

The Diversity of Plants and Animals at Heritage Farm

Convention Speech by Jeff Nekola

Our next speaker this afternoon is Jeff Nekola. Jeff is an Iowa boy who was born in Cedar Rapids and graduated from Coe College in 1987. He received his Ph.D. from the University of North Carolina at Chapel Hill in 1994 and is now an Assistant Professor in the Department of Natural and Applied Sciences at the University of Wisconsin at Green Bay. Jeff maintains a collection of about 250 tomatoes and 250 peppers (which are on his web site), and in his professional life he does ecological research investigating the biodiversity of native plants, land snails and butterflies.

Jeff and I met well over 10 years ago, when he was teaching Environmental Biology at the University of Wisconsin at Green Bay. Every spring Jeff would hold an heirloom plant sale, selling thousands of tomato and pepper plants grown in the University's greenhouses. Then he would use the proceeds from the plant sale to bring his Environmental Biology classes down here, and we would really educate them about heirlooms and genetic diversity.

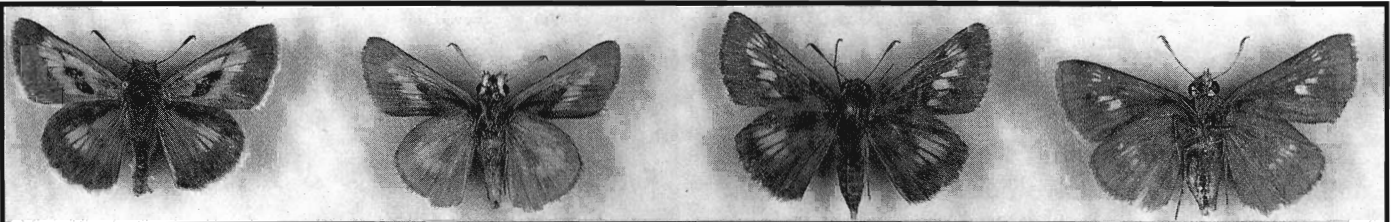
Over the years it has been a real pleasure for Diane and me to be able to walk this property with Jeff, not only Heritage Farm but also Twin Valley Farms. It's always a thrill for me to walk through this beautiful, unique landscape with someone as knowledgeable as Jeff, and to just talk to him about the different features and different plants, to sort of see it through his eyes. Over the years we have walked this property with about a dozen forest and native plant "experts," but I've never met an ecologist who is more knowledgeable and skilled than Jeff. Although he'll always deny it, I think Jeff knows every plant in it, at every stage and at every season. To be able to walk through this landscape with somebody who has that level of knowledge, and to begin to understand the interrelationships of those plants, is just amazing for me. We've walked the property together many times, so it was really gratifying for me to have Jeff do the

vascular plant and land snail surveys of the Heritage Farm properties. I was deeply pleased that Jeff was able to share his knowledge with all of us in that way. It's a real pleasure for me to introduce my close friend Jeff Nekola.

Thank you, Kent. What I want to do today is to introduce you a bit to what I've seen as I have been tromping around Twin Valley Farms and Heritage Farm, and some of the reasons that I'm really quite enamored with these properties.

We're sitting in a very unique part of Iowa. It's been called the Driftless Area, but it's more appropriately termed a Paleozoic Plateau after the rock that sticks out everywhere. It's one of the few places in Iowa where the bedrock dominates the surface topography. Like so many places in northeastern Iowa, Heritage Farm area isn't so much defined by tall hills but rather deep valleys. You'll see this when you go to Nob Hill tomorrow morning for breakfast, and see the rolling Iowa landscape of Grant Wood once you leave the valley itself.

Thanks to these deep valleys, an amazing diversity of plants and animals reside in the region. For a long time Iowa biologists have known Winneshiek County to be home to some of our rarest species. Perhaps the first person to recognize this was one of Iowa's foremost early ecologists, a fellow by the name of Bohumil Shimek who was a professor at the University of Iowa. When he was active at the turn of the last century, there weren't roads to get you from Iowa City to Decorah, so what Shimek had to do was to ride the railroad until the train reached the end of the line, and he'd get off and start exploring. The end of the line in this area was Hesper, which is just a few miles to the northeast. During his exploration of this area he found an amazing collection of rare plants that he'd never seen anywhere else in the state. He



