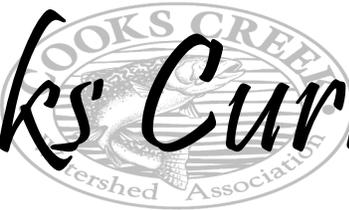


Cooks Current



"To protect, preserve and improve the quality of water, land and life in the Cooks Creek Watershed"

Volume 18, Issue 2

Newsletter of the Cooks Creek Watershed

Spring 2021

2021 Events

Regular Board Meetings: TBD

Check our website for details

Springtown Fire House- 7:30PM

4th Thursday of the month except Nov. and Dec. which is the 3rd Thursday; May 27, June 24, July 22, Aug.26, Sept. 23, Oct. 28, Nov.18 (3rd Thursday), Dec.16 (3rd Thursday)

All Events: TBD please check our website!

June 19, Mini Monster Mayhem, 9:30am-Noon, The Douglas', 3450 Rt. 212, Springtown, PA, **July 10, Native Plant and Invasive Workshop**, TBD, **Springfield Community Day - TBD**, **Oct. 2, Fall Dinner**, 5pm-9pm, Springtown Rod & Gun Club, **Oct. 3, Walk in Penn's Woods**, TBD, **Oct. 9, Durham Community Day**, Noon-3pm, Durham Mill Green, **Nov 13, Fall Clean-Up**, 9-Noon, meet at Old Philadelphia & Rt. 212 & Gallows Hill Rd.



See back for details!

We're on the web!
www.cooks creekpa.org

Cooks Current is a publication of the Cooks Creek Watershed Association.

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From Across the Board...

Spring is here in all its glory; bringing with it the promise of another summer, and for us, the hope of a return to "a new normal". I am sure we all have had enough of this strange year and all its twists and turns. As I do at this time every year, I have recapped 2020 and its sad to say that the CCWA was able to do very little of its usual activities. However, we did not go the year without accomplishments. At the very beginning of fiscal year 2020 we were in full pandemic lock down, with many folks not even able to work. Our roadside cleanup was cancelled, but I went out myself and picked up the trash on our section of Route 212. Springfield Township gracefully agreed to take the trash and dispose of it. With schools closed, we cancelled our Mini-Monster Mayhem, a big disappointment for me. Over the summer we still could not get together for activities, but members kept watch on the pipeline projects, and we celebrated the DRBC decision to



Bloodroot flowers seen by side of road while picking up trash on cleanup day.

make the fracking ban in the Delaware River watershed permanent. I spent quite a bit of time working on our Growing Greener monitoring project with our friends at Princeton Hydro, and we completed our sampling and analysis of invertebrates and water quality (see reports in previous editions of this newsletter). The stream gages are fully functional again, and providing regular updates on the water flow. I plan to apply for another grant to continue to investigate the invertebrate

community impacts we identified in Springtown and Pleasant Valley. While for the first time in almost 20 years we did not have a fall gathering, a small group of Board members was able to get out and clean up our section of Route 212. We also helped conduct a virtual "Walk in Penn's Woods" with our friends at Penn State.

So far this year, we seem to be on track, back to normal, with a successful trash day in April, picking

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up $\frac{3}{4}$ of a truckload of trash. Not the best showing we've ever had, with less than 25 folks helping out, but better than 2020 for sure. I hope to have twice as many people and groups participate next year. We have advertised for Mini Monster Mayhem on June 19, and hope that families will take the opportunity to get their kids out to romp with us in the Creek. We plan to have a summertime plant workshop this July; we are exploring possibilities of a hike on Buckwampum Hill. For the fall, we believe we will be able to get together again as a group in October, and share some food and information. We are looking for ideas for a speaker. If you have any ideas, do let us know. As far as we know, fall community days are being scheduled in late September and early October for both Durham and Springfield. Should they happen, we will be there if invited. I hope you all have been able to schedule a vaccination, and that you will also get out again and enjoy our wonderful community and watershed.

Yours in conservation

W. Scott Douglas, President

Biodiversity *By: Debra Orben*

Biodiversity is the greatest gift our planet has to offer but we are squandering that gift at alarming rates. This is not a quote from David Attenborough but it could be. David has lived longer than I and encountered wildlife in every habitat and on every continent. Now he is witnessing the drastic devastation of species wherever he looks. In the PBS documentary *Extinction: The Facts*, he warns that extinction is happening a hundred times faster than the natural rate. It is not only deeply tragic but has profound consequences for all of us. Humans are not outside of ecological systems but interlocked with all life on a global scale. The loss of species will affect people everywhere and have negative effects on our food and water security.



Plants and animals, on land and in sea, are threatened by illegal poaching and overfishing, by habitat loss, pollution, and our growing human population. It is difficult to learn that there is not a great deal of Wild remaining. Only 4% of the earth's mammals are classified as wild while 60% are pets or livestock. The remaining 36% are humans who pose a threat to all the rest.

Biodiversity is the web of life that connects and protects us all, the trees that provide our oxygen and absorb CO₂, the soil nutrients and pollinators that make food production possible, the predators at the top of the food chain that keep smaller species in check so that they do not spread diseases or new viruses. Everything is connected and every rip in this web of relationships has an impact.

Climate change is perhaps the most serious threat to biodiversity, as species in the hottest, driest, or coldest regions of our planet will find themselves with nowhere to go. Even here in Upper Bucks we are feeling the effects of a warming climate and the diminishment of species.

