles may be submitted at any time, preferably electronically. Photos are also accepted. The journal is published in December of each year.

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2. Wendy VanDyk Evans, www.forestryimages.org
3. Ibid.
4. Bill Cook, Mich. St. Univ., www.forestryimages.org
5. Ibid.
6. Cephas. Réserve nationale de faune du cap Tourmente, Québec, Canada. www.en.wikipedia.org
7. www.deepcraft.org
8. Bruce Martin. <http://www.cirrusimage.com/trees.htm>



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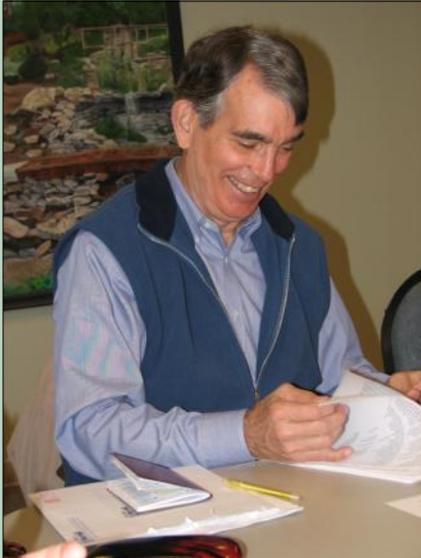
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Address and Email Address Corrections

Timely communication from NCNPS requires that we have your most current street address AND email address. Please also be sure to add the following addresses to your contact list (especially if you have earthlink as a server, as earthlink won't let your mail through).

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From The President...



Over the past several weeks I have attended two meetings about conservation and one on invasive plants. The overwhelming feeling I was left with is that we don't have agreement on what should be done with either subject--perhaps that is why we keep meeting? I hope it is, because there are so many variables involved that a casual exposure to these complex issues will leave you perplexed and I think that continued exposure to all points of view makes it easier for you to formulate your own opinions. I know I have stronger ideas about what we should be doing from attending these meetings.

Another frustrating fact about these meetings is that it seems to be only the choir in attendance. I see the same faces over and over.

Where's the congregation? I was recently given the excuse that "I'm not an expert so why should I go?" Well folks, that just don't fly. You all need to be there and hear what the "experts" say. Some of them have empirical data, some have just opinions but they all provide you with more data points for your conclusions. That's my point, you should have an opinion and be able to discuss it with your friends. There are far too many folks out there that never ponder the effects of invasive plants or of conservation and you may be the impetus to get them involved.

It's in this vein that the Society is going to hold a conservation conference in February of 2010. We hope to give you cogent information on conservation and to move toward determining what you think the Society's position should be. So please watch for the announcement and come.

See you at the meeting,

Tom



Effects of beech bark disease on regeneration of high-elevation beech forests in Great Smoky Mountains National Park

Sarah E Galliher
Elon University, 2010



In 1993, beech bark disease (BBD) was discovered in Great Smoky Mountains National Park (GRSM). This disease is an insect-fungus pathogen complex, meaning that it needs both an insect and fungus to cause infection. The insect is *Cryptococcus fagisuga* and the fungus is *Nectria coccinea*. The insect was introduced to North America from Europe via ornamental trees in the early 1900s at Nova Scotia, and because of the ubiquitous nature of the fungus, beech bark disease was established in North America. Subsequently, the disease spread throughout New England and continued southward to Pennsylvania and Ohio and even to Michigan.

In GRSM, the disease has caused considerable amounts of mortality among the high-elevation beech gaps in only the past 16 years, where it affects beech trees with diameters at breast height (DBH) over 8 cm. One reason for the high beech mortality in GRSM is that beech gaps are created by the clonal nature of the variety of American

beech (*Fagus grandifolia*) trees that grow there. This means that new trees can sprout from the roots of an existing tree. When this happens, there is little genetic diversity among the individual trees (known as ramets) because they are all made up of relatively few parental genotypes (or genets), thus producing the same phenotype, or expression of the genotype, with regards to disease resistance. Therefore, if one tree in a gap is affected by beech bark disease, it is likely that all other sharing the genotype will be as well.

An important characteristic of beech is that they are shade tolerant, meaning they are able to withstand lower amounts of light than some other tree species, though it does not mean they must exist only in low light conditions. Therefore, we would expect that in areas where there is high mortality of beech, there will still be dominance by beech because, as a shade tolerant species, beech were already abundant in the regeneration layer before the canopy trees died. However, the opening of the canopy also allows for colonization by shade-intolerant species. This brings us to our first hypothesis: that in areas of high beech mortality and thus low



Tarry spots on American beech affected with beech bark disease.
Joseph O'Brien, USDA Forest Service. <http://www.forestryimages.org/>

canopy cover, there will be greater diversity of tree species and the dominance of beech will be less than in healthy forests. Similarly, we hypothesized that beech would continue to be the dominant species in the regeneration layer, that is any stem < 10cm in diameter at breast height (DBH) and greater than 1.4m tall. Both of these hypotheses were based on the facts that beech gaps are areas of the forest where beech trees are the primary constituent and that beech are shade-tolerant species.

Our interest was to determine what species of trees may become the next dominant species in this forest type if this trend of

mortality continues into the future. Like-wise, we were interested to determine the future of beech and if it should be expected that this species will diminish with the decreased amount of canopy cover in beech gaps.

Over a two-week period in August 2008, we sampled 9 beech forests containing plots associated with long-term hog exclosures that were established by GRSM in the 1980s to study the effects of hog rooting on the understory vegetation of beech gaps. Each plot had at least one focal area (module) of 100m². The plots were sampled using CVS (Carolina Vegetative Survey) protocol. For the purpose of this study, all sapling-sized stems (that is less than 10cm DBH and greater than 1.4m tall) were recorded. Each stem was identified to species and given one of four size classes: 0.0-1.0 cm, 1.0-2.5 cm, 2.5-5.0 cm, and 5.0-10.0 cm.

The total area sampled made up 0.49 hectares (ha) of beech forest and of that area, 0.21 ha were considered low mortality forest and 0.28 ha were considered high mortality. Shannon's diversity index (H') was calculated to determine if the diversity was greater in the high mortality forest. We also calculated Simpson's dominance index to determine if dominance was lower in these same beech gaps. Density of all stems and of only beech stems was calculated per hectare.

Our results showed that the relative abundance of beech out of all species sampled was 95.05%. The next most abundant species was sugar maple (*Acer saccharum*) at 1.55%, followed by buckeye (*Aesculus octandra*) and yellow birch (*Betula allegheniensis*) each at 0.67% and red spruce (*Picea rubens*) at 0.52%. Beech was found in 100% of the plots sampled and 100% of the modules. The second highest frequency per plot was 45.5% for both buckeye and yellow birch. These two species also had the second highest frequency per module. Sugar and striped maple (*Acer pensylvanicum*) were found in 18.2% of modules, the third highest frequency per module. Based on these results, beech is the most dominant species in the regeneration layer of these beech gaps and it is significantly more abundant in each size class than any other species. Because of the high frequency per module of buckeye and yellow birch and the high relative frequency of sugar maple, we know that these three species are ones most capable of competing with beech for future dominance in these forests. Shannon's diversity index suggested higher diversity in high mortality forests, though the difference was not significant

($H'_{high} = 0.318$, $H'_{low} = 0.250$). Similarly, Simpson's dominance index suggests that beech dominance is lower in high mortality forests, but there was no significant difference here either ($Chigh = 0.89$; $Clow = 0.92$).

When we compared the total stem densities in each forest type and then beech stem densities for each forest type, we saw that the densities of each group of stems were significantly higher in the low mortality forest than in the high mortality forest. In both low and high mortality forests, there was about a 200 stem/ha difference between the total stems and beech alone, which suggests that beech regeneration in healthy forests is driving the difference in total stem numbers.

Based on these results we conclude that beech does, in fact, remain the dominant regenerative species in BBD-affected forests of GRSM. Also, the effect of high mortality is that regenerating stem density decreases, especially for beech, in all size classes. Furthermore, it appears that the opening of the canopy by beech bark disease allows forests to cultivate new tree species. Despite the dominance of beech in diseased forests, it appears that most beech stems are dying before they reach 10 cm DBH. The sprouts of non-beech species were more consistent in numbers throughout size ranges.

