Prairie Notes: An Arboreal Mystery
- Myles Bakke

First, let me say that often what biologists find interesting, or even engrossing, are things that much of society simply finds gross. It was probably a biologist's spouse that came up with the dictum: "You can clean them up, and dress them up, you just can't take them to dinner." That said, and heaven forefend that I repel my readers, but when my friend and fellow board member Julie Klassen sent me an email with an accompanying photograph, I was more than a little intrigued. She and a friend had been out for a prairie walk at Valley Grove on a cold November day, when they came upon a weird and mysterious situation. Wedged between the branches of a small bur oak tree, about six feet off the ground, was the body of a small strange-looking mammal. Its face was coated in ice from a recent freezing rain, and the nearly three-quarter inch claws of its front feet gave it an unearthly spectral appearance. The body was six or seven inches long, and its skinny sparsely furred tail added another three inches to the overall length.

A pocket gopher in a tree, frozen between several small horizontal branches, was a pocket gopher clearly out of context. This is an animal that spends 99% of its life underground, in what is know as a fossorial life style. Even if a pocket gopher could climb a tree, it would never think to do such a thing. So there was a story there, and a mystery to ponder. I had two possible hypotheses to explain the arboreal gopher conundrum, neither of which involved the gopher putting himself out on a limb like that.

I fired off an email to Julie thanking her for thinking of me whenever she discovered offal (or just something awful), and sped out to Valley Grove.

Pocket gophers are rarely seen, considering how common the animal is in most areas of the country. There are three genera, and at least eighteen species in the United States alone. It is primarily a North American rodent, but can be found throughout Central America and even a small distance into South America. I have observed gophers and their sign from along the beaches of Texas' gulf coast up to Rocky Mountain meadows above 11,000 feet, as well as in the Laguna Mountains on the southern tip of the 1,300-mile-long Baja peninsula. Our gopher at Valley Grove is the plains gopher, Geomys bursarius. It is a widespread species found from a just north of the Minnesota/North Dakota border in Manitoba south to the panhandle of Texas.

Most of my observations of pocket gophers have been while they were dumping dirt from their excavations of new tunnel extensions. Gopher mounds are created when the animal pushes dirt out of a short lateral tunnel off its main tunnel system. The discarded dirt fans out away from the plugged opening at the base of the backside of the mound. If you look closely, a three-to-four-inch circular plug extrudes slightly, outlining the closed entrance. Another mound type sign is found more frequently in alpine meadows where snow cover exists for longer periods of time. These are linear deposits of soil sometimes called gopher ropes or eskers, and are created by dumping dirt into pre-dug snow caves. I find this type of sign only occasionally in Minnesota, perhaps because of thicker frost levels in the deeper

soils here makes tunneling to the surface more difficult than the thin soils and deep snow cover in the mountains.

Gophers invariably seal their tunnels to exclude the neighborhood thugs and riffraff, such as weasels and gopher snakes. Some, that at first appeared to be left open, were plugged farther back into the hole. Perhaps they had been frightened or attacked at the surface, and they sealed the entrance after retreating deeper under ground.

I once discovered a gopher dumping dirt and managed to sneak quietly to the mound while the animal was below fetching more soil. This has to be done with a light foot, since gophers have vibration sensitive hairs on their tails and between their toes to alert them to trespassers. It took me several minutes to tiptoe to the edge of the mound, moving only after the animal returned below for another load. I sat down next to mound and, after the gopher expelled a couple more loads, it gave me a cursory myopic inspection. If it recognized my unmoving mass as anything more interesting than a rock or an ugly stump, it gave no indication and went back to work. While not totally blind, eyesight is mostly unnecessary for fossorial animals, and gophers see very poorly. When it finally decided to shut the door on the too bright and dangerous land above, the little hermit pushed a volume of soil only partially out of the opening, nearly occluding the temporary exit. After it left for another installment, I gently pulled the blockage from the hole with the tips of my fingers. A moment later, the gopher returned with a second large load and, meeting no resistance from the initial blocking deposit, pushed this load largely out of the hole. It must have been very surprised, because it was certainly expert and practiced at this important maneuver. This probably hadn't happened since early in its earth-moving career, and it came almost all the way out of the burrow to assess the problem. It gave me a disinterested glance, but I examined it closely. In fact, I was so close that I could see dirt in the twin grooves of each of its upper incisors.[1] My stymied, hole-plugging gopher tried another engineering solution. Backing up, it pulled some earth back to the tunnel entrance. It then pushed more loose dirt against it to form a small abutment. The gopher left for more dirt, and I once again delicately removed the stopple of earth. I was prepared to continue pranking the hard-working little rodent for a while longer, because I was shamelessly enjoying myself. However, after one more failed attempt to close the hole, the gopher never returned. I peered into the hole, considering that it was probably plugging it farther down. Continuing the game by reaching into the hole didn't seem like a prudent idea

While driving down a country road, I once spotted a gopher on a homeowner's lawn, so I stopped to watch. It was gathering dead grass thatch for nesting material, and stuffing it into its cheek pouches.[2] I was amazed at how expansive they were and how much grass the

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[1] Pocket gophers are buck-toothed little vegetarians, whose large paired incisors protrude from the mouth, penetrating through its furred lips enabling them to close the lips behind these teeth. This is an important adaptation for an animal that chews through roots underground and doesn't want to eat a lot of dirt.