If you are as old as I am, you may remember days when insects smeared our windshields at alarming rates. We were told that insects could take over the world, but now we see fewer insects, bees, and pollinators. This decrease in insects may seem minor compared to the loss of whales or elephants, but insects are a food source that helps sustain life on earth.

Every spring, I am grateful for the spring peepers that chorus in the woods, the robins and bluebirds that return to forage for grubs and worms, all the birds and wildlife that brighten our landscape. Grateful too, for the wildflowers, dandelions, and solitary bees that join in this season's celebration of awakening. This spring I am hopeful that we too will awaken and work harder to restore the balance of nature. We need to listen to David Attenborough and learn from each other. We need to address global warming and transi-

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tion to a green sustainable economy that values biodiversity. What changes must we make, not only to prevent the spread of new viruses, but to protect all life on our precious planet? It is the season of new growth and we too need to grow. We can begin by planting more trees and reducing our carbon emissions to protect wildlife. We can work together to support laws and actions inspired by environmental justice, love and compassion for one another, and the natural world. By working together now, we can pass the gift of biodiversity on to our children and grandchildren.



Cicada Towers or Turrets or Chimneys

The cicada nymphs found in the ground, before they emerge, create mud towers above their tunnel holes. Finding the towers is a sure indication that the cicadas will emerge soon.

These towers are built in wetter or moist areas. The towers keep water and mud from back-filling the cicada nymph's holes, so they can continue to breathe. In dryer soil, there are no towers just holes at the surface of the ground which they make and emerge from. If the tower is removed, the hole of emergence is visible. The cicada will still surface if the tower is destroyed. The cicada nymphs will emerge from the ground

at night and crawl to the nearest vertical surface such as a tree and begin to molt. The eggs laid by the adult cicada in branches are tucked into egg-nest grooves made by their mothers. The eggs hatch into nymphs which feed on plant fluids. They leave the groove and find their way to the ground. In the ground the nymphs tunnel establishing a cell from which they feed on roots for most



Cicada mud towers opened to show holes in the earth where cicadas will emerge.



Cicada mud towers constructed so the larve can escape flooding waters in the soil.

of their lives. In the ground the cicada goes through four instar stages and molts three times. Cicadas then build a tunnel to the surface of the ground getting ready to emerge. The nymph emerges from the ground and it then goes through a molting process developing into the winged, singing adult cicada. Male cicadas sing but some species only move their wings to make sounds. They all fly. 2021 is supposed to be a great year for cicadas. Get outside, look and listen to them. They don't bite or sting. The critters will have feasts eating the cicadas. And you could too. Native American people ate cicadas and so do many people around the world.

Back to the Past: “The Indian Walk From Red Hill to the Blue Mountains.”

BY J. I. CAWLEY, M. D., SPRINGTOWN, PA.*

(Red Hill Church Meeting, Ottsville, Pa., October 4, 1910.)

From: **A Collection of Papers Read Before The Bucks County Historical Society, Volume IV., 1917.**

Dr. Cawley was born October 6, 1853; died December 11, 1915 He was serving as Register of Wills for Bucks county at the time of his death.

A column highlighting the natural history of the Watershed. This is Part 1.

The father of William Penn was an admiral in the British navy, and was a creditor of the King to a large amount which he was unable to pay. He therefore compromised the matter by issuing the grant of a large tract of land in America to his son William Penn, in liquidation of the obligation. It appears that no consideration was given to the fact that the natives, the original owners of all the lands in America, might object to being summarily dispossessed of their lands. The fact that they did seriously object to the proceedings of the white people soon manifested itself along the entire eastern coast of the American continent wherever colonization was attempted. William Penn upon assuming the proprietorship of his estate in America, agreeable to his spirit of conscientiousness and humanity, purchased from the natives every acre he took possession of.

He was always absolutely fair and honest in his dealings with the Indians, and instead of experiencing the bloody scenes that befell others he possessed their full confidence, love, and esteem, and by that course established protection for his people who were never molested. He died in England in 1718, and his sons John, Thomas and Richard Penn became the proprietors of Pennsylvania. During their administration of the estate, many settlers located beyond the territory obtained by treaty from the Indians, and for the first time there was discontent shown by the tribes who saw their favorite hunting grounds and best land taken from them. Their dissatisfaction became more and more acute, and when they became threatening, John Penn, after being urged for three years, was finally induced to come to America, to arrange for another treaty for more land, including that unwarrantably occupied by settlers. The Delawares and Shawnees were peaceable, but the six nations and other tribes were also to be appeased. The first conferences were held at Durham in 1734. In 1737 another was held at Philadelphia. These conferences were attended by a large number of chiefs and delegates from the tribes.

The policies of William Penn were not adhered to by his successors, and the Indians were deceived by inaccurate drafts of the territory and other sharp practises (sic), not at all in harmony with the course of the first proprietor. After much discussion the treaty was concluded at the Philadelphia conference, with the Indians believing that the rich land in the forks of the Delaware and north of the West Branch (Lehigh) was still theirs. The deed, however, showed that the walk was to extend along the Neshaminy to its head waters and to continue in a direct course for the distance to be covered in a walk of 1 1/2 days and the territory to include all land between the western end of the walk and the Delaware river.