For the foreseeable future, if the current trends continue, beech regeneration will remain the dominant regenerative species in beech gaps of GRSM. The non-beech species that are most likely to grow to tree size, and possibly replace beech, are buckeye, yellow birch, sugar maple, and red spruce.

Thank you to the North Carolina Native Plant Society for supporting my research with the Tom and Bruce Shinn Grant. Thank you also to the Elon College Fellows Program and the Elon University Undergraduate Research Program for additional funding, to Dr. David Vandermast for overseeing this research project, and to Alexandra Kay and Julia Roberts for assistance in data collection.

Sarah E Galliher
Elon University, 2010

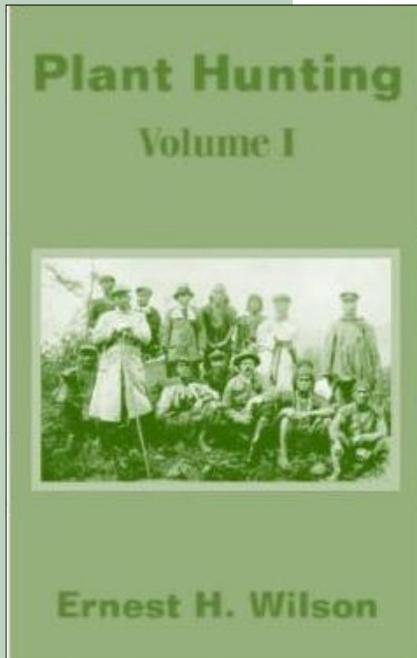
The following note accompanied Sarah's article:

Thank you once again for awarding me the Tom and Bruce Shinn Grant to aid in funding my research on beech bark disease in the Smokies. What a wonderful experience it has been! As required by the terms of the grant, I am submitting an article about my project for the journal Wildflower, as well as a final list of expenditures. I also included a photo of a beech gap with high mortality (in its case, essentially no beech cover), if you would like to include that with the article. I have never received Wildflower before but is there a way I can get one when my article is printed? Please let me know about this and if you have any questions about any of my submissions.

Sarah Galliher



Off The Shelf: Plant Hunting



Plant Hunting, Wilson, E.H. 2002. *Plant hunting*, Vol. I (reprint of the 1927 edition). University of Hawaii Press. Honolulu.

“From 1899 when I paid my first visit to China until 1922, when I sailed home from Capetown in South Africa, I wandered about the world in search of plants. This has been a great and privileged experience and one I thoroughly enjoyed.”

He was called ‘Chinese’ Wilson, Ernest Henry ‘Chinese’ Wilson, and from 1899 to 1922 he reportedly collected over 100,000 specimens of more than 5,000 species, introducing several thousand Asian plants to the Western world. It is said that over one four-month period alone Wilson collected 2,000 species that would be new to Western collections. In his two decades in the field, Wilson made six trips to China, Japan, Korea, and Formosa, with his first two trips to China in the employ of James Veitch and Sons nursery in London. His subsequent journeys to China and Japan were sponsored by Charles Sargent of the Arnold Arboretum at Harvard University. Wilson chronicles his explorations in the two volume series titled

Plant Hunting. Although Volume I has been reprinted and is available through the University of Hawaii Press, a new less expensive edition of Volume II has not, to my knowledge, been published. Used editions of the first edition of both volumes, published by The Stratford Company in Boston, remain available through book dealers.

‘Chinese’ or not, Volume I has nothing to do with Wilson’s Asian travels. Instead he spends his print space chronicling his visits to south and central Africa and Australia, New Zealand and Tasmania. His focus here is on blue gums and tree ferns and men he refers to as ‘they who paid the price.’ “They’ include Captain James Cook, Sir Joseph Banks, and Carolus Linneaus’ protégé Daniel Solander who aided, so greatly, the infusion of plants from Australia and surrounds into the collections of Europe.

Perhaps it was Wilson’s interest in the early explorers that made me wonder why we do it? Why do we climb around on steep mountain slopes, clamber over sometimes dangerous rock slides, or wander knee deep in the muck of swamps and marshes? Why take the risks? Why incur the expense? Over the past several years I have had the pleasure of collecting plants from ‘rescue’ sites at several locations here in the mountains of Western North Carolina. My companions have included people from a number of different occupations. I don’t believe there was a professional botanist among them. However, professional or self-trained, a surprising number of my companions were exceptionally well versed in the native flora of these mountains. And many were obviously on a first name basis with the plants they gathered. Some collected as if their lives depended on it. Others were less dedicated. Some took every-thing in sight while others searched diligently only for a particular species or plants from a particular genera. We were probably all there for different reasons



Ernest Henry Wilson

but if there was one thing we all shared, it had to be a simple child-like fascination. The kind of awe that a toddler or kindergartener might experience when encountering something new for the first time. Some of us never lose that awe. I haven't. We are the ones who slip and slide around on the steep slopes of the Smoky Mountains outside of Waynesville or along the banks of muddy streams and ditches. And we share that awe with the Bar-trams *1+, the Kingdon Wards *2+, and, yes, the Ernest Henry 'Chinese' Wilson's of the world.

Wilson says that "The world holds floral treasures beyond the dreams of avarice but it is for us to seek them out and learn how to use them wisely and well." It seems to me that the importance of the early plant hunters, and we latter-day botanists and naturalists, lie not so much in the number of species introduced to science but rather with our shared dedication and fascination, our shared awe in the face of other life. With apologies to Michael Pollan [3], could 'Chinese' Wilson have been following 'a botany of desire' in his search for the dove tree in western China or the regal lily in Sichuan? Or could it be the biophilia, described by E.O. Wilson, an attraction to life we all share, some more than others, that drew him to search for the yellow poppy and that draws us into the marshes, swamps, and forests in search of whatever plant or plants call to us. Regardless of the name, I strongly suspect that we are motivated by what I can only term a spiritual calling; a calling that binds us together and calls us forth into cold rainy days or blistering heat, that causes us to brave tick fevers and plant toxins, a calling that often surpasses common sense as we search, an obsession to encounter and understand other life.

Read Wilson, enjoy the 'cool air and brilliant light' that made walking in central Africa 'very pleasant.' Visit peat bogs and alpine meadows, and experience the brilliance of the Milky Way at 3 am high in the Aberdare mountain range north of Nairobi. And, while you do all of that, remember that each of us, even in this day of Starbucks and McDonalds, is very much a part of this great adventure.

Tom Baugh
Hidden Springs



*One of the many plants introduced by Wilson.*³

Photo credits:

1 NewCROPTM, the New Crop Resource Online Program, Purdue University.

<http://www.hort.purdue.edu/newcrop/proceedings1993/V2-140.html>. Accessed 11-03-09.

2 Wikipedia, Ernest H. Wilson. http://en.wikipedia.org/wiki/Ernest_Henry_Wilson. Accessed 11-03-09.

3 Heptacodium



Learning from Students...

Dateline: 30 Nov 2009

If you can and the event happens next year, you should must go see this presentation at the Duke University library!

A Thompson Writing Program event featuring student work from 3 sections of Writing 20:

Conservation of Biodiversity

Dr. Stephanie Jeffries

Google Earth's Impact

Dr. Christine Erlien

Writing with Durham

Dr. Elizabeth Drogin

Stefan Bloodworth and I took this trip into academia today. I know, it's been 25 years since I've been in a classroom but I'm not too old to learn, right!? Anyway, Professor Steph Jeffries sent out an announcement to a list serve that I belong to that her students would be exhibiting their work for her class, Writing 20 at Duke University. For the uninitiated, Writing 20 is:

Academic Writing is the only course required of all first-year students at Duke. Writing 20 is taught by a multidisciplinary faculty in the Thompson Writing Program, and each semester we offer writing course topics in our areas of scholarship. Thus, our challenge is to teach students the critical thinking and writing practices specific to our disciplines, but to also make these practices transferable to their future classes.

Steph Jeffries (a forest ecologist) has taken the approach that her students' work should be related to our environment. Last year she chose rare plants as a topic and this year it was "Conservation of Biodiversity."