[2] The external cheek pouches are fur lined and can be everted like pants pockets for emptying and cleaning. These pockets expand back under the skin as they are filled with items for transport, handy accouterments for a gopher carrying food and other supplies to

pouches held. The bulges eventually extended past the shoulders to about half the length of the body, and appeared to nearly double its girth. It's good to have pockets. I watched as it widened the hole in order to re-enter its tunnel. One could only hope that it didn't have too far to go, since their tunnels are not much bigger in diameter than their bodies. Claustrophobia, apparently, is not an issue for pocket gophers.

Through the years I have come across a few gophers gathering food above ground, and several more that were probably banished from the safe netherworld to the fearful world of sunshine and predators by their now less-than-indulgent moms. Gopher mothers are as nurturing and solicitous of the welfare of their pups as most mammalian moms, but their species is an irascible, solitary, and reclusive lot by nature. Once the cuteness and vulnerability of the very young gives way to the unattractive and self-centered adolescent, the tunnel system gets a lot smaller. No longer encumbered by lactating induced hormones, mom realizes these loafers are eating her out of roots and loam, an epiphany that sparks a biological phenomenon known as "dispersal of the young." She opens a tunnel to the surface and expels the batch of them like so many door-to-door insurance salesmen. Doubtless, she packs the tunnel opening a little tighter than usual when closing it up. No failure-to-launch, long-term-tenant offspring living in the basement in this rodent household.

In Minnesota, our plains gopher gives birth to one litter of usually four to six pups a year. Farther south, in warmer climes, two litters a year are normal. Mating is accomplished with a male from an adjacent tunnel system. How he knows when she is receptive to his overtures is something of a mystery, but they are known to vocalize and have some awareness of their neighbors even though their tunnels never directly connect with one another. A researcher once told me that she had radio transmitters on all of the gophers in her study area. When she recaptured and temporarily removed an animal from its runs, an adjacent neighbor would often break into the vacant tunnel system within fifteen minutes to investigate, leading her to think there is more awareness and social interaction among these animals, if only vocally, than might be imagined. In any case, the assignation is brief and the male returns to his own digs. No post coital cuddling is required.

I have always found gophers interesting and important animals in prairie. They mix and fertilize soil, aerate soil, allow water to percolate down faster, and create extensive disturbed areas on the prairie surface. The mixing of fresh mineral material from the lower depths with organic layers nearer the surface increases soil fertility. A single large mound may sometimes cover nearly a square meter of surface area or more, and new tunnel expansions are always ongoing. In older original prairie, gophers were so abundant that their activities moved many tons of soil a year above ground, covering upwards of one fifth of the surface with fresh mounds. Tunnel systems were so prevalent that it gave the gopher its name, gaufre, from the French meaning "honeycomb." With perhaps sixty million or

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underground storage and nest chambers. I've never seen an actual underground nest chamber, but I've seen captive gophers sleep. They don't curl up on their sides like cats or dogs are inclined to do when they sleep, choosing instead to curl forward, head down between their legs, a position that allows less convective heat loss to the soil.

more bison, and many more millions of elk, deer, and antelope compacting the soil by their passing, the importance of burrowing organisms to keep the ground loose for plant growth cannot be overstated.

The loose soils of fresh mounds don't allow for much plant growth for a year or so, until the soil consolidates and becomes a little more compact. I have found toads and salamanders utilizing the moist loose soil of new mounds to escape the hot dry conditions of the prairie afternoon. New mounds are most often re-invaded by grass or other clonal root system plants that already adjoin the mound disturbance, but this open space sometimes allows new plants to establish from wind-dispersed seed or from seed already present in the soil seed bank. Since open space on established prairie is rare, any spot where new plants can recruit to the existing flora is at a premium. The feeding activity of gophers also kills or sets back some established plants and creates new opportunities to increase diversity.

Badger earths or 'throws' created in pursuit of gophers make even larger disturbance mounds. Old gopher mounds sometimes devolve into dish shaped areas resulting from the dust bathing activities of pheasants, turkeys, or other grassland birds. I look at fresh mounds as the only place to find tracks of other animals using the prairie. On occasion gophers unearth small surprises to delight and keep me looking. A few of my favorites include: two Indian arrowheads found near Red Wing, the small porcelain face of a child's broken doll, and on a tiny pedestal of dirt, left by the erosion of surrounding earth, a 1912 Buffalo nickel. Not valuable things, but nice things to pocket when off on a walk.

