



Exploring the Ozark Hills

With Karen GoatKeeper



Looking past fern and moss covered rocks and up an Ozark Hill one misty spring day.

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with
**Karen
GoatKeeper**

Text and Photographs

Unless noted all photographs were taken by the author. All text is by the author.

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A double lady's slipper lights up the forest floor in the spring.

Introduction

Come out for a walk on the hills with me today. Spring is the time when everything that has lain dormant or stoically endured the winter comes alive again. Summer is a time of long hot days and short warm nights. Every plant and creature is living at high speed, living every moment to the hilt. Fall is the last gasp of the year, sometimes literally for many animals and plants. Winter arrives with short cold days and longer colder nights. Much looks dead but is only waiting. Hidden under fallen leaves or in sheltered spots some plants and animals even thrive.

I am lucky living in the Ozarks surrounded by valleys and hills to explore. They are full of wondrous plants and animals going about their daily lives. I just need to do more than give a passing glance, to really open my eyes and look to see them.

Many people now grow up in cities and places where the seasons mean little. Cities try to cover them up with concrete. Warmer areas like Southern California where I grew up don't have the marked seasons I see in the Ozarks.

My father was an avid gardener so our yard was full of green growing things all year round. He loved to camp and took the family with him to explore the beaches, the deserts and the mountains. He taught me to look.

Then I moved to the Upper Peninsula of Michigan with my friend Dr. Richard Rintz, a botanist, and met winter. There are really only two seasons in the U.P. – spring and winter. Spring begins about mid-April and ends with a flurry of brilliant yellow aspens in September. Winter blankets the ground with snow by mid-October and keeps the world white until April.

The Ozarks has four seasons. Watching the cycle of the seasons makes me so much more appreciative of the wonders found in each season. Some things span the entire cycle such as the trees. Yet they are different in each season.

So many times I hear people complain they have nothing to do. There are so many things not known or understood about what lives in their own backyards that they could spend a lifetime studying them and need more time. All it takes is a desire to see, more than see, observe and learn and enjoy the world.

When I started, I knew few of the plants or creatures I saw. Such ignorance is easily removed now, at least in part. I learned to use the nature guides published by the Missouri Department of Conservation. Such guides are available for many if not all states. Even more information is available on the Internet. These are good places to gain basic information.

One other source of information is often overlooked. Personal observations, my own and those of people I know, can show and teach more about what is out on the hills. Such observations can lead to questions leading to more research and learning leading to more questions, a cycle in itself.

So much happens in an Ozark year a book a thousand pages long would still leave much out. I left out many topics I wanted to include but I had to set a limit. These few topics are the ones left after careful selecting. If I started over again, the selection might be a little different.

These essays are my way of sharing some of what I found while exploring in the Ozark hills. They are a way of saying thank you to Richard, my father Clinton Smith and the many others who taught me to do more than look but really see the world around me.

Now let's go out on the hills and see what we can find there today.



One of the most enjoyable things about exploring an Ozark wood is that you never really know what you will find. This day I came across a three-toed box turtle watching me go by.

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*Daffadowndilly
Has come to town
In a yellow petticoat
And a green gown.*

Mother Goose, 1805



The Daffodils

William Wordsworth

I wandered lonely as a cloud
That floats on high o'er vales and hills,
When all at once I saw a crowd,
A host, of golden daffodils,
Beside the lake, beneath the trees,
Fluttering and dancing in the breeze

Continuous as the stars that shine
And twinkle on the Milky Way,
They stretched in never-ending line
Along the margin of a bay:
Ten thousand saw I at a glance,
Tossing their heads in sprightly dance.

The waves beside them danced, but they
Outdid the sparkling waves in glee;
A poet could not but be gay
In such a jocund company
I gazed, and gazed, but little thought
What wealth the show to me had brought;

For oft, when on my couch I lie
In vacant or in pensive mood,
They flash upon that inward eye
Which is the bliss of solitude;
And then my heart with pleasure fills,
And dances with the daffodils.

2 A Host of Golden Daffodils

Lots of spring flowers are blooming. I love walking in the pastures to see tiny blue, pink and white bluets. Then there are the tiny sky blue cups with white edges of Speedwell in the grass in front of the barn. They are too small to be in the wildflower guides. Toothwort is blooming in the woods.

Yet the flowers that seem to herald spring for me are the golden daffodils growing wild in our yard. Perhaps it is their shape with the cup centered on a plate. Perhaps it is the bright yellow color. From what I read I am not alone in this.

All of the myriad garden varieties available came from 14 species given the genus name *Narcissus*. Daffodils have a single flower on a stem, larger cups and little scent. Jonquils have several flowers on a single stem, small cups and lots of fragrance. An old children's poem calls them daffadown dillies. Whatever they are called these flowers are very welcome immigrants all over the world.