Now think about this situation. You have first year students from all over the world taking this class. They are addressing subjects that are near and dear to us, but for them it's a job, an assignment, a grade. They have to research plants and concepts that are WAY out of their experience levels and present cogent papers and construct posters that will convey their findings. And then, verbally present their ideas in an understandable fashion to their classmates and folks like me. I was fascinated to see their work and their conclusions. I talked to a student from Nepal and one from Maine about their poster concerning prescribed burns—they had no idea about the benefits of fire until this project. How about "plant blindness?" I've thought of it many times because I worked in NCDOT and I would say that a majority of DOT employees have this malady but I have never seen it

expressed so succinctly. Well, you get the idea and I hope that we may be able to get some of these posters to one of our functions so you, too, can see them and learn from students.

Here's a list of the students and their subjects:

Ashley Alman	On the road again: the impacts of roadside maintenance and development on plant and animal species
Zahava Alston	What is the best way to control invasive species, prevention or control?
Jennifer An	How can we effectively eliminate invasive plants that threaten native species?
Marisol Azpeitia	On the conservation of NC wetlands: Flora vs. fauna
Michael Decker	A paradigm shift to preserving biodiversity: Death to the single-species approach and birth of an ecosystem approach
Katie Biernacki	Effectiveness of the use of sand nourishment and <i>Ipomoea imperati</i> on erosion
Alexander Bruce	The rare granite outcrops: Save our granite save our planet
Kanchan Chauhan	Combined methods for prescribed burns
Cairang Duoje	To protect rare species like prairie goldenrod, should we use mechanical mowing or prescribed fire?
Michaela Foster	Determining conservation methods for the preservation of watershed habitats
Jina Hamad	Don't resist a plant's right to exist: Plant blindness inhibits biodiversity
Caroline Howes	Do prescribed fires help non-target species such as piratebush (<i>Buckleya distichophylla</i>) in mountainous pine forest ecosystems?
Steven Jones	Speciation, adaptation, and what <i>Camassia scilloides</i> could tell us
Frances Lobo	The effect of woody succession and the decline of mountainous native plant species
Conor McDade	Herbicide enhancement: Why herbicides can make a difference
Sagar Mehta	Green development policies as a solution to plant habitat loss
Joan Nambuba	Pocosins: More than masses of decomposition
Andy Ni	Robin Runaway: How roadways impact North Carolina flora
Tim Noe	The menacing Japanese honeysuckle: why fire should be used to contain the invasive plant
Paul Schisa	A Burning Question: Are Prescribed Burns The Right Answer?
Christina Thompson	Greenfly orchid conservation: Whole habitat conservation over single species management
Amanda Yu	On the Edge: How disjunct peripheral populations could prove useful for future research
Yuan (Ingrid) Zhuang	Laurel Wilt Disease: In-depth research and a solution for long-term treatment

See you in the woods (or the classroom),

Tom



From the archives

From the October, 1954 newsletter of the North Carolina Wild Flower Preservation Society (NCNPS):

Trailing Arbutus (*Epigaea repens*) From Seed

By Herbert P. Smith

After successfully growing Trailing Arbutus, transplanted in our wild flower garden at Smithwin Farm, I was able to gather seed from two plants this year. One plant, brought from Haw River in Alamance County five years ago, has bloomed each year but did not produce any seed. About three years ago I transplanted a nice plant in full bloom from Tryon, in Polk County. This plant has bloomed each year since being transplanted. This spring I transplanted a third plant, which was in bloom, from Deep River in Moore County. All three of these plants are growing within an area of three square feet and near two hemlocks (*Tsuga canadensis*) which are about five feet tall. All three plants bloomed this year but it was the plant from Tryon that produced the most seed. I did get a few seed from the plant that came from Deep River.



After the blooming season I noticed that two of these plants were making seed pods. With renewed interest I decided to try to grow trailing arbutus from seed. The next step was to know when and how to gather the seed. The seed pods were very much the same shape as the morning glory. However, they were in small groups like the flowers. About the first of June I noticed that the seed pods were beginning to turn brown as though ripening. I watched these daily to make sure I did not miss getting the seed. I am sorry I did not keep accurate dates on this project, but I think it was about the middle of June, when I was making my daily visit, that I found all the seed pods wide open and, as Dr. Wherry writes in his Wildflower Guide, "exposing a fleshy white pulp sprinkled with minute seed."

I immediately prepared a mixture of half well-rotted sawdust and half sharp sand and put it in a glazed pot. By taking the point of a pen-knife, I removed the fleshy white pulp or pods with the seed, and mixed them as best I could with the top surface of sand and sawdust. After settling this with water, I put the pot under glass. About six weeks later I noticed that something very small was coming up; in fact, it was so small that it really looked like some kind of moss. Upon examination with a magnifying glass, I could see that they were all small plants with two small leaves.

These plants have grown very fast and now, the first of November, some of them have six and seven leaves—the largest leaves being three-eighths of an inch long. By the use of a glass I have counted 85 plants. I will keep these plants protected from the cold this winter since they are in a pot and can not be mulched heavily. Just prior to the spring growing season, I plan to transplant all of the larger plants into individual pots and keep these pots plunged to the top in well-rotted sawdust mixed with sharp sand for an even supply of moisture. I will keep a frame, which allows ventilation, above these plants to protect them from beating rains. Further progress of this project will be reported at our Spring meeting next year.

Continued...

The subject of the preceding article was mentioned in the Minutes of the October 1954 meeting of the Society:

Nearly 50 members and visitors of the North Carolina Wild Flower Preservation Society met on October 17, 1954 for their semi-annual meeting, at Cumberland Knob State Park.

Members began arriving about 10:00 a.m. Greetings were exchanged, and a period of visiting and fellowship ensued until time for our first field trip of the day scheduled for eleven o'clock. The trail from the clubhouse to the top of Cumberland Knob was taken by our group. Two of our able botanists, Dr. Oliver M. Freeman of Tryon, and Dr. H. R. Totten of Chapel Hill, pointed out some of the more unusual plants and trees along the lush trail of galax, rhododendron, laurel, table mountain pine, white pine, chestnut oaks and trees and plants too numerous to mention. Dr. Freeman pointed out the buffalo nut, a partly parasitic shrub, the cherry birch sometimes called sweet birch, that has a bark which looks much like the bark of the wild cherry with the leaves like a birch and the taste and smell of teaberry. Deciduous holly was in abundance along the trail and most of us gathered some of its berries to bring to our own gardens to plant. Dr. Freeman reminded us that it takes two years for these seed to come up. It was most thrilling to see the beautiful blue bottle-shaped closed gentian. Wild grapes were in abundance and most of us started out lunch there at the top of the Knob as we gazed on the beauty of the countryside with the Pilot Knob in the distance.

Back at the clubhouse we took our picnic baskets to the picnic grounds, such delicious food and in such abundance; there was fried chicken, roast, ham biscuits, numerous kinds of sandwiches, salads, potato chips, olives, pickles, pies, cake, persimmon pudding, fruits and drinks. Mr. and Mrs. Jas. M. Plaster from Winston-Salem brought along a huge coffee pot and in no time flat they had a fire going in the furnace and hot coffee for all. The day being beautiful but a little nippy that coffee just hit the right spot for most of us.



Picnic area at Cumberland Knob. From Blue Ridge Parkway Guide, 1949; www.nps.gov

After lunch we assembled back at the clubhouse for a short business meeting conducted by our President, Mrs. Paul R. Spencer. Mrs. Carl Pegg, our secretary, read the minutes of the last meeting and the various items of business were taken care of. Mr. G. O. Doake of Chapel Hill, President of the North Carolina Lily Society and one of our members asked help in obtaining seed of the Carolina lily. Mr. Herbt P.I Smith of Liberty brought the un-usual for us all to see. He had a pot with a hundred plants of trailing arbutus grown from seed gathered in his own garden. Dr. Totten took time to tell us what a wonderful thing he had done and rarely could you find a botanist that had performed such a fete.

Continued...

