

Long Island Botanical Society

Vol. 29 No. 2

The Quarterly Newsletter

Spring 2019

Three Fossil Fruits, New to the Magothy Formation (Upper Cretaceous) of Long Island

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Figure 1. Cretaceous cliffs at Caumsett State Park, Lloyd Neck, Suffolk Co., N.Y.



Figure 2. A section of Cretaceous cliffs that shows a stratum of red sand, containing limonite flat stones (Caumsett State Park, L.I., N.Y.).

Abstract. We collected three fossilized fruits that are new to the Magothy Formation, and new to science. They are from two Long Island, New York, sites. These fossils are named *Carpolithus caumsettensis* (Lloyd Neck site), a compression fossil; and *Carpolithus slotnickii* (Glen Cove site) and *Carpolithus elongata* (Lloyd Neck site). Both *Carpolithus slotnickii* and *C. elongata* are casts of limonite. *Carpolithus caumsettensis* is referable to the Araceae: Aroideae; *C. slotnickii* is referable to the Rosaceae: Amygdaloideae; and *C. elongata* is comparable to a species in the Passifloraceae (*Passiflora tarminiana*).

Introduction. Hollick (1906) listed 13 locations on Long Island where he collected fossil plants. In most of the locations, Hollick indicated that he collected specimens from "morainal material." Only a few of the 13 sites have been preserved and even fewer still have "clays in place." The Glen Cove collecting site, designated by Hollick as "clays in place," has been preserved in Garvies Point Museum and Preserve. The Lloyd Neck site (Caumsett State Park), cited by Hollick as bearing fossils in morainal material, has subsequently been shown to bear fossils in strata on cliffs that expose the Magothy Formation (Fig. 1, 2).

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Long Island Botanical Society

Founded: 1986 • Incorporated: 1989

The Long Island Botanical Society is dedicated to the promotion of field botany and a greater understanding of the plants that grow wild on Long Island, New York.

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Society News

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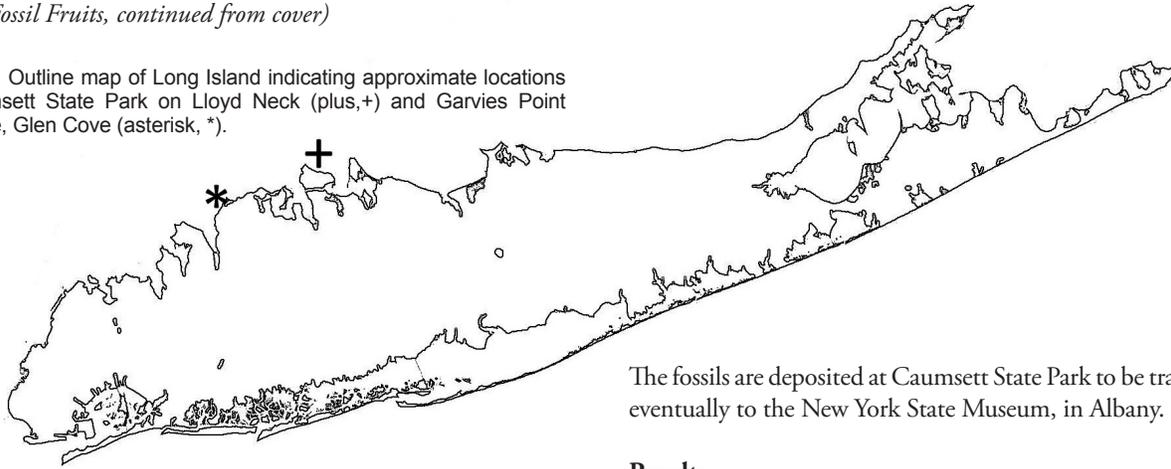
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for 2019 are past-due. If you have not yet renewed, please mail your dues to: Carol Johnston, LIBS Treasurer, 347 Duck Pond Road, Locust Valley, NY 11560.
\$25 Individual, \$30 Family, \$250 Life Member

(Three Fossil Fruits, continued from cover)

Figure 3. Outline map of Long Island indicating approximate locations of Caumsett State Park on Lloyd Neck (plus,+) and Garvies Point Preserve, Glen Cove (asterisk,*).



Location. Map (Fig. 3) shows Long Island with the locations of Caumsett State Park, in Lloyd Neck, and Garvies Point Preserve, in Glen Cove, indicated.