This walk was not conducted with the scrupulous honesty which characterized the conduct of William Penn. A preliminary walk or survey ordered by John and Thomas Penn in a somewhat secret manner, was entrusted to Sheriff Timothy Smith and Surveyor General John Chapman, who were to secure three men "who could travel well," and several on horseback with provisions and refreshments. This was in 1735. Trees were blazed along the way as a guide for the subsequent walk. The course of this preliminary walk was from Wrightstown, practically northwest reaching the head waters of the Perkiomen creek, passing what are now Strawntown and Applebachsville, in Haycock, Pleasant Valley in Springfield, Leithsville and Hellertown in Northampton county, reaching the famous ford of the Lehigh about a mile below Bethlehem, at Jones' Island, where they crossed and then to the northwest, passing through the Lehigh Gap, and ending about 8 or more miles beyond it. The time consumed in this walk was 10 days, from April 22 to May 2. Matters relating to this treaty were suspended for over two years when the real walk was made. It started from Wrightstown at a point now marked by a tablet, proceeded along the Great road (now Durham road) to near Gardenville where the walkers

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took a more northerly direction from the preliminary survey and followed that road to the Tohickon creek, where Deep run joins it, where the road ended but continued as a wagon trail to Durham furnace. On reaching Stony Point in Springfield township, they turned off the wagon trail, and struck a smaller trail through Bursonville to Springtown and in a more westerly direction partly over trails, and partly guided by marked trees till they reached the preliminary route which they had left near Gardenville. This was at the present village of Leithsville, about 6 miles south of the Lehigh river. These two routes nearly paralleled each other and they were at no point more than 3 or 4 miles apart.

The reason for this diversion from the trial-walk or survey was to avoid the rocky territory of Haycock, Springfield and Saucon, and the longer distance over a smoother road or trail was more favorable for gaining time than the rough woods of the trail-walk presented. We must bear in mind that after leaving Stony Point, the route was through a perfect wilderness to its end.

I beg leave here to insert a quotation from my paper read June, 1891, at a meeting of the Buckwampum Historical Society at Springtown. "Picture, in imagination, Springtown, all woods and underbrush, the only streets being Indian paths, and deer trails leading to the Durham creek, with whose sparkling waters they slaked their thirst. The forests and meadows overgrown with luscious berries growing in wild profusion. The waters of the creek alive with speckled trout, and no one but the savage Indian to catch them. The quail, pheasant, duck, turkey, deer and rabbit holding high carnival because the crack of the hunter's rifle had not yet been the knell of doom to them. The song of myriads of birds, the cry of the wolf, the growl of the bear, and the war whoop, song and dance of the Indian, and perchance the funeral dirge, as some loved brave, who had been called to the 'Happy Hunting Grounds' was laid to rest in the old Indian burying ground, now known by a clump of trees, near the residence of George Seifert, were the only sounds to disturb the deathlike stillness which reigned here from the time the world began.

Bio of the Cauleys from Book Of History of Springfield Twp from 1888

- **JAMES IRVING CAWLEY** physician, P.O. Springtown, was born in Lower Saucon township, Northampton county, October 6, 1853.
- His parents were John R. and Mary Cawley, the former a native of Northampton, and the latter of Lehigh county.
- His great-grandfather, Thomas Cawley, was one of two brothers who came from Cheshire, England, prior to the Revolution. He settled in Lower Saucon, Northampton county, and died there August 5, 1806.
- His son, John Cawley, was born there September 22, 1777, and died at the same place November 19, 1858. His wife was Mary Roney, of Bucks county, who was born May 3, 1779, and died November 10, 1851.
- Their son, John R., father of James I., was born December 4, 1811, at the old homestead in Lower Saucon, and is still living at Allentown, Pa.
- James I. spent his early life in Lehigh county. He was educated in Freeburg, Snyder county, Pa., and at Muhlenburg college, Allentown. He completed his professional education at the University of Pennsylvania, at Philadelphia. He is at present practicing at Springtown, where he has been for the past eight years. On December 31, 1878, he married Annie M., the only child of Joel Clauser, of Lehigh county. They have no children.
- The doctor has been a successful physician, and enjoys a good practice. He is a member of the Reformed church, Medical society, of which he is vice-president, and the Lehigh Medical society.

Ubiquitous Microplastic

By: Jim Orben

On the second Saturday in April this spring, the Cooks Creek Watershed Association, Springfield Township and PennDot sponsored the annual Keep Pennsylvania Beautiful roadside cleanup event. This year we collected bags and bags of assorted trash that had somehow flown out of cars and trucks and landed in the gutters of the Cooks Creek Watershed. We found bits and pieces of the “American Way of Life” littered along the roadside. Most of the things we picked up were made of plastic, that ubiquitous material that we find everywhere we turn. That most useful stuff is often only useful once and only for a very short time, so it ends up in the trash, in the gutter, in an incinerator, or in small amounts in the recycle bin.

With so much plastic in use in so many ways, Penn Environment decided to find out just how ubiquitous plastic actually is by launching a statewide study of Pennsylvania waterways. Because plastic is so durable and does not degrade the way banana peels do, once plastic enters the environment it rarely leaves; it just gets smaller and smaller. What was once a one-liter bottle containing ginger ale is worn down by friction and degraded by sunlight into pieces of its former self that bare little resemblance to a pop bottle, but are plastic still. When these plastic bits become small enough their name changes; they become microplastic. Microplastic is plastic less than 5 millimeters in length, about the size of a grain of rice. Microplastics enter our environment in many ways and take more than one form. Plastic fibers are found in the water used to wash clothing and can flow through sewage treatment systems into our waterways. Fragments, like pieces of a soda bottle, are abraded from larger pieces. Film from plastic bags and other packaging finds its way into our waters where it is joined by microbeads from facial scrubs.