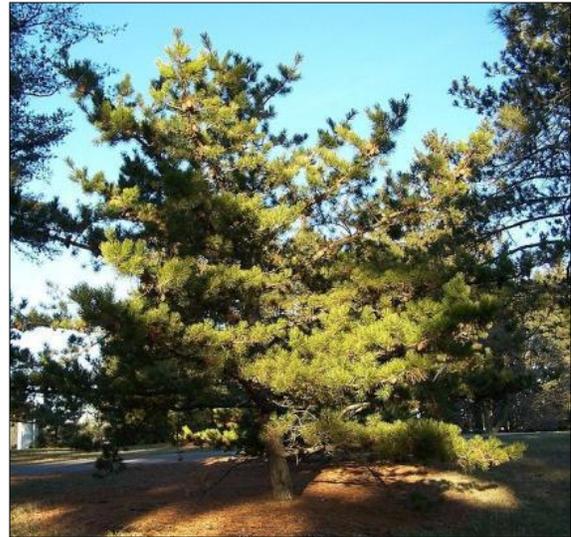
After our business session it was our good fortune to have for our afternoon field trip as our guide Mr. William G. Lord, Parkway Naturalist. Mr. Lord called our attention to the different kinds of pines in that immediate vicinity and showed how the needle formation varied from one to another. The table mountain pine being the most unusual with its top flat like a table and retaining its cones from fourteen to twenty years. We enjoyed our trip with Mr. Lord and his abundance of knowledge of plants, shrubs, and trees.

Some anxiety was caused by Mrs. H. R. Totten and her party, who got themselves lost and did not get to the meeting until mid-afternoon.

There follows a list of the 50 members present, including "others who attended the meeting and failed to register and we did not get their names."



Cumberland Knob is at Mile Post 217.5 on the Blue Ridge Parkway.



Pinus pungens, table mountain pine.
http://www.cirrusimage.com/tree_table_mountain_pine.htm

Photo Credit (page 9):
 Thomas G. Barnes @ USDA-NRCS PLANTS Database / Barnes, T.G., and S.W. Francis. 2004. Wildflowers and ferns of Kentucky. University Press of Kentucky.



Gentiana andrewsii, closed gentian.
www.gardensoftheblueridge.com



"Generally Speaking"

Arleigh Birchler

I sat down and tried to condense an overview of my notes on Carolina plants, as follows:

Eastern red maple



When learning about the plants of any region the trees are a good place to start. The trees and large shrubs tend to set the environment for the rest of the plants. Since trees, like most plants, tend to grow best under a particular set of circumstances they define plant communities.

Not so for the eastern red maple (*Acer rubrum*). These trees grow in a wide range of settings. They can be found near the coast and in the high mountains. They grow in wet and dry areas. They seem to be able to tolerate a wide range of soils.

The eastern red maple is a generalist. If one habitat is destroyed it will grow in another. This is not true for many Carolina plants. Many of them need a very specific habitat in which to live. If that habitat is destroyed they will cease to be (extinction).

Piedmont

In a time when there were few roads and the main method of getting anywhere on land was by foot, rivers were a very important means of transportation. A group of people setting out from near the Atlantic coast in the Southern region of North America might travel by canoe or boat. The larger rivers were easily navigated for a long distance inland. The countryside was generally flat or gently sloping.

On the major rivers along this part of the Atlantic coast, however, the travelers would eventually reach a place where the terrain is more rocky, with steeper slopes. Here they would encounter rapids and falls that made further navigation very difficult.

By mapping the rivers and the place where they became difficult to navigate they would find that they seem form a line that runs roughly parallel to the coast. This is called the fall line. The area from the coast to the fall line is called the coastal plains. Beyond the fall line is the piedmont. In the piedmont the soils are rocky, less deep, and of a different kind. The piedmont is the largest area of Carolina and it supports a different kind of plants than the coastal plains.

Appalachia

Continuing west the travelers would pass through higher hills with a variety of forests. In time they would reach a place where the slope increases rapidly. They would have to climb up to the top. The Blue Ridge Escarpment marks the beginning of the Appalachian Mountains. This range stretches from Maine to Georgia. Different regions of Appalachia have different names.

Shortly after reaching the top of the escarpment the traveler would reach the Eastern Continental Divide. Rain falling west of this will flow down to the Tennessee, or North through the New River Valley. Eventually it will reach the Ohio, and from there be carried by the Mississippi River to the Gulf of Mexico.

Plants growing in these mountains tend to be very different than those in the rest of Carolina. Many of them only grow here (endemic), might be "left-over" from ancient weather changes (relictual), or are plants that usually grow in the Midwest or tundra communities (disjunct).

Protection Status

Endangered

The federal and state governments maintain lists of plants whose habitats might be destroyed and which may become extinct.

Special concern or threatened

Lists are also kept of plants that are at less risk but might become endangered.

Wide-spread

Many other plants, like the eastern red maple, live under a wide variety of conditions and have ranges that extend to the Great Plains or beyond.

Locally wide-spread

Still other plants occur in many parts of Carolina but their range only extends through the Southeast or the Gulf and Atlantic coastal states.

Peripheral

Some plants occur in only a few places in Carolina but have large populations in other states. Carolina is on the edge of their range.

Watch list

Carolina maintains a list of plants that bear watching but that do not appear to be in immediate danger.

Plant listed

Other people and organizations keep their own lists of plants that they are concerned about. These plants may or may not be on any government list.

Some Common Soil Types

Fripp - maritime

Thick sandy sediments; adjoining beaches and waterways; undulating to steep; small amount of salt spray; flooding rare: maritime deciduous and evergreen forests.

Muckalee - coastal plains wetlands

Poorly drained; moderately permeable sandy river sediment (alluvium); on flood plains of shallow and meandering streams; often flooded: bottomland hardwood, small stream swamp.

Kalmia - coastal plains hardwood

Very deep; well drained; negligible surface run-off; marine sediment; river valleys: bottomland hardwood, moist (mesic) mixed hardwood, dry moist oak hickory forest.

Invershiel - wet marl forest

Slowly permeable; beds of clayey marine sediments over marl; uplands and stream terraces; level to gently undulating terraces; slow to medium runoff; slow internal drainage: rare.

Blaney - pineland, sandhills

Sandhills; coastal plain slopes; sandy marine deposit; weathered from acid rock or sediment; very deep; well drained: moist pine flatwood, pine scrub oak sandhill, sandhill seep.

Chewacla – bottomlands

very deep; poorly drained; piedmont and coastal plain river valleys; flood plains; sediment settled from rivers: bottomland hardwood, piedmont low mountain alluvial forest.

Iredell - piedmont uplands

Moderately drained; medium runoff; weathered from rock high in ferro-magnesium minerals; piedmont uplands: very dry (xeric) hardpan forest, upland depression swamp forest

Ashe - Blue Ridge

Gentle to steep ridges and slopes; soil creeps downhill; weathered felsic or mafic rocks; 1,400 to 5,000 feet: acidic cove forest, Canada hemlock forest, montane oak hickory forest.

Porter - northern hardwood

North and east facing ridges; soil creep; weathered from high-grade rock residuum; 3,000 to 4,800 feet; slopes 20 to 45 percent; Southern Appalachia: northern hardwood-typic.

Four Kinds of Rock

Marl

A kind of limestone that contains a lot of silicate material.

Calcareous

Rocks or soils that contain a lot of calcium carbonate (lime). Limestone is one of these. Much of the calcium carbonate comes from the shells of marine mollusks that lived long ago.

Mafic

Rich in heavier elements, such as magnesium, iron, calcium and sodium. They generally weather and crumble to form an alkaline (basic; sweet) soil that supports many kinds of plants.

Granite

Coarse-grained molten rock (magma) that cooled far below the surface or the Earth.