Stratification of the Magothy Formation: We are not aware of any formal classification of the strata of the Magothy Formation that are present at the surface of Long Island. Nevertheless, classification of the Magothy Formation has been accomplished for the coastal plain of New Jersey (Magothy Formation, Rutgers Univ., Dept. of Earth and Planetary Sciences); it has been designated as Upper Cretaceous, middle and lower Santonian, in age (USGS, Magothy Formation). Everhard (2004) assigned an age of 85.5-86.3 MYA to the Santonian deposits. The following strata (listed in order of decreasing age) have been designated by Rutgers University for the New Jersey Magothy Formation: 1. Sayreville Sand, 2. Old Bridge Sand, 3. South Amboy Fire Clay, 4. Amboy Stoneware Clay, 5. Morgan Beds and, 6. Cliffwood Beds. Because commercially important light tan clay beds are present at sea level in both Glen Cove and Lloyd Neck, it may be that the Amboy Stoneware Clay stratum is represented there. Above these basal strata, and younger in age, are white-sand and red clay beds that bear plant fossils in limonite flat stones. This stratum may represent the Morgan Beds of NJ. Gravel beds that have as yet yielded no fossils are also present; these dip into the ground west of the putative Morgan Bed and may represent the Cliffwood Beds that have been removed by glacial scouring from above the local Morgan Bed.

Materials and Methods. Fossilized plant material was examined on the beaches at Glen Cove and Lloyd Neck. Specimens were wrapped in newspaper, labeled with location and collection date, and subsequently examined at our laboratory at Queens College. Photographs were taken with rulers to indicate size. Attempts were made to match the fossils to illustrations in Hollick (1906); or failing that, with nearest living relatives. At the suggestion of Dr. Patrick Herendeen, a morphotype name, in this case *Carpolithus*, has been chosen to refer to these three specimens, because conclusive evidence of their taxonomic affinities has not been established. *Carpolithus* was used by Hollick to refer to all of his unidentified but distinctive fruits.

The fossils are deposited at Caumsett State Park to be transferred eventually to the New York State Museum, in Albany.

Results.

Carpolithus caumsettensis sp. nov., (Plates 1, 2, 3) was collected in 2015 at the Lloyd Neck site. It is a compression fossil, preserved in limonite; both halves of the compression are illustrated in Figure 1; they measure 3.7 x 3.5 cm and 4.0 x 3.3 cm. Compression is on a vertical plane. The specimen is incomplete, with a small portion of the top missing. Close examination revealed a small thin-walled fruit that had a seed enclosed (Plate 2). A dark glossy surface can be seen in many places on the specimen. In these glassy areas, geometric lines intersect, as if liquid was expressed, then hardened, and subsequently cracked. The small fruits, therefore, appear to have been fleshy; and they are aggregated into a short spike, the infructescence. The infructescence of *Carpolithus caumsettensis* was preserved with a relatively long stalk that does not appear to be vascularized; it may be considered a peduncle.

Early attempts to class it with the Butomaceae were rejected. Rather, the aggregation resembles the spadix of a number of local members of the Araceae (aroid family). A possible spathe appears in one of the halves of the compression (Plate 1, left); it arises from the peduncle approximately 1 cm below the base of the putative spadix. Among the living genera with fleshy, often red, fruits on a spadix are: *Arisaema triphyllum*, *Peltandra* (especially *Peltandra sagittifolius*), *Symplocarpus*, *Calla*, *Orontium* and the exotic escape, *Arum*. *Arisaema triphyllum*, *Peltandra sagittifolius* and *Arum italicum* all produce a spadix borne on a long, erect peduncle. The compressed specimen of *Carpolithus caumsettensis* shows an infructescence that is nearly spherical in outline. This feature is unlike that of *Arum italicum*, which has a relatively long and narrow infructescence. It is therefore illustrated side by side with a Long Island specimen of an *Arisaema triphyllum* infructescence (Plate 3).

