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Numbered Flags:

1 Oxeye Sunflower: native, found wild mostly in alluvial soils (along rivers); seeded at PS21
2 Little Bluestem: native, found wild mostly on dry meadows and roadcuts; seeded at PS21
3 Big Bluestem: native, but rare in the wild: seeded at PS21
4 Queen-Ann’s-Lace or Wild Carrot: introduced from Europe, a common “weed” of roadsides and dry pastures/hayfields; the wild ancestor of our cultivated carrots
5 Horsenettle: a native relative of tomatoes and potatoes, often found in pastures and hayfields
6 Hawthorn and Poison Ivy: we have at least ten different species of Hawthorn in the County, most of them are native. They are often found in and around former pastures. Poison Ivy often grows along forest edges or in hedgerows. “Leaves in three—let it be!”
7 Land Use History: ca. 1875, Columbia County was about 15-20% forested; today, it is around 60% forested.
8 Sugar Maple: one of the most common native trees in our forests, the main source of maple syrup. The leaf is on the Canadian flag; Sugar Maple have increased over the past 200 years ago.
9 Brown Knapweed: a European plant that aggressively colonizes dry meadows and, together with Spotted Knapweed, is considered invasive here. However, it is much loved by many flower-visiting insects.
10 Toringo Crab: a common ornamental tree originally from Asia, valued for its pure white blossoms in spring. In our County, it has become an aggressive colonizer of old fields and can creates dense monocultures. Therefore, it should not be used in landscaping.
11 Red Oak: another very common native tree of our forests; note the pointed lobes on the leaves; oaks are widely loved by native creatures.
12-16 Goldenrods (all native) of oldfields
12 Early Goldenrod: the first to flower, smooth stalk, basal leaves, does not spread with rhizomes, usually found as widely spaced individual plants in dry meadows
13 Smooth Goldenrod: also flowers early and has a smooth stalk, but no basal leaves and forms dense patches of plants that are all connected by rhizomes; tends to be in moister soil than the other oldfield goldenrods.
14 Grass-leaved Goldenrod: very narrow, grass-like leaves; the inflorescence is flat-topped; rhizomatous colonies
15a Canada Goldenrod: our most common and maybe most aggressive rhizomatous oldfield goldenrod. The stalk is always a little hairy (else, VERY similar to Smooth Goldenrod). This patch has several Goldenrod Rosette Galls, caused by a Gall Midge (Rhopalomyia solidaginis).
15b Canada Goldenrod with several Goldenrod Ball Galls, caused by the Goldenrod Gall Fly (Eurosta solidaginis)
16 Wrinkle-leaved Goldenrod: broad leaves with pinnate and prominent venation; stem rough hairy, leaves rough hairy below
17 Grape: a small group of native climbers; all with edible fruits
18 White Oak: a native oak that used to be more common in our forests, but has been preferably cut for its timber (for buildings, railroad ties, etc.) and grows on good farmland; note the round lobes on the leaves.

[19 Red Oak, again...]

20 Swamp White Oak: a native oak of wet soils; leaves whitish and pubescent below.

21 Wild Black Cherry: a native cherry tree common in young forests; “burnt tortilla chip bark”; fruit edible but small.

22 Feral Domestic Cherry: bark with horizontal stripes; a legacy of our cherry orchards; bird-dispersed, occasional in our forests.

23 Red Maple: a native species that grows in a wide range of conditions, from swamp forests to dry hilltops; note the leaf margins which seem “ripped”.

24 Norway Maple: a European species of maple, often planted as a yard tree; can invade forests and shade out the native forest plants; large buds and milky sap.

25 Quackgrass: a European cold season grass common in our pastures and hayfields.

26 Smooth Brome Grass: a European cold season grass common in our pastures and hayfields.

27 Sweet Vernal Grass: a European cold season grass common in our pastures and hayfields.

28 Thyme: a European species that might have been brought to our region by the Shakers.

29 Butter-and-Eggs: one of the first introduced plants to ‘make it big’; apparently, a widespread & despised weed in the 18th and 19th centuries; now, occasional in old fields.