A Few Plant Communities

maritime evergreen forest

Sandy soil near coast. Protected from salt spray and flooding. Live oak, loblolly pine, Southern magnolia, yaupon holly, common wax-myrtle, tough bully.

wetlands-coastal plains

Agriculture is required to support human life. Most of the dry-lands in the coastal plains have been used for centuries as farms. Natural plant communities in the coastal plains consist mainly of wetlands that have not been drained.

wet marl forest

Seasonally flooded upland slopes over marl or limestone. Very rare community. Eastern red maple, sweet gum, willow oak, water hickory, common pawpaw.

coastal plains small stream swamp

Floodplains of small blackwater streams. Native cane, pond pine, swamp black gum, water-tupelo, swamp titi, sweetbay.

moist mixed hardwood

Moist uplands protected from fire. Southern red oak, tulip poplar, silky camellia, American holly, coastal sweet-pepperbush.

pine savanna

Wet, flat areas with frequent fires. Long-leaf pine, inkberry, pineland three-awn grass, Carolina birds-in-a-nest, blue huckleberry.

pine scrub oak sandhill

Sloping, sandy sediment with clay layer near surface, generally dry. Long-leaf pine, turkey oak, blackjack oak, goat's rue, finger-rot.

piedmont low mountain alluvial forest

Sediment carried by river or stream deposited in floodplains. Green ash, eastern hop-hornbeam, common hoptree, Virginia creeper.

alkaline forest

Upland forest on alkaline soil. Flowering dogwood, sweet pignut hickory, black oak, post oak, red buckeye, giant chickweed,

rich cove forest

Sheltered, moist, protected concave surfaces of hills and low mountains, alkaline soil. American beech, eastern hemlock, Fraser magnolia, Christmas fern, bent avens, Small's beardtongue, dwarf ginseng.

northern hardwood

Medium to high elevation coves, flats, and slopes, particularly on north-facing slopes. Yellow birch, Fraser fir, Catawba rhododendron, Carolina saxifrage, bent avens.

Some North Carolina State Parks
<http://www.ncparks.gov/Visit/main.php>

Carolina Beach

Forests dominated by longleaf pine, turkey oak and live oak occupy a series of relict sand dunes. Between the dunes are pocosins populated by pond pines, loblolly and sweet bay, yaupon and evergreen shrubs. Brackish marshes consisting primarily of cordgrasses and sedges can be found beyond the relict dunes adjacent to the river.

Merchants Millpond

Towering bald cypress and tupelo gum trees with growths of Spanish moss and resurrection ferns shade the pond's dark, acidic waters. Floating yellow cow lily and submerged coontail thrive in the pond. Floating duckweeds and water fern are moved about by wind and current creating a changing mosaic of colors and patterns.

Raven Rock

Wildflowers reveal magnificent blossoms in early spring. Look over patches of Dutchman's breeches, bloodroot, saxifrage and trailing arbutus. Gaze down paths lined with Solomon's seal, bellwort and spring beauty, or let your eyes wander through a haze of greens and yellows as leaves break their winter dormancy and begin to color the forest.

Weymouth Woods-Sandhills

Sandy ridges and valleys deposited as sediment along an ancient sea. Longleaf pines, turkey and blackjack oaks grow along with wiregrass. Bottomland of hardwoods, including dogwood, red and white oaks, American holly, sourwood, black titi, bay, gum, hickory, tulip poplar, persimmon and red maple. Loblolly and pond pines are also present.

William B Umstead

Exhausted and eroded farmlands and forests, stripped of timber, are being restored to their former grandeur. The varied landscape is now home to beavers, ducks, raccoons and deer. A variety of trees, shrubs, ferns and wildflowers offer beauty in every season. Rhododendron and laurel, plants typically found in the mountains, are abundant along the park's streams.

Morrow Mountain

Uwharrie Mountains that average less than 1,000 feet in elevation. Waters and woodlands are home to a variety of plant and animal life. In the parks forests are long-leaf pine, Southern red oak, Atlantic white-cedar, American beech and black tupelo. Sweetbay, farkleberry, and sourwood, along with anise-scented goldenrod and atamasco lily, may be found.

Chimney Rock

Hickory Nut Gorge of Rutherford and surrounding counties. Wildflowers and other plants carpet the meadows and mountainsides. More than 550 species of vascular plants-including 32 ferns and fern allies. Several species are on the North Carolina and one is on the Federal list of Endangered and Threatened Wildlife and Plants.

Hanging Rock

See rhododendron, azalea, galax, mountain laurel and a variety of ferns. Oak and pine abound, but in moist locations hemlock provides a canopy. One of the few places where Canadian and Carolina hemlock grow side by side. Mosses and lichens, pioneers of mountain forests, have invaded portions of this bare rock, beginning the process of succession.

Mount Mitchell

Red spruce, fire cherry, yellow birch, mountain ash, and mountain maple fill gaps opened by the loss of Fraser fir. Other native plant species such as blueberry, mountain raspberry, red elder, and bush honeysuckle produce beautiful blossoms. Wildflowers, including ox-eye daisy, white snakeroot, purple-fringed orchid, St. John's wort and pink turtlehead add color.

Arleigh Birchler
McGee's Crossroads, North Carolina



Travels with Zack

Steven Covert



Zack and 'Gnarly tree'

Zack and I decided to head out for a hike since we both had finally recovered from recent foot injuries. Our destination was a section of the Mountains-to-Sea Trail (MST) that starts at the Blue Ridge Parkway (BRP) junction with Route 23 south of Waynesville and ends just over 10 miles later at the Doubletop Mountain overlook on the BRP. This overlook was where we started the last adventure we wrote about five months and one season earlier.

We had a round about trip to the trailhead caused by a Parkway closure just south of Asheville (rock slide danger). We wound our way up Route 276 through the Pisgah National Forest by the Cradle of Forestry and then south along the BRP. The last vestiges of Fall color were leaving the trees at the lower elevations and most trees higher up had already lost their leaves. This is a great time of the year in the mountains since what earlier in the year appeared to be lush fairly soft-edged mountains now show their more rugged nature as the many ridge lines and rock outcroppings show through the forest. As

we drove down from Richland Balsam, which is the highest point

in the Pisgah Ranger District at 6,410 feet, it was clear that our hike back up was going to be a challenge.

The MST started across the street from the Route 23 access road and traveled through the woods between the BRP and another road until we came out less than a mile later and crossed over Route 23 on the BRP. We turned right on the MST before the road to the Forest Service Ranger Station and Maintenance Center, then dropped down to the right to follow railroad tracks along Route 23 for a short period until the MST re-entered the woods for the remainder of the hike. At this point we began to climb steadily through a nice forest with several small stream crossings and switchbacks, reaching a crossing with the dirt Red Rock Road at about 2.5 miles. The hike now became more scenic and more strenuous as we ascended eight switchbacks in about a mile. There were winter views north of the Plott Balsam mountains and Waynesville. We kept going through moss covered rock fields with lichen and ferns in abundance and climbed more switchbacks in a rugged setting, reaching Pinnacle Ridge at about mile 5.5. The MST turns sharply right here and continues up. To the left was the Pinnacle Ridge Parkway on the BRP - a faint footpath leads that way. Zack and I took a break here and had lunch, enjoying brilliant sunshine, a breeze and mid-50 degree temperatures. A great day to be in the mountains!

continued....

The next section of the trail was very nice, as we worked our way through moss covered rock fields and climbed steeply up to the side of Steestaches Bald at a little over the seven mile mark where we enjoyed watching a downy woodpecker busily working for its lunch. The next three miles or so was welcomingly easy going as we worked our way along the side of the bald and dropped down to Licklog Gap at mile 10.2. A grouse startled both of us on the way down as it took off with characteristic commotion.

Now, just as we were nearing the end of the trip there was more work to do. The last .6 miles, while not as steep as the earlier climbs felt harder given all the climbing we had done. The payoffs for continuing on were scrambling around a virgin blowdown that gave me an appreciation of the splendor that once was, and a living gnarly tree near the end.

This winter hike didn't afford a wide variety of wildflowers of course, but the MST guidebook [Hiking North Carolina's Mountains-to-Sea Trail](#) by Allen De Hart mentions the presence of Dutchman's pipe, wild quinine, bluebead lily and wood sorrel. Still visible were galax, squaw root and rattlesnake plantain. The variety of mosses, lichens and ferns made me realize I need to start working on their identification!

All in all, it was a very nice, but also very strenuous walk, with 3,000 feet of climbing. There are a couple of opportunities to shorten this hike by taking spur trails out to the Grassy Ridge Mile overlook at mile 8, or the Licklog Gap overlook at mile 10.2. You can also shorten the drive time (from Asheville) to the start by taking highways through Waynesville, including Route 23 where it meets the BRP eight miles south. If you opt for the more scenic BRP route and plan a winter hike, be sure to call the Parkway at 828-298-0398 for possible road closures. Also, several parts of the trail are off camber, which, with all of the rocks and leaves, make sturdy shoes a must.

