

Introduction

A Letter to the Reader

IF YOU'RE LIKE ME, you might have grown up watching nature documentaries. On the screen, you saw animals do amazing things in incredible places. Lions stalked zebras on the plains of East Africa. Perentie monitor lizards crept through the spinifex in the Australian Outback. Sloths hung from branches eighty feet up in the Amazon Basin. No rowhouses, skyscrapers, or concrete sidewalks made it into those documentaries, so you, like I, could be excused for assuming that nature was something “out there,” not here in the middle of a major metropolitan area of more than six million people.

Luckily, we were wrong. I can't argue against the lure of the exotic places and the charismatic fauna in those documentaries, but the natural world offers us plenty to enjoy and learn from right here where we live.

Within a fifteen-minute bike ride of my house in West Philadelphia's Walnut Hill neighborhood, I can watch Cooper's hawks hunt pigeons, I can catch snakes, I can listen to warbling vireos sing as they hunt insects along a creek, I can paddle on a river while short-nosed sturgeon and American eels swim below, and I can pick wildflowers while migrating monarch and buckeye butterflies drink nectar around me.

It has taken me sixteen years to figure this out. When I first moved to Philadelphia, I sought my experiences with nature outside the city. I drove out to the Pine Barrens or the Poconos, where I enjoyed the vistas and looked for reptiles and amphibians

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(“herping”—thus, I am a “herper”). When I got home to my apartment, I stopped looking.

Over the years, I realized that there were snakes, salamanders, and turtles right here too. I started a blog about herping in Philadelphia, which led to writing about urban nature for *Grid*, a Philly environmental magazine. Researching articles for *Grid* introduced me to urban conservationists and environmental educators. I made friends with birders with impressive urban yard lists. I met plant lovers who taught me about what grew all around us in our parks as well as in our gardens and sidewalks. I bought an inflatable kayak that I could take down to the Delaware and the Schuylkill Rivers.

I have chosen to raise my children in a place rich with nature: a block in West Philadelphia lined with century-old twin houses. We listen to singing starlings and cardinals on the walk to school. We watch the butterflies and bees that visit the flowers in our garden and in the planters along the sidewalk. We admire the wildflowers in the vacant lot on the corner. For a week in the fall, we run upstairs right after dinner to a window with a perfect vantage point to see dozens of swifts pour into a chimney a block away. We talk about whether this will be the last night that they roost here on their way to South America. Of course, we also go hiking in conventional green spaces, but we never stop observing and learning from the natural world.

I hope that this book accelerates this process for you and your family. Maybe you are new to exploring nature in general or are looking to connect with the natural world closer to home. Maybe you are a birder or a gardener looking to expand your focus to other living things. Maybe you’re looking for a way to connect your city kids to nature. Whatever brings you to this book, I hope that the activities in the following pages take you further on your journey to connecting with nature, wherever you are. You still might watch the newest BBC nature documentary. You, like I, will probably still take vacations to conventionally wild places and seek experiences with nature there. But when you get home, you’ll keep on looking.

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Urban Habitats

THE CONCRETE JUNGLE

Everywhere is habitat, and habitat is everywhere. While you will certainly have no trouble occupying your attention in official park spaces, where you will find the sorts of habitat types generally covered in nature books (wetlands, meadows, streams, upland forest, and so forth), you can also engage in the same nature observation activities without leaving your neighborhood—and in many cases, without even leaving your block.

Start with your home. In every human home, animals find a way to live, although they might be smaller than you would usually notice. If you have a basement, consider it to be a cave and explore it with a flashlight, searching for the spiders, crickets, and other arthropods adapted for darkness; cool, damp conditions; and little in the way of food. If you have no basement, take a look behind furniture and along windowsills for spiders spinning webs to catch unlucky flies, beetles, and moths.

Step outside onto the sidewalk. The brick and stone surfaces of your house or apartment building can host lichens, and the cracks in the sidewalk can sprout small plants. If you have trees, you will have squirrels, not to mention more lichens on the bark. Depending on the species (for example, lindens, redbuds, or ornamental cherries), their flowers will attract bees, butterflies, and other pollinators. You will also have birds: house sparrows, starlings, and pigeons to start with; chimney swifts in the summer; and larger species, such as crows, gulls, and birds of prey. In one hour in May, a friend and I spotted twelve species of bird at the end of my block in densely built West Philadelphia.

If you have a garden, you have plenty to explore. Spare your weeds as long as you can and figure out what they are. As plants flower, watch what flies in for the pollen and nectar. Any object that you can look underneath (stones, storage bins, straw bales, and so forth) will hide an assortment of invertebrates, such as centipedes, pill bugs,

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and beetles. You might even turn up a brown snake or a salamander. At night, possums, raccoons, and other nocturnal mammals might wander through to munch on those smaller critters (not to mention your tomatoes). You can string up a sheet for a moth night (see “What They Do in the Dark: Hold a Moth Night” for tips). Sit out in summer and watch the fireflies light up the dark. By day, dragonflies will zip along your block. A vacant lot can offer nearly as much to observe. Sparrows—native white-throated sparrows and juncos as well as house sparrows—might feed on weed and grass seeds through the winter. The flowering plants will grow and bloom in a shifting array of colors in the spring, at least until someone gets around to mowing.