Penn Environment chose 53 sites across the state, mostly in more highly populated areas like the eastern part of the State or around State College. They sampled near Pittsburg and around Erie. At each site 5 one-quart canning jars were filled with water from a naturally flowing stream. The samples were filtered and the filters examined under a 50X microscope. Microplastics were found in all samples. The nearest sample site to the Cooks Creek Watershed was the Tohickon Creek, just east of Rt 611. Fiber and film were found in the sample taken there.

What should we do? What can we do? Microplastics have been found in the Tohickon Creek and would have been found in Cooks Creek, if only they had looked. How can we, as individual citizens, do something to relieve this problem? Easing the burden on the overall waste system is imperative to mitigating plastic pollution. Minimizing various waste streams and creating systems to better prevent waste from being created will make it easier to deal with sources of plastic and microplastic pollution. When personal freedoms are in conflict in so many ways it is hard to mandate behavior, even if that behavior is obviously for the good of every living creature living in our only home.

Thanks to Penn Environment Research & Policy Center and Faran Savitz for this survey of our waterways and the insightful analysis. To read the paper in its entirety go to: <https://pennenvironment.org>.

Lightning A Cautionary Tale *By: Steve Smith*

Part I

In Memory of Jonathan K. Smith, MSW 1976-2021

Journal entry, July 13, 2002: "We were close to being killed by multiple lightning strikes on Picco di Vallandro."

Surprisingly, my journal does not contain much more in the way of details but I remember that afternoon as if it were yesterday. My son Jonathan and I had been trekking in the Dolomites in Northern Italy for three days, putting us about a third of the way along our intended route. We had met two hikers from Bolzano trekking in the opposite direction in the early morning, and they spoke English only slightly better than we spoke Italian, resulting in a near fatal misunderstanding. We inquired as to the location of the Rifugio (hut) Vallandro and were directed to the Picco (peak) Vallandro. Up we climbed, beginning late morning, on a beautiful summer day. The Dolomites are arguably the most beautiful mountains in the world and there were almost no other hikers on any of the trails, and none at all on the long switchback up the 9,314-foot Vallandro.

We were well aware of the danger of hiking an exposed peak on a summer afternoon and were, therefore, in a hurry to reach what we thought would be our shelter for the evening near the summit. At about two-thirty in the afternoon, storm clouds appeared from the west. Within minutes we were being pelted by small hail being driven horizontally by gale force winds. The temperature dropped precipitously from the low eighties to the low forties. We were in shorts and had only light windbreakers in our packs. We were now at about 8000 feet and the small rocks covering the slope began to emit loud cracking and popping noises. Suddenly there were small pink clouds of ionized gas forming around some of the rocks by the trail. Then rain began falling in dense sheets soaking us completely.

Then lightning began striking the slope every few seconds from about 5000 feet to the summit. It was apparent that we needed shelter very quickly so we continued the ascent at a trot. Near the summit we encountered a chasm about twenty-five feet wide that could only be traversed by negotiating a knife edge of white marble while holding on to a thick steel chain. The surface of the marble was slick from the rain and a slip meant disappearing into oblivion. Note: Holding onto a steel chain in a thunderstorm is not advised! On the very summit was a large wooden cross supported by steel cables. The rain drops were exploding about two feet from the cross as the electrical charge induced into the water of the droplets by the intense local electrical field was exceeding the surface tension. Despite the extreme peril this was an awesome phenomenon.

One thing became immediately apparent as we walked across the summit, there was no shelter on the peak and a rapid descent was imperative as we were both becoming rapidly hypothermic, in addition to the continued danger of close lightning strikes. We ran down the switchback as rapidly as possible but now, weakened by fatigue and hypothermia, it was hard to maintain a firm footing. I tripped and sustained a gash on my knee but the rain washed away the blood as quickly as it appeared. When we reached the base of the mountain, soaking wet and cold we were forced to splurge on the expensive hotel at the trailhead rather than walk an additional mile to the Rifugio Vallandro. The staff, apparently experienced in these matters, took our wet clothes after we showered and changed and put them in the boiler room to dry.

The next day the comically arrogant hotel manager refused to take my credit card and this took us down to our last Euro. My revenge was the thoroughly bloodied bedsheets from the laceration on my knee. Jonathan figured out how to get 98 Euros cash back at a local café after ordering two coffees which averted a major problem. I had told the two young waitresses that Jonathan was an American rock star and the look in their eyes said that they didn't question the truth of it for an instant.

Part II: The Science of Lightning will appear in the next issue of *Cooks Current*

Green Tip #50: The Gardener as Alchemist - Turning Waste to Gold

By: Jim Orben



Compost has long been called “Gardener’s Gold,” and for good reason. Since compost looks a lot like dirt, what makes it such a miraculous substance with such great value? Compost is high in nutrients that plants need to thrive and grow plus its high humus content causes it to maintain moisture levels around the roots of plants so they can produce fruits and vegetables with less or no watering. Compost is almost magic, and the good thing is, what it takes to make compost is readily at hand. All you need are kitchen scraps and yard waste. Those peelings and coffee grounds mixed with leaves and weeds even a little newspaper, eggshells and grass clippings will make a fine, dark humus rich compost to add to your garden beds. It is even good for flowers and other decorative plantings too.

Compost makes everything grow better. So, how does compost happen?