Carpolithus slotnickii sp. nov., (G[arvies] P[oint] 180808-5; Plate 4) was collected in 2018 at the Glen Cove site. It is named in honor of its finder, Carl Slotnick, a local resident. The specimen is a cast, in limonite, which measures approximately 5.5 x 5.5 cm. The fossil is flattened on a vertical plane. One side appears to be a bisected, open fruit. At the center of the specimen is a flat, nearly smooth, ovoid structure resembling

(Continued on page 12)

(Three Fossil Fruits, continued from page 11)



Plate 1. *Carpolithus caumsettensis* sp. nov. (CAUM 150526-7a,b), showing both halves of the limonite compression fossil. Scale= 1 cm)



Plate 2. *Carpolithus caumsettensis* sp. nov. (CAUM 150526-7a,b), counterpart with an enlarged portion that shows a small unit of the limonite infructescence, one that contains a seed.

a seed. The seed appears to be whole; and the plane of bisection is close to medial on a coronal/frontal plane. Immediately surrounding the putative seed is a thick ring that shows radial banding. Peripheral to that band there is an amorphous ring that appears to contain veins with some attached flesh. The outer wall of this entire structure is very thin, serving only as a border. We interpret this specimen as a single, fleshy fruit, although we have not been able to identify a pedicel scar. A single-seeded fleshy fruit is a drupe. Among the drupes of living angiosperms, we were drawn to a comparison with a small plum, of which there are a few species in eastern North America (*Prunus* spp.). When we made a vertical, coronal, nearly medial section of the fruit of a commercial Cherry Plum (*Prunus cerasifera* variety) we were struck by the close similarity of our specimen in general morphology, seed form, endocarp and mesocarp anatomy. Applying the terminology of fruit morphology, we could describe the specimen as follows (from the center): seed, endocarp, mesocarp, exocarp. If we were comparing it to a nectarine (*Prunus persica*) we could use the terms: stone, seed shell, flesh, skin.

Carpolithus slotnickii and the Cherry Plum are illustrated, side by side, in Plate 4.

Carpolithus elongata sp. nov., (CAUM 180817-1; Plate 5, left; Plate 6) was collected in 2018 on the beach at Caumsett State Park, our Lloyd Neck site. It is a cast which measures approximately 4 cm x 1 cm, at the edge of a limonite flat stone. The fossil is elongated and its dark outer portion is fragmented



Plate 3. *Carpolithus caumsettensis* sp. nov. (CAUM 150526-7a,b; left) and an *Arisaema triphyllum* infructescence, for comparison (right).



Plate 4. *Carpolithus slotnickii* sp. nov. (GP 180808-5; left); compared with a living fruit of *Prunus* cf. *cerasifera* (rt). Scale units = mm.

into a few segments. A small number of spherical objects sit at the center of this narrow specimen. The spherical objects are smooth in outline, and somewhat irregularly shaped. We can speculate that each sphere was fleshy. So the whole specimen can be interpreted as a group of fleshy seeds that are surrounded by a dark, fragmented wall, which is a few mm thick. We interpret this specimen as a berry. Among the berries of living angiosperms, we were drawn to a comparison with *Punica granatum*, the pomegranate. Here we see irregularly spherical, fleshy seeds contained in a leathery wall. The spherical shape and relatively large size of a pomegranate, however, are features not comparable to this small, elongate fruit. *Passiflora* was considered next, because its fruit also comprises a group of fleshy seeds that are enclosed in a relatively thick wall. A pictorial review of fruits of *Passiflora* species showed a remarkable similarity of our Cretaceous fruit to *Passiflora tarminiana*, the Taxo. *Passiflora t.* is a fruit indigenous to South America. A possible pedicel scar is indicated by a white square (Plate 6). Because no remains of a style can be identified, we cannot be absolutely certain this specimen is a fruit. Nevertheless, lacking any better interpretation, we are proposing that it be considered a berry, and comparing it with the *Passiflora* berry.

In Plate 5, *Carpolithus elongata* (left) and *Passiflora tarminiana* (right) are illustrated, side by side, (with permission for the photo of *Passiflora tarminiana* from: Leblanc, Laurence S., In <http://www.globehopnow.com/research-interests.html>; cf. Heenan and Sykes 2003; Segalen 2010).



Plate 5. *Carpolithus elongata* sp. nov. (CAUM 180817-1; left); compared with a hand-held specimen of *Passiflora tarminiana* (rt). Scale is 1 cm.