Your local park, even if it’s just grass with some tree cover, is worth birding. The same goes for cemeteries. Hawks will wait in the trees for unwary squirrels and pigeons. Spring and fall migration will bring dozens of species of songbirds on their journeys north and south. Watch dead branches high in the trees for woodpeckers. As night falls, bats might flap into view to feast on flying insects.

ABOVE AND BELOW THE FALL LINE

Anyone who has ridden a bicycle around Philadelphia has noticed the shift from coastal plain to piedmont. South Philadelphia, Southwest Philadelphia, Center City, and most of North Philadelphia are flat and easy to pedal across in one gear, and the same goes for the Northeast Philly neighborhoods close to the Delaware River. However, ride west on Spruce Street or Ridge Avenue, and you might need to downshift.

The falls of the Schuylkill, now Fairmount Dam, mark the “fall line,” the boundary between the sandy, gravelly ground of the coastal plain to the east and south and the rocky hills of the Wissahickon Formation (mostly schist and gneiss¹ under the soil) rising to the

1. U.S. Geological Survey, “Geological Units in Philadelphia County, Pennsylvania,” accessed October 29, 2020, <https://mrddata.usgs.gov/geology/state/fips-unit.php?code=f42101>.

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west and north. The fall line extends northeast to Trenton, New Jersey, and southwest to the Delaware state line.

The creeks and rivers of the piedmont tumble over small *waterfalls* as they transition to slower, coastal waterways—hence, “fall line.” The force of falling water was once essential to powering industry. In 1645, nearly forty years before William Penn drafted the plans for Philadelphia, the Swedish governor Johann Printz built a mill on Cobbs Creek (then known only by the Lenape name “Karakung”) where today Woodland Avenue crosses from Philadelphia into Delaware County. European settlers continued to build mills at and upstream from the fall line, and the remains of that early industrial infrastructure are still visible today as you hike along our creeks. For example, as you walk the Orange Trail in the Wissahickon past Glen Fern, you’ll notice where the creek pools behind an old dam. There, you can see the ruins of Thomas Livezy’s eighteenth-century mill. The creek banks, less obviously human-made than the stone ruins of the mills and dams, are nonetheless artifacts of this early industrial past. The low stone dams constructed along these creeks to impound mill ponds filled in with silt over the centuries, building up the valley bottoms. As most of the dams have broken down, the creeks have cut their courses down through accumulated sediments.² Thus, our creek corridor parks, enjoyed as natural spaces, are themselves thoroughly postindustrial landscapes.

THE WATER

You might eventually get on or in the water, but the easiest way to check out a creek or river is to stop on a bridge the next time you get a chance and take a look around. This might be the closest you can get to the water without getting in. The Schuylkill and the

2. Robert C. Walter and Dorothy J. Merritts, “Natural Streams and the Legacy of Water-Powered Mills,” *Science* 319, no. 5861 (January 18, 2008): 299–304, doi:10.1126/science.1151716.

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Delaware Rivers are also accessible (in the sense that you can get close to the water's edge) from multiuse trails and old piers, such as Pier 53 in South Philadelphia. Examine logs or old timbers that stick out of the water for basking turtles in warm, sunny weather. Canals, built to transport goods in the years before railroads, are often maintained today as accessible aquatic habitats, with multiuse trails along the Schuylkill and Delaware Rivers above the fall line.

Note the birds that float on, swim in, or fly just over the water. In the summer, swallows will swoop and zip, picking insects out of the air. Waterfowl (such as ducks and geese) will rest or swim on the surface, particularly in the winter, when birds from the north head south, looking for unfrozen water. Cormorants, black birds with long, snakelike necks and yellow bills like spears, will dive and catch fish underwater.

Our murky waterways are generally inaccessible from above, but our creeks, particularly in their shallows, are clear enough to observe the fish swimming in them. From above, you can spot the swimming shapes of various sizes, and in spring and summer, you might even spot a red-breasted sunfish guarding its nest of carefully cleared stream bottom. Frogs and toads will sing from the edge of the water, particularly bullfrogs and green frogs by summer. You can often spot their large tadpoles in the shallows. Watch the dragonflies and damselflies as well. As I write this, forty-seven species of these colorful hunters have been logged on iNaturalist in Philadelphia.