30 Timothy: a European cold season grass common in our pastures and hayfields.

31 Orchard Grass: a European cold season grass common in our pastures and hayfields.

32 Virginia Creeper: a native climber with palmate leaves (five leaflets emerging from a point, like fingers of a hand).

33 Oriental Bittersweet: an invasive climber that can actually strangle trees.

34 Boxelder: actually a maple—note the fruits which are typical maple “helicopters”; unique among our native maples, because it has pinnately compound leaves.

35 WETLAND with Purple Loosestrife (invasive!), Joe-Pye-Weed (native), and Blue Vervain (native).

36 Multiflora Rose: one of the most common invasive shrubs in our region; small white flowers, tiny rose hips; lacerated stipules; introduced by USDA as ‘living fence’, now, suffers from Rose-Rosette Virus.

37 Eurasian Shrub Honeysuckle: one of the most common invasive shrubs in our region; small, opposite leaves; double berries; sometimes these shrubs have witches brooms caused by a type of aphid.

38 Sign of Leafcutter Bee: there is a group of bees (Megachilidae) who cut circular pieces out of leaves to build their nests.

39 Monarch caterpillar on Common Milkweed.

40 Mulberry: a native and an introduced species possible, but rarely see former; widely propagated as part of the Silk Moth Bubble.
**Progress of the Seasons Journal**

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**Farmscape Wonder Wander: 3 August 2020**

*Posted on August 3, 2020*

By Claudia and Conrad.

*New Public Trails at PS21 in Chatham, NY*

Yesterday, with due COVID precautions, we led our first public ecology walk of the season as part of a week-long celebration of [PS21/Chatham Pathways](#) In today’s post we retrace our steps (see map below), share some of our observations, and invite you to go and check out these beautiful new trails, which form part of an evolving trail system that connects the Village of Chatham, Crellin Park, and PS21.

While you might get the most out of this if you can actually visit the grounds of PS21, much of what we talk about is typical of past and present farmland in Columbia County (NY).

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*This map shows the trail we took yesterday and the location of all 40 of our flagged stations (marked by pink or orange flags or ribbons; these will remain in place through August 9). This post won’t detail every single one of these observations, but the following images will be referenced to their respective station numbers. A complete list of*
what can be observed at each of the stations is available here.

Along the driveway and around the parking lot of PS21, you are currently greeted by a sea of yellow flowers. They belong to Oxeye Sunflower [Station #1], a native perennial occasionally found along our streams and often included in native wildflower seed mixes. These beds were likely seeded.

Throughout the fields at PS21, one of the most common flowers at the moment is Horsenettle [Station #5]. This native relative of tomatoes and potatoes is a very spiny plant (hence the misleading name “nettle”) with large white & yellow flowers shaped like those of other members of the nightshade family and pollinated by bumblebees. Its small, tomato-like fruits are yellow when ripe, but are poisonous for people.
Before approaching the hedgerows, it is good to remind ourselves how to recognize Poison Ivy: “Leaves of three—let it be!” The ground below the ribbon indicating Station #6 is covered with this plant that causes a very itchy rash in many people, but whose leaves are readily eaten by cows and other livestock and whose white berries are a favorite of many birds. Above the Poison Ivy (and bearing the ribbon #6), are the spiny branches of a Hawthorn (Crataegus sp.). This diverse group of mostly native shrubs is often present in former pastures (where their spines protect them from grazing animals) and along hedgerows.