I found the dead gopher in the tree just where Julie's email had said it would it would be, and after taking some photographs of my own, I collected it for later examination. While there was no actual mention of it in our wedding vows, promises had been made and veiled threats acknowledged, relating to certain non-food items found inside plastic bags in my pre-nuptial freezer. No more "specimens" in the freezer. Although I find this rule somewhat arbitrary and unreasonable, I follow it, for the most part – I'm not a stupid man. At any rate, my pocket gopher was already frozen stiff. I needed to thaw it out, so I took it to my basement and hid it in a cupboard behind my chainsaw. The following day I brought my dead gopher to the Carleton College Arboretum office, where, as the former Arb manager, I'm still afforded a few privileges.

Originally, I had two hypotheses as to how my gopher had ended up six feet off the ground in a bur oak tree. One possibility I considered was predation by a long tailed weasel. They often cache prey by hanging a kill in a tree or bush. I've found many deer mice hung by wedging the neck into a small forked branch or sometimes just laid in an old bird nest or the crotch of a tree. Never have I found anything as large as a gopher cached like this, so I had my doubts that this was the solution.

Weasels usually kill by a bite to the back of the neck or skull, and a gopher with its powerful forelimbs and long claws could be a formidable animal to attack in this manner. A gopher's neck vertebrae are compressed to draw the head into the body, an adaptation to a life underground. This gives them a no-neck tubular shape like a fuzzy bratwurst. Such an attack by a weasel on an animal this size would have to be quick and violent to avoid injury

from the gopher. My external examination did not disclose any evidence of such wounds. By brushing the edge of my thumb over the fur[3] I searched for wounds, and found only a little blood on the side of the chest, and a small cut on the side of the nose. It also felt like one of the hips was dislocated. This was not a weasel kill, which made my second hypothesis, while less interesting, more plausible.

Human disturbance of a sign can often confound a tracker by making the context confusing, so I try not to forget it's possibility in a situation like this. The gopher's location was also suspiciously only a few feet from one of our main trails. I skinned the animal out and discovered the chest wound was not large and did not seem to penetrate deeply, but had broken some ribs causing some damage to the lungs. There was some blood in the body cavity, and no penetrating wound to the hip. The femur was in fact dislocated from the hip-socket as I had earlier suspected. All of the damage and circumstance made me think that a dog (I'm guessing a terrier) had probably caught the gopher and given it a good shaking. Why was it in the tree? Skippy's owner was probably less enamored of the trophy than the dog was, and tucked it out of reach. Could have happened that way, but I'm open to reasonable alternative explanations. Is there an eyewitness out there?[4]

I'm aware that a lot of people will think that the real mystery is why I find these little puzzlements so intriguing. Why drive fifteen miles in sub-zero weather so that I could do a post-mortem on a pocket gopher? Well, it's always pointless to try to defend one's own idiosyncrasies, so I won't.

Nothing dies in the wild with the quilt pulled up under its chin, and pocket gophers meet their ends in a variety of ways. Badgers are especially good at digging them up, and gopher snakes also are adept at going after them underground, but birds of prey take them in surprising numbers. In some areas, at certain times of the year, gophers comprise nearly 30% of prey items for soaring raptors, such as red tails and harriers. I commonly find gopher remains in great horned owl pellets, proving that dumping soil under the cover of darkness doesn't guarantee safety. Farmers have long reviled the unseen little vegan as another vexing tribulation worthy of old testament mention, not so much for their crop depredations, which is negligible, but for their damnable mounds. Mowing forty or fifty piles of dirt in an alfalfa field can wreak havoc on a mower and ruin a rodent's reputation. I must amend the statement with regard to crop damage and the gopher's negligible

[3] Pocket gopher fur is short and velvety because the gophers have no need of the long, coarser, directional guard hairs that surface animals require for shedding rainwater. In fact, the short, non-directional fur allows gophers to move forward and back in their tunnels more easily.

[4] This is probably a good place to mention dogs and leashes. Please keep your dogs on leashes for the safety of the wildlife, be it small mammals or the ground-nesting birds that are declining throughout their ranges; they all deserve to be protected from this kind of molestation. This measure is also for the safety and respect of other visitors, two- and four-legged, which may fear an unknown dog.

impacts; a field of carrots or other root vegetables must appear to them to be the kingdom of gopher dreamland.

Generations of farm kids trapped generations of gophers, redeeming the long front claws for bounty. In a mismatched battle of fecundity, the gopher parents seem to have gained the upper hand from down below. Gophers are still abundant, while farmers are growing less numerous, and their young are dispersing widely to other habitats in towns and cities.
I don't take sides in that fight, but it always makes me happy to see gopher sign in a healthy prairie.