The first daffodils grew around the Mediterranean Sea. They were placed in tombs by the Egyptians. A Greek who lived before Homer wrote that Zeus commanded the Earth to create the narcissus. "All wide Heaven above was filled with delight at the fragrance, Earth was laughing as well, and the briny swell of the waters." This is from the "Hymn to Demeter" translated by William Cranton Lawton in "The Greek Poets" in 1904.

Shakespeare mentions daffodils in several plays. William Wordsworth wrote a poem called "The Daffodils" which we remember even if we haven't read it with phrases such as 'a host of golden daffodils' and 'dancing with the daffodils.'

A famous Greek myth tells how a forest nymph named Echo fell in love with a youth named Narcissus. The youth was so enamored of himself he spent all his time looking at his reflection in the water ignoring her. Echo wasted away and is only known now for her voice that echoes others' calls. Narcissus became the little flower that nods in the wind often growing where it can 'see' its reflection. The more likely origin of the name is from the dangerous poisonous or narcotic effects from eating the bulbs.

That poisonous quality kept daffodils out of the medieval herbals which were the only flower lists of the day. It still discourages insects and other browsers. Yet the flowers themselves spread throughout Europe and Asia. In China a variety is called the 'sacred lily.'

All of these flowers have a perianth or disk of petals and a cup formed by the corona. All have at least a light scent. All bloom early in the spring, some even before the snow is gone. Most are bright yellow or white or a combination. Some varieties are pink.

Whatever the size or color, the daffodils are blooming. The two rows in the yard when we moved here many years ago are now scattered clumps all over the yard. Even a double daffodil appeared a few years ago. When I drive to town I see them scattered in old pastures near where old homesteads once stood. Everywhere their bright golden blossoms nod and dance on the breeze to welcome spring.



If only my garden visitor ate weeds instead of tomatoes, she would be welcome to stay.



Most turtles hide in their shells when a car goes by making them sitting targets. This one is determined to reach the other side in spite of a car going by.

5 Moving Rocks

I like seeing turtles in the spring. Mostly I see three-toed box turtles, *Terrapene Carolina triunguis*. Some have colorful shells and others have plain ones. They are easiest to spot while crossing the road. From a distance they look like moving rocks.

Sometimes I stop to carry turtles across the road. They are such courageous creatures braving the road. To them it must seem an endless plain devoid of cover and food. It must be especially so for the smallest ones only a few inches across.

These tiny turtles are probably five or six years old so their shells are hard. Younger ones hide as their shells are too soft for protection. Unfortunately their shells are never hard enough to protect them from cars.

Some turtles are slow and cautious. Their heads are held high on stretched necks watching for danger. When a car comes the turtle disappears into its shell maybe with the front open a crack. When I look, the door slams shut with a hiss of escaping air.

Other turtles are real racers. Their heads stretch out almost parallel to the road. Their legs reach out pulling their shell along as quickly as possible heading for that finish line on the other edge of the road. If I pick up these turtles, their legs keep churning, the nails scraping my hand as they keep trying to race along through the air.

A turtle got into my garden one year. It hid when I was out weeding or planting. Sometimes I would suddenly find it. Since turtles eat a lot of insects and worms, my garden was a great home. But this was an older turtle so the helpful diet was supplemented by vegetables. Turtles love tomatoes when they are almost ripe. I had plenty that year so I shared. It got greedy and most of my tomatoes had a bite-sized sample or two missing.

The next year the turtle returned but I kept it outside the garden fence. There was still plenty of food so the turtle seemed happy enough. I saw it around all that spring and summer and expect to for many more years. Turtles can live fifty years.

One day in the woods on a hill I settled down to take some wildflower pictures. I heard leaves rustling behind me. My breath caught as I whirled around even knowing nothing dangerous was there. To my surprise a turtle was marching up the hill. Three-toed box turtles do go hunting in the woods. The undergrowth of wildflowers, low shrubs and ferns harbor lots of insects. And the tender herbs are good food as well.

It takes lots of time and patience to wait for a turtle to come out of its shell. When I come across turtles on the hills, they pull their back legs in and sit there watching me watch them. Some have reddish eyes and splashes on their faces and necks. These are males. Some have yellowish eyes and splashes. These are females. Usually I find females on the hills.

The turtle waits. If I twitch or aim the camera, the front legs start to disappear. I am far too impatient to outlast a turtle who is probably convinced this unexpected giant is planning on turtle for dinner. I take some pictures and leave.

Now and then I come across an empty turtle shell. There are evidently creatures that do like turtle for dinner and can manage to open the doors. They must be strong as I tried to pull one open once just to see how hard it would be. I didn't get it open.

Turtles lay their eggs along the creek in the pastures. Many of the eggs are eaten. If the weather is bad, they rot. And baby turtles are easy dinners for many creatures. All of this means the turtle population really depends on the adults living a long time.

This depends on the turtles having places to live. And it also depends on how well drivers watch for and avoid those moving rocks crossing the roads.