Although we didn't have colorful native wildflowers to enjoy during our walk the late fall timing did offer a couple of benefits, mainly better views than earlier in the year, more abundant water sources for Zack and fewer crowds. In fact, we didn't see another person on the trail, despite the great weather!

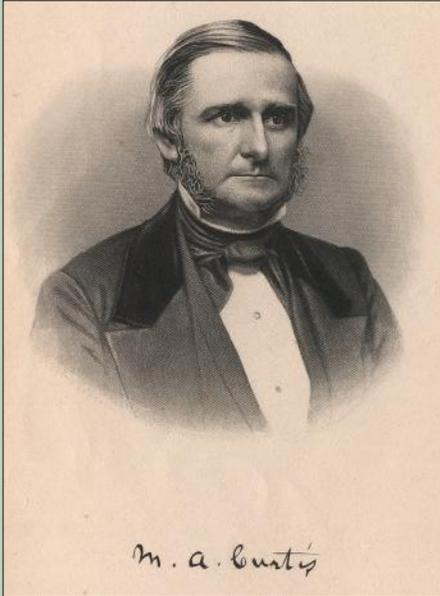
Steven Covert



K. Schlosser

Conopholis americana, squaw root.

*North Carolina Naturalists: first in a series of historical sketches of
the men and women who advanced botany in the state*



A Sketch of the Botanical Work of the Rev. Moses
Ashley Curtis, D.D.

Read before the Mitchell Society at the University of North Carolina,
May 22d, 1885.

By Thomas F. Wood

In the early days of this century botany was the science of great expectations in America. The florid narratives of the old chroniclers were being displaced by a generation of scientific men, whose zeal and earnestness fitted them for the vast work of the exploration and study of the flora of a new continent.

From the very beginning in this country, the science of botany was an aristocracy of learning, except in the matter of lineal transmission, and even in this direction we have two illustrious examples in the case of the Bartrams and Michaux. The pioneer teachers were admitted authority in their broad domain, and received the encouragements and patronage of the mother country in our colonial state, and the sympathy and re-

spectful admiration of the people when we became federated States. This was a very natural state of things, for although the science of botany was so well cultivated that it became a matter of national pride, still the real botanists were very few.

As we look through the superb volumes which remain the permanent monuments of the work of these men, we find a striking repetition of a very few names referred to as authority, but these men were able, industrious, and with very few exceptions, men of marked longevity, having the capacity of exciting enthusiasm among the young men who attended their instruction. It was not until the century was nearly twenty years old that botanical works began to multiply in such number as to be of use to the student; so at the time Dr. Curtis entered upon the study of botany, the science had already enlisted the men who were to give it the permanent impress of their rare ability. I propose now to pass in review the botanical career of the Rev. Dr. Curtis, rather than attempt a general biography.

Moses Ashley Curtis was born in Stockbridge, Berkshire county, Mass., May 11th, 1808. His mother was the daughter of Gen. Moses Ashley. He graduated at Williams College, September, 1827.

Mr. Curtis came to Wilmington in October, 1830, as a tutor in the family of Governor Dudley. He devoted himself in all of his leisure hours to the study of the flora of that region. Especially on Saturdays he made excursions among the sand hills and savannahs near Wilmington. At that time (1831) Wilmington was a village of about 4,000 inhabitants, and the field for botanizing existed where now are busy streets. Close up to the village reached the pine forests abounding with a flora rich and novel to the enthusiastic young botanist, while the savannahs, with their strange and interesting *Sarracenia* and *Pixidantha* [sic], and *Droseras*, and the thousands of gaudy heads of *Liatris*, and the brilliant yellows of *Coreopsis* and *Solidago*, charmed the eye and filled his portfolios.

A flora so vast as that of America was difficult for any one man to compass in the course of a lifetime, and so the earlier botanists had conceived the advantage of florulas, to be prepared each for his local section. Dr. Samuel L. Mitchell led off in 1807 in this work by publishing a catalogue of the plants growing around his country seat in New York, and he was followed by Maj. John le Conte in a florula for the island of New York in 1811, and in 1814 Dr. Jacob Bigelow published a model specimen of a local flora entitled *Florula Bostoniensis*. Subsequently the science of botany was enriched by the contributions of Dr. J. A. Brereton, for Washington, D. C.; and in 1830 by Prof. C. W. Short, for Lexington, Ky.

It was the result of his botanical studies that Mr. Curtis gave to the public under the title of "*Enumeration of Plants Growing Spontaneously Around Wilmington, North Carolina*," with remarks on some new obscure species." This first appeared in the *Boston Journal of Natural History*, September 3d, 1834, (No. 2, vol. 1) the first edition of which was nearly all burnt, but it was subsequently reprinted "with many additions and emendations." Dr. Gray says it was one of the first works of the kind in this country in which the names are accented.

His quick eye and assiduous application may be judged by the fact that (1) in little more than two seasons, at intervals from other engagements, he made a collection of over a thousand species (exactly 1,031.) This was two hundred less than were then reckoned as belonging to the flora of Massachusetts, and more than half the number described in Elliot's *Botany of South Carolina and Georgia*, and about a fourth of the phenogamous flora of the United State, as then known. He then adds that much ground still remains unexamined. Most of these plants were found within about two miles radius of Wilmington, and a number of maritime species discovered at Smithville, and several from Rocky Point. Dr. Darlington, who was one of his earliest and warmest friends, speaks of Mr. Curtis at that date as a careful observer and sagacious botanist.

At the time Mr. Curtis was pursuing his studies in Wilmington, there were few professed botanists in the State. The year before Dr. Curtis published his florula (1833) (2), H. B. Croom Esq., and Dr. H. Loomis made a pretty careful survey of Newbern [sic], and printed a catalogue of the plants they found growing in that neighborhood. Subsequently (1837) Mr. Croom published an enlarged catalogue. Mr. Croom was a lawyer, and a botanist of no mean ability, and besides the above contributions, prepared a valuable monograph on the Sarracenas which appeared in the third volume of the *Annals of the New York Lyceum*. The memory of Mr. Croom received a more distinguished record in the annals of botanic science than any of his contemporaries or successors in North Carolina, having had a genus (*Croomia*) named in honor of his contributions.....

.....In Wilmington Dr. James F. McRee, Sr., also cultivated botany with assiduity, and the two botanists worked together effectively. Dr. McRee's country residence was a Hilton, the country seat of Cornelius Harnett, near the junction of the North East Care Fear with the main stream. It was at this house that Harnett received a visit from Josiah Quincy, and where plans were laid for the prosecution of active hostilities against Great Britain. Here Dr. McRee cultivated with great care and with rare success the indigenous trees and shrubs he collected in the course of his extensive journeys in the pursuit of his calling. Dr. McRee added 34 species to Curtis' catalogue proper, and all through the writings of Dr. Curtis may be found appreciative allusions to his scientific attainments. No proper memorial has ever been made of this pioneer scientist.

Before railroads brought their freights speedily to our doors, and the art of printing had so multiplied books, there could be found upon the shelves of Dr. McRee's library the most recent and expensive works on the science of medicine in which he was a great master, but side by side with them he had a natural history collection in volumes of such rare value that to-day—the day of numerous and valuable books—it would be considered exceedingly choice. Until a late day in his life his herbarium was kept in order by replacing new specimens, but as his health failed and the war brought sorrows and cares to his home, his herbarium fell into neglect, and finding no cultured hand to preserve its scientific treasures, it was abandoned, and its crumbling remains now lie neglected

- 1 Enumeration of Plants, &c., M. A. Curtis, p. 83. Reprint Boston Journal Natural History, Vol. I, No. 2, 1834
- 2 Dr. Curtis gives the date of his publication as 1833, but in the reprint I have, it is stated that the paper was communicated to the Boston Journal of Natural History in 1834.

in the dusty garret of a former slave, and the best of the books doubtless found their way through the intervention of plunderers, to Northern bookstalls, if they did not go down off Care Fear in the ill fated steamer *Gen. Lyons*, with thousands of dollars belonging to other of our citizens.