The making of compost begins with the raw materials. Instead of tossing our kitchen scraps in the garbage and sending it off to a landfill, or burning the fall leaves, we use them to make gold. The recipe calls for a carbon nitrogen balance of one third nitrogen to two thirds carbon. Grass clippings, kitchen scraps and weeds are good sources of nitrogen and fall leaves or straw are carbon rich. Build your pile in layers, turning it every few weeks with a pitchfork or shovel to give it air since the bacteria that preform the alchemy of composting need to breathe. Layers can always be added and turned in as you go. Along with air a compost pile needs moisture. If there is not enough rain to keep it moist a compost pile will need to be watered. A compost pile gets hot too. The bacteria and molds that break down the pile generate heat. A good compost pile will reach 120 to 130 degrees Fahrenheit. This will kill weed seeds and reduce weeds in the garden.

Compost cannot always be used directly on or around your special plants. Sometimes there just isn’t room to add more stuff to the raised bed, the window box or the potted plant on your deck. In that case the answer is compost tea. Just take about a half bucket of finished compost and add water. After letting this soak a few hours remove the compost and use the dark brown water to give your special plants a nutrient rich drink.

An actual compost pile doesn’t always fit into the landscape of a lawn and garden. There are many types of commercial composters on the market that will do just fine. The tumbler type is the size of a garbage can that is loaded through a sealable lid and can be rolled around the lawn to mix it, being careful to not lose control going downhill.

I found these compost incites at the Earth Easy website. If this Green Tip has sparked your interest in composting your kitchen and garden waste, check out the complete guide here:

<https://learn.eartheasy.com/guides/composting/>



A Botanical Focus: MAYAPPLE (*Podophyllum peltatum*) By: David Oleksa

This is the 19th installment in a series of articles on the flora of the Cooks Creek Watershed.

Taking a walk through the woods at this time of year almost guarantees that you will be seeing large numbers of this issue's subject plant. This fascinating umbrella shaped plant is easy to identify and the fact that it congregates in huge populations ensures that most people are aware of its existence. What a lot of people don't know, however, is that these are complex organisms that have unique characters impacting on humans and other fauna. The Mayapple is known by a variety of names dependent what part of the country you are from. Its range extends from southern Ontario in the north to northern Florida in the south and from the east coast of the North American continent to as far west as Texas. Its names include; raccoon berry, yellow berry, wild lemon, custard apple, American mandrake, and hog-apple.



Mayapple flower seen on two branched stalk surrounded by hosta leaves

In late April to early May, the plant extends itself up from the soil in a shape quite similar to a furlled umbrella. Reaching a height of 14 to 24 inches, it unfurls its leaf or leaves and assumes its well-known shape. Occasionally, a plant has the misfortune of coming up through a fallen dried leaf that happens to have a hole in it. This unfortunate circumstance leads to the mayapple bearing the leaf upward off the ground and then finding itself unable to unfurl its own leaves because of the constricted nature of the dried leaf. Once the mayapple is unfurled you may note that it has either a single stem with one leaf or a single stem which forks near the apex and two leaves form. One leaf indicates that the plant is a young one and is not yet able to flower and bear seed. Plants with two leaves are mature and these are the ones that you should explore carefully to try and find their beautiful (but well-hidden) flowers. The flowers form under the leaves and due to the numerous plants in a colony, they are hard to see. A fully



Mayapple leaves

mature and fertile plant will produce a single flower in the late spring. The flower is quite striking with 6 to 8 glossy white petals and brilliant yellow stamens and pistils. They have an extremely unusual scent which is hard to describe.

Like rhubarb, the mayapple's leaves are quite toxic and death can occur in humans who have digested them. Unlike the rhubarb however, is that the stems of the mayapple are also poisonous to humans. What value than does the plant have to us? Well, in late August through early September, the mayapple produces a lovely fruit which happens to be a prize find for foragers. The fruit is egg-shaped, about the size of a kiwi, and when ripe turns from a light green color to a yellow or brown-yellow color. This usually occurs in late summer and often the ripe fruit can be spotted because the plant's leaves have already started to brown and wilt. Often the fruit has been released from the plant itself and is lying on the forest floor. It is not advisable to try to consume unripe fruit since it is quite unpleasant. Only when the fruit is completely ripe does it have the, what some people describe, as an "ethereal" fragrance and is ready to eat.

The skin is leathery and indigestible but the inside is a liquidy pulp that is a pale yellow in color. The pulp contains many seeds about the size of grape seeds. The simplest way of eating the fruit is to scoop out the pulp and spit out the seeds. But the fruit can also be consumed and enjoyed as a superior jam or in pies, cakes and custards.

The biggest problem in harvesting mayapples is to find them. As one of their names, raccoon berry indicates, they are a favorite of these animals and the vast majority are consumed by their namesake and other wild critters. Often colonies of mayapples will be found at the edge of forests or even in utility companies' right-of-ways. Larger colonies usually provide a better opportunity for finding adequate numbers of fruit but the weather also plays an important role. If the summer is a dry one, there will be little fruit but too much rain will cause the ground to be too saturated and that will have a negative effect on the harvest as well. However, despite the inconsistencies in foraging success, efforts should be made whenever possible to savor this unique fruit.



Children's Backyard: The Smell of Rain, Petrichor, Geosmin, Terpenes and Ozone *By: Lois Oleksa*

Do you know the smell of the air before or after it rains? Farmers describe how they can smell rain right before a storm. It isn't the water that you smell (rain has no scent) but a mixture of other chemicals. The odor you smell *before* the rain comes from **ozone**, a form of oxygen which is produced by lightning, and ionized gases in the atmosphere. The name given to the odor of rain *after* it rains, especially following a dry spell, is **petrichor**. Petrichor is caused primarily by a molecule called **geosmin**.