This ravine is usually a dry place as are the little channels running into it. Big spring rains change all that as rain flows down the hillsides toward the creek.

The normally quiet, clear shallow creek turns a gray muddy color, spreads across the creek bottom and tears its way toward the Merrimac River when spring floods arrive. When the water drops it leaves behind scoured banks, gravel bars and pockets of sand.



8 Putting the Pieces Together

A creek runs through our property which must be crossed to reach some of our pastures and hills. When we first moved here, we set up an old telephone pole we found as a foot bridge. That creosote mixture telephone poles are soaked in makes them heavy. We thought that foot bridge would last until we could build something better. Then the spring rains arrived. I guess that pole eventually got to St. Louis.

We did build a small bridge across that creek out of two steel beams set on cement pilings with thick wood planks as the top surface. It's just big enough for the tractor and foot traffic which is what we need. Of course the goats think the bridge is a great idea as they hate to get their feet wet for any reason.

The bridge is a couple of feet above the five foot wide creek. This is room for many gallons of water. It's always a bit amazing when the creek fills this space and flows over the top of the bridge. Since it flows quickly, the amount of water going down that creek is even more amazing. Where does all that water come from? After all, only a few inches of rain fell.

Ecology says a watershed is the area drained by a creek. This creek flows about four miles through a valley with hills on both sides. It must include close to two thousand acres. Four inches of rain falling on all that land and flowing into the creek is a lot of water! Since I see only a small area getting that rain, it doesn't seem like much.

Maybe that's why people have so much trouble with conservation. We see only a small piece with only a small perceived impact. The big picture gets lost because we can't grasp how each little impact adds up with all the rest.

Spring floods are a good place to start seeing the bigger picture. The clear, quiet creek rises and turns a muddy brown. That mud comes from somewhere. That somewhere is creek banks cleared for pasture or driven through by logging trucks or ATVs. That mud is those pastures washing away.

Big stumps, tree trunks and branches leftover from logging operations race down the creek. Some get tangled up on our bridge and must be pulled free. They tear out the fences and batter trees growing along the creek.

Being the Ozarks, a lot of gravel comes with the mud. When we first moved here and put in the bridge, there was over three feet of space between the creek and the bridge. There were deep shady pools and bluegill. The creek ran deep all summer.

Then people made changes along the creek. Two owners ran bulldozers down their sections to straighten the creek so it wouldn't wash out the banks so much. It didn't work. Even more gravel and dirt washed out. The valley was logged leaving and the creek crossed by deep ruts from the trucks. Debris was left all along the banks.

Our creek now has almost two feet of gravel in it. The deep shady pools are gone and so are the bluegill. The creek often sinks into the gravel leaving only a series of shallow pools during the summer. Our banks are washing out with the battering from the gravel, undermining the sycamores which slowly topple over as their roots are dug out.

Pastures are important. If trees and bushes are left along the creek banks, the pastures won't wash away with the rain. Logging is important. Taking care where roads and debris are left would protect the forest to grow for the next logging crew.

It is so easy to lose sight of the big picture when each of us sees only a small piece and each of us has a busy life. Spring floods can amaze us with a glimpse of the big picture. They can also be a report card on how well we are really caring for the land we say we love.



The early morning crowd is dropping by for breakfast.

18 A Good Use of Sugar

The Spanish called them Joyas Volardores or “flying jewels”. We call them hummingbirds. Whatever name is used their iridescence and acrobatic flying can really capture the imagination.

In the 1800s thousands of hummingbird pelts were used for decorating clothing, hats and other items. Today Websites are devoted to attracting and feeding them as well as decorations and other items. We put up a feeder the first summer we were in the Ozarks. Only one or two ruby-throated hummingbirds, *Archilochus colubris*, the only ones east of the Rocky Mountains, came by. The feeder needed refilling only once a week.

The next year we debated whether a hummingbird feeder was worth the trouble. We decided to try another year because hummingbirds are so fun to watch. Half a dozen birds moved in for the summer so the feeder had to be filled every day. There is no debate now.

Hummingbirds can live ten years or more and they must eat two-thirds their weight in nectar and tiny insects every day. The Ozarks is not a good place for them in the winter so they migrate down to Panama. Spring brings them back to remembered food sources.

Hummingbirds can rotate their shoulders moving their wings in a circle. They move them in a figure eight to hover. Those wings beat eighty times a second to give that characteristic whirr.

The males arrive about the third week of April. Only the males have the ruby throats, except the feathers are not red. Instead the tips of the feathers catch and refract and reflect the light so it looks red if seen from the right place. Other hummingbirds can have red, purple, blue or green iridescence. Young and female hummingbirds have plain feathers.

Each year the females build their tiny nests and lay two eggs. They work alone building a nest and raising the young. The males are too busy fighting and showing off to help. After a few weeks the young birds join the crowd at the feeders.