Fishing, of course, is one way to explore the diversity swimming below wherever you are, but also keep an eye out for piles of mussel shells and clamshells left by raccoons and otters. And take a look before you brush off the flying insects that land on you. The caddisflies, mayflies, stoneflies, midges, and others are brief adult phases of critters that spend most of their lives beneath the water, and they themselves feed everything from bridge spiders to the swallows that catch them out of the air and the yellow warblers that pick them off the trees lining the shore.

Paddling a canoe or a kayak on our rivers puts you at the water's surface. This can be a great vantage point to observe aquatic

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waterlife, such as basking turtles and waterfowl. Fish jump right in front of you, and bugs and birds (such as tree swallows) fly at eye level. Inexperienced paddlers should start with guided trips as they get the hang of maneuvering a boat on rivers with big currents. Also, keep an eye on water quality. Storms flush all sorts of pollutants into the river, and for a few days after a heavy rain, you'll want to avoid contact with the water. Check PhillyRiverCast.org, a water-quality forecast tool, before you put in.

FOREST

Neglect any piece of ground long enough in our area, and it will probably end up as forest. Of course, the forest will vary, depending on where you are. Along our creeks and rivers, you might find willows, eastern cottonwoods, and such exotics as princess trees and mulberries. In hillier landscapes, oak, beech, and tulip trees might dominate the canopy. You can find some hemlocks in the Wissahickon Valley, along with stands of white pines. Virtually all of these forests are young, growing on land cleared for farming and industry as Europeans colonized the Delaware Valley. For example, the Wissahickon Valley, which today can feel like the forest primeval with towering oak and tulip trees, was protected as parkland starting in the mid-1800s, and those stately white pine trees were likely planted intentionally, not having been found in the area previously.³

Whatever their species composition, our forests offer so much to explore. The trees themselves can be hugged and admired. Ephemeral wildflowers color the forest floor before those trees leaf out in the spring and block out the sun. In the autumn, wood asters and white snakeroots brighten up the browns and oranges of falling leaves. The leaf litter and the rotting logs of the forest floor fuel their own hidden ecosystem, with a wide variety of invertebrates

3. David Hewitt, "The White Pines of Cresheim Creek," *Growing History*, June 22, 2012, accessed October 29, 2020, <https://growinghistory.wordpress.com/2012/06/22/the-white-pines-of-cresheim-creek/>.

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and inconspicuous vertebrates, such as red-backed salamanders and American toads. Lichens grow on the tree bark, and mushrooms sprout from dead wood and the forest floor. You can spot our larger mammals, such as the overly abundant white-tailed deer, and, of course, there are plenty of birds to watch and listen to.

MEADOW

A visitor from Independence-era Philadelphia might be shocked at the scarcity of meadows (let's pretend that they wouldn't be fixated on automobiles, skyscrapers, and people baring their legs). Back when Philadelphia was mostly farmland, pastures and hayfields served as economically active land as well as habitats for plants and animals that are now scarce in our area. Today, vacant land often sprouts relatively sterile monocultures of mugwort or gets swamped by other exotic plants, such as Japanese hops. All this makes our existing meadows, generally actively managed to maintain a mix of native grasses and forbs (leafy plants), all the more special. You can listen to field sparrows trill in the spring. Through the summer, milkweed patches attract hordes of pollinators and host gorgeous monarch butterflies. In the fall, you can see the goldenrod and other fall wildflowers paint the fields in bright yellow. By winter, all the seeds of these flowers and grasses will feed native sparrows, including white-throated sparrows and juncos. You can also find patches of meadow in other infrequently mowed spots, such as along power line rights-of-way.

WETLAND

Below the fall line, Philadelphia used to be a lot wetter than it is now. Much of South Philadelphia, including the Philadelphia International Airport, has been built on wetlands drained or filled in to create solid land. Our tidal waterways are now largely defined by “bulwarked” infrastructure. The shores rise steeply in concrete and timber walls or have been reinforced by riprap—rocks or the

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brick and concrete remains of demolished buildings, dumped to stabilize the banks. You can still explore wetlands at the John Heinz National Wildlife Refuge at Tinicum, which straddles Philadelphia and Delaware County. Smaller patches of marsh are accessible at other sites, such as Fort Mifflin and Cramer Hill Preserve in Camden, and in between piers along the Delaware River waterfront, where the still water allows sediment to settle out and marsh vegetation to take root.

The challenge of wetlands is that they are difficult to walk through, so you need to observe them either from neighboring land or water. For example, the John Heinz National Wildlife Refuge at Tinicum offers boardwalks and trails along levees to get you as close by foot as possible without sinking into the muck. Paddling offers a closeup look at marshy shorelines, whether you're in the back channel of the Delaware River in New Jersey or in the mouth of the Pennypack on the other side.

Urban Life and How to Observe It

You can start by simply looking around and listening. While there are many techniques to observing the natural world, staying still and quiet while you use your senses is easy, free, and useful. As your ears and eyes adjust to the setting, details emerge that you otherwise would have missed.