Black Dash Skipper

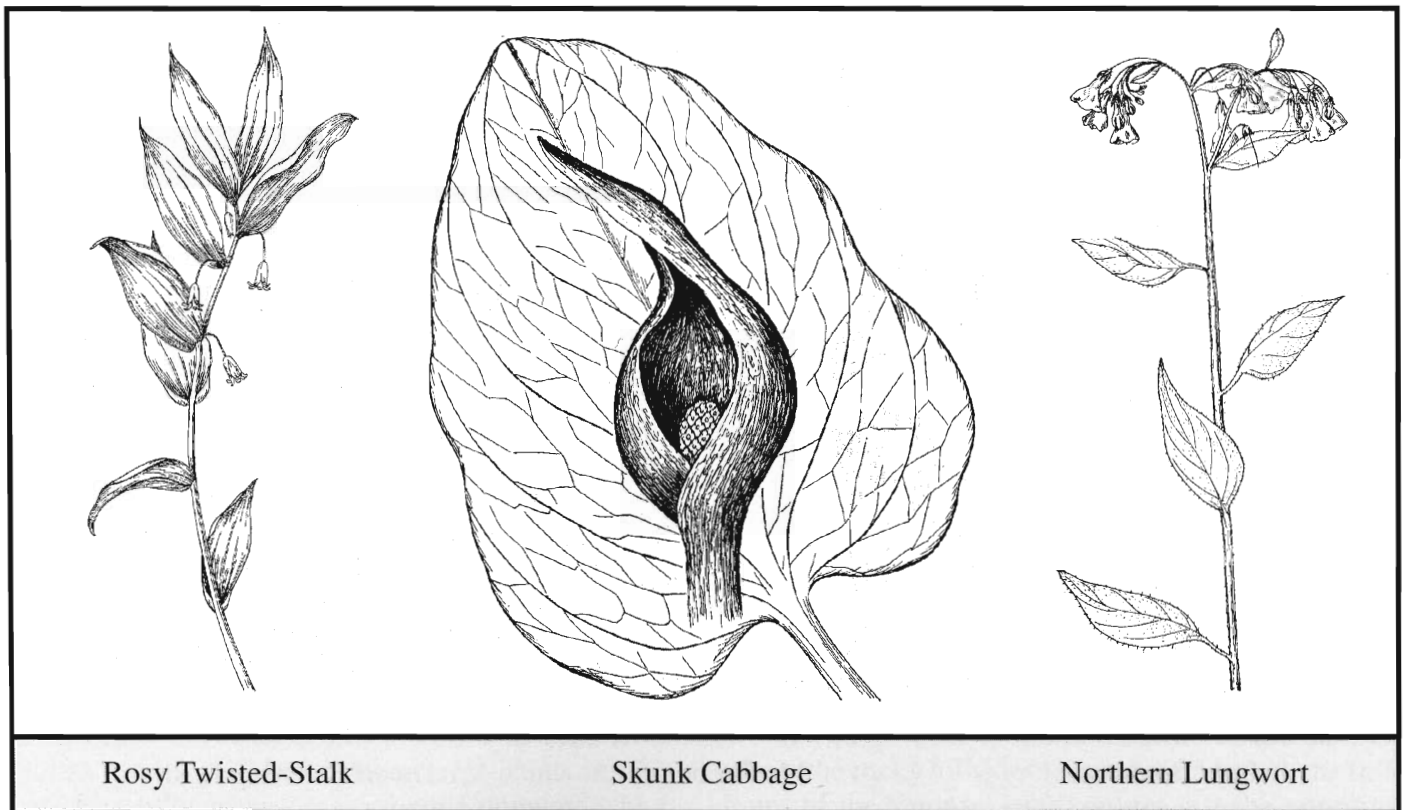
wrote up his discoveries for the *Flora of Winneshiek County* that was published by the Iowa Geological Survey in 1906. This work gives us an amazing snapshot of this landscape a mere 50 years after Euroamericans arrived, and what is so interesting is how much of that diversity survives in this landscape to this day.

In the 1930s another botanist named Henry Conard from Grinnell College followed in Shimek's footsteps, studying instead mosses. He discovered some arctic and alpine species thousands of miles removed from their normal range, which are typically the top of mountain peaks in the Rockies and Alps. He also discovered that these mosses tended to occur under the scattered balsam fir groves along the bluffs of the Upper Iowa river. These mosses and trees can still be found in many of the same places that Conard reported them from.