This year we will have four feeders hanging from the shed eaves. At least two will need refilling every day. We mix a cup of sugar into three cups of water. The birds do fine.

Visitors are amazed at our crowds of hummingbirds. They try to count as the birds zoom back and forth. We have counted three dozen hummingbirds sitting eight to a feeder and waiting. Some days we get busy and don't notice when the feeders empty out. The last feeder is surrounded by a hovering mass and the whirr of wings. All the feeders were empty one day. Hummingbirds landed on the feeders and circled my head as I brought filled feeders out to hang.

Our hummingbirds seem to come by first thing in the morning for breakfast. Then they are off visiting flowers all day except for a few snacks. Trumpet vine, royal catchfly, day lilies and milkweeds are favored. They prefer red and orange flowers which they see well but insects don't. The crowds are back in the evening for supper.

Occasionally a hummingbird will end up in the shed or house. Panicked it flies from room to room until it arrives at a large window. Then I can carefully catch it in my hand.

Most birds around here are small. Hummingbirds are especially so. Most of their size is nothing but feathers. Hummingbirds weigh less than an ounce. Once caught the bird just seems to lie there as long as my hand is closed. I walk outside, open my hand and usually the bird flies. One just lay there. I dipped its beak in the rain barrel. Its beak clicked. Its tongue ran out and back. Its head lifted and off it flew.

Hummingbirds are such interesting visitors. Maybe I will buy a fifth feeder this year just to be sure I have enough.



Tickseed Sunflowers

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An armadillo's armor feels thick and leathery. The nine bands are across the middle of its body. A live armadillo's claws can do a lot of damage to anyone trying to pick one up.



14 Armored Excavators

Late last summer a living rototiller moved into my garden. I found big holes here and there. The pepper patch was very popular. By barricading the fences and gates, I managed to keep the creature out.

Now gardening season is over, manure is spread over much of it and the gates are open. The rototiller is busy digging the manure in for me. A side benefit is a reduction in the grub population. For those unfamiliar with this creature and the holes it leaves everywhere, it is an armadillo, *Dasyops novemcinctus*.

Armadillos normally come out at night. During winter they will often come out during the day. I came across one out in the pasture busy excavating for grubs. I was downwind and snuck over to look it over and take some pictures.

The armadillo looked like a little tank with sheets of pebbly armor, its ears scouting for sounds like small radar disks. A triangle of armor went down its face. Hairs stuck out from under the armor. Its tail had rings of armor all the way down. Like all the armadillos found in the U.S., it was a nine-banded armadillo.

The armadillo continued to excavate as I circled only a couple feet away. Suddenly it looked up, saw me and fled. An opossum or a raccoon would have fled before I was anywhere near. Why didn't the armadillo?

An armadillo has very poor eyesight. Its hearing is little better. It just doesn't see or hear very well. It detects danger by smell or air movement through the hairs on its back. Ruffling those makes the armadillo leap into the air. It can smell the grubs, scorpions, spiders, insects and other small invertebrates it likes to eat six inches down in the dirt. This lends itself to one reported way of discouragement: scatter cut up cayenne peppers around the yard to burn its nose. Of course the experts say there is no known repellent.

Most armadillo species live in South America. Two migrated up Central America. One stopped in Mexico. The nine-banded kept moving north into the U.S. It crossed the Rio Grande about 1850 probably with help as many people then thought armadillos were good to eat. The experts say they are moving north faster than expected and may expand to a line from New York to Nebraska. They can survive anywhere with an average winter temperature above 28° and 15 inches or more of rain. The Ozarks qualify.

Armadillos move because of an increasing population. Females have four identical babies from a single fertilized egg in the spring. They have few natural enemies. They can swim across streams or walk across the bottom holding their breath for 10 minutes.

Contrary to popular opinion, armadillos do have teeth—32 peg-like molars. They also come equipped with four claws on each front foot and five on each back. They are expert diggers. Some scientists in Texas dug up an armadillo burrow. It was about 15 feet long with curving tunnels and rooms. Some rooms had dried grass in them. Others had non-armadillo residents.

The really annoying habit armadillos have is digging those little cone-shaped holes. These are insect traps similar to those dug by antlions (doodlebugs). The armadillo digs these holes then comes back later to see who fell in for dinner.

Many people find armadillos very annoying. After fighting numerous holes in my garden last year, I understand. But, armadillos are here to stay just like the deer and raccoons that also have annoying habits. Knowing this, I find armadillos interesting to check out and will learn to live with them. My rototiller one is being very helpful at the moment. However I will improve my garden defenses before spring.



These enormous leaves are intriguing. They form great clumps in sunny areas along my road.



In late summer yellow flowers top tall stems above the enormous leaves.

17 Native Elephant Ears

Roads are strange. They are definitely not natural but manmade. They are bare expanses of gravel in my rural area or black pavement in others. Yet they are quickly adopted by wildlife for a variety of purposes.