I am frequently amazed at how close animals will get to me when I stop moving. This is usually unintentional on my part because I have trouble sitting still. I'll stop for a drink of water and check my phone, or I'll freeze in place as I try to locate a warbler that just sang high up in a tree. Then, I'll hear something rustling in the underbrush, and out pops a squirrel. Browsing deer will gradually work their way in my direction until I flinch. Then, with a snort, they bound away.

All that being said, trying out specialized observation techniques can reveal more about the natural world, whether you are in your garden or in the middle of a forest. For more detail, check out specific guidebooks, but this overview and the examples in the suggested activities can get you started.

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In general, take care with methods that involve disturbing the organism that you are observing. We have regulations on fishing (seasons, catch limits, and so forth) so that populations aren't affected and enough remains for other people to enjoy. Similarly, our parks often limit what you can pick, catch, or take home due to the high volume of visitors and their potential impact. When in doubt, consult with specialists to see what level of disturbance is too much in particular settings.

PLANTS, FUNGI, LICHENS, AND SLIME MOLDS

In many ways, it is easiest to observe things that don't move. Plants, fungi, lichens, and even slime molds stay still while you look at them. There's no need to sneak up on them, and you can take your time examining them.

In urban landscapes, it helps to think small. On sidewalks, plants survive the constant trampling by growing in cracks and keeping a low profile. Often, you can find plants growing and flowering as tiny versions of what you'll find elsewhere. Not surprisingly, our solid surfaces of brick, concrete, and stone grow more hospitable as they age, so pay extra attention to old stone walls for mosses, lichens, and ferns and inspect older sidewalks for plants growing from the cracks. The same can be true of street surfaces. Old brick, cobblestone, or Belgian block road surfaces, which often survive in alleys or driveways, host a jungle of tiny plants in the sandy gaps between the individual pieces.

You might feel overwhelmed as you look at all the plants growing in a green field, vacant lot, forest understory, or even a weedy garden. One technique that botanists use is to intensively search a smaller plot—say, a square meter in area—and catalogue everything growing in it. You don't have to be quite so rigorous, but narrowing your focus to a manageable scale can help you get past the showier plants that catch your eye and pay attention to smaller or plainer species. Similar approaches can work just off the ground as you search for lichens, fungi, and slime molds. You might study the lichens growing

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on one tree's trunk, or you might spend some focused time searching for mushrooms and slime molds on one rotting log, carefully checking all its surfaces and peering under loose bark.

While you might have no trouble finding trees, you might miss a lot of the action if you only glance at the trunks as you walk by. Low twigs can offer a look at the development of leaves, flowers, and then fruit. We tend to ignore tree flowers that are up high, out of sight, but insects do not. The flowers of many of our trees, such as willows, offer pollen and nectar to bees early in the spring. Others, such as cherries and black locusts, might have showy blossoms that humans like to look at, but you might miss the orange flowers of the tulip tree mixed in with the leaves high in the canopy. Be sure to look for them.

Vining plants, often considered nuisances when they're growing on your house or fence, are similarly important and easy to ignore. Cities are full of vertical surfaces that trumpet flower, porcelain berry, and honeysuckle can climb. Virginia creeper's inconspicuous flowers offer nectar to pollinators, and their dark blue berries feed birds from fall into the winter.

Of course, immobility is not the same as permanence, and much of the fun of exploring nature is seeing how landscapes and organisms change through the seasons. A vacant lot will reward your attention with a shifting palette of flowers: pink dead nettles at the end of winter, then white flowers of shepherd's purse reaching higher as a haze above the ground, later to be topped by yellow dandelion and white and lavender fleabanes. You can also track individual plants or patches of plants through the year. The Virginia jumpseed that starts out as a few glossy leaves sprouting out of the forest floor sports a whiplike spike of small white flowers in the middle of the summer. In the fall, those flowers end up as little football-shaped seeds that shoot out like bullets when touched.

Fungi and slime molds are difficult to observe most of the time. The mushrooms or visually striking slime-mold features that catch our attention are the spore-producing structures of creatures that carry out the rest of their business out of sight. Fungi are primarily

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networks of threadlike structures called hyphae that spread in soil or wood. Slime molds might be spread out and inconspicuous as they ooze around and consume single-celled organisms and decaying matter. Thus, you might walk past the same rotting stump for most of the year and only notice the bright orange chicken of the woods growing out of it on a damp day in early fall. You might then take a closer look at a chocolate tube slime mold that likewise just became visible to you, while both organisms have spent all year feeding on or in the stump. In general, dry weather is bad for fungi and slime molds. A good soaking after a dry spell can bring forth a bloom of mushrooms.