However, much of the rest of Winneshiek County has long been converted now to high intensity agricultural systems, and many of the places explored by Shimek and Conard simply no longer exist. Among the destroyed places is a fen with Grass-of-Parnassus that used to occur near Hesper, a sandstone outcrop also near Hesper that used to support Bearberry, plus a number of hill prairies that have been lost to grazing and overplanting of non-native forage grasses. So while we can lament the death of some of these unique places, it is comforting to know that some very important places still exist. And, this farm sits squarely

within one of them. That this area has remained diverse is thanks to both accident and design: an accident in the sense that it was originally owned by an 80-year-old fellow named Vitis McCabe who must not have been a very intensive farmer and let wild things live on his farm; and a design by the fact that it was bought from him by the Seed Savers Exchange, which has since overseen this property, keeping this unique area from being farmed to the hilt.

I would like to give you a sense – for those of you who weren't on the tour this morning – of why Heritage Farm and Twin Valley Farms are as unique as they are. These properties, like the rest of north-eastern Iowa, are defined by their geology. Two types of rock are exposed here. On the upper elevations, and on the western parts of the property (like here at the barn), limestone of the mid Ordovician Galena Group are exposed. They are full of fossils, including marine snails, corals, algae, brachiopods. They even contain some rare fossils like trilobites, crinoids and cystoids. These last two are types of sea lilies that rarely fossilize, and people from all over come to this area to find them in local road cuts and abandoned quarries. As you walk downstream about a mile from the barn, St. Peter sandstone begins to show up as small cliffs along the streamside. This bedrock unit forms the main drinking water aquifer for many of the large cities in eastern Iowa and southeastern Wisconsin, including the city of Cedar Rapids and the suburbs of Green Bay, where I live. In a sense,