Since roads are bare, the sun beats down on them unless trees along their edges add a little shade. The rocks heat up to uncomfortable temperatures so walking on them is unpleasant during the day. In the evening the rocks hold their warmth until after dark attracting especially reptiles to bask which can be fatal due to traffic.

Roads are also great ways of getting from one place to another with a minimum of trouble. They are fairly even and hard giving good footing. They have no brush to tangle the feet or snag you with thorns. The road in front of my house often has deer tracks after a rain softens the surface. These reasons make the road an attractive place for a walk.

It was on such a walk I first noticed these enormous leaves growing along the edge of the road. They are shaped like great spear points at least a foot long topping tough stems. Their edges have coarse teeth along them and are a bit wavy. The stems come up in loose clumps.

All summer I watched these clumps of leaves. They just sat there along sunny sections of the road. Since wildflower books are based on flower colors, I had no idea what plant these leaves belonged to. Surely, I thought, these leaves would have an enormous flower to go with such enormous leaves.

Late in the summer a flower stalk emerged and rocketed up. It grew an easy four feet up topped with flower buds. I began to wonder about my assumption. The stalk was much too slender to hold an enormous flower up. And there were several flower buds on the stalk.

The stalk branched off so each bud had its own stalk. Finally the buds opened into small yellow sunflowers about two or three inches across. They seemed such a disappointment when compared to those leaves.

I seemed the only one disappointed by these flowers. Bees moved in and buzzed happily from one to another. Hummingbirds added them to their schedules. I decided to find out more about this plant before abandoning it to a stack of disappointments.

It is called Prairie Dock, *Silphium terebinacium*. Bison and cattle do eat the leaves if the plant grows in a pasture. The large leaves make it easy to identify from a distance.

This perennial is promoted for native gardens. It loves full sun and does put off side shoots but only far enough to make a small clump of plants. It is very drought tolerant as it puts down a long taproot, up to twelve feet long. I must agree the plant would be an interesting addition to a native garden all season. The leaves are eye-catching. And, once you get over the size comparison, the flowers are nice. They are certainly popular with insects.

Now I find I enjoy watching these large leaves as I take advantage of the hard surface and lack of brush to have a leisurely walk just to see what else is interesting along the road.



Tickseed coreopsis starts blooming in late spring ushering in summer with its gay yellow blooms lasting until midsummer.

21 Yellow is the Color of Summer

Yellow is the color of summer. That doesn't mean yellow flowers don't bloom other seasons of the year; only that so many large yellow flowers dance on summer breezes. Many of them look like daisies. Many are hard to tell apart.

The yellow daisy parade around here begins with tickseed coreopsis, *Coreopsis lanceolata*. This gay little plant can grow in great colonies turning a field or pasture yellow. The flowers have a yellow center and many orange yellow rays. Each ray tip looks like stair steps going up one side and down the other.

Like most daisy-like flowers, coreopsis is a ray flower. The flower center is made up of closely packed tube flowers. The petals are long rays that surround the flowers with color to attract insects. These rays grow out from the flower instead of folding down from inside a bud. This is a common flower arrangement and very successful for plants. A single insect tramping across the many flowers probing for nectar can pollinate many of them. Each flower makes a single seed but, because there are so many flowers, there are lots of seeds.

Coreopsis is soon joined by yellow coneflowers, *Echinacea paradoxa*. The purple coneflower gained notice when it became popular in herbal cold remedies. The yellow coneflower looks similar with a tall dark center and yellow rays sweeping back giving the flower a cone shape. It's interesting to watch one of these flowers from the time it first appears to when it is done blooming. The tall center is the usual pack of tiny flowers. When the flower first opens, a ring of tiny flowers blooms putting up its yellow stamens around the outside of the center. As this ring closes, the next ring blooms. This progression continues until the last of the flowers bloom.

Another yellow coneflower, the gray-headed, *Ratibida pinnata*, is also blooming. These flowers are very similar except the center is a brownish gray instead of dark brown.

The daisy parade continues with black-eyed and brown-eyed Susans. They are easily confused with coneflowers at first glance. At second glance there are several differences. One is how the rays stand out from the flowers. Coneflower rays sweep backward. The Susan rays stand out straight so the flower appears flat with the center bulging upward.

The centers are different too. Coneflower centers form high rounded balls. Susan centers are short fat cylinders. Their names reflect the colors of their centers. Black-eyed Susans, *Rudbeckia hirta*, have very deep brown centers, almost black, surrounded by up to twenty golden rays. Brown-eyed Susans, *Rudbeckia triloba*, are smaller with many on a single plant and have deep golden brown centers surrounded by a mere dozen rays.