Prof. Elisha Mitchell and Rev. Dr. L. De Schweinitz had preceded Dr. Curtis in the study of North Carolina plants, the former to abandon it for the more congenial study of geology, the latter to establish a world-wide reputation.

Dr. Cyrus L. Hunter, of Lincoln county, published a list of such plants as he found in his neighborhood, about the year 1834, and pursued his studies with more or less regularity and zeal since then.

This scanty review gives an idea of what degree of cultivation the pursuit of botany had reach in North Carolina when Mr. Curtis engaged in it.

To the south of us the Rev. Dr. Bachman, a diligent naturalist, had made such advance in the study of botany as to publish a catalogue of the plants growing in the vicinity of Charleston. At the same time, Mr. H. W. Ravenel was also a cultivator of the science. Of both of these gentlemen Mr. Curtis speaks in his diary as having met, while on a botanical tour in South Carolina and Georgia in 1835, also Mr. Leitner, of Georgia.

The number of botanists actually at work were few in number, but those were bound together by the closest ties of scientific and friendly interest. Much of the knowledge of plants was communicated by means of long and carefully prepared letters, written with that engaging art which unfortunately threatens to become extinct.

Mr. Curtis was twenty-two years old when he came to Wilmington a young teacher. His early associations had been favorable for the inculcation of a true scientific spirit. He found absorbing pleasure in the quiet of the fields and forests, and without ever a thought of becoming a scientific botanist, he amassed a wealth of knowledge, and won an exalted position among the botanists of the world. No doubt he looked forward to Saturday with eager expectation, that he might exchange the constrained duties of the school room for the freedom of the woods, and for pleasant intercourse with the old and new floral friends he was to meet.

If there is such a thing as a scientific instinct, Mr. Curtis possessed it. He was habitually accurate in his studies, and the results were early relied upon by his correspondents. Coming into a new field of botanical study, it was quite natural that he should have directed his attention to the habits of the very local *Dionoea muscipula*. Saturday after Saturday he would watch its peculiarities. The popular description which he gave of it in "Enumeration of Plants around Wilmington," has been repeated for the last fifty years, and shows how greatly he possessed the gift of accurate and entertaining description. I quote the passage without apology:

The leaf, which is the only curious part, springs from the root, spreading upon the ground or at a little elevation above it. It is composed of a petiole or stem with broad margins, like the leaf of an orange tree, two to four inches long, which at the ends suddenly expands into a thick and somewhat rigid leaf, the two sides of which are semicircular, about two-thirds of an inch across, and fringed around their edges with somewhat rigid cilia or long hairs like eye lashes. It is very aptly compared to two upper eyelids joined at their bases. Each side of the leaf is a little concave on the inner side, where are placed three delicate, hair-like organs in such an order that an insect can hardly traverse it without interfering with one of them when the two sides suddenly collapse and enclose the prey with a force surpassing an insect's efforts to escape. The fringe or hairs of the opposite sides of the leaf interlace, like the fingers of the two hands clasped together. The sensitiveness resides only in these hair-like processes on the inside, as the leaf may be touched or pressed in any other part without sensible effects.

The little prisoner is not crushed and suddenly destroyed, as is sometimes supposed, for I have often liberated captive flies and spiders which sped away as fast as fear or joy could hasten them. At other times I have found them enveloped in a fluid of a mucilaginous consistence, which seems to act as a solvent, the insects being more or less consumed in it. This circumstance has suggested the possibility of their being made subservient to the nourishment of the plant through an apparatus of absorbent vessels in the leaves. But as I have not examined sufficiently to pronounce on the universality of this result, it will require further observation and experiment on the spot to ascertain its nature and importance. It is not to be supposed, however, that such food is necessary to the existence of the plant, but like compost, may increase its growth and vigor.

But however obscure and uncertain may be the final purpose of such a singular organization, if it were a problem to construct a plant with reference to entrapping insects, I cannot conceive of a form and organization better adapted to secure that end than are found in the *Dionoea muscipula*. I therefore deem it no credulous inference that its leaves are constructed for that specific object, whether insects subserve the purpose of nourishment to the plant or not. It is no objection to this view that they are subject to blind accident, and sometimes close upon straws as well as insects. It would be a curious vegetable indeed, that had a faculty of distinguishing bodies, and recoiled at the touch of one, while it quietly submitted to violence from another. Such capricious sensitiveness is not a property of the vegetable kingdom.

The spiders net is spread to ensnare flies, yet it catches whatever falls upon it; and the ant lion is roused from his hiding place by the fall of a pebble; so much are insects, also, subject to the blindness of accident. Therefore the web of the one and the pitfall of the other are not designed to catch insects! Nor is it in point to refer to other plants of entirely different structure and habit which sometimes entangle and imprison insects. As well might be reason against a spider's web because a fly is drowned in a honey pot, or against a steel trap, because some poor animal had lost its life in a cider barrel.

In his note upon the structure of *Dionoea*, or Venus Fly-Trap, a plant found only in the district around Wilmington, says Dr. Asa Gray, "Dr. Curtis corrected the account of the mode of its wonderful action that had prevailed since the time of Linnaeus, and confirmed the statement and inferences of the first scientific describer, Ellis, namely, that his plant not only captures insects, but consumes them, enveloping them in a mucilaginous fluid which appears to act as a solvent."

During the preparation of his first little work he returned to Boston and commenced his studies for the ministry, 1833-34, with the Rev. William Croswell. While there he commenced a correspondence with Dr. Torrey, who aided him in determining species. His acquaintance with Dr. Gray commenced later, but became much more intimate.

While on his way to Boston, he formed the acquaintance of Dr. Darlington, of Westchester, Pa., and he afterwards became a valued friend and a helper so long as he needed one.

He married Miss Mary DeRosset, daughter of the elder Dr. J. A. DeRosset, of Wilmington, December 3d, 1834.

He returned to the South in the latter part of 1834, continued his studies with the Rev. Dr. R. B. Drane and was ordained to the ministry of the Episcopal church by Bishop Moore, of Virginia, in 1835. He immediately entered upon mission work in Western North Carolina from Charlotte to the mountain country as far as Morganton, with his residence in Lincolnton. It was while pursuing his work as a missionary that he took advantage of his journeying in the solitary woods to pursue his botanical researches. Most of his traveling was done in a "sulky," which was so arranged that his portfolio was under the cushion. As he came across specimens by the way, he would collect them and place them in his portfolio, and so by the end of his journey he had secured a number of ready pressed plants for future study, or for mounting permanently in his herbarium. He left the mountain section at the end of 1836, and was engaged as a teacher in the Episcopal school in Raleigh from the beginning of 1837 to May 1839.

The summer of 1839 he spent in the mountain country for health chiefly, though always carrying on his botanical explorations, and went through that region to the extreme west and southwest of the State.

Extending his botanical observations to the western borders of his adopted State, Dr. Curtis was among the first to retrace the steps and rediscover the plants found and published by the Elder Michaux, in the higher Alleghany mountains. (Silliman's Jour., January to June, 1873, p.392.) From the very beginning of these journeys the search for a plant found in the Elder Michaux's herbarium was begun and pursued with hopeful expectation for years. Michaux had been proven so truthful and accurate in his descriptions, that he had impressed his successors with faith in him. This veteran botanist had collected a remarkable plant, as Dr. Gray says, with the habit of *Pyrola* and the foliage of *Galax*, and the only specimen extant was in the Michauxian herbarium, among the *Planta incognita*, and this only in fruit. This plant, since discovered in flower by Mr. Hyams in McDowell, had already been named by Dr. Gray, in honor of Prof. Short, of Kentucky, and now known as *Shortia galicifolia*. Over and over again did Dr. Curtis traverse the line of Michaux's travel for *Shortia*, but without success.

Prof. Gray (3) says in a paper in which he sketched the botanical tours of the botanists who had visited the mountains of North Carolina in 1841: "No loving botanist is so well acquainted with the vegetation of the Southern Alleghany Mountains, or had explored those of North Carolina so extensively as the Rev. Mr. M. A. Curtis, who, when resident for a short time in their vicinity, visited, as opportunity occurred, Table Mountain, Grandfather, the Yellow Mountain, the Roan, The Black Mountain, &c., and subsequently, (although prevented by infirm health from making large collections) extended his researches through the counties of Haywood, Macon, and Cherokee, which form the narrow southwestern extremity of North Carolina. To him we are indebted for local information, which greatly facilitated our recent journey, and, indeed, for a complete itinerarium of the region south of Ashe county."