Discussion. Hollick (1906) illustrated and briefly discussed a number of fossil fruits. *Tricarpellites striatus*, abundant in the Amboy Clays, but collected north of New Jersey only on Martha's Vineyard, is present as a cast in Glen Cove (Greller unpubl.). Ten species of *Carpolithus* are figured by Hollick (1906, Pl. VII). Four of these fossil fruits are distinctive enough to be assigned species names: *Carpolithus euonymoides*, *C. hirsutus*, *C. vaccinioides*, and *C. floribundus*. Hollick figured, as well, two species of "aments;" these he named *Populus* sp. and *Myrica* sp. One problematic Hollick genus is *Williamsonia*, with two species. These specimens may be infructescences of *Magnolia*, which is perhaps the most abundant angiospermous leaf fossil at Lloyd Neck.

The senior author and his colleague previously identified to genus, two fossil fruits from the Magothy Formation, Upper Cretaceous deposits of Long Island: "Rosa," and *Alatacarpus* gen. et sp. nov., aff. *Dodonaea* (Greller 2008; Greller and Goudket 2010).

Scott and Barghoorn (1957) identified fossil dicotyledonous fruits from the Upper Cretaceous Raritan formation at Kreischerville, New York (U.S. Geological Survey, Raritan Fm) "as the endocarps of *Phytocrene* Wall. (tribe Phytocreneae, Icacinaceae). Modern species of *Phytocrene* are climbing vines from tropical Asia and Africa. The Raritan species described as *P. microcarpa* n. sp. is the first Cretaceous record of the genus, which has also been identified from fossil leaves of Eocene age in California. The fossil endocarps of *P. microcarpa* constitute one of the common Mesozoic occurrences of reproductive structures referable to a modern genus of the angiosperms.

Bogner et al (2005) described a fossilized aroid, *Albertarum pueri* from Late Cretaceous (Late Campanian) age in southern Alberta, Canada. It resembles a *Symplocarpus* (Orontoideae subfamily). *Carpolithus caumsettensis*, described in the present paper, is more likely related to *Arisaema* or *Peltandra*, in the Aroideae sub-family.

A leaf assigned to *Amelanchier* is the only member of the Rosaceae that Hollick (1906) included in the Magothy flora of the northeastern U.S. The Bennington/Durso fossil of a putative rose hip, which I referred to as "Rosa," represents the first possibly rosaceous fruit (Greller 2008). *Carpolithus slotnickii*, described in the present paper, may represent the

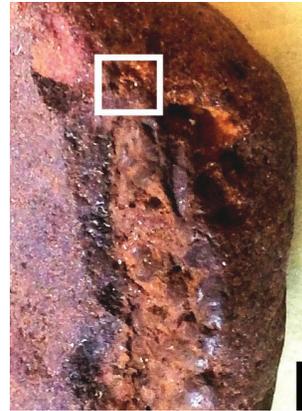


Plate 6. *Carpolithus elongata* sp. nov. (CAUM 180817-1. Possible pedicel scar is outlined in the white box. Scale is 1 cm.

first member of the Rosaceae: Amygdaloidae in the Magothy Flora of the northeast.

Carpolithus elongata is an enigmatic specimen. Possibly, it is the first member of Passifloraceae described for the Magothy Formation of the northeastern U.S.

Conclusions.

Two of Hollick's (1906) sites on Long Island have persisted to yield Cretaceous plant fossils; these are Glen Cove and Lloyd Neck. In the past decade, the Lloyd Neck site has yielded a few fossil fruits, "Rosa", (cf. Bennington [and Durso]); and *Alatacarpus* gen. et sp. nov., aff. *Dodonaea* (Greller 2008; Greller and Goudket 2010). The three fossil fruits described in the present paper add to the diversity of Late Cretaceous (Magothy Fm) angiosperm fruits. These resemble some living genera. Perhaps this is not surprising, in light of the fact that Hollick named many leaf fossils in the Magothy Fm of coastal New England after modern genera. Subsequent research on their identities, using modern techniques of leaf anatomical analysis, supports Hollick's assignment of modern names (Castillo and Greller 2010).

Acknowledgements.

The authors acknowledge with gratitude the help provided this study by: Leonard J. Krauss, Jr., Superintendent of Caumsett State Park; Rose Chin; Carl Slotnick; Donald Hecht; and Katie Paccione. We thank Caleb Bomske, Pensacola Christian College, and Linda Kukol, for sending photographs to aid in identification. Special thanks go to Patrick Herendeen, Chicago Botanical Garden, for a critical review of the manuscript and helpful suggestions. We thank the State of New York, Department of Parks, Long Island Office, for continuing permission to collect fossils at Caumsett SHP.