Sunflowers now join the parade. Sunflowers have broader, flatter centers. They are often much taller. The sawtooth sunflower, *Helianthus grosseserratus*, is fun to watch grow. It puts up a fat single stalk with great leaves hanging off. The stalk grows taller and taller. Little branches jut out with smaller leaves hanging off and fat buds at the tips. In good soil the main stalk can easily top six feet. The top looks almost brushy as more and more side branches surround the main stem. Finally the buds burst open and cover the plant with yellow sunflowers.

There are so many kinds of these yellow daisies. They are joined by false dandelions and bitterweed, the bane of the dairyman, and sneezeweed among others. Summer is just filled with yellow flowers.

The great thing about this summer parade of yellow daisies is how long they bloom. Many of them first open in late spring and last into fall. Yellow is definitely the color of summer.



An ambush bug waits on a spray of New England asters.

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Hackberry fruits make a good snack for this young squirrel.

9 Bushy Tailed Antics

I enjoy picking up black walnuts in the fall. A tree behind the workshop puts out lots of nuts. This year the ground was paved with them so I moved in with my buckets.

Something is falling on me! The sky is cloudy but this doesn't feel like rain. It's not. It's bits of walnut hull!

Skritch. Skritch. Skritch.

More bits of walnut shell are raining down. I have competition: squirrels.

Squirrels seem to be everywhere this year. At a house in town I'm told the squirrels stripped a big tree in three days. Squirrels run across power lines over the streets carrying away nuts. Squirrels bound across our road carrying away nuts.

Grey squirrels, *Sciurus carolinensis*, are active most of the year. One year about a dozen squirrels were bounding and racing across the snow then, up and down the trees, chasing and being chased along the creek. The squirrels soon vanished for a few weeks as winter blew itself out.

All spring and summer I mostly hear but sometimes see squirrels here and there in the woods. When a squirrel takes off across the forest floor, it can be heard scattering dead leaves. A scolding call about a cat or intruder can be traced to a safely ensconced squirrel on a branch.

Young squirrels head out on their own in late summer. One moved in near the barn lot gate and would sit by the gate letting me walk up to within six feet to take pictures. Now it's wary and takes off when I let the goats out to pasture.

Squirrels really become noticeable in the fall when the acorn, hickory nut and walnut crops are ripe. Squirrels compete eating and storing as many nuts as they can. They depend on these nut crops. A good year means fat squirrels and well-stocked nests for the winter. It means lots of baby squirrels the next spring. A bad year means squirrels have a hard time surviving the winter.

Squirrels are very territorial. Each has a home area which is defended fiercely with the intruder squirrel almost always losing. This presents a real dilemma for foraging squirrels.

Three walnut trees grow in the back yard, a neutral area. Every year several squirrels arrive to carry off or bury the crop. They race up and headfirst down the trees carrying nuts. They sit with their tail wrapped around, spread out or curled up along their backs eating nuts. Each squirrel has its area to work in although they overlap if no one else is around right then.

Any nuts carried off go only to where that squirrel lives and only by a certain route with branches off to each squirrel's home. Squirrels use the trees as a highway system racing out limbs and leaping to the next tree as the limbs bend and bounce to mark their progress.

Squirrels gathering walnuts on the road have a different problem. There is no common route. Each squirrel comes from its home territory and must return there to get off the road. An oncoming vehicle is terrifying but the squirrel can not just get off the road. It must go up the road, across the road or down the road to where it belongs or risk being attacked by the squirrel that lives in a neighboring territory. Many squirrels don't make it home.

So many animals are only out at night. Squirrels are day creatures like I am, they can not see at night. But that means I have a good chance of enjoying their antics any time I go walking in the woods.



Fresh clusters of Indian Pipe look ghostly on the forest floor.

Pinesap's lovely reds and yellows should make it easy to spot but don't seem to unless you know where to look for it.



16 Plants Aren't Always Green

Students learn plants are green because they contain chlorophyll to make sugar to feed the plant. Two unusual plants bloom in the fall Ozark woods. They have no leaves. They are not green. All that appears through the leaf litter are stems with flowers on them.

One stem and flower is a glistening ghostly white. It rises up with the flower bent down pushing aside the dead leaves until the stem is six to eight inches tall. Then the flower begins to turn upward.

Inside the flower has a pinkish cover with a hole in it. I don't know what pollinates it but suspect it puts out a rotten meat smell to attract tiny flies and beetles. The shine fades as the flower continues rise until it points skyward as it forms its seeds.

Indian Pipe, *Monotropa uniflora*, isn't a parasite. It's a saprophyte because it lives on nutrients from dead leaves and other forest floor litter. It has no need of chlorophyll or other pigments to make food leaving it that ghostly white color. Its leaves are tiny white triangles lying along its single stem. It does have roots attached to fungi eating decaying leaves on the forest floor. Many trees and other plants do the same. The fungi dissolve the leaves releasing the nutrients and the Indian Pipe takes a share.