Ozone consisting of three oxygen atoms plays a role in the smell especially after thunderstorms. Lightning bolts with their electrical charge can split molecules in the air causing them to recombine into nitric oxide which then interact with other chemicals in the air to produce ozone. Ozone can be smelled in the air even before the storm arrives because it can be carried over long distances from high altitudes. It is a pungent smell, described as being similar to chlorine.

Petrichor is the name given to the earthy scent that you can smell after the rain starts to fall on dry soil. The name comes from "petri" which are stones and "ichor" which means "the blood of the gods" in Greek. By experimentation, two scientists, in 1964, heated rocks to get rid of all chemicals in them and then left the rocks out to be rained on. With a little bit of wetness, the smell was noticed but the origin of the smell was a mystery to them and so they came up with the term "ichor". Almost half a century later, in 2015, scientists at the Massachusetts Institute of Technology used high speed cameras to see how the scent moved into the air. What they found was that when a raindrop lands on a porous surface, air from the pores forms small bubbles, which float to the surface and release aerosols. This aerosol carries the scent as well as bacteria and viruses from the soil. Slow raindrops in a light rain produce more aerosols.

Where does the scent come from? During dry periods, certain plants exude oils that are absorbed by the soils and rocks. During the rain, the oil is released into the air producing the scent. There are bacteria and viruses, in particular the Actinomycetes and Streptomyces found in soil. These soil bacteria secrete sweet-smelling molecules called **geosmin** whenever it rains. The bacteria secrete the compound, geosmin, when they produce spores; then, the force of rain landing on the ground sends these spores up into the air, and the moist air sends the chemical into our noses.

Our noses are very sensitive to the smell of geosmin. Some people can detect it at concentrations as low as 5 parts per trillion. With long periods of dryness, large amounts of the spores build up and at the first drops of rain the scent of geosmin is the greatest or strongest. Just turning over soil in your garden may make it possible to smell the geosmin molecules. It's a pleasant aroma, sort of a musky smell. It's the earthy smell of beets.

Plants also release **terpenes**, aroma-rich molecules into the air. These terpenes are then carried to the soil by falling raindrops. Terpenes are the major components of turpentine and resin. Pines, peppermint, ginger all have terpenes that give them their scent. Rocks and clay absorb the terpenes and other molecules during hot, dry seasons and especially in places like deserts. When the humidity and moisture in the air build up, the terpenes are released from

the rocky pores and the scent drifts in the wind.

When all these previous molecules combine, their smell gets amplified, and as the raindrops hit the ground, the smell is forced from the soil into the air. All these chemicals may carry messages. Some biologists think that petrichor running in waterways acts as a clue to freshwater fish, signaling spawning time. Geosmin's fragrance may help camels find their way to desert oases. In return, the bacteria that produce geosmin use the camels as carriers to sow their spores. Springtails, soil dwelling arthropods, are big fans of geosmin. They sense it with their antennae and feed on the *Streptomyces* producing it. In return, the spores of the *Streptomyces* are spread by the springtails.

The smell after rain is scientific, but what sets it apart from other smells? Why do we like the smell of rain over other natural smells? Perhaps we have evolved to love the smell? A new season is marked in many areas of the world with the arrival of the "rainy season". In India, Southeast Asia, West Africa, and parts of Australia, great dry desert areas are subject to dramatic seasonal storms. Here in our Watershed, we get rain, usually, on a regular basis. The huge portions of the world having "dry" or "rainy" seasons determining when rain will fall and bring plenty of food for the people and their animals. Anthropologists say that because rain is held in very high regard by these people, they just had to love the smell that came with it.



Who doesn't love petrichor – the smell that comes with rain after a dry season? Perfumes and candles with the petrichor aroma have become popular. But scientists were not the first to extract the smell. What they call petrichor was being produced long ago in Kannauj, India and is still produced today. The rain perfume is crafted in this ancient city in cauldrons, in distilleries

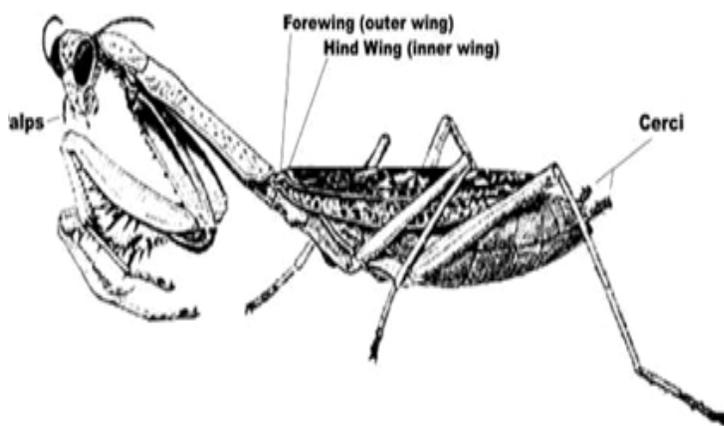
where dried clay disks dug from the dried ground before the monsoon season are cooked and bottled. Called *mitti attar*, it is the scent of the Indian rain.

Children's Backyard Activity: Get outside and smell the rain.

Creature Feature: Praying Mantises *By W. Scott Douglas*

This is 56th in a series on the fauna of the Cooks Creek Watershed.