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FIELD TRIPS

April 6, 2019 (Saturday) 10 AM

William Floyd Estate, Suffolk County, NY

Trip Leader: MaryLaura Lamont

Email: woodpink59@gmail.com (in case of bad weather)

Explore the natural and cultural history of the old Floyd Estate on Moriches Bay. The 613 acres of property still has some record size trees that are among the largest of their kind, and the fields and woodlands are almost as they were when the Floyd/Nichols family donated the property to the National Park Service in 1976. We will walk through a variety of habitats and will discuss botany, cultural plantings, and a bit of ornithology too.

Directions to the Estate in Mastic Beach: (don't use GPS as typically it takes people to the wrong gates!) Take LIE or Sunrise Hwy to William Floyd Parkway and head south. You will come to the large intersection of Montauk Hwy and WFParkway. Continue south on Floyd Parkway for app. another 3 miles. When you see the CVS Pharmacy on the left hand side of the road turn left at that light. This is Havenwood Drive, which quickly merges into Neighborhood Rd. Continue on Neighborhood Rd through Mastic Beach for 2 miles. Road ends on Park Drive, where you turn left. Go a few hundred yards down this road and find the large Entrance Gates on the right hand side of the road. Park in the lot at the end of the entrance road.

May 25, 2019 (SATURDAY) 10:00 AM

Stillwell Woods Preserve, South Woods Road, Woodbury, Nassau County, NY, Oak Woodlands

Trip Leader: Al Lindberg

Email ajlindberg@optonline.net

Stillwell Woods is a 270 acre preserve/multi-use area with several interesting habitats, which include managed grassland, old field, juniper and oak woodlands. On this trip we will

concentrate on the oak woodlands, which are unique in Nassau County's preserve system. Occurring on the County's eastern border within the hills and ravines of the Harbor Hill Terminal Moraine, the sandy soils and flora present a habitat more typical of eastern Long Island's pine/oak barrens.

Stillwell Woods is located next to 72 South Woods Road, behind the Town of Oyster Bay recreational fields, in Woodbury. Meet at the parking area at the farthest end from the South Woods Rd. entrance, past the recreation fields.

Please contact the trip leader to register in advance for this walk and in case we need to cancel due to weather. Insect repellent for ticks, sunscreen, water and a snack are recommended.

June 22, 2019 (SATURDAY) 10 AM

Planting Fields Arboretum State Historic Park, Upper Brookville, Nassau County, NY

Fields and Woodlands

Trip Leader: Rich Kelly

Email: vze2dxmi1@verizon.net

Have you explored beyond the formal gardens or the greenhouse? Planting Fields is over 400 acres, and has much natural habitat that we will explore. There are many fields and edges, as well as deciduous woods. There is an extensive area of woodland that is dominated by Mt. Laurel and other ericaceous plants. This is also the time of year when the most diversity of plants in flower is to be expected in our area.

Meet at the west end of the main parking lot. There is an entrance fee unless you have an Empire Pass. Please contact trip leader in advance in case we need to postpone or cancel due to weather. Insect repellent for ticks, sunscreen, water, and a snack are recommended.

SAVE THE SEPTEMBER DATE: SMARTWEED SAVVY

Sunday, September 22, 2019, Alley Pond Park, Queens, NY, Leader: Daniel Atha

Plant Enthusiasts Meet for Coastal Rare Plant Meeting, September, 2018

by Steve Young, Chief Botanist, NY Natural Heritage Program

In the past I have updated the rankings and taxonomy of New York's rare plants almost every year but for a hiatus in the early 2010s because of funding. Before making the annual changes, I have had a rare plant meeting in Albany and invited botanists from around the state to meet to go over the rankings. This year I decided to change the procedures and have regional meetings so more people could attend them. My first regional meeting was held on September 7th on Long Island to discuss rare plants from the coastal plain from Fishers Island to Staten Island. The Long Island Invasive Plant Management Area (LIISMA) was gracious enough to let us use a room in the building where their office is in Brentwood, a nice central location, and the meeting was attended by twelve people for a four-hour meeting that included a lunch break to look at the foundation plantings of the Long Island Native Plant Initiative (LINPI). Attending was Steve Young, Eric Lamont, Daniel Atha, Dave Taft, Vicki Bustamante, Juliana Quant, Zihao Wang, Don Recklies, Polly Weigand, Steve Pearson, Luke Gervase, and Caroline

Schnabl. Our meeting focused on the plants of the review and watch lists that grow principally on the coastal plain. We finished going over them right on time and recommended the following changes for the review list species (Table 1).