Indian Pipe blooms from late August to frost. There is an old story that the flowers appeared where Indians knocked white ashes out of their pipes. Each white stem is topped with a single flower. Often several stems come up in a group. They can be hard to spot because dead leaves are pushed up over and around them. Surprisingly the white color blends into the forest floor.

Although Indian Pipe isn't rare, it is found in small local patches. I found it on a north facing hillside by accident while looking for ferns. Later I found some on a west facing hillside. Indian Pipe seems to like areas where moisture gathers but isn't pooled. The plants like the sides of shallow hollows forming rainwater channels running down the hillside. They also grow near fallen logs that trap leaves and water behind them. An added benefit of the fallen log is more food to feed the fungi to feed the plant.

A plant similar to Indian Pipe is the Pinesap, *Monotropa hypopithys*. It grows and lives in much the same types of places. It even blooms at about the same time. I went looking for it but found nothing. But one day on my way sliding down a west facing hill on recently fallen leaves I stopped just before sliding through a patch of Pinesap.

These stems are red and yellow. A cluster of flowers hangs down from the end of each stem. They are a bit shorter than Indian Pipe. New flowers have a glossy shine to them and hang down. Just like Indian Pipe flowers these gradually move upward until they are facing straight up as the seeds form. There were even a few dry black seed stalks left from the previous year.

Both Indian Pipe and Pinesap flowers are difficult to spot among the newly fallen dry brown leaves. I enjoy finding them because they look so strange. Yet I have often found one just as I was going to step right on it. One advantage is that they tend to grow in the same areas every year. But my landmarks seem to vanish by the next fall so the search is on anew every September.



Fingers of icy frost adorn fallen grass stems and leaves.

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Although a turkey vulture's wings are entirely black, they appear to be white underneath as the bird soars.



A group of turkey vultures wait for my truck to pass by so they can again descend on a road kill carcass.

1 Riding the Wind

One late October morning I stand in the doorway of my barn for a break while milking my goats. I wanted to look at the trees which had seemingly changed into full fall colors overnight. Then I notice the vultures. There are six or eight of them swooping and soaring over the barn and pasture. I have never seen them so close in flight.

Usually vultures are small figures soaring across the sky. Hawks tip back and forth, flapping their wings often to stay aloft. Eagles also tip though less than hawks and flap only occasionally. Vultures soar for hours without flapping their wings almost like small planes.

Turkey and black vultures range across the Ozarks. Turkey vultures, *Cathartes aura*, with their red heads and necks are much more common than the black-headed black vulture, *Coragyps atratus*. All vultures have no feathers on their heads and necks. Considering what they eat, this is a good thing.

I have seen large numbers of vultures gather in the trees over a large road kill. They roost in the trees watching, waiting, finally swooping down to tear the carcass apart. More vultures are soaring in from other areas. They have a keen sense of smell, one of the only birds that does. If the carcass is small like a squirrel, only one or two vultures show up. No one knows how they know the difference.

Cars are a really fortunate invention for vultures. They provide about a million fresh carcasses a day nationwide. Vulture populations are on the rise.

Vultures like to sleep late. They wait for the day to warm up before getting up. They may stand around in an Horaltic Pose with their wings outstretched in the sun first. Their dark brown feathers warm up fast. This can also bake off any bits of their latest meal and its attendant bacteria or dry wet wings.

When the ground warms, it warms the air above it. This warm air rises to be replaced with colder air which repeats the cycle. Vultures wait for these warm updrafts to fly. Then they spread their wings and their outstretched wings catch this updraft to lift the six pound vultures up into the sky.

Warm updrafts are getting scarce in late October. This group soaring over my barn is having trouble gaining altitude. One bird rides an updraft only to have the draft disappear. The bird dives down until it catches another updraft and rises again. The entire group is rising and falling from draft to draft. They finally soar far up and become the usual specks. Vultures like to soar in groups just for the fun of it as well as to keep a lookout for food.

Not too many days after that, in early November, the vultures are gone from the sky. They have gone south for the winter so they can continue soaring on the warm updrafts no longer common in the Ozarks.

Vultures bracket the Ozark winter. They leave just as the cold gets serious. They reappear in February when spring is making inroads on the winter. I look forward to their return, a harbinger of spring with its warmer weather and array of colors.



Frosty mornings decorate leaves like these clover leaves with lace edgings and grow long ice feathers above a small spring.



3 Frosting the World with Ice

Water is so unique and essential to life. The Ozarks usually has plenty of water so we don't think much about it. During winter water shows off some of its special features.

When I go after water for my goats in the morning, I see henbit and other leaves surrounded by delicate spikes of ice giving them a lacy look. Fallen leaves have ice feathers brushed across them. Blades of grass are edged in tiny white teeth.

When winter temperatures really drop, ice feathers form on the inside of windows as warm moist air touches frozen glass causing the moisture to freeze. They have this definite center line with delicate spikes branching off. They grow from the tips to form elaborate lacy patterns across the panes. Lately they decorate the milk room window almost daily.