There is no mammalian predator quite as monster-like as the praying mantis. With its triangular head, bulging eyes and its grasping spiked front legs, not to mention its mastery of camouflage, it is a creature of nightmares. Thank goodness for us it's only a few inches long. But for many invertebrates, and even for small birds and lizards, mantises are the tigers of the insect world. Their vision is akin to a raptor's; they can move their heads 180 degrees, giving them an amazing 300-degree field of vision. They are so good at ambush predation that most of their prey probably never sees what's coming until it's too late. For humans, the mantis can be both good and bad. It is true that in the garden mantises can eat a lot of pests, but they are indiscriminate, and can also eat beneficial insects as well. While our invertebrate fauna has adapted to the native mantis, there are two other species of mantises in our area, and they can actually be detrimental to your yard and garden, even to the point of capturing and eating hummingbirds!

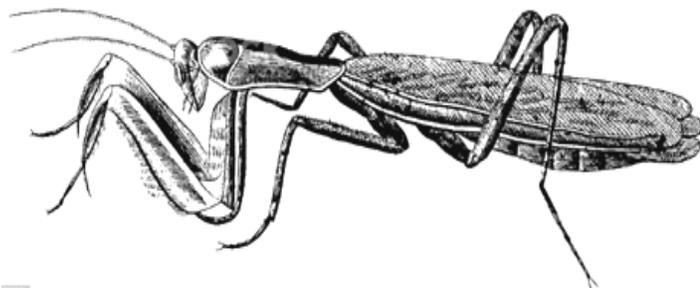


S. Carolina adult

adults of the Chinese mantis also have a very distinct green wing stripe. All three are indiscriminate and opportunistic predators; eating whatever they can catch from crickets and grasshoppers to beetles, moths and mosquitos. They in turn are preyed upon by a variety of vertebrates, including birds, bats, spiders, snakes and lizards. If they can be found.

All three mantises exist in similar habitat, but the larger European and Chinese varieties are becoming more common, mostly because of the belief that having more mantises is good for your garden. Garden supply outfits are still marketing egg clusters of the non – native species as a way to naturally control pests. However, both species are such efficient predators that they clean out too many insects and other beneficial creatures, and then move away from your garden into the surrounding meadows and fields. As a consequence, the native variety is becoming more and more rare in our area. It is not known if the non-native mantises are causing a problem with any other native inverte-

The native praying mantis is *Stagmomantis carolina*, easily recognized by its grey or brown mottled coloring, short hind wings that do not go all the way to the end of the abdomen, and smaller size (2-2.5 inches at most). The two non-native species, the European mantis (*Mantis religiosa*) and the Chinese mantis (*Tenodera sinensis*) are bright green or brown in color and much larger (3-4 inches). You can tell the Chinese and European varieties easily by looking at the head: both are fairly square, with the Chinese mantis having two very distinct stripes running down its face. Brown



M. religiosa adult

(Continued on page13)

(Continued from page 12)



Non-native mantis egg cluster

brates. Pictures of large Chinese mantises capturing and eating hummingbirds at feeders can be found on the internet, but this is not likely occurring with any frequency in the natural environment.

Our mantises live for only one year, dying off quickly when frost arrives in the fall. The next generation overwinters in a brown styrofoam-like cluster of several hundred eggs called an ootheca. Each species has a distinct form of ootheca. The two non-native species' egg cases are larger and more puffy than the native variety.



Native mantis egg cluster

You can often find the non-native clusters laid on the stems of meadow flowers like goldenrod, whereas the native species' clusters are laid on the trunks of trees or bushes. The native cluster is also flatter, harder, darker in color, and has more distinct segments. The young hatch out *en masse* in the spring when the weather gets warm and other insects are stirring.

You might think from reading this that I am not a fan of using natural pest controls. Quite the contrary! I am a big fan of encouraging Mother Nature to do her thing in my gardens. As we have said in the past, it is good practice to leave the dead twigs, stems and leaf litter in your garden over the winter and spring months to serve as refugia for eggs and overwintering adults of beneficial insects, spiders and pollinators. Do your cleaning up only when it's warm enough to plant. If you really want mantises in your garden, go about in meadows and fields in the fall and look for the egg clusters of our native species and simply take the stems with you and lay them about in your gardens. The young will hatch out in the spring and terrorize the invertebrate denizens of your flowers and bushes as they should.

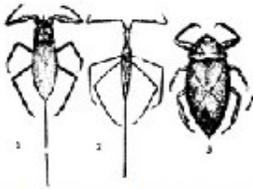
Help us keep up the good work!

Renew Your Membership for 2021

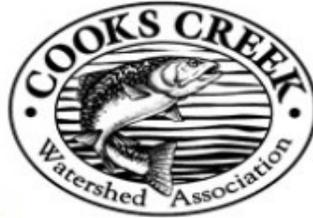
Cooks Creek is an important resource for our community. Don't forget to renew your membership and stay up to date on issues concerning our Watershed.

If you want to get more involved, come to a meeting and share your talents and interests!

Find the membership form on the back page.



COVID CABIN FEVER RELIEF!



COVID CABIN FEVER RELIEF!

19th Annual (REPRISE) Mini Monster Mayhem



Join us as we celebrate water, watersheds, and the amazing creatures which crawl in, on and under Cooks Creek. Our own Scott Douglas presents a fun-filled, kid-friendly program featuring dinosaurs, comets, mud, gummy worms, a toilet...and monsters! We will practice social distancing as best as we can - we can group you by family unit - but kids are kids so please bring masks AND water shoes.