A beautiful view in a westerly direction opens up as we continue on the trail. On a clear day, you can see the Catskills and Helderberg Plateau from this trail section [Station #7]. Notice how much of what you can see is forested, and then try to imagine what this view may have looked like 150 years ago and 500 years ago.
We largely can only guess at what this landscape looked like 500 years ago, but chances are that standing in this spot, one would have been surrounded by forest, with no landscape view in sight. One hundred and fifty years ago, on the other hand, this view probably would have been more extensive. This image shows the modern trails, roadways and main building overlaid on a 1948 aerial photograph of the landscape. Compare that map to our first image – even at this quite local scale, some reforestation is evident.
But that reforestation becomes even more pronounced as one zooms out. This figure shows the modern landscape west of PS21 (whose location is shown by the yellow oval). Overlaid in hatching is the approximate location of forest ca 1930 (based on forest shading in a 1933 USGS toponym). At the peak of agricultural clearing around 1875, about 20-30% of the land remained in forest, while about 70-80% was in fields; today, those proportions have nearly reversed, with the County roughly 60-70% forested. Presumably, many of those islands of forest that existed in 1930 had long been in forest. We call such long-term forest “Ancient Forest”. Unlike “Old Growth Forest”, these patches likely served as woodlots and even sites for woodland grazing. None of their trees may be particularly old. However, like Old Growth, most of these sites may never have been plowed. As a result, they probably still possess forest soils, and some of these stands harbor herbaceous plants unseen in secondary forests, such as certain of our wild orchids.

One of our common native tree of young and ancient forests alike is Sugar Maple [Station #8]. It is the source of maple syrup and a stylized version of its leaf is featured on the Canadian flag. This species has apparently increased in our forests over the past two centuries, but this beloved and economically important tree is expected to decline in our forests in response to the warming climate. In the early years of this country, entrepreneurs dreamt of supplanting Caribbean cane sugar production with maple sugar. While reality did not quite fulfill these dreams, maple syruping continues to be a relatively common pursuit with the latest available statistics indicating a production of about 5500 gallons in the County and 820,000 gallons in the State. Examples of other maples, native and not, can be observed at Stations #23, #24, and #34.
Station #10 marks one of the common non-native small trees that can be seen growing in hedgerows and old fields throughout PS21. It is a type of crabapple, Toringo Crab (Malus sieboldii), which is often planted as an ornamental because of its large white springtime blossoms. Its small fruits, which are orange when mature, look more like cherries than apples, but when you cut a cross-section, they do reveal five tiny seeds, resembling the core of an apple and not the pit of a cherry. Unfortunately, this beautiful little tree (whose seeds are spread by birds) has developed into a very rapid colonizer of old fields and forest edges. It should be considered an ‘invasive species’ and we strongly discourage its planting. This species can be distinguished from other crabapples by its variable leaf shape which often includes tri-lobed, vaguely oak-like leaves like the one on the left margin of the image.
Station #11 marks another native tree, Red Oak. It is by far the most common of the 11 oak species considered native to our County, all of which provide food to a variety of mammals and birds (who mostly are interested in the acorns), but also to a myriad of insects, who feed on the leaves and young acorns. Books have, literally, been written about the communities of creatures that oaks support. Oaks are particularly important as food plants for moth caterpillars. Red Oak can, on a good, open site, be a fast grower and reach a diameter at breast height of more than three feet in about a century. The leaves of Red Oak, like those of other members of the “Red Oak group”, such as Black Oak, Scarlet Oak, and Pin Oak, are characterized by pointed lobes. In contrast, the “White Oak group”, including White Oak [Station #18] and Swamp White Oak [Station #19], as well as Chestnut Oak and Bur Oak, have leaves with rounded lobes.
In keeping with its tendency to host other life, oak leaves support various galls. Galls are abnormal growths of plant tissue stimulated by the presence of another organism (in many cases an insect, but sometimes a microbe). That growth often provides food and/or protection for the insect larva which grows within it. If you inspect the leaves of Red Oaks, you may be able to find an Oak Apple Gall such as this one on our flagged oak. The size of a small golf ball, these are formed in response to the egg laying of a gall wasp.