You generally won't need binoculars, but magnification can still help. There is always more detail to be revealed at a smaller scale. Even on our largest trees, tiny buds and leaf scars can be the key to identification. The small parts of flowers can vary importantly, and what looks like a simple patch of gray lichen can be seen reproducing through cuplike structures if you look closely enough. Handheld magnifying glasses or loupes can do the trick, but these days, so can the zoom feature on a smartphone camera.

Be sure to look at the whole organism, even underneath. Common blue violets, for example, might dazzle with their namesake blooms, but they also hide plain, pale flowers close to the soil. Mushroom identification often depends on what's underneath: gills or pores? Some species of goldenrod can be differentiated by the fuzziness of their stems, and the same can be true of the shape of the little scalelike bracts under an aster.

Multiple apps, some powered by artificial intelligence, can help you make an identification simply by uploading a photograph. Working out the identification on your own, however, will help you learn the key differences between species and teach you something about their natural history in the process. If you can't take the organism home, then take lots of pictures or notes, taking care to observe all its parts. It can be frustrating to get home and realize that you forgot to check some key feature, such as whether the leaves

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were attached with petioles (little stalks at their base), so err on the side of thoroughness.

Studying a plant from an established path is a low-impact activity for the plants and their habitat. Be careful as you tromp off into the woods or meadows, though, because heavy traffic can disturb leaf litter, erode the forest floor, and even damage plants that you might be looking for. Follow rules for official park spaces and use your judgment about how popular a spot is. If you're the only person who walks through that patch of woods all year, you probably aren't causing much damage, but the more people do it, the more damage they cause. Similar judgment should apply to picking plant or mushroom specimens to examine at home. Yanking a goldenrod from a vacant lot or power line right-of-way doesn't make much of a difference, but if everyone visiting Houston Meadow came home with a bouquet, it might actually degrade the view and experience for other visitors. Again, follow rules for official park spaces and, when in doubt, explore with guided groups and ask the leader for their more expert opinion on what you can and should pick.

The Philly area is blessed with active clubs devoted to plants (the Philadelphia Botanical Club) and fungi (the Philadelphia Mycology Club). Both offer a full schedule of walks and events, as do our local arboretums, parks, and nature centers.

FISH AND OTHER AQUATIC ORGANISMS

Aquatic habitats are the most difficult to observe. We generally cannot explore under the water without breathing aids, such as snorkels, and the water is often too green or brown to see through.

When and where we can see into the water—for example, from bridges over shallow water—we can watch fish swimming, feeding, breeding, and generally carrying on their lives. Polarized sunglasses can help cut the glare coming off the water. The Fairmount Dam Fishway camera, when it is operational in the spring, films fish and other animals swimming up the Fishway (a rising series of

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compartments that allows shad to make it over the dam and swim upstream) and gives us a peek under the water.

We are often limited to what we can bring to the surface—most commonly, fish—making fishing a valuable way to learn about what is down there. Ichthyologists will use particularly thorough methods, such as electrofishing (running a current through the water that stuns all the fish in the vicinity). Multispecies fishing, which is the approach of trying to catch as many species of fish as possible in a particular body of water, can help you learn a little more about the fish actually below the surface. By varying bait and tackle (including using “microfishing” tackle for smaller fish species), you can get beyond the usual channel catfish and smallmouth bass. Under a multispecies fishing approach, any body of water is worth fishing, whether that’s a lake surrounded by forested hills or a creek surrounded by rowhouses. Consider bringing along a small aquarium or large jar to place catches into. That way, you can observe them for a moment before releasing them. A fish in its element is much more beautiful than one flopping at the end of a line. Leo Sheng, known as “Extreme Philly Fishing” on social media, is a proponent of multispecies fishing, and his videos and blog posts are an excellent introduction.

Guided fishing events offer a way to get started without gear or a license, but be sure to get a fishing license and learn about species-specific seasons and catch limits once you decide to strike out on your own. Luckily, the agencies that regulate fishing are eager to get more people into the hobby and welcome beginners looking to learn more about how to fish safely and legally.

SMALL LAND INVERTEBRATES

Insects, spiders, and other invertebrates are stupendously diverse, and so are the methods scientists have devised to capture and observe them. I’ll touch on a few here.

Diurnal pollinators, such as butterflies and bees, make it easy. Park yourself next to some flowers and see who flies in. In spring,

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be sure to pay attention to flowering trees. In summer, milkweed patches can be particularly productive, and don't give up in the fall. Late-flowering asters, for example, bring in bees and butterflies into November.

Look under surface objects. When you're small and vulnerable to predators and the drying heat of the sun, you tend to hide during the day. Thus, lifting a flowerpot in a garden or a board in a vacant lot can reveal a small menagerie of crickets, spiders, centipedes, mollusks (snails and slugs), and beetles. The same can be true of checking the undersides of plants, where lots of critters hide during the day or when they're otherwise resting.