Saturday June 19, 9:30am – 12:00 noon
At the Douglas', 3450 Rt. 212, Springtown

**This event is free and open to the public
Bring your water shoes (or other suitable footgear),
We will be walking in the Creek!**

Children under 12 must be accompanied by an adult throughout the event.

RSVP by June 16, (610) 346-1604

You can check out more Mini-monsters and more information on the web:
www.cooks creekpa

Schedules of Local Government Meetings

Springfield Township:
www.springfieldbucks.org
 610-346-6700
 2320 Township Road

Supervisors: 4th Tuesday @ 7:30 PM
Planning Commission: 1st Wed. @ 7 PM
Environmental Advisory Council:
 2nd Thurs. @ 7:30 PM
Open Space Committee:
 As required
Historic Commission:
 2nd Wed. @ 7:00 PM

Durham Township:
www.durhamtownship.org
 610-346-8911
 215 Old Furnace Road

Supervisors: 2nd Tuesday @ 7:30 PM
Planning Commission:
 1st Tues. @ 7:30 PM
EAC: 3rd Tues. @ 7:30 PM

Lower Saucon:
www.lowersaucontownship.org
 610-865-3291
 3700 Old Philadelphia Pike

Council: 1st and 3rd Wed. @ 7 PM
Planning Commission:
 4th Thurs. @ 7 PM
EAC: 2nd Tues. @ 7 PM

Williams Township:
www.williamstwp.org
 610-258-6060
 655 Cider Press Road

Supervisors: 2nd Wed. @ 7 PM
Planning Commission: 3rd Wed. @ 7 PM
Land Preservation Board:
 4th Tues. @ 7 PM

Richland Township:
www.richlandtownship.org
 215-536-4066
 1328 California Road

Supervisors: 2nd Mon. @ 7 PM
Planning Commission: 3rd Tues. @ 7 PM
Preservation Board: 2nd Wed. @ 7 PM

Recycle! Local Information

Durham Township Recycling Center

Location: Municipal Building, 215 Old Furnace Rd, Durham

1st Saturday of every month (2nd Saturday if 1st Saturday is on a holiday weekend)

Hours: 9:00AM – 12:00 noon.

Accepting newspapers, magazines, junk mail, phone books, glass, tin, food grade plastic, aluminum and cardboard. Please note that this facility is just Durham Township residents!

Contact the township building for more info. 610-346-8911

Springfield Township

Cloth/clothes only at Springfield Fire company.

Springfield no longer has recycling. Check out Bethlehem or, paper and cardboard recycling at the Southern Lehigh Public Library. Also, check with your local trash hauler who will offer a recycling program.

See website: www.springfieldbucks.org

or call 610-346-6700.

Blinderman & Son

Location: 1320 Whitaker St, Hellertown. 610-838-9221

Hours:
 7:30AM – 4:00 PM, Monday – Friday

7:30 AM – 11:30AM, Saturday

Accepting cardboard and most metals.

City of Bethlehem Theis/Cornfeld Recycling Center

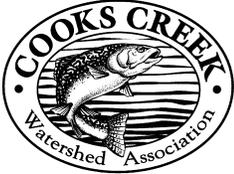
Web site: www.bethlehem-pa.gov/recycle/services/theis_cornfeld.htm

Location: 635 Illick's Mill Rd., Bethlehem

Phone: 610-865-7082 Hours: Weekdays: 9AM to 5 PM, Saturday 9 AM to 4 PM, Sunday 11AM to 4 PM

Accepting glass, cans, plastics, newspapers, all books, magazines, catalogs, cardboard, mixed office paper, metals, textiles (clothing, shoes, etc.), large appliances (certified freon-free). Call or go to the web site for specifics.

Bonus!! They provide FREE on site shredding services for businesses and private individuals. If you have 4 or more boxes, call 610-865-7082 to schedule an appointment.



Cooks Creek Watershed Association
 P.O. Box 45
 Springtown, PA 18081
 www.cookscreekpa.org

If you hold precious the beauty that surrounds us in the Cooks Creek Watershed area and would like to be actively involved in its preservation, then consider joining our association as a member. Reach out to your community! We would love to hear from you! Please drop us a line at info@cookscreekpa.org

CCWA is a 501 (c) (3) non-profit organization.

Find us on Facebook



Please Join Us... Cooks Creek Watershed Association-Membership Form

All of us who reside in the area enjoy the beauty of Cooks Creek.

Those of us who are fortunate enough to live here are dependent upon this watershed not only for the beauty of the creek but our wells, the wetlands, the wildflowers and all of the beautiful landscapes in our townships.

It's up to all of us to protect this treasure. The Cooks Creek Watershed Association asks that you become a member and help in the task of protecting this special resource.

Name: _____

Other household members: _____

Address: _____

Phone: _____ E-mail: _____

Interests: (circle)

Newsletter	Website	Roadside Cleanup	Event Planning
Membership	Fundraising	Stream Studies	Wherever I'm Needed

Individual Membership Fee: \$ 15.00 per year _____

Family Membership Fee: \$ 25.00 per year _____

Student Membership Fee: \$ 10.00 per year _____

Donation: to legal defense fund: _____

Total:

I wish my membership and donation to remain anonymous in our board minutes. Check box.

Please detach and mail to Cooks Creek Watershed Association, (CCWA)

P.O. Box 45, Springtown, PA 18081. **THANK YOU!**

Checks can be made payable to Cooks Creek Watershed Association.

CCWA is a 501 (c) (3) non-profit organization.