Rosy Twisted-Stalk

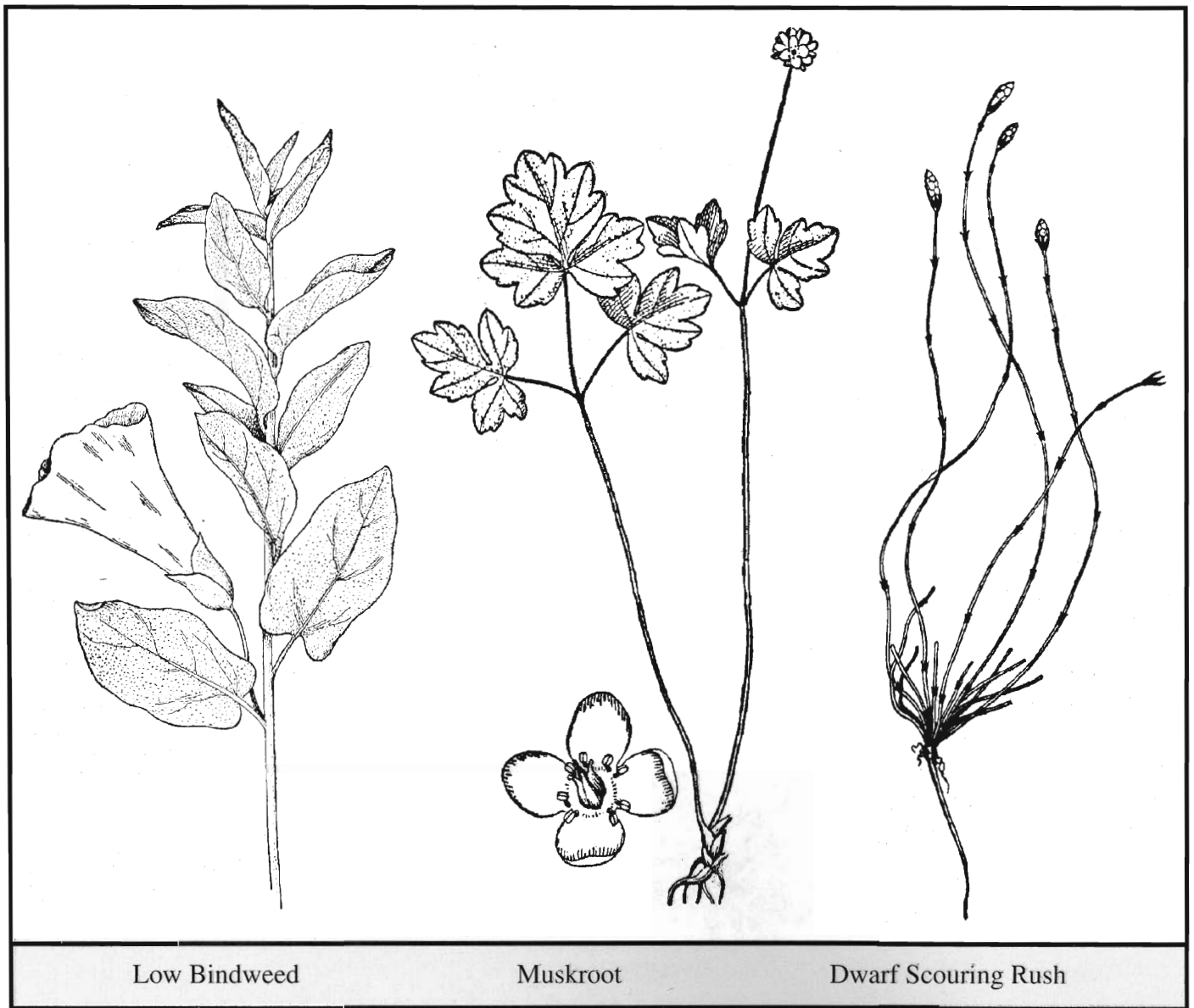
Skunk Cabbage

Northern Lungwort

these surface exposures of St. Peter sandstone serve as the recharge zone for these aquifers, and in many thousands of years the water seeping into the ground here at Heritage Farm will end up in someone's sink or bathtub far to the south or east.

It is these different bedrock units, combined with the sharp topographic relief along the streams, that allows many different plants and animals to live here. For instance, where the Galena limestone and St. Peter sandstone meet, a clay lens occurs. This clay lens tends to stop the downward flow of some groundwater, making it instead move horizontally until it seeps out along the base or side of a hill. Because of this, a number of seeps and springs occur within the Heritage Farm and Twin Valley Farms properties. Some of these are very well developed, and still contain their natural vegetation. The largest is found about three-quarters of a mile east of here on the north side of the creek. Not only do unusual plants live there (like

Skunk Cabbage and Turtlehead), but also some of the rarest wetland butterflies in the state, such as the Black Dash Skipper and Baltimore Checkerspot (the latter which feeds only on Turtlehead plants). It's very easy to destroy such places if you have 100-200 head of cattle in a pasture, especially in the late summer when they wade out into these seeps to graze on the last green grass, in the process sinking up to a foot or more into the wet ground. This process, combined with tiling, has reduced the number of such places in northeastern Iowa from an original 2,300 to now less than 160. At least 20 of these sites have been lost over the last decade alone. It is heartening to know that the seep communities along the west branch of Canoe Creek and Pine Spring Creek on the SSE properties will be protected, and that these rare plants and animals will be able to share this valley with us for many decades (or centuries) to come. I also suspect that there will be other exciting discoveries to be made



Low Bindweed

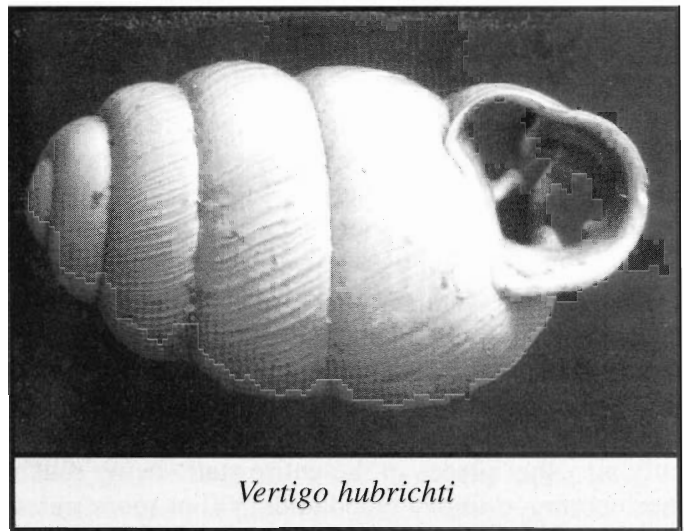
Muskroot

Dwarf Scouring Rush

in these seeps. Near New Albin along the Upper Iowa River, 35 miles east of here as the crow flies, a seep much like these here was found to harbor a native orchid called the Spring-blooming Ladies-tresses. It is not known from anywhere else within a 200 mile radius. Yet, given that this seep also supports Baltimore Checkerspot butterflies, I would not be surprised to discover that this little wildflower also occurs in the Twin Valley Farms.

The steep topography of this property also contributes to the diversity of species found on Heritage Farm and Twin Valley Farms. I just completed a survey of plants and land snails of these areas, and found 379 different plant and 52 different land snail species. These numbers represent some of the highest diversities yet reported for similarly-sized areas in Iowa. In fact, almost 60% of Iowa's entire land snail fauna currently lives within these two properties. This diversity is aided not only by different bedrock exposures, but also many different slope aspects found here, creating unique microclimates that allow species to survive that could otherwise not do so.