Stations #12-#16 give us the opportunity to compare five species of goldenrods that thrive, side-by-side, in this meadow. In this image, we have placed a leaf of each of these species side by side to illustrate the differences (and similarities) in leaf shape and venation as seen on the leaf underside. (The size differences of the leaves in this image are not representative, because each plant has a range of leaf sizes!) Wrinkle-leaved Goldenrod (Solidago rugosa) has relatively broad leaves with strongly serrated margins, and their veins are
pinnate, with several side veins emerging from the central vein. Its leaves are also rough hairy to the touch. Early Goldenrod (Solidago juncea) has very smoothly textured leaves with almost invisible venation and some serration along the margin. Smooth Goldenrod (Solidago gigantea) and Tall Goldenrod (Solidago altissima, which may include another, hard-to-distinguish species, Canada Goldenrod (Solidago canadensis)), have so-called three-veined leaves with a pair of prominent side veins emerging at about 1/3 the length of the main vein and paralleling it to the leaf tip. The leaves can be strongly serrated or almost smooth along the margins. Grass-leaved (=Flat-topped) Goldenrod (Euthamia graminifolia) has very narrow, three-veined leaves with smooth margins.

![Early Goldenrod](image)

Early Goldenrod [Station # 12] does not form rhizomes and therefore grows as individual plants, rather than in the colonies typical of the other four oldfield goldenrods we present here. It is also the only one that has basal leaves at the time of flowering. Finally, together with Smooth Goldenrod, it is usually the first goldenrod to come into bloom in mid to late July.
Early Goldenrod [Station #12] also has a very smooth stem (like Smooth Goldenrod) and tends to have bushels of small leaves in the upper leaf axils (unlike any of the other four goldenrods presented here).

Smooth Goldenrod [Station #13] has the colonizing, rhizomatous growth of most oldfield goldenrods, and is usually found in patches of various sizes.
The stalk of Smooth Goldenrod [Station #13] is without any hairs and often has a waxy covering that can be rubbed off. The color of the stalk ranges from bluish green to purple.
These early flowers of Smooth Goldenrod (Station #13) are typical of all goldenrod flowers, which are tiny and clustered into little flower heads, which in turn are arranged in large panicles. Goldenrods are in the Aster family, and each flowerhead is, botanically speaking, a collection of numerous smaller flowers. While most of our 19 goldenrod species have yellow flowers, there is one exception: Silverrod (S. bicolor) has cream-colored flowers. All goldenrods provide excellent floral resources for pollinators and are an important nectar source for late-flying bees and migratory butterflies, such as the Monarch.
Grass-leaved (=Flat-topped Goldenrod) [Station #14] is relatively easily spotted in a sea of oldfield goldenrods. It stands out because of its narrow leaves and flat-topped inflorescences.
Tall Goldenrod (Stations #15a and #15b) is probably the most common and maybe the most aggressive of our oldfield goldenrods. From afar, it seems to me indistinguishable from Smooth Goldenrod. However, its stalks—at least close to the top, right underneath the flowers—always have a little bit of hairiness (in contrast to the smooth waxy texture of Smooth Goldenrod). Like oaks, goldenrods produce galls to provide shelter and food for the larvae of several insect species. In response to the egg of a certain gall insect deposited in its stem, the goldenrod creates a specific type of gall. This image illustrates two different types of galls commonly found on several goldenrod species. Unlike the earlier case with Oak Apple Gall, these galls are formed by flies: the Goldenrod Ball Gall houses the larva of a Goldenrod Gall Fly and the Goldenrod Rosette Gall houses the larva of a Goldenrod Gall Midge. Including pollinators and these gall-inducing insects, together with stem borers, and root, leaf, and seed eaters, goldenrods have been shown to serve as food for at least 150 species of insects! Next time you find yourself thinking “oh, just a goldenrod...”, maybe you could instead remind yourself that you are looking at a very important component of the native ecological web!
Finally, at Station #16, you have a chance to inspect the last of today's goldenrods: Wrinkle-leaved Goldenrod. With your eyes sharpened to the differences, this will now be an easy species to distinguish from other colonial, rhizomatous oldfield goldenrods: note the broad, rough-hairy, pinnately-veined leaves with sharply serrated margins. Also, this species has a very rough-hairy stem!
Following the trail down into the forest, you will pass an opening [Station #17] where native grape vines thrive, and the canopy almost gives the appearance of having dropped to ground level. A little further along the trail, at Station #18, you will see the huge trunk of a White Oak (here pictured) and a little further on a huge trunk of a Red Oak [Station #19]. By referring back to our 1948 aerial photograph, you can see that this patch of forest may be what we call “Ancient Forest”. It looks to be mature forest at that time, and there is no clear on-the-ground evidence of agricultural activity. That said, it was doubtless used as a woodlot and animals may well have been allowed to forage beneath it. The Red and White Oaks which we’ve flagged are forest-grown (notice the lack of any low branches or branch stumps) and these trees are likely more than 200 years old.
At Station # 20, a little further along the forest trail, just before you pass into an overgrown clearing, you can observe a small group of Swamp White Oak. Swamp White Oak leaves have rounded lobes typical of the White Oak group, but this tends to have a broad, almost spatulate leaf tip, in contrast to the more ‘balanced’ leaf of White Oak itself.