Early in 1840 he was called to mission work about Washington, in Beaufort county, remaining there a year, and early in 1841 he removed to Hillsborough, where he remained six years. In April, 1847, he removed to Society Hill, in South Carolina, which accounts for the fact that he is spoken of as a resident there, his residence at that place having been nine years. From Society Hill Dr. Curtis removed to Hillsborough in 1856, and resided there until his death in 1872...

The first botanical essay contributed by Dr. Curtis was more than a mere catalogue, and it attracted the favorable notice of his teachers and correspondents. It was so thorough that after a lapse of half a century only about fifty species have been added to his list. One of them has a peculiar interest as illustrating the laudable jealousy with which he regarded his earlier achievements.

In the summer of 1967, Mr. Wm. M. Canby, of Wilmington, Del., an esteemed friend of Dr. Curtis, a botanist second to none in the Union for diagnostic learning, came to Wilmington to add to his collection, and look over the old botanizing territory after the smoke of war had cleared up. On the memorable occasion of this narrative he had been to Hilton Ferry, close by the estate of Dr. James R. McRee, in search of the very local Alligator Bonnets, (*Nuphar Sagittaeifolium*.) He had completed his collection, and was carefully spreading them on the logs to dry. His face was turned towards the bank of the river, which at this point is an abrupt bank of grey marl, overhung by thick festoons of beautiful shrubbery. Clinging to this wall, under the drippings of the water through the marl as the tide recedes, he espied beautiful fronds of the true Maiden's Hair Fern, (*Adiantum Capillus-Veneris*.) This beautiful fern had not before been detected in this part of the State, or indeed north of Alabama. The discovery was a great pleasure and surprise to Mr. Canby, for here on the territory of Curtis he had been able to add such a

beautiful plant to his list. Specimens were soon borne by the mail to Dr. Curtis, then living in Hillsborough, and the earliest mail brought me a letter of specific instructions where to go and what to look for, and I was able to verify Mr. Canby's discovery. It was not long before Dr. Curtis had important business to attend to in Wilmington, and a visit to the newly discovered Adiantum station was not the least important....

His earliest records show that he studied the relation of plant-life to geologic and climatic surroundings. The study of botanical geography was begun and continued during his whole career as a botanist, extending over 38 years. The account he has given us in his "Woody Plants," is to-day the best guide to the natural climatological divisions of the State which has even been given. His studies were also directed to the numerous economic questions which met him in his intimate acquaintance with the treasures of the field and forest. It was this feature of his labors alone which brought him an audience in his adopted State, and with this object in view he brought together the material which he published as a part of the Geological and Natural History Survey, known best by the condensed title given to it by Prof. Emmons, as the "*Woody Plants.*" This volume of 124 pages was printed by the State in 1860, and at once became a popular manual for the farmer and the woodsman, and for amateur botanists, a key to the more conspicuous trees and shrubs useful for their fruit or timber, or as ornaments...

.....That North Carolina has a difference of elevation between the east and west which gives a difference of climate equal to 10 or 12 degrees of latitude, was first shown by Dr. Curtis in his comparison of the local flora in which *Woody Plants*.....

.....Dr. Curtis found this new field of botany [fungi] greatly to his liking. His habit of study was painstaking and accurate, and the microscopic work necessary for the determination of species became in his hands a triumph of skill. It was in this steady sedentary pursuit that Dr. Curtis injured his health. For hours at a time, day by day, he pored over the micrometry of fungus spores. Few were the botanists with whom he could compare specimens and interchange notes. He pursued this specialty without the stimulus offered now by special societies, and for the greater part of his career absolutely without an audience....

In 1867, the State published as a part of the Geological and Natural History Survey, "A Catalogue of the Indigenous and Naturalized Plant (of the State,)" by Dr. Curtis. It was intended that this work should have been printed with "Woody Plants," but the outbreak of the war prevented it. At the time of its issue, in 1867, its author stated that it was the most extensive local list of plants ever published in North American, comprising over 4,800 species. It was the first attempt to enumerate the cryptogamous as well as the phenogamous plants made by any botanist in this country, and its appearance was a matter of much scientific congratulation. The volume consisted of 158 pages of catalogue, with no scientific description, but a mere statement of the locality of each plant. This was the result of twenty-five years of botanical study, over a territory of 50,000 square miles. Still he was quite confident in the assertion that few flowering plants would be added to his list, and that the additions which would reward the researches of future observers would be entirely cryptogams.

[*Cryptogam*: a formerly recognized taxonomic group that included all seedless plants and plantlike organisms, such as mosses, algae, ferns, and fungi

Phenogamous: Having true flowers with distinct floral organs; flowering.]

It has always been a matter of regret that this work of a lifetime should have been given to the public in such a skeleton form, and produced in such a primitive state of the typographer's and bookmaker's art. The only reward to the man of science was the consciousness of his thorough work, and the State could well have afforded to have made an ample volume in which he might have recorded the rich treasures of his research for the use of the future student. But it seems that Dr. Curtis was very many years in advance of his time, and the expectation that his broad foundation would have been built upon by his early successors has little prospect of fulfillment.

The part which Dr. Curtis took in the progress of American Botany, was always recognized as important. His correspondence was very extensive, and his herbarium was consulted by botanists with great satisfaction. So largely did Dr. Chapman feel himself indebted to Dr. Curtis for aid, that he dedicated the first edition of his Flora of the Southern United States to him, and the two botanists were in close communication until the death of Dr. Curtis in 1872.....

.....I have spoken of Dr. Curtis' splendid achievements, his scientific precision, his ardor in the pursuit of natural history, his completion of a botanical survey almost to the remotest domain of the lowest microscopic plant, but I would not have you believe that this was the sum of his life work. Botanical science was his pastime and recreation. In the mission he had chosen as a servant of Christ, he was no sluggard. He was a pioneer missionary in the rugged hills of North Carolina, when to be a pioneer was to suffer hardship and privation. Love and sympathy beamed from his benignant face, and wherever he went his Master's mission of "Peace on earth and good will towards men," was made actual by the tenor of his own life....

Thomas F. Wood, 1885.

Excerpts from:

Journal of the Elisha Mitchell Scientific Society for the Year 1884 – 1885, Raleigh, NC, Edwards, Broughton & Co., Steam Power Printers and Binders, 1885. Pp 9-31.

...the irrational use of natural resources and the unchecked consumption of energy contribute to the reality of climate change, with consequences on the life and survival of humanity created in the image of God and is therefore tantamount to sin.

Bartholomew, The Green Patriarch, Sept. 2008



2010 NCNPS Schedule

Sunday, February 7, 12:00 ~ 5:00 p.m. at the N. C. Zoo, Asheboro, NC
"Exploring Issues of Plant Conservation," Mark Rose
Initiating a Society-wide conversation in order to develop a formal position.

Saturday, February 20, 1:00 ~ 4:00 in Winston-Salem
Board Meeting

April 30—May 1 Location TBA
NCNPS Spring Field Trip

Saturday, May 22, 1:00—4:00 in Cary, NC
Board Meeting

Saturday, June 5, 10:00 ~ 3:00, Hagan Stone Park, Greensboro, NC
NCNPS Annual Picnic and Plant Auction, details TBA

Saturday, August 21, 1:00—4:00, Charlotte, NC
Board Meeting

October 1—3 Location TBA
NCNPS Fall Field Trip

Saturday, November 20, 1:00—4:00 in Chapel Hill
Board Meeting

Board of Directors

Tom Harville, President
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Terry Britton, Webmaster
Marlene Kinney, At Large
Larry Mellichamp, At Large
Mark Rose, At Large
Chapter chairs:

Margaret Partridge, Margaret Reid Chapter
Kathy Schlosser, Triad
Kathy Mitchell and Susan Ruiz-Evans, N.E. Coast
Duane Truscott, S.E. Coast
Mitch Russell, Asheville
Tracy Rush, Sandhills
_____, Uwharrie



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