Let's start by considering the north-facing slopes. While most of these areas contain typical oak-sugar maple-ash forest, in a few places another very unique habitat type, termed an algific talus (or cold air) slope, occurs. During the last ice age, when this area was covered by arctic tundra, the bedrock became fractured by permafrost. In about 300 special places extending from Rochester, Minnesota in the northwest to Sabula in the southeast, where rock exposures were protected from the sun, this permafrost has never completely melted away and the limestone remains below freezing, allowing permanent ice caves to exist. Where these ice caves enter out onto the hillside, a refrigerated microclimate develops that almost exactly mimics the climate that occurred in this area at the end of the last ice age. This has allowed a large number of ice age plants and animals to maintain populations in the hills of northeastern Iowa. The nicest example of this habitat type on the property is found on the eastern border of the Heritage Farm property, just underneath those pine trees on the horizon that Kent talked about earlier this afternoon. On top of the bluff, where the pine trees are growing, there are a series of sinkholes where, during the summer, air is sucked into the ground like a vacuum cleaner. Often you can feel this with your hand. This air enters into the chambers of the ice cave under the bluff, and cooled to near freezing. It then is able to seep out along the base of the cliff, creating small pockets of habitat that has been literally frozen in time from 12,000 years ago. Among the rarest plants on this particular hillside is the Northern Lungwort which



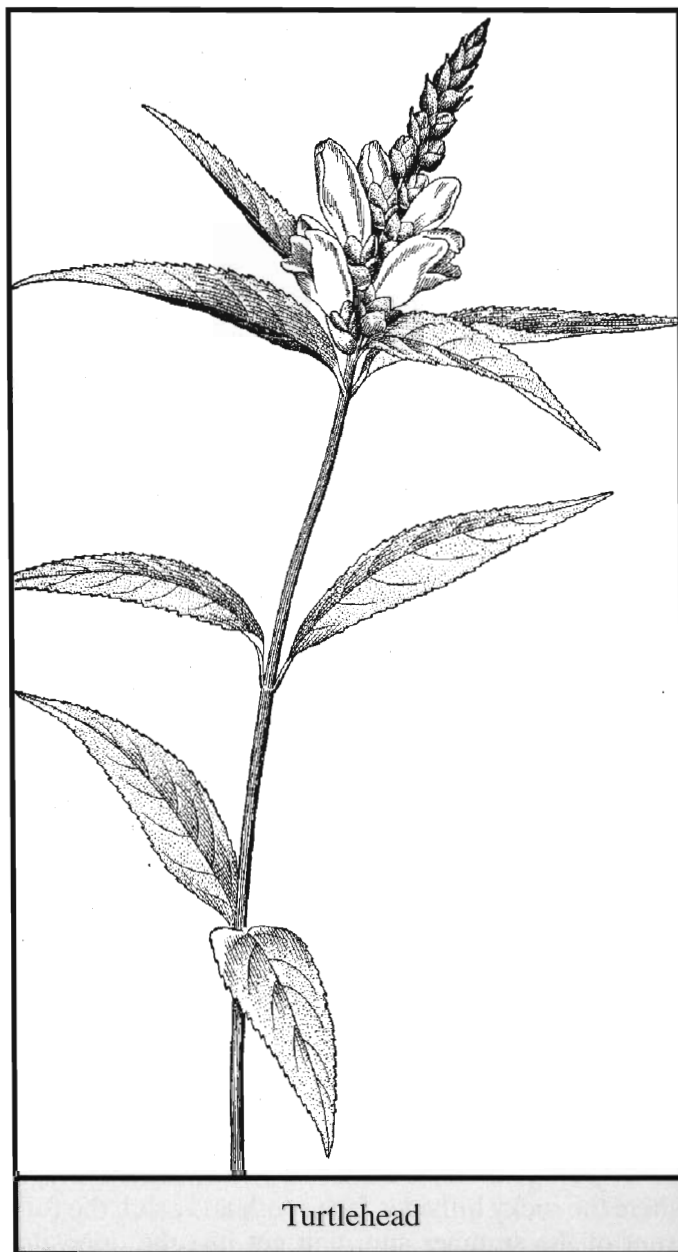
Vertigo hubrichti

normally ranges from northern Wisconsin all the way to the Yukon. Even in northern Wisconsin, this plant is very rare, being far more common in the boreal forest to the north of Lake Superior. Also found with this plant is an endangered snail, called *Vertigo hubrichti*, that is approximately the size of Lincoln's nose on a penny. It was originally described as a fossil found near St. Louis in glacial sediments, and was not known to be alive until found in northeastern Iowa in the early 1980s. It used to live across a wide range in central North America, from Pittsburgh to Omaha, but is now limited to a few places in northeastern Iowa and the Door Peninsula in eastern Wisconsin. It truly represents a living fossil of the last ice age.