It might feel strange to use binoculars to look at something ten feet away, but they can come in handy to watch butterflies without spooking them. The same is true of the dragonflies and damselflies you can observe around water.

Consider investing \$20 or so in an insect net. You can use these to catch such insects as butterflies or dragonflies in the air for a closer look, and you can also sweep vegetation and take a closer look at what you catch in a jar.

Take advantage of inadvertent bug traps. Insects fall into fountains and swimming pools, but they rarely get out alive. This is, of course, sad for them, but it means that a small aquarium net is all you need to take a closer look at the drowned critters. Indeed, entomologist Isa Betancourt undertook a multiyear study of the bugs that drowned in the Swann Fountain in Logan Circle in Philadelphia.⁴

The nighttime is the right time to observe moths and lots of other nocturnal critters. You can do this with the sheet-and-light setup described in the Moth Night section, but also be sure to use your ears. With a little practice, you can distinguish the various crickets, katydids, and cicadas that we too often let slip into the background of our evening soundtracks but are singing all around us, particularly in the summer.

4. Isa Betancourt, "The Philadelphia Fountain Insect Survey," *The Bug and the Beetle*, accessed October 29, 2020, <http://www.thebugandthebeetle.net/research>.

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The Academy of Natural Sciences of Drexel University offers arthropod programming through the year, including at Bug Fest events at its museum as well as social media content to help the backyard butterfly watcher.

REPTILES AND AMPHIBIANS

Quiet watching works well for some reptiles and amphibians, particularly for species active during the day, such as garter snakes, and those that bask in the open, such as larger turtles.

Listening is an important way to observe frogs and toads, particularly during the spring and summer. Wood frogs and spring peepers kick off the action as the ground begins to thaw, and bullfrogs and green frogs call well into the summer. Although many will call in the daytime, evenings are best, and so is wet weather. Calling amphibians will often shut up when they hear or see you. Luckily, they will stop noticing you if you stop moving. Freeze for a couple of minutes, and they'll pick up their singing again.

Herpers (people who recreationally seek out reptiles and amphibians, known as “herping”) spend a lot of time looking under surface objects for critters hiding underneath, “flipping,” as in “flipping rocks” or “flipping boards.” Indeed, whatever the habitat, it's worth looking under stuff. If you're in the garden, you could turn up a brown snake. In a meadow, you might find garter snakes and milk snakes. In forests, you'll find woodland salamanders, toads, and ringneck snakes. Near aquatic habitats, you can find a variety of amphibians as well as water snakes.

Whatever the habitat, follow a few rules to avoid injuring the critters you find or ruining their habitat:

- Always reposition what you flip exactly the way you found it.
- Always move critters out of the way before you replace a heavy object so that you don't squash them. They will find their way back underneath on their own.
- Related to the previous rule, be careful to avoid lifting objects

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too heavy to hold up with one hand while you manipulate the animals with the other.

If you plan to capture and examine a reptile or amphibian, it can help to have a clear container to put it into for the closer look. A garter snake biting and pooping all over you calms down pretty quickly in a jar, and you can then take your photos or pass it to other people before you release it. Amphibians in particular can have extremely delicate skin. A clean jar protects them from us. Be sure to clean jars when you get home with a little bleach and water and let them dry thoroughly before the next use. Also, be sure to punch holes in the jar lids from the inside, so that any sharp edges project out and don't cut the captured critters.

Remember to consult state regulations on catching reptiles and amphibians if you decide to focus on herping. In Pennsylvania, for example, catching any reptile or amphibian requires a fishing license. Luckily, fishing licenses are inexpensive and support much of the state's reptile and amphibian conservation work.

Unfortunately, many species are vulnerable to poaching. Park rangers or game officers can't always distinguish between someone catching a snake to take some photos and a poacher catching it to sell. Rules often restrict catching them at all, regardless of the reason. Whatever the state-level regulations, when you're in a park setting, observe the rules of the park.

Some snakes and turtles can be dangerous. It takes some care to handle a large snapping turtle, and smaller species, such as stinkpots, will clamp down on your hand if you let them. More challenging are venomous snakes. Luckily for the beginning herper, venomous snakes only reach the fringes of the Philadelphia suburbs: copperheads in Pennsylvania and timber rattlers in the Pine Barrens of New Jersey, both beyond the reach of this guidebook. When in doubt, don't pick it up, and remember that any snake you see is no threat to you. You can always move around it.

Of course, starting with guided walks led by experts is a great way to learn the rules wherever you are and to handle critters safely.

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At the time of writing, the Pennsylvania Amphibian and Reptile Survey (PARS), run by the Mid-Atlantic Center for Herpetology and Conservation (MACHAC) in partnership with the Pennsylvania Fish and Boat Commission, collects observations of reptiles and amphibians to help guide research and conservation efforts. You can contribute your observations directly at <https://paherpsurvey.org> or by joining the PARS project in iNaturalist.