Look for their fallen leaves on the ground, and note how in both the green and dried leaves, the leaf underside is noticeably light-colored and slightly fuzzy.
Back out in the field, you will find yourself surrounded by European pasture/hayfield grasses [several of them are flagged at Stations #25-27 and #30/31]. However, one of the more striking European meadow plants in this field is Butter-and-Eggs (aka Toadflax) [Station #26], whose pretty yellow & white flowers are reminiscent of snapdragons. This seems to have been one of the first introduced plants to “make it big”; apparently a widespread and despised weed in the 18th and 19th centuries, it now is only occasionally found in old fields.

When you reach the entry road, walk up to the gate and peek over the Oxeye Sunflowers into a wet meadow below.

Typical of many of our wet meadows, it has a mix of invasive and native plants and is a paradise for flower-visiting insects. Visible in this image are the invasive Purple Loosestrife, and the native Joe-Pye-Weed and Blue Vervain. The next images show close-ups of each of these wetland wildflowers.
Although the non-native Purple Loosestrife is considered an invasive species because of its aggressive spread to the detriment of native wetland plants, many native insects, like this Silver-spotted Skipper, happily drink the nectar from its flowers. We have not observed this wetland long enough to have a sense for whether the Purple Loosestrife is still expanding and crowding out the native plants, or whether, as seems to be true in some other wetlands we know, they have come to some sort of peaceful coexistence...
The Purple Loosestrife flower hides its nectar relatively deep inside the flower tube and therefore mostly attracts long-tongued insects, such as butterflies and bumblebees (as well as Honey Bees, who themselves hail originally from the Old World).

The native Joe-Pye-Weed is a nectar source accessible to shorter-tongued insects. During colonial times, a tea of its leaves was reportedly valued as a fever-reducing remedy. Joe Pye was said to have been a Mahican Indian who used this plant to cure typhus.
Another tall plant in this wetland is the native Blue Vervain, which sometimes is mistaken for Purple Loosestrife. Its flowers, which are also arranged in spikes, are much smaller and have a more bluish hue.
Only few flowers on each spike of Blue Vervain are open at any one time. They are mostly visited by very small insects.
Along the path back to the parking lot, you can see the result of the work of leafcutter bees (Megachiliidae) at Station #38. Bees of this group cut somewhat circular holes into leaf edges. They fly away with the leaf fragments and use them to line their solitary, tubular nests.
The last flagged stop [Station #40] is a White Mulberry tree standing somewhat isolated in an old field. Actually, this one is multi-trunked and relatively low, giving it the appearance of a large shrub. This European species apparently received widespread planting during the Silk Bubble of the first half of the 1800s. A taste of those heady times can be garnered from the motto affixed to this book's title page, "Look to the Silk Culture for the true Gold Mines of the United States, leading to Independence, Wealth, and Power." The White Mulberry is the prime host plant for the Domestic Silk Moth's caterpillar (aka "silkworm"), a truly domesticated insect who wraps its cocoon in fine silk threads and is the source of commercial silk.