There are also remnants of cold air slopes found along the Canoe Creek valley. The problem is that this valley has had a longer history of grazing and also, unlike the little cold air slope on Heritage Farm, is not protected on the bottom by a small cliff. As such, cattle were able to climb up into these sites to cool off on hot summer days. In the process, they have destroyed much of the delicate limestone talus and cold air vents once present. However, in spite of this grazing, some very rare plants still occur. For instance, this spring I was amazed to discover on one of these a little plant called the Bering Chickweed, which is named after the Bering Sea. It had never been documented from Iowa before, with the nearest known populations being found over 1,000 miles away in the tundra of the Rocky Mountains in Colorado and Wyoming, and in the Gaspé Peninsula of Quebec. It is more typically found in the high Arctic tundra north of the Arctic Circle, and may be one of the most exciting new plant discoveries in Iowa in over 30 years.

If you go over to the north sides of the valleys where the rocky hillsides face south and catch the full brunt of the summer sun, you get just the opposite

effect. Rather than being cool and wet, these hillsides are hot and dry. I've found an amazing assortment of interesting plants on these hillsides that you're more apt to see far to the south. One place in particular stands out. It's about half-way down the Pine Spring Creek valley on a very steep, rocky, southwest-facing slope, where only an open woodland of stunted bur oak and elm is able to grow. Under these trees is a strange mixture of southern plants. One of the most interesting of these is a small, wild morning-glory called the Low Bindweed. It was last seen alive in Winneshiek County by Bohumil Shimek back in the late 1800s. As far as I can tell, it may be known from only six other places in the entire state, being much more common in dry woodlands 500 or more miles to the south. So, within 300 yards along Pine Spring Creek, you can go from plant communities reminis-



Turtlehead

cent of the boreal forest on an algalic slope, to those more reminiscent of hot, dry forests in the Ozarks, communities that are normally separated by distances of perhaps 1,500 miles or more.

There is one last special place that I have not yet mentioned. Immediately across Canoe Creek from the old 1870s Norwegian log cabin that was restored in 1993 by the Amish is a sandstone cliff that comes right up out of the creek. Above this is an undisturbed, old-growth sugar maple forest. Even though there is no cold air coming out of the ground, this steep, north-facing maple forest is so protected from the summer sun that it supports populations of a number of plants that are otherwise confined in Iowa to cold air slopes. Most of these are extremely rare in Iowa. One is the Dwarf Scouring Rush, which is a horsetail that only grows 3" tall. Another is the Rosy Twisted-Stalk, a common wildflower in the woodlands of northern Wisconsin and the Upper Peninsula of Michigan. A third is Muskroot, which normally is found in North America in the Rocky Mountains, and along the north shore of Lake Superior near Duluth, Minnesota. It's also found in cool, moist forests in northeastern Iowa and southwestern Wisconsin, and from a single site in the Catskill Mountains of New York State. It gives me great comfort to know that this special little piece of old-growth forest, with its rare plants, will be around for botanists to enjoy for centuries to come.

Through the survey work I conducted over the last year, I discovered a total of seven plants and three animals on these properties that have once been listed in the past on Iowa's Endangered Species list. It's wonderful to realize that so many of Iowa's rarest wild species call Heritage Farm and Twin Valley Farms home.

When Kent and Diane drove into this gorgeous farm 16 years ago and said, "This is the home for the Seed Savers Exchange," they intuitively knew and recognized just how diverse this particular landscape was, and picked one of the real jewels of Winneshiek County to make into the world center for heirloom crop protection. I'm thrilled that they made that decision and I'm also thrilled that there's now the opportunity to also protect the adjoining Twin Valley Farms. These two farms have the potential to show the world that it is possible for agriculture and biodiversity to coexist, especially when that agriculture is low-intensity. This may become one of the most important messages to come from Heritage Farm, as we are often told by the Powers-That-Be that our natural diversity must be sacrificed to maintain a healthy agricultural economy. I do not believe this, and think that these properties and this organization can uniquely tell this story to the world.