BIRDS

Start by listening and watching around your block, as described in the “Rats with Wings and Other Common Birds: Start Birding Anytime” entry. Birds are around us wherever we are, and you can get a lot of practice observing them from the sidewalk outside your home. Pretty soon, you’ll notice other, less abundant birds, whether migrants passing through or seasonal residents, such as chimney swifts in the summer or white-throated sparrows in the winter.

Use your ears as much as your eyes. Sometimes, this is the only way to distinguish visually similar species. Philadelphia is full of American crows and fish crows, but I had no idea which was which until I learned to pick out the more nasal calls of the fish crows. Many birds announce their presence and their ownership of a territory. For example, the iconic, high-pitched scream of a red-tailed hawk will let you know to look up and find it wheeling overhead. Many birds sing during their breeding season or while they’re migrating north, and those songs are often the only clue you have that they’re around. You can easily hear the lovely song of the warbling vireo near the water at parks throughout our region, but it takes a lot more effort and patience to actually spot them hunting for bugs in the trees.

Binoculars are incredibly helpful in birding. You can check binoculars out of many Free Library of Philadelphia branches for use at home, and nature centers and other groups that sponsor birding walks often provide a few extra pairs for beginners. Keep in mind that you tend to initially find birds with the ear or the naked eye. Once you hear one or see it moving, lift the binoculars to take a closer look.

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Myriad guidebooks and apps help you identify birds that you find. Whatever you use, consider documenting your finds in citizen science apps, such as iNaturalist or eBird, or by participating in such events as a Christmas Bird Count (or Philadelphia's Winter Bird Census). Your observation, even one from the sidewalk on your block, could end up as a useful data point for research or conservation efforts.

Birders tend to flock together, for better or for worse. Social media helps spread news of rare visitors or hotspots during migration, and before you know it, a small crowd forms, bristling with spotting scopes and high-powered zoom lenses. This can be helpful for the beginner, as such popular spots as the John Heinz National Wildlife Refuge at Tinicum will usually have someone around who can tell you about what they are watching.

Once you get the hang of observing birds, though, please consider branching out to less birded spots. Our region is full of green spaces whose biodiversity hasn't been well documented, and you can help fill in these blank spots on the map by simply birding close to where you already are. Most importantly, never give up simply because you don't have the time to travel to a conventional hotspot. I got started birding at the Independence National Historical Park in Old City because it was close to my office, and I could pop out during my lunch breaks. I now frequently bird at Malcolm X Park in West Philadelphia, simply because it is near my house. Neither of these parks looks particularly wild (mostly grass, trees, and ornamental shrubs), but I usually find more than enough birds to keep me happily occupied.

Thanks to the popularity of birding, more birding resources are available than for nearly any other corner of the natural world. The Delaware Valley Ornithological Club (DVOC) offers meetings and guided walks year-round. The DVOC partners with Philadelphia Parks and Recreation to lead the BirdPhilly walk series at Philly parks. New birding groups, including the In Color Birding Club, Philly Queer Birders, Adapted Birding, and a local chapter of the Feminist Bird Club, are welcoming an expanded community of

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birders. Nature centers and parks offer birding programming as well. Outside the city, check your local Audubon chapter for its own schedule of walks and events.

MAMMALS

I'll bet that the wild urban creatures you know best are mammals. These could be the mice and rats you wish didn't live with you, but more likely, these are the squirrels you see every day, year-round. Most wild urban mammals (I'm excluding pet species and, of course, humans) follow rule number one of urban animal survival: Stay out of sight. Squirrels don't. They carry out most of their lives in plain view. You can watch them gather acorns (or raid your trash), you can watch them play, and you can watch them get eaten by hawks. Their nests in tree cavities can be hard to find, but others you can spot as big wads of leaves up in trees, particularly in fall and winter.

Going beyond watching squirrels can take a little more effort and patience. Most of our other mammal neighbors are active when we generally are not. A walk around your neighborhood at night (or just at dawn, if that is safer) can turn up rabbits, raccoons, skunks, opossums, coyotes, and foxes that stay out of sight during the day.

Likewise, visiting your nearest park at dawn or dusk can be productive. Deer are more likely to be out feeding, as are woodchucks. When you can, choose parks connected to other green spaces, whether by waterways or by railroads. These connections serve as corridors that expand habitat for animal populations.

During the day, learn about the local mammals by paying attention to their signs (clues they leave behind). Check sidewalks for animal prints left behind as the concrete set. Also, take a look at muddy patches in parks for prints of deer, raccoons, and other mammals mixed in with the prints of dogs and humans. In winter, get outside as soon as the snow stops to look for prints. Get to know your local animal scat (poop) as well. Deer leave plenty behind as they travel, and some animals, including foxes, defecate in prominent spots to mark their territory. What looks like dog poop

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but has fur in it can be a sign of local foxes and coyotes—dogs tend not to eat small animals whole.