Up north the frost forms rime. One very cold, ten below morning the rime crystals on the bushes and tree twigs were over an inch long. When the sun hit these, everything lit up with white fire and halos. The rime quickly vanished along with the show.

I found something similar near our house here. There is an old shallow spring-fed pond in the ravine behind our house. The spring bubbles out of the ground in a small rock-lined hollow always in the shade. The air and rocks were close to freezing. The water put up plumes of vapor. Rime shaped like triangular teeth gathered on the rocks and fallen leaves above the water.

In the fall frost flowers form from old weed stems for the first few killing frosts. The stems still have water in them. When the temperature drops, the water freezes. The ice splits the stems and oozes out as a delicate curving ice sheet. Early the next morning before temperatures rise or the sun hits them; these long curved sheets look like white petals coming out of the stems. I rarely get to see them because I have chores to do but they are worth the effort now and then.

Most solid substances make crystals although we can't see many of them. Some we can see. Table salt makes clear square crystals easy to see with a magnifying glass. Even bigger crystals form when salt water evaporates.

Copper sulfate makes blue crystals. Looking down from the top they are diamond shaped. From the side they are slanted like a parallelogram. A friend who taught eighth grade science in California had her classes grow these crystals into huge six or eight inch monsters.

These and many other crystals have a definite shape and color. Water doesn't. That's why no two snowflakes have the same shape. It's also why frost can be so lovely.

Water molecules look like tiny triangles. The tip likes other bases but not other tips. The base likes other tips but not other bases. This causes the molecules to line up and branch off the main line. This is why frost forms feathery designs on a window or fallen leaf.

This lining up makes frost crystals on other things stick out as triangles and spikes. These give leaves their lacy edging. When lots of water vapor is around such as at a spring, the frost crystals can get very large. When a breeze is blowing, the crystals only form downwind and can get very long.

The reasons frost forms are interesting. They make it possible to guess where and when the best frost displays could be. But frost is still lovely to look at in all its artistic displays. I just have to get there early, before the sun makes the displays vanish. Ice feathers make the morning seem much nicer even when it's so cold. And seeing the frost vanish gives the illusion the day has warmed up whether it has or not.



It's easy to see the branches in a bare tree but can be difficult to capture them with a camera. The best ones are silhouetted against the sky. Sunset set these off beautifully.



The twisted bark and crowning canopy of small twigs show up well on this redbud in Salem.

10 Tree Silhouettes

When photography first started, it was in black and white, no color. Black and white pictures depend on sharp contrasts in light and shadow between the objects in the picture. Pictures taken during spring, summer and fall are at a distinct disadvantage since the most distinct contrasts are between the colors. Winter is the reverse.

Winter colors are drab browns, grays and whites for the most part. A few plants remain colored in dark greens. These winter colors provide the sharp contrasts black and white photography captures so well. This is especially true of the trees.

All growing season trees are clothed with leaves. These leaves come in a variety of greens but hide the tree underneath. The tree becomes a pile of green blobs. There are different hues of greens but no sharp contrasts.

Winter changes this. Most trees drop their leaves. This makes sense because chlorophyll doesn't work well in the cold. Most leaves are too thin to keep from freezing. Another disadvantage to winter leaves is freezing rain, not uncommon in the Ozarks. Freezing ice forms easily on leaves, even pine needles. The extra weight pulls over young trees and snaps off bigger ones. Without their leaves trunks and branches stand naked, exposed, etched against the sky, fascinating in their shapes, their twists, their curves.

Each species has its own general shape. Some are easily identified because of this. White oaks form great spheres of spreading limbs. Sycamores grow tall and elliptical. Young sweet gums form airy pyramids.

Yet each tree is unique. Some have limbs that swing down seeming to reach out to catch any passerby, surely the inspiration for those haunted forest tales. I saw a large white oak down in Licking rising upwards for several feet with a great tractor tire leaning up against it then the trunk bent away from that tire as though seeking to flee. Others have great ropes of grape vines hanging from them.

Leaves must have light for photosynthesis. Each tree seeks to spread its leaves out to catch the most light to make the most food so it won't starve over the winter. When two trees grow close together, their branches mesh in a delicate ballet to share the space between them. This dance becomes more complex as the number of trees increases. A tree growing up under another tree swoops out and around to reach for the sky.

Eyes see these bare shapes easily. A camera may not. Winter helps here too. Fields are seas of browns and yellows. The sky is cold blue or covered with a gray sheet. Bare shapes set against these backdrops provide stark contrasts easily caught by a camera.

It is so tempting to snuggle in near a warm stove in the winter. It's cold and damp outside. But this is the time to admire the trees etched against the sky. The opportunity is only for the season. So I struggle into those extra layers, grab the camera and go out. I'm rarely disappointed in time spent admiring the stark beauty of a winter's day.