From our discussion of these species we realized we needed more field work and herbarium work to obtain better data on many of these species. In future newsletter articles I will write about how to identify some of the more difficult species and varieties so more people can look for them.

Many of the watch list species that were recommended for the active list were species from the coastal plain ponds. That is because the ponds are now under much more threat from invasive species and hydrology problems than they were when the species were originally ranked.

I would like to thank all those who attended. I plan to make this an annual meeting and look forward to next year. I think everyone enjoyed getting together and talking about rare plants!

Table 1. Recommended changes in rarity rank of some plants that grow principally on the coastal plain of Long Island, New York.

| Scientific Name | Common Name | Decisions from 2018 LI Meeting |
|---|-------------------------------|--------------------------------|
| <i>Andropogon glomeratus</i> var. <i>glomeratus</i> | Bushy Blue Stem | S3 Watch List |
| <i>Cuscuta gronovii</i> var. <i>latiflora</i> | Broad-flowered Common Dodder | S3 Watch list |
| <i>Cyperus esculentus</i> var. <i>macrostachyus</i> | Large Yellow Nut Sedge | S1 Active List |
| <i>Dichanthelium commonsianum</i> | Commons' Rosette Grass | SH Active List |
| <i>Dichanthelium lucidum</i> | Shining Rosette Grass | SH Active List |
| <i>Elymus virginicus</i> var. <i>halophilus</i> | Coastal Virginia Wild Rye | SH Active List |
| <i>Eutrochium dubium</i> | Coastal Plain Joe-Pye-weed | S3 Watch List |
| <i>Glyceria obtusa</i> | Coastal Manna Grass | S2? Active List |
| <i>Lycopodiella alopecuroides</i> | Fox-Tail Bog-clubmoss | S2? Active List |
| <i>Piptochaetium avenaceum</i> | Black-Seeded Spear Grass | S1S2 Active List |
| <i>Schizachyrium littorale</i> | Dune Bluestem | S3 Watch list |
| <i>Sisyrinchium fuscum</i> | Coastal Plain Blue-eyed-grass | S1? Active List |
| <i>Spiranthes tuberosa</i> | Little Ladies'-tresses | S2 Active List |
| <i>Zostera marina</i> | Eel-grass | S3 Watch list |

UPCOMING PROGRAMS

April 9, 2019* **Tuesday, 7:30 PM**

Marie George: "Are Plants Sentient?" Recently, a number of biologists have claimed that plants are sentient (able to perceive or feel things). For example, Daniel Chamovitz claims that the dodder sniffs out its host, but many biologists and philosophers remain skeptical. Marie is Professor of Philosophy at St. John's University and holds a PhD in Philosophy and a MA in Biology.

May 14, 2019* **Tuesday, 7:30 PM**

Andrew Leslie: "Late Cretaceous Plant Fossils from Garvies Point, Long Island." Collections were made and analyzed of Late Cretaceous clays and lignites from Garvies Point, Long Island, which contained a variety of micro and meso scale fossils. These include several kinds of charcoalfied fossil flowers, although angiosperm fossils are rare in general. The most

common fossils in the assemblage are megaspores of lycopsids and Marsiliaceous water ferns, which suggest a wet habitat with numerous aquatic pteridophytes. Andrew is a paleobotanist at Brown University who specializes in gymnosperms. Most of his work has focused on understanding the evolution of conifer reproductive structures by combining data from the fossil record with studies of how cones function in living species. In addition to working on fossils from New England, he has also collected fossils in Mongolia, Patagonia, and New Caledonia.

June 11, 2019 **Tuesday, 5:30 PM**
(please note early start time for the barbecue)

Annual Barbecue: The annual barbecue, featuring Chef Eric's made-to-order hot dogs and hamburgers. Salads, deviled eggs, desserts, etc. gladly accepted. The traditional location - on the green behind the Muttontown Preserve meeting house.

* All programs held at Bill Paterson Nature Center, Muttontown Preserve, East Norwich
Refreshments and informal talk begin at 7:30 p.m. Formal meeting starts at 8:00 p.m.
Directions to Muttontown: 516-354-6506