A NOTE ON HUNTING

You might think of hunting as something people do out in the country, but hunting on private land is often legal in other landscapes. Urban hunters are generally folks who learned to hunt in the countryside but realized they could bag deer and turkeys here too.

I consider hunting to be a bit advanced for a guide targeted toward the beginning or casual naturalist, but if you'd like to get started, check with your state game agency. Some local parks, such as Ridley Creek State Park, do allow hunting, and the John Heinz National Wildlife Refuge at Tinicum has offered a bowhunting program for beginners.

Nature Activities

No matter what I include, this section is incomplete. Fifty-two activities fit well with the fifty-two weeks of the year, and they fit well in a relatively compact book.

In reality, though, there is no end to the ways you can connect to nature, even in a city. You can stake out your backyard for nocturnal mammals, but you can also bait tree trunks with peanut butter for flying squirrels or observe coyotes in wide open spaces, such as at Valley Forge. You can study lichens in a cemetery, but you could also follow the life cycle of mosses in sidewalk cracks. Please consider this book to be a sampling of ways to engage with nature rather than a comprehensive list.

Moreover, while urban habitats are distinctive, the techniques useful in a city are just as useful outside in more classically “wild” spaces. Keying out plants is the same wherever they grow. You can find brown snakes by flipping surface objects in gardens and vacant lots. In the Pine Barrens, you can find worm snakes the same way, just as you flip rocks for pale milk snakes in Montana.

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With that in mind, many of these activities are easy to do at or near your home, outside official park spaces. For others, I recommend a place to take part in the activity, but these site recommendations are by no means exclusive. Riverfront North runs an introductory fishing program, but if you don't live near Northeast Philadelphia, you can do something similar at the John Heinz National Wildlife Refuge at Tinicum and Bartram's Garden, to name just a few possibilities. And, of course, you can easily get a fishing license and take your own gear to a body of water near you.

Most of these activities require little in the way of specialized equipment, and much of that, you can borrow. For example, if you want to go fishing, you'll need a rod and tackle, but the fishing programs I mention provide that for participants. Generally speaking, the most useful equipment to have is magnifying glasses and binoculars. Magnifying glasses are easy to find for under \$10, but you can also use the camera on your smartphone or tablet to zoom in for magnification. Binoculars can be a bit more expensive, but you can check them out of several library branches, and many nature centers offer them for visitors to borrow.

You might notice that this book is a bit birding-heavy. There's a good reason: Habitat in cities is sliced into relatively small patches by our road networks, which, to earthbound creatures, are often insurmountable barriers. For example, much of Philadelphia and all of its suburbs would be perfect black rat snake habitat—plenty of trees and structures to climb, plenty of holes in buildings for hiding, and an endless supply of small, warm-blooded prey. But a slow, five-foot-long snake has little chance of successfully crossing a four-lane arterial road. Thus, in Philadelphia, we find black rat snakes at the fringes, close to strips of green space with little car traffic. Creatures that can disperse by air (including many insects as well as spiders that “balloon” as hatchlings) have an easier time crossing roads. Birds are also relatively large and conduct their business in the open, so birding offers the urban naturalist a lot of biodiversity to experience and enjoy.

Most of these activities are also suitable for children. Some might lend themselves better to older children rather than younger:

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Flipping rocks and seeing what lives underneath is fun at any age, but patiently waiting in freezing weather for ducks to swim into view might take a little more maturity and a longer attention span. Nocturnal activities in particular might keep kids up past their bedtimes. I've added a note to each section about how kids might engage with the activity, but, of course, you know your kids better than I do. Use your own judgment about what makes sense for them.

Some of the programming I refer to might not be available when you read this. Organizations (nature centers, friends groups, clubs, and so forth) change over time, and so do their staffing, funding, opportunities, and priorities. Natural phenomena themselves are dynamic, so a meadow can become overgrown with trees, or a tree holding an eagle nest can blow down in a storm, forcing its inhabitants to move. Writing this book during the COVID-19 pandemic added an additional layer of uncertainty, with so much in-person programming suspended or modified. A particular walk series or annual event might end or be adapted to new circumstances, but I hope a little searching or asking around will turn up similar programming somewhere else.

I have organized these activity suggestions as follows:

- After an introduction, I provide an overview of the activity.
- I then cover the basic information you need to know before you get started (where, when, access considerations, needed equipment, how you can take part in a guided version of the activity, and resources to learn more).
- I note other locations in the area where you can take part.
- I end with a note on considerations for taking part with children.

I have tried to spread the site recommendations around geographically. Some of our larger parks, such as the Wissahickon Valley or the John Heinz National Wildlife Refuge at Tinicum, could, practically speaking, host almost all of these activities, but I hope you can find some examples near you wherever you are.